

Literature List

Cutometer®

K. Mizukoshi, M. Kuribayashi, K. Hirayama, J. Yabuzaki, M. Kurosumi, Y. Hamanaka, **Examination of age-related changes of viscoelasticity in the dermis and subcutaneous fat layer using ultrasound elastography**, Skin Research & Technology, Volume 27, Issue 4, July 2021, p. 618-626

Background: Using ultrasound elastography, the present study aimed to measure the viscoelasticity in each skin layer and to determine the relationship between the measured value, age, and body mass index (BMI). Materials and Methods: The present study included 77 Japanese women. We calculated the BMI and measured the facial cheek via elastography. With the use of the elastographic image, the dermis was divided into two layers, and the subcutaneous fat layer was divided into five equal sections according to the depth, ultimately obtaining seven layers. Furthermore, the thickness and viscoelasticity of each divided layer were measured. Results: The analysis of echo images revealed that the thickness of the upper dermis layer decreased with age, whereas that of the subcutaneous fat layer tended to increase with age and BMI. As measured by elastography, the viscoelasticity of both the lower dermis and the upper subcutaneous fat layer decreased with age. As the BMI increased, the viscoelasticity of the lower subcutaneous layer also increased, but that of the upper subcutaneous layer decreased. Conclusions: The present study revealed the relationship between aging and viscoelasticity in the lower dermis and the relationship between aging, BMI, and viscoelasticity in the upper subcutaneous fat layer.

J. Kim, S. Yoo, O.-S. Kwon, E.-T. Jeong, J.M. Lim, S.G. Park, **Influence of quarantine mask use on skin characteristics: One of the changes in our life caused by the COVID-19 pandemic**, Skin Research & Technology, Volume 27, Issue 4, July 2021, p. 599-606

Background: The influence of various environmental factors on skin properties is well known. However, there is a lack of research into the effect of quarantine masks on skin properties, even though the use of masks has significantly increased after the COVID-19 outbreak. Therefore, this study aimed to investigate the influence of mask use on skin properties. Materials and Methods: Twenty subjects were enrolled in this study. The subjects used approved quarantine masks for 6 hours a day for 2 weeks. We measured eight skin biophysical parameters: temperature, redness, pore volume, texture, elasticity, trans-epidermal water loss (TEWL), sebum content, and pH, and evaluated acne lesions before and after using quarantine masks. The evaluation was performed on the mask-wearing area of the face. Results: Skin temperature, redness, and TEWL increased significantly after a 6-hour mask use, while the sebum content increased marginally. Skin elasticity was reduced by the use of masks over 1 and 2 weeks, whereas the pore volume and the number of acne lesions increased after a 2-week mask use. The skin changes caused by mask use showed sex-based differences in the skin elasticity (after 6 hours), redness, and roughness (after 2 weeks). Conclusions: The use of quarantine masks causes a change in the skin temperature, redness, and TEWL in the short term and in skin elasticity, pores, and acne in the long term. This study revealed that prolonged mask use could have negative effects on the skin.

S.-R. Park, J. Han, Y.M. Yeon, N.Y. Kang, E. Kim, **Effect of face mask on skin characteristics changes during the COVID-19 pandemic**, Skin Research & Technology, Volume 27, Issue 4, July 2021, p. 554-559

Background: Previous studies have demonstrated the possibility of adverse effects of prolonged wearing of personal protective equipment in healthcare workers. However, there are a few studies about the effects on skin characteristics after wearing a mask for non-healthcare workers. In this study, we evaluated the dermatologic effects of wearing a mask on the skin over time. Materials and Method: Twenty-one healthy men and women participated in the study. All participants wore masks for 6 hours consecutively. Three measurements were taken (a) before wearing the mask, (b) after wearing the mask for 1 hour, and (c) after wearing the mask for 6 hours. Skin temperature, skin redness, sebum secretion, skin hydration, trans-epidermal water loss, and skin elasticity were measured. Results: The skin temperature, redness, hydration, and sebum secretion were changed significantly after 1 and 6 hours

of wearing a mask. Skin temperature, redness, and hydration showed significant differences between the mask-wearing area and the non-mask-wearing area. Conclusion: Mask-wearing conditions and time can change several skin characteristics. In particular, it is revealed that the perioral area could be most affected.

*G. Dell'Acqua, F. Germani, **Fighting AGEs Formation - Upcycled Artichoke Inhibits Glycation, Increases Skin Firmness***, Cosmetics & Toiletries, July/August 2021, p. 44-51

Recently, interest in upcycling organic material such as agricultural and food waste into valuable ingredients including cosmetic actives and polymers has increased. Waste disposal has been associated with greenhouse gas emission ability to convert waste or waste byproducts of industrial production into new products with commercial value fits well into the growing trend for sustainability and the circular economy. And opportunity abounds, considering waste accumulates throughout the food supply chain—from initial agricultural production to manufacturing and final household consumption, as evidenced by one European Union report on food waste. Although the proportion of food waste in different phases of the supply chain varies per country, agriculture, manufacturing and household are at the top, overall, for food waste

*T.-F. Hsu, Z.-R. Su, Y.-H. Hsieh, M.-F. Wang, M. Oe, R. Matsuoka, Y. Masuda, **Oral Hyaluronan Relieves Wrinkles and Improves Dry Skin: A 12-Week Double-Blinded, Placebo-Controlled Study***, Nutrients 2021, 13, 2220

Hyaluronan (HA) is present in all connective tissues and organs, including the skin and joint fluid. However, few clinical trials have comprehensively evaluated the impacts of oral HA on skin conditions, including wrinkles and moisturization. In this study, we conducted a placebo-controlled, randomized, double-blind trial of daily HA (120 mg) intake for 12 weeks in 40 healthy Asian men and women (aged 35–64 years). Skin condition was determined by the evaluation of wrinkles, stratum corneum water content, the amount of transepidermal water loss, elasticity, and through image analysis. After 12 weeks, skin condition was significantly improved in terms of wrinkle assessment, stratum corneum water content, transepidermal water loss, and elasticity in the HA group compared to the placebo group. Regarding the percentage change from baseline, wrinkle assessment, stratum corneum water content, and skin elasticity were significantly improved in the HA group versus the placebo group after 8 and 12 weeks of ingestion. The present findings indicate that oral ingestion of HA may suppress wrinkles and improve skin condition.

*G. Boyer, G. Bellemère, C. de Belilovsky, C. Baudouin, **Mapping of the biophysical properties of pregnant women abdomen skin: a pilot study***, Poster at the ISBS Digital Congress 2021, 3-5 June 2021, Berlin, Germany

During pregnancy mechanical stretching of abdomen skin due to baby growth is very important and could lead to stretch mark (also known as striae distensae). Recent work demonstrated that biomechanical properties of healthy abdomen skin change drastically during pregnancy and that these properties remain altered 4 months after delivery¹. It remains unclear if these observed modifications are homogeneous on the abdomen area or if a specific area is more affected.

*G. Boyer, G. Bellemère, C. de Belilovsky, C. Baudouin, **Mapping of the biophysical properties of pregnant women abdomen skin: a pilot study***, Poster at the ISBS Digital Congress 2021, 3-5 June 2021, Berlin, Germany

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*S. Faloni de Andrade, P. Rijo, C. Rocha, L. Zhu, K. Chen, L.M. Rodrigues, **High Resolution Sonography confirms that essential oils benefit epidermal water barrier *in vivo****, Poster at the ISBS Digital Congress 2021, 3-5 June 2021, Berlin, Germany

Essential oils are complex mixtures of volatile low molecular weight compounds (terpenoids and phenylpropanoids) extracted from plants and are responsible for the characteristic aroma in those plants. Despite the wide use of these in cosmetic and dermatological formulations, information about its mechanism of action and efficacy is still insufficient.

*R.E. García Pasiminio, **Lecythis Minor - A Major Resource for Skin/Hair Benefits and Social Progress***, Cosmetics & Toiletries, June 2021

Global demand for natural ingredients and cosmetics has raised interest in exploring materials from a variety of biodiversities. Considering their beauty benefits,¹ these naturally sourced ingredients can support the development of innovative and environmentally sustainable products while also affording an opportunity to support social progress by benefiting the communities in these environments. The biodiversity of Colombia provides one such opportunity.

*S.H. Pérez Damonte, M.A. Moyano, M. Nuñez, .A.I. Segall, **Effects of α -lipoic acid on the biomechanical properties of the skin**, World Journal of Advanced Research and Reviews, 2021, 10(02), p. 057–070*

Background: The Cutometer MPA 580® (Courage and Khazaka, Germany) is a well-established instrument for the accurate and reproducible measurement of the biomechanical properties of the skin. The purpose of this study was to assess the effect of 4 formulations containing 2.5% and 5.0% of α -lipoic acid and ascorbic palmitate or butylhydroxytoluene on skin elasticity and firmness and to assess the equivalence between alternative parameters (Q0, Q1 and Q3) and the traditional parameters R0, R2, R5, R6, all determined with the same cutometer. Methods: Measure of in vivo firmness and elasticity of the skin was performed using R and Q parameters measured in the same device. Results: Different statistical analysis were applied to the results obtained from the parameters (Q0, Q1 and Q3) and the traditional parameters R0, R2, of the in vivo measurements after the application of the four formulations during 28 days. A correlation between both types of measurements was demonstrate. Conclusion: A four-week treatment with a cream containing 5% α -lipoic acid improves the biomechanical characteristics of the skin, thus contributing to the protection against photo-aging. Both methods of measurement proved to be equivalent.

*A. Roca, M. Aso-Perez, B. Martinez-Teipel, J. Bosch, **Balancing epigenetics for skin wellbeing**, PERSONAL CARE MAGAZINE, June 2021*

Rather than looking younger, the more mature generations want to feel at one with their age and show off the very best version of themselves. Since more than 90% of decisions are made subconsciously, Provital - with its everlasting commitment to innovation and technological progress in the interests of caring for people – used Artificial Intelligence to demonstrate the emotional impact that its active ingredient Wonderage had on the subconscious of 47 volunteers, providing a holistic approach to an ingredient with a physical improvement on skin luminosity, hydration and density achieved by its effect on the epigenetic signature and on the endogenous hyaluronic acid production. Because overall wellbeing is seen as integrative beauty that embraces both the physical aspect and emotional health. Because happiness is the key to beauty

*N. Nakagawa, N. Shimizu, T. Sugawara, S. Sakai, **The relationship between habitual physical activity and skin mechanical properties**, Skin Research & Technology, Volume 27, Issue 3, May 2021, p. 353-357*

Background: Physical activity (PA) is important for body health. A few reports suggested that PA also influenced skin structure and components. Little data are available on the influence of PA on skin mechanical properties (SMP). Here, we investigated the relationship between PA and SMP. Methods: Twenty-five healthy Japanese female subjects (31.0 ± 3.3 years) were enrolled in the study. To monitor the 24-hr pulse rate, a wrist watch-type pulse monitor was used. PA intensity was divided into five PA intensity zones (max, anaerobic, aerobic, fat combustion, and warm-up) by the pulse monitor. The average values of the time spent on each intensity for 70 days were calculated. To measure SMP, a Cutometer was used at the end of the monitoring. R0 indicated the height of the maximal skin deformation, and R6 was the ratio between viscoelastic and elastic deformation. Results: R0 was positively correlated with the time spent in four of the five PA intensity zones (max, anaerobic, aerobic, and fat combustion), whereas R6 was negatively correlated with the time spent in these four PA intensity zones. The time of warm-up did not correlate with SMP. Conclusion: These results suggest that habitual moderate-to-vigorous PA influences SMP.

*I. Dolečková, A. Čápková, L. Machková, S. Moravčíková, M. Marešová, V. Velebný, **Seasonal variations in the skin parameters of Caucasian women from Central Europe**, Skin Research & Technology, Volume 27, Issue 3, May 2021, p. 353-357*

Background: The human skin is greatly affected by external factors such as UV radiation (UVR), ambient temperature (T), and air humidity. These factors oscillate during the year giving rise to the seasonal variations in the skin properties. The aim of this study was to evaluate the effect of seasons, environmental T, relative and absolute humidity on the skin parameters of Caucasian women, perform a literature review and discuss the possible factors lying behind the found changes. Materials and Methods: We measured stratum corneum (SC) hydration, transepidermal water loss (TEWL), sebum

level, erythema index, and elasticity parameters R2 and R7 on the forehead and the cheek of Caucasian women from the Czech Republic throughout the year. We also performed a non-systematic literature review focused on the seasonal variations in these skin parameters. Results: We confirmed a well-documented low SC hydration and sebum production in winter. In spring, we found the lowest TEWL (on the forehead) and the highest SC hydration but also the highest erythema index and the lowest elasticity presumably indicating skin photodamage. For most of the skin parameters, the seasonal variations probably arise due to a complex action of different factors as we extensively discussed. Conclusion: The data about the seasonal variations in the skin parameters are still highly inconsistent and further studies are needed for better understanding of the normal skin changes throughout the year.

A. Nkengne, J. Robic, B. Leng Lua, Self-perceived and objective measurements of facial puffiness in Chinese women, Skin Research & Technology, Volume 27, Issue 3, May 2021, p. 385-392

Background: Facial puffiness, caused by mild or normal fluid retention, commonly experienced by women, may not pose a health risk, but it can be a cause of cosmetic concern. The objectives of this study were to determine whether self-perceived facial puffiness can be measured objectively. Materials and Methods: A total of 151 Chinese women between 20 and 68 years of age were recruited. Facial water content, skin thickness, and elasticity were measured at two time points within a day (visit one occurred when the participants perceived they had facial puffiness; visit two occurred when the participants perceived their facial puffiness had subsided). Participants were also given a rating scale to self-evaluate their puffiness and firmness at different regions of the face. Results: The participants could perceive a difference in facial puffiness between the two visits. Water content and skin thickness were significantly higher in all regions of the face for all participants during the first visit. Skin elasticity was also significantly different between visits one and two. There was a significant increase in water content and skin thickness in the lower eyelid region in women who were older than 40 years. Conclusion: This is the first study to show that self-perceived facial puffiness can be measured objectively and that skin elasticity can change significantly when facial puffiness subsides.

H. Stettler, R. de Salvo, R. Olsavszky, E.A. Nanu, V. Dumitru, S. Trapp, Performance and Tolerability of a New Topical Dexpanthenol-Containing Emollient Line in Subjects with Dry Skin: Results from Three Randomized Studies, Cosmetics 2021, 8, 18

Three studies were conducted with three new dexpanthenol-containing emollients containing increasing lipid contents (Emollients 1–3) to assess their performances in healthy adults with dry skin. All three studies (N = 42 each) followed virtually the same design. A single skin application of the study product was performed followed by once-daily usage. Skin hydration, transepidermal water loss (TEWL), skin biomechanical properties, and lipid content of the stratum corneum (SC) were regularly assessed over the 28-day study period; a subset (N = 22) underwent a sodium lauryl sulfate (SLS) challenge prior to product application. All three emollients were well tolerated and showed good performances with only minor differences in instrumental measurements. After single and prolonged once-daily applications of Emollients 1–3 to dry skin and dry SLS-damaged skin, skin hydration significantly increased from baseline (BL) (by 38.1–72.4% in unchallenged skin, $p < 0.001$ for all three). This was paralleled by significant increases in skin elasticity parameters. Usage of Emollients 1 and 3 caused increases from BL in SC cholesterol (by 9.8–12.5%, $p < 0.05$ for both) and SC free fatty acid levels (by 3.7–26.3%, $p < 0.05$ for both) at the end of the study. No sustained effects on TEWL were recorded. Our findings support the once-daily use of all three emollients in adults with dry skin.

P. Orzol, I. Doleckova, J. Starigazdova, G. Huerta-Angeles, V. Velebny, Safe and strategic – Hyaluronic and retinoic acid derivate allays aging and acne, Cosmetics & Toiletries, April 2021, p. 61-70

Retinoids are a group of active molecules comprising vitamin A and its natural and synthetic derivatives. Commonly used in cosmetic products, these lipophilic molecules bind to specific nuclear receptors that modulate the expression of genes involved in cellular proliferation and differentiation, e.g., of keratinocytes, which can normalize desquamation. The topical application of retinoic acid, for one, has been shown to improve clinical features of aged skin by reducing wrinkles and diminishing hyperpigmentation.

A. Roca, M. Perez-Aso, B. Martinez-Teipel, J. Bosch, Glowing Review - Monk Fruit Encourages Epigenetic Well Aging, Cosmetics & Toiletries, March 2021, p. 53-62

Aging is characterized by the accumulation of macromolecular damage, impaired tissue renewal and progressive loss of physiological integrity. Over the past decade, a growing number of studies also has revealed that progressive changes to epigenetic information have a major influence on the aging process. Lifestyle habits, diet, pollution and other environmental factors all impact the human life span

by altering epigenetic information. Therefore, given the reversible nature of epigenetic mechanisms, these studies provide promising avenues for healthy aging.

E. Besic Gyenge, S. Hettwer, B. Suter, B. Obermayer, Genderless cosmetics with gender-specific efficacy, PERSONAL CARE, March 2021, p. 50-52

Unisex was yesterday's trend – genderless beauty is here to stay. The definition of gender has become very fluid. It now goes beyond simply 'male' and 'female', taking the form of a desire for acceptance and empowerment in one's own person. Man, woman, transgender and those who fall under any other definitions of gender should be able not only to share fashion but also their lotions and potions. From the consumers' point of view, this makes cosmetics more practical and sustainable. Nevertheless, genderless cosmetics should not be defined in terms of non-binary fragrances but rather by their mode of action, which should adapt to the respective needs of various skin types. However, where to start? Can genderless skin care truly cater to the distinct needs of male and female skin? Are there differences between male and female skin? With this in view, our approach has been to develop Reforcyl®-Aion, an active ingredient with the capability to spring clean skin cells, activating and rejuvenating them, improving overall skin appearance and positively influencing the personal perception of beauty. Reforcyl-Aion meets the individual needs of skin regardless of gender or age.

E. Öksüm Solak, G. Emel Gökçek, D. Kartal, N. Kalay, S. Levent Çinar, G. Savaş, M. Borlu, The relationship between the severity of coronary artery disease and skin measurement parameters, Skin Research & Technology, Volume 27, Issue 1, January 2021, p. 101-107

Purpose: This study aimed to investigate the relationship between skin parameters and CAD. Materials and Methods: The study included 50 patients diagnosed with coronary artery disease as the patient group and 45 volunteers without any known coronary artery disease as the control group. The participants' skin TEWL, pH, temperature, electrical capacitance, sebum, and elasticity values were measured using noninvasive methods at the forehead, back, and forearm. Findings: Skin temperature was significantly higher in the back and forehead regions in the patient group. No difference was found between the sebum values of the patient and control groups at the back and forehead. A significantly higher result was obtained for the forearm area. The pH was significantly lower in the patients' forearm, although the obtained values were within the normal range. The TEWL was significantly higher in patients in all three regions. In terms of flexibility, R2 was significantly higher in the back and forehead regions of the patient group, and the R6 was significantly higher in the patient group in all three regions. In addition, there was no correlation between skin parameter and SYNTAX score increase measurements. Conclusion: It can be suggested that skin sebum and TEWL measurements can be accepted as cheap and noninvasive methods of predicting CAD.

H. Ohshima, M. Kurosumi, H. Kanto, New solution of beauty problem by Staphylococcus hominis: Relevance between skin microbiome and skin condition in healthy subject, Skin Res Technol. 2021;00: p. 1–9

Background/aims: Recently, it was suggested that skin microbiome is related to some skin disease. The possibility of affecting the skin might be high, but there were few reports of the influence on the skin condition in healthy subjects. Our aim was to evaluate the relationship between skin condition and skin microbiome in healthy subjects. Methods: Experiment 1: 293 Japanese healthy women were divided into two groups, good skin properties and poor skin properties by 14 skin physiology parameter values on the cheek using noninvasive method. Differences of abundance of bacterial species on the cheek between the two groups were evaluated. Experiment 2: 11 Japanese healthy women were applied *Staphylococcus hominis* (*S. hominis*) on halfside of cheek for eight times in 1 month. Difference of change of physiology parameter values comparing to placebo side was evaluated. Results: Experiment 1: Multiple skin bacterial species were found to be significantly relevant in 14 physiology parameters. The abundance of *S. hominis* on the cheek with good skin properties group was significantly higher than poor skin properties group. Experiment 2: The application of *S. hominis* improved significantly the conspicuous pore number, melanin index, and the wrinkle count compared to placebo side. Conclusion: We found many skin bacterial species that might improve the skin condition in healthy women. In particular, *S. hominis* might have the potential to improve multiple skin beauty problems.

G.G. Hillebrand, P. Dimitriu, K. Malik, Y. Park, D. Qu, W.W. Mohn, R. Kong, Temporal Variation of the Facial Skin Microbiome: A 2-Year Longitudinal Study in Healthy Adults, Plast. Reconstr. Surg. 147: 50S, 2021

Background: The human skin microbiome is highly personalized, depending on, for example, body site, age, gender, and lifestyle factors. The temporal stability of an individual's skin microbiome—its resiliency and robustness over months and years—is also a personalized feature of the microbiome.

The authors measured the temporal stability of the facial skin microbiome in a large cohort of subjects. In addition to measuring microbiome dynamics, they tracked facial skin condition using noninvasive, objective imaging and biophysical measures to identify significant facial features associated with temporal changes in microbiome diversity and composition. Methods: The authors used 16S ribosomal RNA amplicon sequencing to track cheek and forehead skin microbiome diversity and composition annually over a 2-year period (2017–2019) in 115 healthy adult men and women. Skin metadata included facial features, such as wrinkles, hyperpigmentation, porphyrins, and skin color tone, as well as biophysical parameters for stratum corneum barrier function, pH, hydration, and elasticity. Results: Across the subject population, the facial skin microbiome composition and diversity were relatively stable, showing minor variation over the 2-year period. However, for some subjects, composition, diversity, and relative abundance of specific organisms showed substantial changes from one year to the next, and these changes were associated with changes in stratum corneum barrier function and follicular porphyrins. Conclusions: For healthy people, facial skin microbiome diversity and composition are relatively stable from year to year. Tracking the temporal changes in the microbiome along with skin phenotypic changes allows for a deeper understanding of the skin microbiome's role in health and disease. These results should be helpful in the design of longer-term intervention trials with microbiome-based skin care treatments.

C. Uhl, D. Khazaka, Pomiar Rzeczywistego Wieku Skóry, CHEMIA I BIZNES. 1/2021

Nagłówki w czasopismach i blogi coraz częściej ogłaszają, że „50 lat to nowe 30”. Czy to faktycznie prawda? Czy osoby „po pięćdziesiątce” rzeczywiście są dziś bardziej sprawne fizycznie i umysłowo – i wyglądają młodziej – niż kiedyś?

M.E.H. Jaspers, P. Moortgat, Objective Assessment Tools: Physical Parameters in Scar Assessment, in L. Téot et al. (eds.), Textbook on Scar Management, 2020

Several types of problematic scars can be identified: hypertrophic scars, keloids, contractures, and adherent scars. All these scars require specialized treatment. However, the need for innovation and novel treatment is paramount to further reduce the burden of these scars and to ultimately attain scarless healing.

D.J. Son, J.C. Jung, Y.M. Choi, H.Y. Ryu, S. Lee, B.A. Davis, Wheat Extract Oil (WEO) Attenuates UVB-Induced Photoaging via Collagen Synthesis in Human Keratinocytes and Hairless Mice, Nutrients 2020, 12, 300

The efficacy of wheat extract oil (WEO), standardized to glucosylceramides, for protecting against ultraviolet B (UVB)-induced damage of skin barrier function was assessed using the SHK-1 hairless mouse model and two human skin cell lines, namely, CCD-986sk and HeCaT. The ability of repeated oral administration of 30, 60, and 120 mg of WEO/kg/day for 12 weeks to prevent skin damage of SKH-1 hairless mice induced by UVB irradiation was evaluated. The results demonstrated that UVB-induced water evaporation (transepidermal water loss, TEWL) was significantly decreased by WEO. Similarly, UVB-induced losses in moisture and skin elasticity were improved by WEO supplementation. WEO attenuated the tissue procollagen type I, hyaluronic acid (HA), and ceramide reductions induced by UVB treatment as well. Collagen concentrations in skin tissue were increased in the WEO-treated mice, while UVB-induced epidermal thickening was reduced. In vitro studies using HeCaT human keratinocytes confirmed increased HA and collagen synthesis in response to WEO treatment. This may occur via WEO suppression of matrix metalloproteinase-1 (MMP-1), since its induction by UVB treatment was diminished in treated CCD-986sk cells. Oral administration of WEO improves skin barrier function in UVB-irradiated mice by attenuating damage typically observed in photoaging. This research further clarifies the clinical benefits previously observed by dietary WEO consumption.

L.M. Rodrigues, J.W. Fluhr, EEMCO Guidance for the in vivo Assessment of Biomechanical Properties of the Human Skin and Its Annexes: Revisiting Instrumentation and Test Modes, Skin Pharmacol Physiol 2020;33:44–59

Biomechanics of the skin is an important subject in skin research. It has been studied for many decades involving various technologies and methods to characterize and quantify mechanical properties of the skin under different in vivo conditions. The present EEMCO paper reviews the current relevant information, providing practical orientation to researchers dedicated to in vivo assessment of biomechanics of skin and its annexes. We discuss the available noninvasive instruments, including their principles and variables. A correspondence between the descriptors nomenclature proposed by Agache and the designation for the suction-based standard instruments is proposed. The addressed properties include skin softness/stiffness, firmness, elasticity, elastic and viscoelastic properties, extensibility,

resilience, anisotropy, acoustical shock wave hardness, friction (in relation to topographic properties), thickness, fiber/stress-mechanics (bending, cyclic, tensile, fatigue, or torsion), and hardness. We provide the relation of these properties to biomechanical descriptors and in some cases to SI units. Practical guidance for the proper use of these instruments, limitations, and possible interpretations are provided, while discussing the meaning of descriptive or “phenomenological” variables. For studies intended to quantify the effect of an intervention with regard to mechanical properties, we recommend a minimum of 30–40 participants, based on normal distribution of the data sets. Some important limitations are recognized, including the lack of standardization of procedures and calibration of instruments, which compromises the relevance and real nature of the descriptors/parameters obtained with these devices. The present work highlights an approach to a better practice and a sciencesupported biomechanical assessment of human skin, hair, and nails.

*T. Mosquera, S. Peña, P. Álvarez, P. Noriega, **Changes in Skin Elasticity and Firmness Caused by Cosmetic Formulas Elaborated with Essential Oils of Aristeguietia glutinosa (matico) and Ocotea quixos (ishpingo). A Statistical Analysis***, *Cosmetics* 2020, 7, 95, December 2020

External factors such as prolonged exposure to solar radiation and environmental pollution accelerate the aging process of the skin, and this process is a challenge for pharmacological science. To counteract the effects of skin photoaging, the cosmetic industry has introduced natural topical products that have proved to be effective in reducing signs of age. In this sense, a statistical analysis was conducted on the changes in the properties of firmness and elasticity of the skin caused by cosmetic formulas (lotion and cream) elaborated with essential oils of *Aristeguietia glutinosa* (matico) and *Ocotea quixos* (ishpingo) in which the concentration of the oils in two cosmetic products (lotion and cream) varied to be tested in vivo, through the measurement of elasticity and firmness in three times T1 (0 day), T2 (28 days) and T3 (56 days), and in two age groups according to the Glogau scale (30 to 40 and 41 to 50 years). The results showed positive changes in the values of elasticity and firmness of the skin in the presentation of the lotion whose concentration was 20% *Aristeguietia glutinosa* (matico) and 80% *Ocotea quixos* (ishpingo), with a minimum application time of 28 days.

*L. Gao, H. Kang, Y. Li, M. Lu, W. Song, Y. Wang, K. Li, L. Wang, G. Wang, **Clinical Efficacy and Safety of 3DEEP Multisource Radiofrequency Therapy Combined with Fractional Skin Resurfacing for Periocular Skin Aging***, *J Clin Aesthet Dermatol.* 2020;13(3): p. 41–44

Background: The early signs of skin aging usually occur in the periocular region. Objectives: This retrospective analysis evaluated the efficacy and safety profile of a multisource 3DEEP radiofrequency (RF) technology (EndyMed, Caesarea, Israel) in combination with fractional skin resurfacing (FSR) for the treatment of periocular skin aging. Methods: A total of 15 patients with periocular aging underwent monthly treatment sessions of 3DEEP and FSR for three months. Sessions were administered at the Department of Dermatology at Xijing Hospital in Xi'an, China. Indices of skin moisture level, transepidermal water loss (TEWL), skin elasticity, wrinkles, pore size, and skin texture were determined before and after treatment using the Visia® (Canfield Imaging Systems, New Jersey), Multiprobe Adapter (CK, Cologne, Germany) and Antera3D® (Miravex, Dublin, Ireland) systems. Results: Skin moisture level, elasticity, wrinkles, pore size, and texture improved relative to baseline ($p < 0.01$). There was no significant difference in TEWL before and after the treatments ($p > 0.05$). Patient satisfaction was 86.67 percent. Patients experienced varying degrees of transient edema, erythema, scabbing, and occasional hyperpigmentation; all adverse effects resolved within 2 to 10 days post-treatment. Conclusion: ENDYMED 3DEEP in combination with FSR appears to be safe and effective in treating periocular skin aging. Randomized controlled trials with a larger patient group are needed to confirm our findings.

*T. Yazdanparast, K. Yazdani, S.A. Nasrollahi, L. Izadi Firouzabadi, P. Humbert, A. Khatami, M. Kassir, A. Firooz, **Biophysical and ultrasonographic changes in early patch/plaque stage of mycosis fungoides, compared with uninvolved skin***, *Skin Research & Technology*, Volume 26, Issue 6, November 2020, p. 859-866

Background: The goal of this study was evaluation of the skin biophysical properties in early patch/plaque stage of mycosis fungoides (MF) and its comparison with uninvolved skin in order to gain a better understanding of the pathogenesis of diseases. Materials and Methods: The stratum corneum hydration, transepidermal water loss (TEWL), surface friction, pH, sebum, melanin, erythema, temperature, elasticity parameters (R0, R2, R5), thickness, and echo density of epidermis and dermis were measured on lesions of 21 patients and compared with controls (average measures of uninvolved perilesional and symmetrical skins) by paired sample *t* test. Results: Stratum corneum hydration ($P < 0.001$) and echo density of dermis ($P = 0.044$) were significantly lower, whereas pH (P -value = 0.007), erythema ($P < 0.001$), and melanin content ($P = 0.007$) were significantly higher in lesions. There was

not any significant difference in TEWL, friction index, sebum, temperature, R0, R2, R5, thickness of epidermis and dermis, and echo density of epidermis between lesions and normal skin. Conclusion: Parapsoriasis/MF lesions are specified by a set of certain changes in biophysical properties which are mainly correlated with histological changes. These sets of alterations may help in noninvasive, early diagnosis of parapsoriasis/MF.

E. Sofrona, L.-A. Tziveleka, M. Harizani, P. Koroli, I. Sfiniadakis, V. Roussis, M. Rallis, E. Ioannou, In Vivo Evaluation of the Wound Healing Activity of Extracts and Bioactive Constituents of the Marine Isopod Ceratothoa oestroides, Mar. Drugs 2020, 18, 219

Wound healing is a fundamental response to tissue injury and a number of natural products has been found to accelerate the healing process. Herein, we report the preparation of a series of different polarity (organic and aqueous) extracts of the marine isopod *Ceratothoa oestroides* and the in vivo evaluation of their wound healing activity after topical administration of ointments incorporating the various extracts on wounds inflicted on SKH-hr1 hairless mice. The most active extract was fractionated for enrichment in the bioactive constituents and the fractions were further evaluated for their wound healing activity, while their chemical profiles were analyzed. Wound healing was evaluated by clinical assessment, photo-documentation, histopathological analysis and measurement of biophysical skin parameters, such as transepidermal water loss (TEWL), hydration, elasticity, and skin thickness. The highest levels of activity were exerted by treatment of the wounds with a fraction rich in eicosapentaenoic acid (EPA), as well as myristic and palmitoleic acids. Topical application of the bioactive fraction on the wounds of mice resulted in complete wound closure with a skin of almost normal architecture without any inflammatory elements.

B. Walzel, T. Shah, B. Senti, U. Batz, S. Bänziger, Natural matrikine-like peptides for skin rejuvenation, PERSONAL CARE ASIA PACIFIC, September 2020

A person's perceived age is determined by physical traits on face and neck. These traits mostly reflect the integrity of the extracellular matrix, which provides structure, homogeneity and elasticity to skin. Matrikines are dermal messenger peptides that instruct skin cells to reorganise and build up the extracellular matrix. So far, synthetic matrikines have been used in cosmetics. Now, for the first time, Lipoid-Kosmetik AG investigated and isolated natural matrikines-like peptides from cedar nuts and presents them in a novel anti-ageing concentrate: PhytoCodine®. Here we show that plant-derived, matrikine-like peptides mimic the activity of matrikines that naturally occur in our skin. Plant-derived, matrikine-like peptides activate the formation of extracellular matrix components, optimise skin structure, and improve age-related properties of mature skin, such as elasticity, density, wrinkles and sagging. Altogether, PhytoCodine® is the first concentrate of plant-derived, natural matrikine-like peptides. It reprograms fibroblasts to build up extracellular matrix components characteristic of younger looking skin and thereby directly contributes to a person's perceived age.

W. Kawałkiewicz, M. Matthews-Kozanecka, M. Janus-Kubiak, L. Kubisz, D. Hojan-Jezierska, Instrumental diagnosis of facial skin - a necessity or a pre-treatment recommendation: in aesthetic medicine, J Cosmet Dermatol, Jul 2020

This paper presents the possibilities of pre-treatment instrumental diagnosis for assessing the condition of various facial skin areas. Tests which aimed at determining the firmness and elasticity of facial skin were conducted. Analysis of skin parameters in selected facial areas in adults over a wide age range was performed using the Cutometer Dual MPA 580 probe. Parameters R0, R2, R5, R7, R8, R9 were analysed. The following results were obtained: R0 (0.20-0.33) mm; R2 (0.66-0.82) a.u.; R5 (0.60-0.92) a.u.; R7 (0.37-0.52) a.u.; R8 (0.10- 0.27) mm; R9 (0.03-0.05) mm. The R0 parameter showed no statistically significant correlation between skinfirmness and age. On the basis of the other parameters it can be concluded that skin elasticity and an ability to return to its original shape around the eyes, on the cheeks and around the lips is greater in younger patients than in older groups. There were no statistically significant differences within each age group between the right and left sides of the face. Skin firmness described by the R0 parameter is constant in the studied groups and independent of age. Skin elasticity, and an ability to return to its original shape around the eyes, on the cheeks and around the lips, is greater in younger patients. The ageing process simultaneously affects the entire facial skin.

Moderne Hautanalyse - Die ungeschminkte Wahrheit, Fit for Fun, Juli 2020

Ein geschultes Auge sieht der Haut auf Anhieb das Wichtigste an – aber nicht alles. Präzise Informationen über den Hautzustand liefern diese fünf technischen Geräte.

K. Zduńska-Pęciak, H. Rotsztein, The effectiveness of ferulic acid and microneedling in reducing signs of photoaging: a split-face comparative study, Dermatol Ther, Jul 2020

Background: Photoaging is closely related to UV-induced oxidative stress. Ferulic acid is a plant-based antioxidant with anti-aging activity. Combining ferulic acid peel with microneedling enhances its transdermal penetration. This study was designed to evaluate the efficacy of 14% ferulic acid peel combined with microneedling for facial photoaging. Materials and methods: 16 women aged 45-60 with Fitzpatrick skin type II and III, were enrolled in this trial. All patients received 8 treatment sessions with a full face application of chemical peeling based on 14% ferulic acid in 1-week intervals. During each session, on the right half of patient's face, peeling application was followed by microneedling. Efficacy was measured using MPA (Courage+Khazaka electronic). The measurement of hydration, elasticity, melanin index and erythema index were taken before treatments, after 8th session and 1 month after the last application. Results: The objective evaluation showed statistically significant improvement in all measured skin parameters ($p < 0,05$), after ferulic acid peel application, as well as ferulic acid peel followed by microneedling. Combined therapy showed significantly greater improvement especially in skin elasticity, comparing to peeling administered alone. Conclusion: Ferulic acid has a significant bleaching, anti-redness, smoothing and moisturizing activity. When combined with microneedling, the efficiency is increased, in particular regarding skin elasticity.

C. Uhl, D. Khazaka, Measuring skin's "true age", PERSONAL CARE June 2020, p. 66-68

The human desire to look young is as old as mankind and our skin plays central role in this craving. Even in ancient civilizations, people developed formulations for creams, tonics and bath additives to keep skin young and beautiful. The physiological process of skin ageing involves structural, biochemical and functional changes. Starting at approximately age 25, the content of collagen and other components of the connective tissue, such as elastin or hyaluronic acid, in the skin continuously decreases. This gradually results in a loss of bound water, leading to a deterioration of the water-protein interaction and an alteration of the overall protein stability.

N. Hazwani Mohd Ariffin, R. Hasham, Assessment of non-invasive techniques and herbal-based products on dermatological physiology and intercellular lipid properties, Heliyon 6 (2020)

Skin is the largest external organ of the human body. It acts as a barrier to protect the human body from environmental pollution, mechanical stress, and excessive water loss. The defensive function resides primarily on top of the epidermis layer commonly known as stratum corneum (SC). Human SC consists of three major lipids, namely ceramide, free fatty acid, and cholesterol that comprise approximately 50%, 25%, and 25% of the total lipid mass, respectively. The optimal composition of SC lipids is the vital epidermal barrier function of the skin. On the other hand, skin barrier serves to limit passive water loss from the body, reduces chemical absorption from the environment, and prevents microbial infection. In contrast, epidermal lipids are important to maintain the cell structure, growth and differentiation, cohesion and desquamation as well as formation of a permeability barrier. Multiple non-invasive in vivo approaches were implemented on a regular basis to monitor skin physiological and intercellular lipid properties. The measurement of different parameters such as transepidermal water loss (TEWL), hydration level, skin elasticity, collagen intensity, melanin content, sebum, pH, and tape stripping is essential to evaluate the epidermal barrier function. Novel non-invasive techniques such as tape stripping, ultrasound imaging, and laser confocal microscopy offer higher possibility of accurate and detailed characterisation of skin barrier. To date, these techniques have also been widely used to determine the effects of herbal plants in dermatology. Herbal plants have been traditionally used for ages to treat a variety of skin diseases, as reported by the World Health Organisation (WHO). Their availability, lower cost, and minimal or no side effects have created awareness among society, thus increase the demand for natural sources as the remedy to treat various skin diseases. This paper reviews several non-invasive techniques and evaluations of herbal-based product in dermatology.

M.A. Nilforoushzadeh, S. Alavi, M. Heidari-Kharaji, A.R. Hanifnia, M. Mahmoudbeyk, Z. Karimi, F. Kahe, Biometric changes of skin parameters in using of microneedling fractional radiofrequency for skin tightening and rejuvenation facial, Skin Res Technol., Jun 2020

Background Fractional radiofrequency (RF) has been used for skin rejuvenation and tightening by dermatologists and cosmetic surgeons in recent years. Methods Twenty female patients (mean age of 51.9 years) with Fitzpatrick III to VI skin phototypes who desired to undergo skin lift/tightening received six sessions of fractional microneedle RF treatment and were assessed at baseline and then 3 months after the last session for biometric characteristics using a Colorimeter, Visioface 1000D, Tewameter, Cutometer, Mexameter, and Sebumeter and a skin ultrasound imaging system to evaluate the transepidermal water loss (TEWL), skin pores, color, melanin content, erythema, sebaceous content, and thickness and density of the epidermis and dermis. Patient satisfaction with visual analog scale

(VAS) was also measured. Results The results showed that skin pores and spots decreased significantly. TEWL also decreased significantly (by 18.44%). Meanwhile, skin density increased significantly (R7, by 44.41%). The ultrasonographic assessments showed that both the density and thickness of the dermis and epidermis were increased. The changes in the other parameters were not significant. Conclusion FR increases the density and thickness of the dermis and thus also increases the collagen content and decreases skin pores and TEWL.

A. Charpentier, Clinically supporting 'antiage' and 'pro-age' claims, Personal Care Europe, June 2020

Claims of personal care evolve following trends and various innovations in the field of the active ingredient development, the finished product formulation and the way both are evaluated, demonstrating their performances. Since 2014, the cosmetics industry is gradually leaving the era of anti-ageing behind. Today, most consumers are more in the mood for a well ageing, slow ageing or pro ageing approach. The philosophy of the 'pro-ageing' movement has sought to remove all 'anti' claims because, according to this concept, women over 50 are not interested in looking younger; they want to look healthy and be honest about their age. Some brands have used the idea of "improves the appearance of skin quality", and "restore the skin comfort", for example. A new vocabulary of renewal, regeneration, plumpness and "glow" now dominates the language of the beauty industry.

F. Bracone, A. de Curtis, A. di Castelnuovo, R. Pili, M. Boccardi, S. Cilla, G. Macchia, F. Deodato, S. Costanzo, L. Iacoviello, G. de Gaetano, A.G. Morganti, K. Petroni, C. Tonelli, M.B. Donati, C. Cerletti, Skin toxicity following radiotherapy in patients with breast carcinoma: is anthocyanin supplementation beneficial?, Clinical Nutrition, 2020

Background: The EU-supported ATHENA project stems from a previous study suggesting that moderate wine consumption reduced the side-effects of radiotherapy (RT) in breast cancer patients, an effect possibly due to non-alcoholic anthocyanin fractions of wine. Objective: To evaluate the role of anthocyanins on RT skin side effects in breast cancer patients. Methods: Randomized, controlled, double-blind clinical trial. Patients were assigned to an intensity modulated radiation therapy (IMRT) either for three or five weeks, then randomized to receive three times a day a water-soluble anthocyanin (125 mg)-rich extract of corn cob or a placebo. Supplementation started one week before till the end of RT. Skin characteristics were detected by a standardized, noninvasive Cutometer® dual-MPA580, providing quantitative indices of skin maximal distensibility (R0), elasticity (R2, R5, R7) and viscoelasticity (R6); a Mexameter® MX18 probe evaluated the skin erythema (Er) and melanin (M). Measures were performed before (T0), at the end of RT and of supplementation (T1), and 1, 6 and 12 months after RT (T2-T4). Acute and late skin toxicity were scored according to the RTOG/EORTG scale. Selected biomarkers were measured at T0 and T1. Results: 193 patients previously assigned to 3- or 5-week RT schedules were randomized to either anthocyanin (97) or placebo (96) supplementation. RT induced changes in skin parameters: R0, R2, R5 and R7 decreased, while R6 increased; the changes in R0 and R6 continued in the same direction up to one year, while the others recovered towards basal values; Er and M peaked at T1 and T2, respectively, and returned to basal values at T4. Comparable skin changes were apparent in anthocyanin and placebo groups. A moderate RT-induced increase in total and HDL cholesterol and triglycerides was prevented by anthocyanins. Conclusions: Anthocyanin supplementation did not prevent RT-induced local skin toxicity. The supplementation was well tolerated and safe.

L. Téot, T.A. Mustoe, E. Middelkoop, G.G. Gauglitz (Editors): Textbook on Scar-Management - State of the Art Management and Emerging Technologies (ebook), Springer 2020

The interest in wound healing goes back to the beginning of history and has not diminished throughout the centuries also because practical implications of wound healing studies have remained very relevant for public health. During the last century, much progress has been made in the understanding of basic mechanisms of skin wound healing, and it has been realized that healing processes evolve similarly in various organs. It has been established that fibrotic diseases are regulated by analogous mechanisms, albeit less controlled, compared to those regulating wound healing. Moreover, many advances, such as the use of antiseptics and, later, of antibiotics, as well as the introduction of skin transplants have facilitated the treatment of wounds. It has been shown that wound healing evolution depends on several factors including the type of injury causing the damage, the tissue and/or organ affected, and the genetic or epigenetic background of the patient. This Compendium has the merit of discussing a broad spectrum of topics, including the general biology of wound healing, modern diagnostic approaches, and therapeutic tools, applied to many different clinical situations. It should be of interest to teachers, students, and clinicians working in different aspects of wound healing biology and pathology. I am sure that it will rapidly become an important reference book in these fields.

S. Yoo, M.-R. Kim, T.-Y. Kim, S.J. Hwang, J.-M. Lim, S.G. Park, Relationship of transcutaneous oxygen tension with age and skin elasticity in Korean women, Skin Research & Technology, Volume 26, Issue 3, May 2020, p. 325-328

Background: Oxygen has several positive effects on the skin, including improving collagen synthesis and accelerating wound healing. However, only a few studies have investigated the relationship between skin oxygenation and skin aging parameters. Therefore, this study aimed to assess the correlation between skin oxygenation and skin aging parameters—elasticity, hydration, sebum, color (lightness, redness), and blood perfusion—in Korean women. Materials and Methods: We evaluated the transcutaneous partial pressure of oxygen, also known as transcutaneous oxygen tension (TcPO₂), and skin aging parameters, including elasticity, hydration, sebum, color (lightness or redness), and blood perfusion, in the cheek of 34 healthy women (aged 20-69 years) and assessed the correlation between TcPO₂ and other skin aging parameters using IBM SPSS Statistics 25 software (SPSS Inc). Results: Facial TcPO₂ was negatively correlated with age ($P < .05$). There were positive correlations between facial TcPO₂ and elasticity parameters ($P < .01$). We noted no correlation between facial TcPO₂ and skin lightness; however, skin lightness tended to slightly improve with increasing TcPO₂. Skin aging parameters, including hydration, sebum, skin redness, and blood perfusion, showed no correlations with TcPO₂. Conclusion: In Korean women, facial TcPO₂ tends to decrease with increasing age and is positively correlated with gross, net, and biological skin elasticity. Therefore, this study demonstrated that oxygen tension of facial skin can be a major causative factor of skin aging.

T. Chu, N.-L. Wu, C.-Y. Hsiao, H.-J. Li, T.-Y. Lin, C.-H. Ku, C.-F. Hung, An isoflavone extract from soybean cake suppresses 2,4-dinitrochlorobenzene-induced contact dermatitis, J Ethnopharmacol, May 2020

Ethnopharmacological relevance: Numerous epidemiological and clinical studies have demonstrated the protective role of dietary isoflavones against development of several chronic diseases. ISO-1, one fraction of isoflavone powders derived from soybean cake, is reported to attenuate inflammation and photodamage. Aim of the study: Contact dermatitis is a common inflammatory skin disease, which accounts for most occupational skin disorders. Instead of oral administration, we aimed to explore the effects of topical ISO-1 application on contact dermatitis by using 2,4-dinitrochlorobenzene (DNCB)-stimulated HaCaT keratinocytes and DNBCB-induced mouse dermatitis as models. Materials and methods: In the in vitro study, we first evaluated the biologic effects of DNBCB on HaCaT keratinocytes. HaCaT keratinocytes were treated with 2,4-dinitrochlorobenzene (DNCB), and cell viability was measured by MTT assay. Then, we detect the prominent induction of IL-8 mRNA expression after DNBCB and ISO-1 treatment by reverse transcription polymerase chain reaction (RT-PCR), and release of IL-8 from HaCaT keratinocytes was measured by ELISA assay. HaCaT keratinocytes were pretreated with ISO-1 and then treated with DNBCB, phosphorylation of JNK, p38, ERK and I κ B α was analyzed by Western blot. In the in vivo study, the hairless mice were used for an induced contact dermatitis model. The surface changes in the dorsal skin after DNBCB and ISO-1 treatment were recorded using photography, and TEWL, erythema were measured using an MPA-580 cutometer. Blood was also collected from mice for measurement of white blood cell counts. Results: Results showed ISO-1 inhibited DNBCB-induced IL-8 production and also suppressed DNBCB-induced phosphorylation of JNK and p38, and I κ B α in HaCaT. In the animal model of DNBCB-induced contact dermatitis, topical ISO-1 treatment significantly decreased DNBCB-induced erythema and transepidermal water loss (TEWL) in mouse skin. ISO-1 also reduced DNBCB-induced skin thickening and increase of white blood cell count. Conclusions: ISO-1 is promising for improvement of DNBCB-induced inflammation and skin barrier impairment, suggesting the potential application of topical ISO-1 for inflammatory dermatoses.

F. Perin, K. Chalothorn, P. Tachalerdmanee, Mechanical properties of skin and exploration methods, PERSONAL CARE ASIA PACIFIC, May 2020

Our skin constitutes the interface between the interior of the body and the outside world, covering between 1.5 and 2.0 m² and weighing almost 4 kg in adults. Its thickness ranges between a few tenths of millimeters and 5-6 mm for areas submitted to high stresses and loads such as the soles of the feet. This organ (encompassing cells, fibres, sebaceous and sweat glands, hairs, nerves, blood vessels) ensures numerous essential functions such as maintaining homeostasis and protecting the organism from external aggressions (mechanical, thermal, chemical, bacterial, etc.) It is sometimes said that it is the silence of organs that defines their health. This is probably why we almost forget the mechanical function of the skin. This is unfair when we consider its incredible ability to absorb shocks, to support all internal body tissues, to stretch so as to allow movements, changes of posture and variations of body volume in the case of pregnancy for instance. This article aims to bring light to this

critical mechanical function and to present the different methods which can be used for its exploration and measurement.

F. Wandrey, D. Schmid, F. Zülfi, Clearing senescent cells for rejuvenated skin, Personal Care Europe, April 2020

Cellular senescence is one of the hallmarks of ageing. Senescent cells that reside in the dermis as a result of the ageing process and oxidative stress, secrete pro-inflammatory factors that further contribute to ageing. Therefore, eliminating senescent cells has emerged as a promising anti-ageing therapy in the medical field in the past few years. This novel concept known as 'senolytics' helps to clear tissues of senescent cells without affecting healthy cells in order to reduce inflammation and rejuvenate the tissue. For the first time, this concept has been adapted for cosmetics. An extract from organic alpine rose leaves demonstrated a clear senolytic activity on senescent fibroblasts. In placebo-controlled clinical studies, the alpine rose extract prevented the formation of protein carbonyls, one of the most harmful irreversible modifications of proteins, upon UVA irradiation. In addition, treatment with alpine rose extract significantly reduced skin redness and increased elasticity.

A. Tito, C. Zappelli, M. Angelillo, M.G. Colucci, F. Apone, New ingredient from Rosa rugosa delays skin ageing, Personal Care Europe, April 2020

Skin ageing is an inevitable physiological process, determined by several concomitant factors, resulting in a thinner and drier skin, in the formation of fine wrinkles, and a gradual dermal atrophy. During this process the skin cells become senescent, they slow down their metabolism and the production of structural matrix components. The Growth Differentiation Factor 11 (GDF11) has been recently identified as a pro-youth factor in several cell types, and in particular it was shown its involvement in the restoration of a young phenotype in skin fibroblasts, by stimulating important ExtraCellular Matrix proteins. Furthermore, its key role in modulating mitochondrial functions in skin cells during ageing has been highlighted. In the present article, we describe the characterisation of a plant extract, obtained from *Rosa rugosa* tissue cultures, able to produce a 'rejuvenating' effect in aged skin fibroblasts by inducing GDF11 expression and synthesis. The extract was also capable of increasing the expression of PGC1- α , the master regulator of the mitochondrial biogenesis, and other important genes involved in the pathway, leading to an improvement of cell metabolism and longevity.

S.I. Jang, My. Lee, J. Han, J. Kim, A.R. Kim, J.S. An, J.O. Park, B.J. Kim, E. Kim, A study of skin characteristics with long-term sleep restriction in Korean women in their 40s, Skin Res Technol., March 2020, Volume 26, Issue 2, p. 193-199

Background: Previous studies have demonstrated increased pore size and darkening skin color with total sleep deprivation. There are many studies of skin characteristics with short-term sleep restriction, but there are few studies on skin characteristics when sleep is restricted more than three consecutive days. This study evaluated skin changes with sleep limited to 4 hours per night for six nights. Materials and Methods: The study included 32 Korean women in their 40s. Skin hydration, desquamation, barrier recovery, texture, gloss, transparency, elasticity, crow's feet, frown lines, and color were measured. Individual sleep time was monitored by smartwatches. Subjects slept 8 hours per night for six nights in week one and 4 hours per night for six nights in week two. Results: Skin hydration was significantly reduced after 1 day of sleep deprivation, and it continued to decrease. Skin gloss, desquamation, transparency, elasticity, and wrinkles were significantly aggravated after 1 day of sleep deprivation. Skin texture was significantly aggravated on the fourth day of sleep restriction. Elasticity was most affected by reduced sleep, with a standardized coefficient of -0.320 , indicating a significant decrease over time as compared to other characteristics. Conclusion: Skin hydration was gradually decreased with sleep restriction. Skin texture did not change after only 1 day of sleep restriction. It is a new finding that elasticity decreases more than other skin characteristics with prolonged sleep restriction.

Y. Mofid, G. Faleweei, C. Chartier, L. Machet, E. Vierron, V. Gissot, V. Tauveront, G. Georgescu, P.-A. Dujardin, M.-C. Machet, T. Kervarrec, F. Patat, F. Ossant, A. Maruani, High-Frequency Transient Elastography Prototype to Assess Skin (Dermis) Fibrosis: A Diagnostic Study in Patients with Venous Insufficiency and Controls, Ultraschall Med, 2020 Mar 18

Purpose High-frequency transient elastography (HF-TE) is a noninvasive technique for assessing shear-wave speed and finally elasticity in thin tissue such as the skin. It has never been validated for monitoring fibrotic skin diseases. The purpose was to evaluate the potential of HF-TE to assess skin fibrosis in patients with chronic venous disorders (CVD). Materials and Methods This clinical study enrolled 48 patients at various stages of CVD and 48 paired healthy volunteers. Subjects underwent a clinical examination with an evaluation of Rodnan's fibrosis skin score. We studied the

dermis thickness measured using ultrasound (US) and elasticity measurements using cutometer and HF-TE studied according to 3 cutaneous zones positioned on the leg. The area under the receiver operating characteristic curve (AUC) was calculated to evaluate the diagnosis performance for a combined parameter (PRL) based on a logistic regression model using both elasticity and dermal thickness. Results Patients with CVD had significantly higher values of skin elasticity than healthy subjects, 134.5kPa and 132.1kPa vs. 91.3kPa, respectively. The dermis thickness also increased with escalation in CVD stage for all studied zones. The PRL parameter had an AUC value of 0.79 for all zones and stages of CVD clustered. The discriminating power of PRL increased with escalation of the CVD stage; with an AUC value of up to 0.89 for evolved stages, and a sensitivity and specificity of 0.79 and 0.89, respectively. Conclusion HF-TE, coupled with a US measurement of dermis thickness, made it possible to propose a new biomarker, which proved to be a good diagnostic tool for skin fibrosis.

M. Ijaz, N. Akhtar, Fatty acids based α -Tocopherol loaded nanostructured lipid carrier gel: In vitro and in vivo evaluation for moisturizing and anti-aging effects, J Cosm Dermatol, March 2020

Background: α -Tocopherol is a potent antioxidant present in the skin. Its concentration decreases with age, synthetically available α -tocopherol is viscous, irritating to skin and unstable toward oxidation and ultraviolet, (UV) light. Aims: To develop fatty acids based nanostructured lipid carrier (NLC) gel loaded with α -tocopherol and to evaluate its moisturizing and anti-aging properties. Methods: Lauric acid, oleic acid, and Tween-80 were used as solid lipid, liquid lipid, and surfactant, respectively. Seven formulations (F0-F6) were developed by using different concentration of ingredients. Most optimized formulation (F2) was selected for further study on the basis of characterization. Dialysis tube method was used for release study. F2 was incorporated in gel, and then, in vitro and noninvasive in vivo study regarding skin moisture content by corneometer and skin mechanical properties by cutometer for 12 weeks on human volunteers (n = 13) was conducted. Results: Size, polydispersibility index (PDI), zeta potential, and %entrapment efficiency (%EE) of optimized formulation (F2) were found 82 nm, 0.261, -28.6, and 94.88 ± 1.16 , respectively. Particles were spherical in shape. The release profile showed initial burst and then sustained release, and release data were best fitted to weibull model. α -tocopherol loaded NLC gel (NLCG) appeared physically stable for 12 weeks at room temperature and showed significant results in terms of skin capacitance and mechanical properties. Rheological assessment showed non-Newtonian behavior. Conclusion: Fatty acids based NLC proved to be a promising carrier of photochemically unstable lipophilic vitamin E with enhanced moisturizing and anti-aging properties.

G. Bifulco, F. Rastrelli, G. Rastrelli, G. Tosti, Postbiotics in Anti-Ageing Care, COSSMA 3, 2020, p. 16-19

Recently, the use of living probiotics- tyndallized bacteria and lysates- and prebiotics has been blooming. However, the production of stable, reproducible and safe formulations containing most of these ingredients remains a topic of discussion. Big effort is currently devoted in elucidating the interactions between beneficial microbes and skin.

W. Sangsuwan P. Asawanonda, Four-weeks daily intake of oral collagen hydrolysate results in improved skin elasticity, especially in sun-exposed areas: a randomized, double-blind, placebo controlled trial, J Dermatol Treat, March 2020

Background: Topical as well as oral 'collagen' is widely popularized and claimed to possess anti-aging properties for the past several years. Few placebo-controlled trials exist. Objectives: *Primary*: To evaluate the effect of collagen hydrolysate (CH) ingestion for 4 weeks on skin elasticity. *Secondary*: To compare the effects of CH ingestion on skin elasticity between sun-exposed and sun-protected areas. Materials and methods: This study was a prospective, randomized, double-blind placebo-controlled trial comparing the effects of daily intake of 5-g oral CH and placebo in post-menopausal women. Participants were evaluated for skin elasticity, using cutometer at baseline, 2 and 4 weeks after randomization and 4 weeks after discontinuation of study agents. Results: A total of 36 participants were enrolled. Skin elasticity measured from left and right cheeks in participants receiving CH increased compared to placebo ($p=.006$, $.03$, respectively). After 4 weeks of discontinuation of study agents (week 8), skin elasticity measured from both left and right cheeks remained different between CH and placebo group ($p=.01$, $.004$, respectively). Conclusions: We demonstrated significant improvement of skin elasticity in sun-exposed areas after 4 weeks ingestion of marine CH. The improvement of elasticity remained 4 weeks after discontinuation of study agents. There were no severe adverse effects during the study.

N. Lourith, M. Kanlayavattanakul, Formulation and clinical evaluation of the standardized Litchi

chinensis extract for skin hyperpigmentation and aging treatments, Ann Pharm Fr, 2020 Mar;78(2): p. 142-149

Introduction: The standardized litchi extract had been revealed on phytochemical actives, in vitro and cellular activities against aging and darkening of skin. However, a formulation containing the extract has never been developed as per clinical evaluated. Materials and methods: The litchi serum was developed, safety and efficacy were clinically evaluated in human volunteers. The stable and none irritated 0.05 and 0.1% litchi serums were randomized-single blind placebo control clinical applied on the inner forearm of 29 volunteers for a consecutive 112 days and monitored by Mexameter® MX18, Cutometer® MPA 580 and Visioscan® VC 98. Results: Skin lightening efficacy of the 0.1% and 0.05% litchi serum was significantly ($P < 0.001$ and $P < 0.05$) higher than the placebo. Skin elasticity and wrinkle reduction was significantly ($P < 0.05$ and $P < 0.005$) achieved by the 0.1% litchi serum. The efficacy of litchi serums was confirmed by a split-face, randomized, single-blind controlled that the 0.1% litchi serum was significantly ($P < 0.05$) better than the 0.05% one of all examined parameters. Conclusion: Safety and efficacy of litchi extract are clinically confirmed for hyperpigmentation and aging of skin treatments.

S.P. Loureiro Luna, A. Schoen, P. H. Esteves Trindade, P. Barreto da Rocha, Penetration Profiles of a Class IV Therapeutic Laser and a Photobiomodulation Therapy Device in Equine Skin, J Equine Vet Sci, Feb 2020

Photobiomodulation therapy (PBMT) effects depend on the energy settings and laser penetration. We investigated the penetration time profiles of two different light therapy devices, at the dark and light skin regions in horses. Six light skin and six dark skin adult clinically healthy Arab and Quarter horses were used. A cutometer was used to measure the width of the skin fold from both sides of the cervical area, followed by three measurements of the thickness of the same skin fold by transversal and longitudinal ultrasonography (US). The depth of light penetration was compared based on the percentage of penetration versus power, between a portable PBMT device versus a class IV laser device. The laser mean power output was measured with an optical power meter system for 120 seconds after penetrating the skin. Skin width and laser penetration were compared among equipment by paired "t" test. There was no difference in the width of the skin fold between measurements acquired by the cutometer against either longitudinal or transversal US or between the US measurements at cervical versus metacarpus area. Light penetration was greater in both kinds of skins in the PBMT (0.01303 ± 0.00778) versus class IV laser ($0.00122 \pm SD 0.00070$) ($P < .001$). The PBMT device provided a greater energy penetration than the class IV laser in unclipped light and dark skin, suggesting that the former may produce a better therapeutic effect. The color of the skin changes penetration profiles of PBMT.

R.L. Evans, S. Bates, R.E. Marriott, D.S. Arnold, The impact of different hair-removal behaviours on the biophysical and biochemical characteristics of female axillary skin, International Journal of Cosmetic Science, 2020, 42, p. 436–443

Objective: The impact of hair removal on the biophysical and biochemical characteristics of human axillary skin is not fully understood. This study investigated the effect of different hair-removal techniques on biophysical parameters and the concentrations of key inflammatory biomarkers in the axillae of female Thai subjects. Axillary hair was removed by shaving, plucking or waxing. Methods: Following a 2-week washout phase without hair removal, subjects underwent visual assessment for erythema and skin dryness in one (randomized) axilla, then hair was removed from the axilla by shaving, plucking or waxing according to each subject's established habit. Erythema and dryness were assessed again 30 min after hair removal, and buffer scrubs collected from depilated and non-depilated axillae and analysed for inflammatory cytokines; after a further 48 h, erythema, dryness and post-inflammatory hyperpigmentation (PIHP) were assessed in the depilated axilla. Biophysical assessments (skin hydration, barrier integrity, elasticity and roughness) were made in depilated and non-depilated axillae. Results: All three hair-removal techniques induced an increase in axillary erythema and skin dryness. Shaving was associated with significantly less erythema ($P < 0.01$), but significantly greater skin dryness ($P < 0.05$) versus the other techniques 30 min after hair removal. There were no between-technique differences in PIHP or biophysical parameters. Interleukins IL-1 α and IL-1RA concentrations increased, and IL-8 concentration decreased following hair removal by each technique. Conclusion: This is the first study to identify the principal cytokines associated with the inflammatory process triggered by axillary hair removal. A single hair-removal treatment did not appear to induce PIHP or further biophysical changes to the skin.

N. Muizzuddin, R. Benjamin, Beauty from within: Oral administration of a sulfur-containing supplement methylsulfonylmethane improves signs of skin ageing, International Journal for Vitamin and Nutrition Research, February 2020

Abstract: Background: Methylsulfonylmethane (MSM) is an organosulfur compound with known benefits for joint health, sports nutrition, immune function, and anti-aging formulations and is gaining popularity as a nutritional supplement for the support of hair, skin and nails. Methods: The study was conducted in two steps; in Part I (pilot study) a panel of 20 participants ingested either 3 g a day of MSM or placebo capsules for 16 weeks. Visual and subject self assessment of wrinkles and skin texture as the predominant sign of ageing was observed. In Part II (dose-response study), 63 participants ingested either 1 g or 3 g per day of MSM for 16 weeks. Expert clinical grading, instrumental measurements and consumer perception was used to evaluate skin conditions like lines and wrinkles. Additionally, instrumentational analysis was conducted using corneometer and cutometer for investigation of skin hydration, firmness and elasticity. Results: Part I of the study clearly indicates that oral ingestion of MSM (3 g/d) reduces signs of ageing like facial wrinkles ($p < 0.05$) and skin roughness ($p < 0.05$) as compared to placebo. Detailed analysis in Part II instrumentation assessments showed a significant ($p < 0.05$) improvement from baseline in the severity of facial wrinkles, as well as improved skin firmness, elasticity and hydration with MSM. Some of these parameters exhibited a good dose response indicating that the higher (3 g/d) of the supplement was more effective than the lower dose of 1 g/d, but generally the lower dose of 1 g/d appeared to be sufficiently effective in reducing the facial signs of ageing. Conclusion: This study indicated that MSM is effective in reducing visual signs of skin ageing even at a low dose of 1 g/d.

*F. Havas, S. Krispin, N. Borenstein-Auerbach, E. Loing, **Slowing the cellular clock**, Cosmetics & Toiletries, Vol. 135, January 2020, p. 49-57*

Skin is the barrier separating the body from the outer environment, protecting against water loss and external aggressions. Skin's condition is the most visible indicator of health and general status, and of age...or youth. Extrinsic and intrinsic factors affect skin aging. Extrinsic factors include exposure to sunlight or pollution, and repetitive muscle movements. Intrinsic aging represents physiological changes over time, occurring at variable, genetically determined rates. The combined effects of aging over the human lifespan lead to a loss of structural integrity and physiological function in the skin. Aged skin is susceptible to dryness, wrinkling, loss of elasticity and hyperpigmentation, among others.

*P. Rattanawiwatpong, R. Wanitphakdeedecha, A. Bumrungpert, M. Maiprasert, **Anti-aging and brightening effects of a topical treatment containing vitamin C, vitamin E, and raspberry leaf cell culture extract: A split-face, randomized controlled trial**, J Cosmet Dermatol. 2020 Jan*

Background: Skin aging has many manifestations such as wrinkles, uneven skin tone, and dryness. Both intrinsic and extrinsic factors, especially ultraviolet light-induced oxidative radicals, contribute to the etiology of aging. Human skin requires both water- and lipid-soluble nutrient components, including hydrophilic and lipophilic antioxidants. Vitamins C and E have important protective effects in the aging process and require exogenous supply. Raspberry leaf extracts contain botanical actives that have the potential to hydrating and moisturizing skin. Topical products with these ingredients may therefore combine to provide improved anti-aging effects over single ingredients. Objectives: To evaluate the anti-aging and brightening effects of an encapsulated serum containing vitamin C (20% w/w), vitamin E, and European raspberry (*Rubus idaeus*) leaf cell culture extract. Methods: Fifty female volunteers aged 30-65 years were allocated one capsule of serum for topical application on one side of the face for 2 months, in addition to self-use of facial skin products. Both test (treated) and contralateral (untreated) sides were dermatologically assessed after 4 and 8 weeks. Skin color (melanin index), elasticity, radiance, moisture, and water evaporation were measured by Mexameter MX18®, Cutometer®, Glossmeter GL200®, Corneometer CM825®, and Tewameter TM300® instruments, respectively (Courage + Khazaka Electronic GmbH). Skin microtopography parameters, smoothness (SEsm), roughness (SEr), scaliness (SEsc), and wrinkles (SEw), were measured by Visioscan® VC98 USB (Courage + Khazaka Electronic GmbH), and gross lifting effects were measured by VECTRA® H1 (Canfield Scientific), and adverse reactions and satisfaction were also assessed. Results: Skin color, elasticity, and radiance were significantly improved. The smoothness, scaliness, and wrinkles were also revealed significant improvement. Mild adverse reactions were tingling and tightness. Conclusions: The vitamin C, vitamin E, and raspberry leaf cell culture extract serum has anti-aging and brightening effects of skin.

*S. Yamawaki, **Scar Evaluation**, in R. Ogawa (Edt): Total Scar Management: From Lasers to Surgery for Scars, Keloids, and Scar Contractures, Springer December 2019*

Scars induce cosmetic disfigurements, functional disorders, and psychological problems. The treatment of scars is challenging for plastic surgeons. Many treatment modalities are available for scars, including surgical excision, steroid injection, silicone gel sheeting, pressure treatment, and laser treatment. Thus, it is essential to robustly assess the outcomes of scar treatment. Assessment tools for

scars fall into two categories, namely subjective assessment using scar rating scales and objective assessment using devices. We introduce the most common assessment methods in this chapter.

S. Heraud, A. Delalleau, A. Houcine, B. Guiraud, D. Bacqueville, B. Payre, M.-B. Delisle, S. Bessou-Touya, O. Damour, Structural and Biomechanical Characterization of a Scaffold-Free Skin Equivalent Model via Biophysical Methods, Skin Pharmacol Physiol. 2019 Dec 18: p.1-13

Aims: Among in vitro skin models, the scaffold-free skin equivalent (SFSE), without exogenous material, is interesting for pharmacotoxicological studies. Our aim was to adapt in vivo biophysical methods to study the structure, thickness, and extracellular matrix of our in vitro model without any chemical fixation needed as for histology. **Methods:** We evaluated 3 batches of SFSE and characterized them by histology, transmission electron microscopy (TEM), and immunofluorescence. In parallel, we investigated 3 biophysical methods classically used for in vivo evaluation, optical coherence tomography (OCT), and laser scanning microscopy (LSM) imaging devices as well as the cutometer suction to study the biomechanical properties. **Results:** OCT allowed the evaluation of SFSE total thickness and its different compartments. LSM has a greater resolution enabling an evaluation at the cell scale and the orientation of collagen fibers. The viscoelasticity measurement by cutometry was possible on our thin skin model and might be linked with mature collagen bundles visible in TEM and LSM and with elastic fibers seen in immunofluorescence. **Conclusion:** Our data demonstrated the simplicity and sensitivity of these different in vivo biophysical devices on our thin skin model. These noninvasive tools allow to study the morphology and the biomechanics of in vitro models.

A. Hameed, N. Akhtar, H.M. Shoaib Khan, M.Asrar, Skin sebum and skin elasticity: Major influencing factors for facial pores, Journal of Cosmetic Science, Volume 18, Issue 6, December 2019, p. 1968-1974

Objective: The current research work was initiated to develop anti-aging phytocosmetic formulation of phytoantioxidant, to evaluate their effect on human skin, and to link R parameters of skin with skin sebum and aging. **Methods:** According to COLIPA, 10 healthy male volunteers, aged between 20 and 30 years, having no skin infection or other hypersensitivity disorders, were included in the study. The effect of formulation was evaluated on skin pores and skin elasticity on cheeks for 90 days at regular interval. Various parameters of visible facial pores were assessed using the Skin VisioFace®, Cutometer®, Elastometer®, and Sebumeter®. These data were compared and correlated to examine the possible relationship between visible facial pores, skin elasticity, and skin sebum. **Results:** From R0 to R9, R0, R5, and R9 were negatively correlated with elasticity while R7 shows a positive correlation with elasticity. R7 parameter of Cutometer® was negatively correlated with facial large pores ($r=-0.337$, $P=0.033$). R9 parameter of Cutometer® was significantly positively correlated with facial large pores ($r=0.54$, $P=0.000$). **Conclusion:** We could assume that the enhancement of skin elasticity would be the fundamental strategies in the prevention of size and count of visible facial pores (fine and large) by the application of formulation containing natural compounds.

F. Niforos, P. Ogilvie, M. Cavallini, C. Leys, J. Chantrey, M. Safa, S. Abrams, R. Hopfinger, A. Marx, VYC-12 Injectable Gel Is Safe And Effective For Improvement Of Facial Skin Topography: A Prospective Study, Clinical, Cosmetic and Investigational Dermatology 2019;12, p. 791–798

Objective: Evaluate safety and effectiveness of VYC-12 (Juvéderm Volite; an injectable crosslinked hyaluronic acid gel designed to improve skin quality attributes such as surface smoothness and hydration) for facial intradermal injection. **Materials and methods:** In a prospective, single-arm study, subjects with moderate/severe cheek skin roughness per Allergan Skin Roughness Scale (ASRS) received VYC-12 in the cheeks and forehead, and/or neck, with touch-up treatment to correct asymmetry 30 days later and optional repeat treatment 9 months after last treatment. The primary effectiveness measure was ASRS responder rate (percentage of cheeks with ≥ 1 -point improvement from baseline) at month 1. Skin hydration was instrument-assessed. **Results:** Of 131 subjects treated, 31 (23.7%) received touch-up treatment. ASRS responder rate was 96.2% at month 1, 76.3% at month 4, 34.9% at month 6, and 87.1% after repeat treatment. Responder rate in cheeks with severe baseline roughness was 93.8%, 83.1%, and 52.3% at months 1, 4, and 6, respectively. Skin hydration improved significantly ($P<0.01$) from baseline at all timepoints through month 9. Injection site responses were as expected. All treatment-related adverse events were mild/moderate. **Conclusion:** VYC-12 safely and effectively improved skin smoothness up to 6 months and hydration lasting 9 months.

N. Braun, S. Binder, H. Grosch, C. Theek, J. Ulker, H. Tronnier, U. Heinrich, Current Data on Effects of Long-Term Missions on the International Space Station on Skin Physiological Parameters, Skin Pharmacol Physiol 2019; 32: p. 43-51

Background: Skin reaction to spaceflight has not really been studied yet, although the skin has

a very important barrier function to protect the body and can contribute to a more general understanding of physiology. It is proposed here to make a more thorough investigation of the skin during longterm spaceflight, using noninvasive techniques. Aims: The aim of the present Skin-B study is to investigate the kinetics and range of possible skin modifications during long-duration spaceflights and their recovery. Methods: In order to investigate the effect on skin physiological parameters during spaceflight, measurements were carried out on 6 astronauts with respect to skin hydration, transepidermal water loss/n barrier function, and surface evaluation of the living skin in orbit. Additional measured parameters on the ground were skin elasticity, skin density and thickness, as well as microcirculation. Results: Data from the Skin-B subjects (n = 6) contradict the results obtained in the previous pilot study SkinCare (n = 1 subject). In the present study, no deterioration of the skin was found but rather an improvement in skin hydration and skin barrier function, and no changes or improvement in the appearance of the skin surface. Furthermore, the skin density and skin thickness as well as skin elasticity values were unchanged from pre-flight values. Conclusion: In conclusion, we found that spaceflight under present conditions has no negative impact on skin physiological parameters.

F. Spada, A.H. Lui, T.M. Barnes, Use of formulations for sensitive skin improves the visible signs of aging, including wrinkle size and elasticity, Clinical, Cosmetic and Investigational Dermatology 2019;12, p. 415–425

Background: Sensitive skin affects an increasingly large proportion of the population and is less tolerant to frequent and prolonged use of cosmetics. This study investigates the antiaging effects of a skin care system developed for use on sensitive skin. Methods: A total of 30 healthy Caucasian females, aged 32–72, were enrolled in this doubleblind randomized placebo-controlled split-face study. A routine consisting of twice daily topical applications of the test cleanser and test moisturizer or placebo or positive control products was followed for 28 days, with parameters measured at baseline and at 7-day intervals. Objective skin assessments for hydration, transepidermal water loss (TEWL), skin surface topography, elasticity and safety assessment were conducted. Results: Wrinkle surface, length and depth significantly improved by $34.8 \pm 4.7\%$ ($P < 0.001$), $19.0 \pm 3.2\%$ ($P < 0.05$) and $24.3 \pm 3.5\%$ ($P < 0.05$), respectively, after 28 days of skin care treatment with the test cleanser and test moisturizer. R2 (gross elasticity), R5 (net elasticity) and R7 (biological elasticity) significantly increased by $32.8 \pm 6.5\%$ ($P < 0.001$), $47.3 \pm 8.6\%$ ($P < 0.001$) and $50.6 \pm 5.1\%$ ($P < 0.001$), respectively, while R6 (viscoelastic portion) significantly decreased by $33.4 \pm 4.6\%$ ($P < 0.001$) after 28 days. Skin hydration was also found to increase significantly after 28 days by $42.2 \pm 8.5\%$ ($P < 0.01$), but there was no change in TEWL. No adverse events were reported. Conclusions: A novel skin care routine developed for use on sensitive skin significantly improves the signs of aging including hydration, wrinkle size and elasticity without significant adverse effects.

R. Lubart, I. Yariv, D. Fixler, A. Lipovsky, Topical Hyaluronic Acid Facial Cream with New Micronized Molecule Technology Effectively Penetrates and Improves Facial Skin Quality: Results from In-vitro, Exvivo, and In-vivo (Open-label) Studies, J Clin Aesthet Dermatol. 2019;12(10): p. 39–44

Background: Topical hyaluronic acid (HA) has shown effectiveness in maintaining skin hydration. Topical creams containing HA are widely available, but their efficacy is limited by their lack of penetration into the skin due to the large molecule size of HA, the result of being formulated into a cream base. Objective: In this three-part study (in vitro, ex vivo, and in vivo), molecule sizes, penetration levels, and antiaging qualities of a topical HA facial cream that was formulated using a new technology that micronizes HA molecules (m-HA) were assessed. Methods and Results: Particle sizes of m-HA were evaluated using electron microscopy, which showed varying sizes, the smallest of which was 100nm in diameter. The antioxidation capabilities of m-HA were measured using electron spin resonance and were found to be higher than original HA. Skin penetration of the m-HA formulation was evaluated via immunohistochemical staining of porcine skin samples, which demonstrated penetration of the formulation into the stratum corneum and the deep epidermal layers toward the dermis. Antiaging qualities of the m-HA formulation were assessed in an open-label clinical study that included 36 healthy adult women. Skin parameters were measured objectively (e.g., Corneometer, Cutometer) and subjectively via patient questionnaire, results of which indicated significant improvements in facial skin hydration, elasticity, and wrinkle depth. Conclusion: The topical HA facial cream with m-HA technology demonstrated penetration into the epidermal skin layer, and, to our knowledge, our formulation is the first HA facial cream to achieve this. Clinical application of the facial cream demonstrated objective and subjective improvements in facial skin quality of healthy adult female subjects. Our results support the use of this new HA facial cream with m-HA technology as an effective antiaging topical therapy. Larger randomized, controlled studies are needed to confirm our findings.

A.K. Langton, H.K. Graham, C.E.M. Griffiths, R.E.B. Watson, Ageing significantly impacts the

biomechanical function and structural composition of skin, *Experimental Dermatology*, 2019;28: p. 981–984

Skin ageing is a complex process involving the additive effects of skin's interaction with its external environment, predominantly chronic sun exposure, upon a background of time-dependent intrinsic ageing. Here, using non-invasive cutometry and ballistometry, we explore the consequences of ageing on the biomechanical function of skin in otherwise healthy White Northern European volunteers. Intrinsic skin ageing caused biomechanical decline; skin loses both resilience ($P < 0.01$) and elasticity ($P < 0.001$), which is characterised histologically by modest effacement of rete ridges ($P < 0.05$) and disorganisation of papillary dermal elastic fibres. At photoexposed sites, biomechanical testing identified significant loss of biomechanical function—particularly in the aged cohort. Photoaged forearm displayed severe loss of resilience ($P < 0.001$) and elasticity ($P < 0.001$); furthermore with repetitive testing, fatigue ($P < 0.001$), hysteresis ($P < 0.001$) and viscous “creep” ($P < 0.001$) were exacerbated. Histologically, both young and aged forearm displayed flattening of rete ridges and disruption to the arrangement of elastic fibres. We conclude that maintenance of skin architecture is inherently associated with optimal biomechanical properties. Modest perturbations to skin architecture—as exemplified by intrinsic ageing—result in moderate functional decline. Chronic sun exposure causes fundamental changes to the clinical and histological appearance of skin, and these are reflected by an extreme alteration in biomechanical function.

N. Nishimura, S. Inoue, K. Yokoyama, S. Iwase, Effect of spraying of fine water particles on facial skin moisture and viscoelasticity in adult women, *Skin Res Technol.* 2019;25: p. 294-298

Background/purpose: It is known that the elderly and adult women with reduction in sebum secretion have reduced skin barrier function, drying of the skin in a low humidity environment is accompanied by physiological distress. As our hypothesis, when fine water particles are sprayed on the skin, the water content of the corneal layer is significantly increased. In the present study, we examined the ability of fine water particles to improve facial skin moisture levels in adult women. **Methods:** We examined skin conductance, transepidermal water loss (TEWL), and skin elasticity as an index of skin barrier function at the cheek in 17 healthy adult women in the spraying of fine water particles, in the environment temperature at 24°C and 34.5% relative humidity. **Results:** The skin conductance of stratum corneum after 120 minute of spraying, A condition (peak particle size below 0.5 μm) was $119.7 \pm 25.1\%$, B condition (peak particle size 1.8 μm) was $100.4 \pm 31.7\%$, C condition (peak particle size 5.4 μm) was $110.1 \pm 25.0\%$, and the A condition was significantly higher than the B condition. Also, skin elasticity in the A condition tended to be higher value than in the other conditions. Transepidermal water loss (TEWL) after 120 minute of spraying showed a lower value in the A condition than in the other conditions. In the A condition, the skin conductance steadily maintained their initial levels up to 360 minute after spraying. **Conclusion:** Especially, by spraying smallest fine water particles, skin barrier function at the cheek was improved. These data indicated that non-charged fine water particles played an important role on moisten skin in a low humidity environment.

Y. Song, Y. Pan, H. Wang, Q. Liu, H. Zhao, Mapping the face of young population in China: Influence of anatomical sites and gender on biophysical properties of facial skin, *Skin Res Technol.* 2019;25: p. 333-338

Background: Facial skin exhibits unique biophysical properties, which are influenced by anatomical regions and genders. The aim of this study was to comprehensively assess the regional and gender differences in facial skin biophysical parameters among Chinese population. **Materials and Methods:** The 12 skin biophysical parameters at four distinct facial skin sites (forehead, cheek, canthus and chin) were measured in a normal population ($n = 212$) with 42 males and 141 females aged 18-29 years living in Beijing. These parameters consisted of skin hydration, transepidermal water loss, sebum content, erythema/melanin indices, $L^*a^*b^*$ color, skin gloss and elasticity, all quantifying with non-invasive instruments. **Results:** The results demonstrated that the characteristics of the facial skin were significantly different between the regions and genders. The forehead had weaker skin barrier function but secreted the most sebum content, while the cheek was the driest and brightest region on the face. The canthus was the most hydrated area and the chin displayed higher sebum secretion, darker skin color and less elastic. The females showed more hydrated, less oil, lighter and more elastic facial skin compared with males. **Conclusion:** This study indicates that the young Chinese facial skin significantly varies with face anatomical regions and differs between genders.

H. Cortes, J.J. Magana, O.D. Reyes-Hernandez, N. Zacauala-Juarez, M. Gonzalez-Torres, W. Diaz-Beltran, M.C. Leon-Trejo, L. Carino-Calvo, G. Leyva-Gomez, M. Gonzalez-Del Carmen, Non-invasive analysis of skin mechanical properties in patients with lamellar ichthyosis, *Skin Res Technol.* 2019;25: p. 375-381

Background: Reliable methods for the quantitative evaluation of skin of patients with ichthyosis are critically needed. Our purpose was to evaluate the biomechanical parameters of skin in a cohort of patients with clinically diagnosed lamellar ichthyosis. Materials and methods: Twenty-two patients diagnosed with lamellar ichthyosis were studied. Ichthyosis plaques located in upper distal limbs were assayed, and a nearby anatomical region without plaques from the same patient was employed as control. Skin biomechanical properties were studied through a non-invasive device (Cutometer ' ' MPA 580). Results: Ichthyosis plaques had higher values for the Uf-Ua parameter and lower values for the Ua/Uf, Ur/Ue, and Ur/Uf parameters. Adults and children showed similar statistical differences. There were no significant differences in data from men, whereas in women differences for all of the parameters were found. There was a significant decrease in the hydration and an increase in melanin index in the ichthyosis plaques. Conclusion: Our results suggest that analysis of parameters Uf-Ua, Ua/Uf, Ur/Ue, Ur/Uf, hydration, and melanin index could be employed for quantitative monitoring of skin. Therefore, the non-invasive method applied may be suitable for evaluation of skin of patients with ichthyosis in response to medical treatments.

L. Bolke, G. Schlippe, J. Gerß, W. Voss, A Collagen Supplement Improves Skin Hydration, Elasticity, Roughness, and Density: Results of a Randomized, Placebo-Controlled, Blind Study, Nutrients 2019, 11, 2494

The purpose of this randomized, placebo-controlled, blind study was to investigate the effects of the drinkable nutraceutical ELASTENfi (QUIRIS Healthcare, Gütersloh, Germany) on skin aging and skin health. Drinking ampoules provides a blend of 2.5 g of collagen peptides, acerola fruit extract, vitamin C, zinc, biotin, and a native vitamin E complex. This controlled interventional trial was performed on 72 healthy women aged 35 years or older. They received either the food supplement (n = 36) or a placebo (n = 36) for twelve weeks. A skin assessment was carried out and based on objective validated methods, including corneometry (skin hydration), cutometry (elasticity), the use of silicon skin replicas with optical 3D phase-shift rapid in-vivo measurements (PRIMOS) (roughness), and skin sonography (density). The verum group was followed for an additional four weeks (without intake of the test product) to evaluate the sustainability of the changes induced by the intake of the test product. The test product significantly improved skin hydration, elasticity, roughness, and density. The differences between the verum group and the placebo group were statistically significant for all test parameters. These positive effects were substantially retained during the follow-up. The measured effects were fully consistent with the subjective assessments of the study participants. The nutraceutical was well tolerated.

D. Ap O Modena, C. Nogueira da Silva, T.C.P. Delinocente, T.B. de Araújo, T.M. de Carvalho, C. Grecco, Re. Gomes Moreira, G. Campos, J.R. de Souza, R. Michelini Guidi, Effectiveness of the Electromagnetic Shock Wave Therapy in the Treatment of Cellulite, Dermatology Research and Practice, Volume 2019

In the past centuries, the human body was undervalued; nowadays, however, it is overvalued, and thus the manifestation of the dissatisfactions regarding the body has been increasing. Most of the time, these dissatisfactions are related to cellulite, which is most common in women. Its treatment is one of the challenges which encourage the development of new therapeutic modalities, among them the shockwave therapy. Objective. To evaluate the efficacy of ESWT in the treatment of cellulite in gluteus and posterior of thigh. Method. This is a prospective and comparative study, in which volunteer women who attended the criteria of inclusion were selected and who were subjected to 10 sessions of ESWT. The following were performed as an evaluation method: anthropometry, perimetry, skin viscoelasticity with the Cutometer, thickness of hypodermis with diagnostic ultrasound, analysis of the scale of severity of cellulite (CSS), and quality of life by the Celluqol questionnaire. The evaluations occurred before the first session (baseline), after 6 and 10 sessions, and during a follow-up of 3 months after the last session. The statistical test applied was the ANOVA one-way with post hoc of Tukey (P-value < 0.05). Results. There was significant improvement (P<0.05) for CSS, for the variable referring to gross elasticity and skin deformation ability evaluated in the Cutometer and improvement of quality of life represented by Celluqol. The result was maintained particularly in the follow-up of 3 months after the end of the treatment. Conclusion. The results presented demonstrated the effectiveness and safety of ESWT in the treatment of cellulite and in the decrease of the degrees, improvement of the aspect of the skin, and reestablishment of quality of life.

M. Sano, S. Hirakawa, Y. Yamanaka, E. Naruse, K. Inuzuka, T. Saito, K. Katahashi, T. Yata, T. Kayama, H. Tsuyuki, N. Yamamoto, H. Takeuchi, N. Unno, Development of a Noninvasive Skin Evaluation Method for Lower Limb Lymphedema, Lymphatic Research and Biology, Volume 00, Number 00, 2019

Background: The skin's condition is altered in lymphedema patients, and evaluating this change

is important. Some noninvasive methods for evaluating skin condition have been reported, especially in upper limb lymphedema. However, evaluating the skin in lower limb lymphedema remains challenging and is often limited to palpation. We aimed to develop a noninvasive skin evaluation method for lower limb lymphedema patients. **Methods and Results:** Twenty-five lower limb lymphedema patients were included. Skin induration and elasticity were measured using Indentometer IDM 400 and Cutometer MPA580. The relationship between the properties of skin from the healthy forearm and thigh, those of the affected thigh, and age was analyzed. Predicted skin induration age (IA) and elasticity age (EA) were calculated from the forearm, whereas actual values were calculated from the thigh, and the differences (DIA and DEA) were assessed. Patients were classified according to the International Society of Lymphology clinical staging system, and the differences in DIA and DEA were analyzed among the three groups (healthy, stage I/IIa, and stage IIb/III). Skin biopsy was performed in five unilateral lower limb lymphedema patients, and the dermal elastic fiber area was determined using microscopy with Elastica van Gieson staining. DEA significantly increased with disease progression, but DIA did not change significantly. Microscopy revealed elastic fiber filamentous changes, with decreased elastic fiber areas in lymphedema-affected skin. **Conclusion:** To our knowledge, this is the first report to evaluate lower limb skin elasticity in lymphedema quantitatively and noninvasively. DEA is useful for evaluating skin condition progression in lymphedema patients.

C. Cho, E. Cho, N. Kim, J. Shin, S. Woo, E. Lee, J. Hwang, J. Ha, Age-related biophysical changes of the epidermal and dermal skin in Korean women, Skin Res Technol. 2019; 25: p. 504-511

Introduction: The clinical characteristics of skin were investigated to study the interrelationship and changes in the biophysical properties of the epidermal and dermal layers associated with aging using noninvasive methods. **Methods:** Our study included 100 healthy women aged between the early 20s and late 60s. Biophysical characteristics of skin such as color (brightness and spots), transparency, wrinkle on crow's feet, elasticity, hydration, sebum content, glossiness, and transepidermal water loss measured under controlled conditions. **Results:** This study performed in a Korean population demonstrated that aging significantly affects human skin in terms of parameters such as wrinkles, skin color, elasticity, and epidermal hydration. Age-related changes in skin hydration showed varying patterns between the epidermis and dermis. Skin color showed heterogeneous characteristics between the upper and lower epidermal layers associated with aging. Skin elasticity and wrinkles were observed to show an inversely proportional relationship in the early 40s. **Conclusions:** We confirmed the significant influence of aging on the biophysical properties of skin and determined the distinct age-related biophysical changes in the epidermal and dermal layers of skin using noninvasive method. This study indicates the need for further research to investigate the distinctive age-related changes in characteristics of the epidermal and dermal layers of human skin.

H. Cortés, J.J. Magaña, O.D.Reyes-Hernández, N. Zacauala-Juárez, M. González-Torres, W. Díaz-Beltrán, M.C. León-Trejo, L. Cariño-Calvo, G. Leyva-Gómez, M. González-Del Carmen, Non-invasive analysis of skin mechanical properties in patients with lamellar ichthyosis, Skin Res Technol. 2019; 25: p. 375-381

Background: Reliable methods for the quantitative evaluation of skin of patients with ichthyosis are critically needed. Our purpose was to evaluate the biomechanical parameters of skin in a cohort of patients with clinically diagnosed lamellar ichthyosis. **Materials and methods:** Twenty-two patients diagnosed with lamellar ichthyosis were studied. Ichthyosis plaques located in upper distal limbs were assayed, and a nearby anatomical region without plaques from the same patient was employed as control. Skin biomechanical properties were studied through a non-invasive device (Cutometer® MPA 580). **Results:** Ichthyosis plaques had higher values for the Uf-Ua parameter and lower values for the Ua/Uf, Ur/Ue, and Ur/Uf parameters. Adults and children showed similar statistical differences. There were no significant differences in data from men, whereas in women differences for all of the parameters were found. There was a significant decrease in the hydration and an increase in melanin index in the ichthyosis plaques. **Conclusion:** Our results suggest that analysis of parameters Uf-Ua, Ua/Uf, Ur/Ue, Ur/Uf, hydration, and melanin index could be employed for quantitative monitoring of skin. Therefore, the non-invasive method applied may be suitable for evaluation of skin of patients with ichthyosis in response to medical treatments.

S.H. Kim, S.J. Lee, J.W. Lee, H.S. Jeong, I.S. Suh, Clinical trial to evaluate the efficacy of botulinum toxin type A injection for reducing scars in patients with forehead laceration, Medicine (2019) 98:34(e16952)

Skin damage by either trauma or surgical intervention inevitably results in scar formation. In some patients, facial scars can be cosmetically disfiguring and may cause functional impairment and psychosocial withdrawal.[1] Cutaneous scars are generally distinguished from surrounding normal skin

by differences in color, thickness, contour, compliance, overall cosmetic, and functional damages such as contracture formation. Not only the disfigurement contributes to the undesirable appearance, but also to prolonged contracture, itching, or tingling which intervenes in the daily-living of patients. Young and Hutchison found that patients were usually dissatisfied with their surgical scars, irrespective of sex, age, ethnicity, or geographical location and that 91% of them would value even a small improvement in their scars.[2] Although surgeons make every effort to prevent widening, hypertrophy, hypo- or hyperpigmentation of scars, in some situations (massive trauma or burn) the situations is out of their hands, resulting in horrible sequelae. Despite numerous methods, such as excision, steroid administration, radiation, laser, and pressure therapy, having been introduced until now, scar management has always been a troublesome and challenging task for surgeons.

B. Hersant, M. Sid-Ahmed, L. Braud, M. Jourdan, Y. Baba-Amer, J.-P. Meningaud, A.-M. Rodriguez, Platelet-Rich Plasma Improves the Wound Healing Potential of Mesenchymal Stem Cells through Paracrine and Metabolism Alterations, Stem Cells International, Oct 2019

Chronic and acute nonhealing wounds represent a major public health problem, and replacement of cutaneous lesions by the newly regenerated skin is challenging. Mesenchymal stem cells (MSC) and platelet-rich plasma (PRP) were separately tested in the attempt to regenerate the lost skin. However, these treatments often remained inefficient to achieve complete wound healing. Additional studies suggested that PRP could be used in combination with MSC to improve the cell therapy efficacy for tissue repair. However, systematic studies related to the effects of PRP on MSC properties and their ability to rebuild skin barrier are lacking. We evaluated in a mouse exhibiting 4 full-thickness wounds, the skin repair ability of a treatment combining human adipose-derived MSC and human PRP by comparison to treatment with saline solution, PRP alone, or MSC alone. Wound healing in these animals was measured at day 3, day 7, and day 10. In addition, we examined in vitro and in vivo whether PRP alters in MSC their proangiogenic properties, their survival, and their proliferation. We showed that PRP improved the efficacy of engrafted MSC to replace lost skin in mice by accelerating the wound healing processes and ameliorating the elasticity of the newly regenerated skin. In addition, we found that PRP treatment stimulated in vitro, in a dose-dependent manner, the proangiogenic potential of MSC through enhanced secretion of soluble factors like VEGF and SDF-1. Moreover, PRP treatment ameliorated the survival and activated the proliferation of in vitro cultured MSC and that these effects were accompanied by an alteration of the MSC energetic metabolism including oxygen consumption rate and mitochondrial ATP production. Similar observations were found in vivo following combined administration of PRP and MSC into mouse wounds. In conclusion, our study strengthens that the use of PRP in combination with MSC might be a safe alternative to aid wound healing.

M. Kubiak, P. Mucha, H. Rotsztejn, Comparative study of 15% trichloroacetic acid peel combined with 70% glycolic acid and 35% trichloroacetic acid peel for the treatment of photodamaged facial skin in aging women, J Cosmet Dermatol., 2019 Oct

Background: Photoaging (extrinsic aging) is caused by environmental exposure to ultraviolet radiation. Superficial and medium-depth chemical peels with trichloroacetic acid (TCA) are performed to reduce wrinkles, hyperpigmentation, dryness, and erythema caused by photoaging process. Aim: The aim of this study was to compare the efficacy and tolerability of 15% TCA peel against the combined 70% glycolic acid and 35% TCA for the treatment of photodamaged facial skin. Patients/methods: Forty female patients with types II and III of Glogau photoaging scale were divided into two groups of twenty subjects (GA/TCA and 35% TCA). The GA/TCA group was treated with combination peeling of 70% GA and 15% TCA, whereas the 35% TCA group was treated with monopeeling of 35% trichloroacetic acid. Each patient was submitted to five sessions of these peels, with an interval of 14 days between each session. The following skin aging parameters were examined before treatments, before each session, and 3 months after the last application: hydration, elasticity, melanin index, and erythema index (MPA-5; Courage-Khazaka, Germany); and depth and volume of wrinkles (PRIMOS; GFMesstechnik GmbH, Germany). Results: Both peel methods achieved significant improvement in all skin parameters: elasticity, hydration, melanin index, and erythema index. Significant differences between the GA/TCA and 35% TCA groups were found only for hydration and melanin index. GA/TCA was characterized by significantly higher values of the hydration parameter and lower values of melanin index compared with 35% TCA. Combination peel GA/TCA did not cause dryness, edema, or intensive lysis of the epidermis, and the frequency of peel-induced erythema did not increase with the addition of glycolic acid, but with higher concentration of the TCA solution. However, subject-perceived improvements of the 35% TCA peel did not differ significantly from subject-perceived improvements of combination peel treatment. Adverse events requiring intervention or discontinuing treatment were not observed in either group. Conclusion: The addition of glycolic acid before 15% TCA chemical peel application significantly enhanced TCA-induced improvement in photoaging parameters (increase in skin elasticity and

hydration; reduction in melanin index and erythema index), and subject-perceived improvements. However, 35% TCA peel is more effective in reducing wrinkles, despite a lower tolerability. Both medium-depth chemical peels including 15% TCA in combination with 70% GA and 35% TCA alone proved to be useful for the removal of epidermal or superficial lesions and to improve the texture of photodamaged facial skin (grade II-III Glogau photoaged skin).

M. Napoli, S. Gervason, J.-Y. Berthon, E. Filaire, Psychobiological approach for a positive skin ageing: target senescence cells to boost emotion, presentation at the 25th IFSCC Conference Milan, October 2019

The world's population is getting older. According to Euromonitor, as of 2019, 1.7 billion people globally, or 23% of the global population, is aged 50 or above. Life expectancy is rising around the globe. The average global life expectancy is 72.3 years with some countries exceeding this average, such as Japan at 84.1 years, the United Kingdom at 81.3 years and the United States at 79 years. Thus, population ageing has become a global phenomenon in recent decades. Even if people are living longer, they have a growing desire to be healthier. Healthy living is no longer a sub-culture; it is a prominent part of mainstream culture globally across all industries, ranging from sleep devices to supplements, healthy snacks and beverages... The pursuit of healthier lifestyles is driven by a desire for two things: the ability to live a quality life in the present and the ability to live a long life in the future. It is the distinction between prolonging life and prolonging quality of life, which differentiates the topics of health and ageing. Thus, the desire to be healthier is changing the narrative of ageing, moving away from fighting the signs of ageing to focusing on "looking and feeling good at any age". This shift is most evident in the beauty industry. Terms such as 'successful ageing', 'active ageing' and 'positive ageing' are now part of the discourse with regards to growing older. From this trend, a new dermo-cosmetic concept emerged, well ageing, which focuses on wellness in order to maintain health capital. This concept is linked to the psychophysiological approach.

K. Saito, F. Fujita, A. Yamaguchi, K. Motonami, Y. Yamamoto, T. Shimada, M. Toriyama, R. Utami, Y. Suzuki, M. Tominaga, K.J. Ishii, A new anti-inflammatory agent from a traditional Japanese spa: The role of TRPM4 in immune responses in keratinocytes and its activating agent, presentation at the 25th IFSCC Conference Milan, October 2019

The immune system is essential in protecting the human body against attacks by harmful viruses and bacteria and exposure to certain antigens. However, excessive immune reactions in the skin lead to inflammation and cause skin troubles such as dryness, decreasing elasticity, and pore conspicuousness in the skin. Hariya et al. reported that the inflammatory cytokine interleukin 1 receptor antagonist (IL-1ra)/ IL-1 α ratio was higher in female subjects with sensitive skin than in healthy control subjects. That ratio also correlated with the values for transepidermal water loss (TEWL), an index of the skin's barrier function. Matrix metalloproteases (MMPs), which degrade collagen and lead to sagging or wrinkles in the skin, are activated by inflammatory cytokines under exposure to ultraviolet (UV) rays, resulting in decreased skin elasticity. It was also reported that women with abundant large facial pores showed high TEWL values and high sebum content with significant amounts of free fatty acids. Oleic acid increases intracellular calcium ion concentration in keratinocytes, induces abnormal keratinization, and induces IL-1 α in keratinocytes, suggesting that it causes parakeratosis around the facial pores. Keratinocytes produce IL-1 α that initiates immune reaction and enhances keratinocytes growth by stimulating the growth factor production by fibroblasts. Keratinocytes also release cytokines in response to non-infective environmental factors such as chemical substances and UV irradiation as well as injury or infection. As a result, unnecessary immune reactions occur. Therefore, it is important to properly regulate immune responses in keratinocytes as excessive activation of keratinocytes may cause abnormal proliferation, resulting in skin problems.

C. Matsuda, R. Uematsu, M. Ogura, Y. Hada, H. Iwano, S. Sawakio, Correlation between proteasome activity and ECM components synthesis and improvement effect of skin elasticity by adzuki bean extract, presentation at the 25th IFSCC Conference Milan, October 2019

The proteasome is a large multi-protein complex that plays a central role in protein degradation. Proteasome activity decreases with age, and proteasome inhibition results in increased production of MMPs and decreased collagen synthesis in fibroblasts. Although proteasome may play an important role in maintaining ECM components, there have been few studies investigating the correlation between proteasome activity and synthesis of ECM components other than collagen. To elucidate new mechanisms of sagging on the face with age, we focused on the correlation between proteasome activity and ECM components synthesis. It was revealed that inhibition of proteasome activity reduced gene expression of collagen, hyaluronan synthase and elastin in fibroblasts. This result suggests that proteasome plays an important role in maintaining ECM components. Therefore, a decline of

proteasome activity may lead to increased wrinkles and sagging with age. Furthermore, we found that adzuki bean extract had an effect that improved the elasticity of the skin by activating proteasome. Adzuki bean extract effectively increased proteasome activity, collagen synthesis and gene expression of hyaluronan synthase and elastin in fibroblasts. Moreover, it improved the elasticity and tactile elasticity of the face *in vivo*. Together, the findings suggest that adzuki bean extract increases ECM components synthesis by increasing proteasome activity and that this effect appears even *in vivo*.

K. Takagaki, Y Matsumoto, M. Sawane, Y. Hara, A. Miyake, K. Kajiya, Holistic Beauty -3-Dimensional Macroscopic Visualization of Vasculature in Skin and its Physical Relevance in Skin-Aging, presentation at the 25th IFSCC Conference Milan, October 2019

There seems to be ever increasing interest for “holistic beauty” in the cosmetic field, which refers to the idea that skin is not a separate organ but is physically and functionally connected to the body through its vascular, immune, and endocrine systems. Oriental medicine has the view that skin is a mirror of the rest of the body. This perhaps shows that the connection between the skin and body has long been emphasized in Asia. Following this, in western medicine, as William Osler stated, “A man is as old as his arteries.” Vascular function is particularly related to the aging process, which includes the skin. However, the relevance of blood vessels to the process of skinaging, including their physical properties, still remains to be elucidated. In this study, we succeeded in making a 3-dimensional (3D) “macroscopic” visualization of capillaries in human skin. It revealed that capillaries are densely and uniformly networked in the upper dermis – particularly with a regular loop structure just below the epidermis – and were reduced with photo-aging. This innovative visualization of the skin’s 3D capillary structure allowed the examination of the relationship between the capillaries and physical features of the skin, like elasticity, with *in vivo* testing using optical coherence tomography angiography and a newly established *in vitro* model. This work suggested that elasticity was strongly correlated with the density and size of capillaries. Furthermore, our *ex vivo* skin culture model clearly demonstrated that type I collagen was found closely surrounding the blood vessels, suggesting a possible mechanism of increased elasticity by vessel-associated collagen production. These results indicate that blood vessels play an important role in maintaining skin elasticity. Previous studies have argued that skin elasticity is only controlled by dermal matrix components like collagen, elastin, and hyaluronic acids. Here, for the first time, we revealed both *in vivo* and *in vitro* that capillaries can control the skin’s physical properties. This data seems to explore a new avenue of understanding in the skin’s physical properties which could allow us to provide expanding holistic solutions to promote better skin health and greater beauty.

M. Benvegnu, C. D’Erceville, I. Bonnet, D. Hérault, A. Mine Solène, V. Frei, The Sustainable Rambutan Program: A Multiple Valorization to Foster a Better Local Impact, presentation at the 25th IFSCC Conference Milan, October 2019

In the global trend of responsible living, consumer’s beauty routine is one key field where consumers seek for products with ecological and social engagements. The future cosmetic solutions should be developed with an environmental consciousness while keeping the same high level of *in vitro* demonstrated biological efficacy and clinical performance. Responsible living is a daily challenge, women and men want to give their skin and hair special care to counter environmental impacts, but not to the detriment of the planet. Consumers are now searching for more ethical cosmetic products, which are as healthy for them as they are for the earth. Consequently, the cosmetic industry has taken up the trends of the demand of modern consumers and their growing environmental awareness to continue developing sustainable solutions. This industry expects more responsible cosmetic ingredients from suppliers who can assure a reliable supply chain and social commitment, and who will not compromise on the level of effectiveness. This is the starting point of our work. Capitalizing on our experience acquired with a previous Argan program, we identified a plant and built a new specific supply chain in cooperation with a long-standing local partner in Vietnam. We identified rambutan, also called *Nephelium lappaceum*, a well-known tree in Asia, that grows in the humid tropics. Out of the fruit itself, we discovered that other by-products of the rambutan plant may possess interesting properties for our skin’s health and beauty.

V.R. Moraes, P.M.B.G. Maia Campos, Characterization of Nondiabetic and Diabetic Type 2 Skin in the Aging Process Using Biophysical and Skin Imaging Techniques, presentation at the 25th IFSCC Conference Milan, October 2019

The aging process is a biological, multifactorial and complex phenomenon that includes intrinsic and extrinsic factors. The intrinsic factors are correlated with genetic and metabolism and the extrinsic factors are caused by sun exposition, pollution and other. Both processes results in skin aging, where signs as wrinkles, expression lines, changes in dermal thickness can be observed. Advanced glycation end products – AGEs, are originated from no enzymatic reactions which involves the reduction of sugars

and amino groups of proteins and amino acids. Collagens are essential proteins since they are responsible for the extracellular matrix structure. The AGEs cause modifications on the matrix, once the skin collagen deteriorates by crosslinking process. People with Diabetes have more AGEs in the tissue due to the high glucose concentration, which can cause skin damages. Thus, diabetic patients are more predisposed to signs of early aging than healthy people. In this context, it is very important the better comprehension of the diabetic skin in comparison to the no diabetic one. Thus, the aim of this study was to evaluate the clinical changes in the diabetic type 2 skin by biophysical skin imaging techniques.

F. Carlomagno, Effectiveness of a Biotechnological Active Ingredient for Cosmetics Targeting Skin Microbiota Protection, presentation at the 25th IFSCC Conference Milan, October 2019

The skin is the largest organ of the human body in surface, mainly serving as a physical barrier which protects the body from external aggression. An adult's skin hosts an average population of 1,000 billion microorganisms among fungi, viruses and bacteria. This fauna lives and moves on the skin surface as well as in the superficial layers of the epidermis to down to the hair follicles and glands. Microorganisms form a complex ecosystem collectively referred to as skin microbiota. This tiny, but important micro-world is essential for the skin to main it healthy and to work as a perfect barrier. A distinctive combination of microorganisms all over our body is peculiar for all of us, although scientists point out that skin microbiome varies a lot during our lives. This variation is linked to age, changes of lifestyle and to the external stressors we are submitted to (4). Different body sites can also have completely different skin microbiota configurations, both inter- and intra-personally, linked to the peculiar characteristics of that precise micro-environment. For example, just focusing on the face, studies show that there are great differences between forehead and cheek skin microbiota, due to the existence of moist, dry and sebaceous skin sites (5). Despite continuous changes in its composition, when the body is healthy, skin microbiota seems to be an equilibrium between protective and pathogens microorganisms. These live together in a complex community and have a number of different symbiotic interactions. If we consider bacteria, the most important and frequent phyla living on human skin are Actinobacteria, Firmicutes, Proteobacteria and Bacteroidetes, without huge differences among ethnicities. Further, looking more deeply into specific taxonomic classification, as class or genus or species, we can find differences among peoples' microbiomes even by looking at subjects with very similar age, lifestyle, and from the same ethnicities. The general truth for everyone's healthy condition seems to be the homeostasis of skin microbiota with its singular peculiarities.

E. Lee, J.Y. Lee, S. Woo, Y. Noh, J. Shin, P. Ruan, J. Ha, Variation of Biophysical Parameter with Skin Aging from Distinct Geographic Locations in South Korean and Chinese women, presentation at the 25th IFSCC Conference Milan, October 2019

There are the differences of skin properties with aging in various ethnic groups. Within the same ethnic group, it is also important to understand that the change of skin with aging as well as skin characteristics be influenced by external environment, such as climatic condition, UV radiation and environmental pollution. The purpose of this study was to investigate the alteration of biophysical parameter with aging in different locations.

H. Yoshida, K. Yamazaki, A. Komiya, M. Aoki, S. Kasamatsu, T. Murata, T. Sayo, M.Z. Cilek, Y. Okada, Y. Takahashi, Inhibitory effects of Sanguisorba officinalis root extract on HYBID (KIAA1199)-mediated hyaluronan degradation and skin wrinkling, International Journal of Cosmetic Science, 2019, 41, p. 12–20

Objectives: Hyaluronan (HA), an important constituent of extracellular matrix in the skin, has many biological activities such as hydration that contributes to firmness and bounciness of the skin. We have reported that reduction in HA in the papillary dermis and over-expression of HYBID (HYaluronan Binding protein Involved in hyaluronan Depolymerization, alias KIAA1199 or CEMIP), a key molecule for HA degradation in skin fibroblasts, are implicated in facial skin wrinkling in Japanese and Caucasian women. However, little or no information is available for substances which inhibit the HYBID-mediated HA degradation. **Methods:** Inhibition of Sanguisorba officinalis root extract and ziyuglycoside I, one of the components of Sanguisorba officinalis root extract, to the HYBID-mediated HA degradation was assessed by size-exclusion chromatography of HA depolymerized by stable transfectants of HYBID in HEK293 cells (HYBID/HEK293 cells) or normal human skin fibroblasts (Detroit 551 cells and NHDF-Ad cells). The HYBID mRNA and protein expression was examined by quantitative real-time PCR and immunoblotting in the skin fibroblasts treated with Sanguisorba officinalis root extract, and size distribution of newly produced HA was evaluated by preparing metabolically radiolabelled HA. A double-blind, randomized and placebo-controlled study was carried out in the 21 healthy Japanese women, who were topically treated with the formulation containing Sanguisorba officinalis root extract or the placebo on each side of the face including crow's foot area. **Results:** Sanguisorba officinalis root extract,

but not ziyuglycoside I, abolished HYBID-mediated HA degradation by HYBID/HEK293 cells. Sanguisorba officinalis root extract also inhibited HYBID-mediated HA degradation in skin fibroblasts by down-regulating HYBID mRNA and protein expression. Although control untreated skin fibroblasts produced polydispersed HA, the cells treated with Sanguisorba officinalis root extract produced only high-molecularweight HA. Treatment with Sanguisorba officinalis root extract-formulated lotion significantly improved skin elasticity, and reduced skin wrinkling scores at the outer eye corner compared with the placebo formulation. Conclusion: Sanguisorba officinalis root extract showed an antiHYBID-mediated HA degradation activity and anti-wrinkle activity on human facial skin, which is accompanied by the improvement in elasticity. Our study provides the possibility of a new strategy to inhibit HYBID-mediated HA degradation for anti-wrinkle care.

A. Gimenez, O. Laporta, E. Canadas, E. Gonzalez, R. Delgado, The eyes: a reflection of genderless beauty, PERSONAL CARE NORTH AMERICA, October 2019, p. 18-20

Given the expansion of masculine products for facial skin care on the shelves around the world, eye contour ranges are in the spotlight as they can help reduce unwanted bags, dark circles and fatigue signs, offering excellent improvements in facial appearance. The skin surrounding the eyes is one of the most delicate of the body, which is why it can experience more accentuated aging changes that easily worsen the appearance of such important area. Eyeseryl® peptide acts on the mechanisms of glycation, vascular permeability and lipid accumulation, to minimize the presence of eyebags and dark circles and reduce skin damage in the fragile eye contour. As the clinical studies show, the ingredient is a good candidate to introduce in skin care formulations to improve the overall eye contour region of both men and women.

Ò. Expósito, M. Pérez, A. Gallego, T. Ruiz, M. Mas, P. Riera, D. Luna, S. Laplana, First Generation of Biomimetic Plant Membrane Lipids to Fight Energetic Ageing, sōfw journal, 145, 10/19

During ageing, as well as under stress situations, the cellular energy of the skin, and its vitality, decrease, causing what it is known as energetic ageing. The new active Olea VitaePLF (INCI name: Olea Europaea (Olive) Callus Culture Lysate) made from plant stem cells of wild olive tree sprouts, achieves the activation of the energetic rejuvenation cycles, through a new mechanism of action: the stimulation of Mitochondrial Synapses. This active represents the first generation of biomimetic plant cell membrane lipids: the Phyto-Lipidic Fractions (PLF), with a unique lipidic composition, that stimulates the communication between mitochondria, to boost the energy and vitality levels of the epidermal cells, increasing the production of structural proteins to obtain a clear anti-wrinkle, firming and repairing effect. Several *in vitro* and *in vivo* studies were performed to support these claims.

D. Khazaka, C. Uhl, In-house tests complement CRO final product testing, PERSONAL CARE EUROPE. September 2019

Before a cosmetic product is offered on the market, final tests are obligatory for the manufacturer to prove its safety and to substantiate the various claims on the products, e.g. reduces wrinkles up to 20%, increases skin hydration for 24 h. There are no limits to modern claims. All over the world, contract research organisations (CROs) varying from small laboratories to vast multinational institutes offer their services to the cosmetic manufacturers to perform all kind of tests and compile the final necessary product documentation.

S. Léglise, Ageing tackled by strengthening cell function, PERSONAL CARE EUROPE. September 2019

One might well call *Angelica archangelica*, the herbaceous plant from northern Europe that is particularly suited to lower temperatures "magical angelica". Its spicy, musky smell had a reputation in the Middle Ages for warding off evil spells! In the Renaissance, the root was recognised for its digestive properties, and the essential oil for its ability to induce sweating; it was also used against infections and epidemics such as the plague; while "angel grass" or its sister "angelica sinensis" is used in traditional Asian medicines. Edible, it is still used mixed with candied fruit in desserts (the French town of Niort is famous for its candied Angelica sticks), and in several famous liqueurs and luxury perfumes.

C. d'Erceville-Dumond, I. Bonnet, Solene Mine, F. Trombini, C. Kalem, V. Andre-Frei, Rambutan bioactives for hair and skin, PERSONAL CARE EUROPE. September 2019

BASF is sourcing the raw materials for three new highly effective natural skin and hair care ingredients from two of Vietnam's first organic-certified rambutan gardens. The bioactives are extracted from the fruit's peels, leaves and seeds- potential byproducts of fruit cultivation that are usually discarded. This form of upcycling benefits both the environment and local rural communities.

P. Pericu, C. Gherardi, H. Lambers, **Discovering the invigorating osmolyte**, PERSONAL CARE EUROPE. September 2019

Next to GENENCARE OSMS BA (Betaine), DuPont Industrial Biosciences has now added GENENCARE ' OSMS MI (INCI name: Inositol also known as myo-inositol) to the family of all-natural osmolytes. Like betaine, myo-inositol, is highly purified and suitable for many skin care applications. It is extracted from non-GM sugar beet, 100% biobased and Cosmos and Natrue certified. This article focuses on myo-inositol and describes the many versatile functions of this ingredient in particular how it is involved in the regulation of three main elements in skin: energy, oxygen and water. This is reflected and supported by an improved skin elasticity of the face in a large clinical test where an OAA/ cream with 3% myo-inositol was applied for 5 weeks and compared to a placebo cream and to the start of treatment.

X. Zeng, X. Li, X. Wang, X. Wen, X. Jiang, **The effect of Zanthoxylum bungeanum maxim extract on crow's feet: A double-blind, split-face trial**, Dermatologic Therapy 32(6), September 2019

Introduction: As one of the most obvious signs of aging, wrinkles have long been the concern of many people and continue to be a major topic in dermal-cosmetic industry. Accordingly, there is a need to develop products with good efficacy and safety profile. The Zanthoxylum bungeanum Maxim (ZBM) extract is a natural food which may possess the property of a toxin-like botulinum. Objective: To evaluate the efficacy and safety of a formulation that contains 2% ZBM pericarp extract in the treatment of wrinkles. Methods: 20 females aged 35 to 60 years old were enrolled in this randomized, vehicle-controlled, double-blind and split-face trial. The trial lasted for 30 days, when participants randomly used formulations containing 2% ZBM extract on one side of the temporal canthus and vehicle formulation on the other side. Skin roughness, skin hydration and skin elasticity were evaluated by Primospico, Corneometer® CM825 and Cutometer® MPA580, respectively. Results: The formulation containing 2% ZBM extract has a significant short-term anti-crow's feet effect compared with vehicle. No adverse effect was shown during the study. Conclusion: Topical application of 2% ZBM extract is tolerable and can be used as an effective cosmetic agent for short-term wrinkle treatment.

M. Lefort, L. Heider, V. Bicard-Benhamou, H. Hanau, **Youth in full bloom**, Cosmetics & Toiletries, Vol. 134, No. 8, p. 18-30

Red Poppy Extract for Under-eye Circles and Sagging: *Papaver rhoeas*, better known as com poppy, field poppy or red poppy, is abundant in nature, with 50-120 different species known worldwide. The common variety is large and showy, with four vivid red petals and a black, central base. While it often is grown as an ornamental plant, it also serves functional purposes. For example, the petals of *Papaver rhoeas* can be used to sooth coughs, whereas the seeds can be used as a food ingredient or for oil production.

S. Laneri, R. di Lorenzo, A. Bernardi, A. Sacchi, I. Dini, **Aloe barbadensis: A Plant of Nutricosmetic Interest**, Natural Product Communications Volume 15(7): 1–6

Aloe barbadensis Miller (Aloe Vera Linne) products have long been employed in health foods and for medical purposes. It has antiinflammatory, antifungal, antioxidant properties, which indicates excellent potential in antiaging cosmetic and skin protection products. The objective of this study is to evaluate the antiaging efficacy of dermocosmetic formulations containing *A. barbadensis* extract on young and mature skin using biophysical and skin imaging techniques. Twenty healthy adult volunteers participated in the study, aged between 20 and 65. The cream formulation, with 10% (w/w) of *A. barbadensis* extract, and placebo, were applied to the face of the volunteers. The effects were evaluated in terms of skin hydration and barrier effect by the measurement of transepidermal water loss (TEWL), derma firmness, and elasticity. The formulation containing *A. barbadensis* extract significantly improves water contained in the stratum corneum, firmness, elasticity of the skin, and decreased TEWL.

V. Chowjarean, P.P. Phiboonchaiyanan, S. Harikarnpakdee, P. Tengamnuy, **A natural skin anti-ageing serum containing pseudobulb ethanolic extract of *Grammatophyllum speciosum*: a randomized double-blind, placebo-controlled trial**, International Journal of Cosmetic Science 41(6), August 2019

Objective: *Grammatophyllum speciosum* is utilized to treat sore throats and bronchitis In Thai folk medicine. This study evaluated the in vitro activity and clinical efficacy of a *G. speciosum* pseudobulb decoction. Methods: Measure of in vitro anti-aging activity was performed using non-cell based assays as well as in CRL 2097 human fibroblast cells. A prophetic patch test method was used to determine skin irritation in 24 healthy Thai volunteers. A randomized double-blind, placebo-controlled trial was conducted with 24 subjects for 56 days after facial application to evaluate efficacy. The results were measured with Visioface® and Cutometer® MPA 580 as well as by visual observations. Results: The

total content of the antioxidant polyphenols in *G. speciosum* ethanolic extract (GSE) was 48.19 ± 0.39 mg EGCG equivalent per gram. The GSE possessed potent and higher anti-elastase activity more than EGCG. The extract was able to protect human fibroblasts against superoxide anion-induced cell death at the concentration of 10 $\mu\text{g/mL}$. In a clinical study, facial application of the serum containing 0.5% GSE was found to safely increase skin distensibility in healthy volunteers. Skin viscoelasticity and wrinkle volume were also significantly reduced ($p < 0.05$). Conclusion: Thus, both the in vitro and the clinical studies have illustrated the anti-wrinkle/anti-aging benefits of GSE on human skin.

A. Pérez Davó, M.T. Truchuelo, M. Vitale, J. Gonzales-Castro, Efficacy of an Antiaging Treatment Against Environmental Factors: Deschampsia antarctica Extract and Hightolerance Retinoids Combination, J Clin Aesthet Dermatol. 2019; 12(7): E65–E70

Background: Effects of environmental contaminants, such as air pollution and cigarette smoking on skin include increased oxidation, subclinical inflammation, and degradation of the dermal matrix, which can accelerate the skin aging process. Objective. An open-label, prospective study was conducted to assess the efficacy and tolerability of a topical anti-aging regimen comprising high-concentration retinoids, *Deschampsia antarctica* extract, and niacinamide in participants living in a heavily polluted (Level III, World Health Organization) city. Methods. Twenty-two female Caucasian volunteers with Fitzpatrick Skin Types III and IV were treated for 90 days with the topical anti-aging regimen. Subjective clinical assessments using the Rao-Goldman Scoring for Facial Aging, Patient's Global Assessment (PGA), and Investigator's Global Assessment (IGA). Additionally, objective instrumental assessments for wrinkles using Visia® (Canfield Scientific, Parsippany, New Jersey) and Visioline® (Courage+Khazaka Electronic GmbH, Cologne, Germany) and viscoelasticity and firmness using Cutometer® (Courage+Khazaka Electronic GmbH) were completed at baseline, Day 30, and Day 90. Results. At Day 30, wrinkles in the periorcular area significantly improved by 35.7 percent ($p=0.003$) compared to baseline. At the end of the study (Day 90), a significant improvement in firmness (41.7%) and viscoelasticity (12.8%) were observed. Tolerance for treatment was assessed as "good " or "very good" in 86.5 percent of the volunteers. Conclusion. This novel antiaging treatment regimen could potentially serve as an effective and long-term topical treatment option for improving signs of facial aging and protecting the skin from external factors associated with acceleration of the skin aging process, such exposure to UV radiation, air pollution, and cigarette smoke. Larger and longer-term, randomized, controlled clinical trials in more diverse population samples are needed to confirm our results.

F. Carlomagno, S. Zanzottera, Empowering the Micro-World of the Skin Microbiota: Approaches to Maintain Nature's Ideal Homeostasis for Betterment of Cosmetic Products, Euro Cosmetics, 6-2019, p. 18-22

Skin is a complex environment where billions of microorganisms live providing a unique environment for each host, collectively referred to as the skin microbiota. Skin microbiota is, therefore, the result of an equilibrium between protective and pathogens species of those microorganisms. However, this balance can be disrupted by stressors. The alteration of skin microbiota, known as dysbiosis, has been associated with skin disorders. This article is designed to demonstrate different approaches to the prevention of skin microbiota dysbiosis.

H. Dobrev, Value of non-invasive bioengineering investigations of the human skin in vivo, Dissertation in Dermatology and Venerology at the University of Plodiv, 2019, Bulgaria

The skin is the largest organ of the human body. It has a surface area of about 2 m² and a weight of about 16% of the body weight. Skin is a great visual field. Most of the changes that occur in it are visible and accessible to dermatologists. For centuries, the dermatologist's eyes and fingers have been his main diagnostic tools. Old physicians are known to describe the rash elements with great love, diligence and methodicality, especially with regard to morphological details. Today, this descriptive phase in the evolution of dermatology has lost its dominance. According to Prof. J. Serup, "*The dermatologist's eyes and hands are already becoming archaic diagnostic tools.*" With the introduction of modern skin bioengineering methods, there has been a transition from the "visible" to the "invisible". From the "visual" field, dermatology is increasingly becoming an "instrumental" field. The advantage of the new research methods created is that they enable the detection of invisible changes in skin functions, as well as their objective and quantitative measurement. This dissertation is devoted to the new methods of skin functional diagnostics. It illustrates the practical application of some of them in the field of dermatology and cosmetic science based on the experience of the sector of "Functional diagnostics of the skin" at the Department of Dermatology and Venereology, University Hospital "St. George", Plovdiv, Bulgaria. The literature review part provides an overview of current bioengineering methods for functional skin diagnostics. The apparatus used to carry out the present work is described in detail. Additionally, two little-known aspects of skin bioengineering research are presented - protocol

and research ethics. Data on Bulgarian experience in the field of skin functional diagnostics have also been reported

*M.T. Truchuelo, M. Vitale, A cosmetic treatment based on the secretion of *Cryptomphalus aspersa* 40% improves the clinical results after the use of nonablative fractional laser in skin aging, J Cosmet Dermatol., 2019 Jun*

Introduction: The main purpose of this study was to evaluate whether the application of a cosmetic treatment based on the secretion of *Cryptomphalus aspersa* (SCA) enhances the clinical results, tolerance, and skin regeneration after nonablative laser treatment in patients with moderate photoaging. Methods: Randomized, double-blind, split-face trial in 20 patients with moderate aging. Two sessions with fractional nonablative laser were performed, and the cosmetic treatments (SCA 40% on one hemiface and vehicle on the other) were applied immediately after laser session and daily during the study (28 days). Tewameter, Cutometer, Visioscan, VisioFace, photography, dermoscopy, and clinical evaluation were assessed. Side effects were also evaluated. Results: A significant decrease in the density of microcolumns (25%, 71%, 32%, and 61% less density, respectively, at T3 $P = 0.008$, T7 $P = 0.002$, T22 $P < 0.001$, and T24 $P < 0.001$) was observed on the side treated with SCA compared to the vehicle-treated side. Cutaneous elasticity, area of wrinkles, and hydration on the SCA-treated side also showed a significant improvement compared to the vehicle-treated side. Both the researcher and patients observed a significant improvement on the side treated with SCA compared to the vehicle-treated side. Significantly fewer side effects (erythema, burning, and dryness) were also detected. Conclusion: A cosmetic product with SCA 40% applied immediately after laser and for a period thereafter enhances and accelerates repair of damage produced by the laser and significantly reduces related adverse effects. In addition, SCA treatment could improve clinical results. In conclusion, we suggest that SCA enhances the effectiveness of laser in the treatment of cutaneous aging.

T. Yazdanparast, K. Yazdani, P. Humbert, A. Khatami, S.A. Nasrollahi, H. Zartab, L. Izadi Firouzabadi, A. Firooz, Biophysical and ultrasonographic changes in lichen planus compared with uninvolved skin, International Journal of Women's Dermatology 5 (2019), p. 100–104

Background: Lichen planus (LP) is a chronic inflammatory disease of the skin. Currently, noninvasive techniques are used to evaluate biophysical properties of the skin in vivo. Objective: In this study, we aimed to evaluate skin biophysical properties in patients with LP and make a comparison between involved and uninvolved skin to provide a better understanding of the pathogenesis of LP. Methods: The stratum corneum hydration, transepidermal water loss, pH, erythema, melanin, sebum, friction, temperature, elasticity parameters (R0, R2, R5), and thickness and echo-density of the epidermis, dermis, and subepidermal low echogenic band were measured on lesions of classic LP in 21 patients and compared with the average of perilesional and symmetrical uninvolved skin (as control) with a paired t test. Results: Stratum corneum hydration ($p = .002$), sebum ($p = .04$), R0 ($p = .005$), and echo-density of the dermis ($p = .005$) were significantly lower, but pH ($p = .007$), melanin content ($p = .001$), erythema ($p = .001$), temperature ($p = .01$), thickness of dermis ($p = .02$), and subepidermal low echogenic band ($p = .001$) were significantly higher in LP lesions. Conclusion: An evaluation of its biophysical, biomechanical, and ultrasonographic characteristics showed that the skin is an objective, noninvasive, and quantitative measuring tool that can be used to provide valuable information about skin changes in classic LP.

M. Nawaz, H.M. Shoaib Khan, N. Akhtar, T. Jamshed, R. Qaiser, H. Shoukat, M. Farooq, Photodamage and Photoprotection: An In vivo Approach Using Noninvasive Probes, Photochemistry and Photobiology 95(5), May 2019

Solar radiations trigger the physiological alteration in skin which progress toward photoaging. Sunscreens are known to be effective against the photodamaging effects of sunlight. The purpose of this study was to evaluate the extent to which aging signs caused by real-life sunlight exposure could be avoided by comparing various parameters between sun-exposed and sun-protected skin using noninvasive probes. Female volunteers ($n = 11$) after getting their consent were provided with marketed sunscreen product to apply onto their skin for 6 months. Measurements were scheduled every 15 days from the baseline reading for 6 months. Cutometer, Mexameter and Corneometer were used for evaluation of facial skin parameters. Clinical evaluations showed the effects of sunlight exposure on different skin parameters by comparing sun-protected and unprotected skin, where Gross elasticity (R2), Net elasticity (R5), Viscoelasticity (R6) and Biological elasticity (R7) showed insignificant results, while Hydration, Melanin and Erythema showed significant results. Sun-exposed skin presented 0.72%, 0.66%, 0.77%, 1.39%, 1.99%, 2.01% and 3.15% changes in R2, R5, R6 and R7, melanin, erythema and hydration, respectively, which were potentially prevented by sunscreen application. Premature aging is

inhibited by following photoprotective regimen on routine basis, emphasizing the potential benefit of sunscreen against early aging signs.

H. Azaryan, Comparative Analysis of the Efficiency of the Skin Functional Statement Correction Methods in Women with 3rd Degree of Photo Aging, Georgian Med News, 2019 May;(290): p. 100-107

The purpose of this study was to conduct a comparative analysis of the effectiveness of isolated and combined use of intradermal injections of bioreparant (hyaluronic acid modified with vitamin C, glutathione and cysteine) and platelet-rich autologous plasma on functional indicators of the face skin of women with signs of 3-rd degree of photoaging. In this study, 120 women with 3-rd degree of photoaging were examined (mean age 34.5 ± 1.54) and divided into 3 groups in accordance with the applied therapy method (isolated and combined use of plasma therapy and bio reparation). The study of the functional parameters of the skin, including corneometry (determination of the degree of epidermal hydration), sebumetry (assessment of the sebum regulating function of the epidermis), cutometry (determination of the deformation and elastic properties of the skin), TEWL (determination of the transepidermal water loss level), mexametry (assessment of skin pigmentation) and pH-metry (assessment of the skin acid-base balance) was performed in all examined patients. The obtained results testify to various shifts in functional parameters, caused by the use of various therapeutic approaches. A comparative analysis of the data obtained has provided a basis for concluding that efficacy of the autologous plasma and modified hyaluronic acid combined implementation is significantly higher compared to the isolated application of these methods.

M. Kanlayavattanakul, N. Lourith, P. Chaikul, Youth in Yields - Jasmine Rice Extract Whitens, Protects and Smooths Skin, Cosmetics & Toiletries, Vol. 134, No, 5, May 2019, p. 26-33

The demand from consumers for natural products including cosmetics continues to increase. Eco-friendly, organic and sustainable options are in the mainstream of this trend. Moreover, active phenolics derived from natural sources are playing an important role in the safety and efficacy of cosmetics. In relation, rice, or *Oryza sativa* cv. Indica (Oryzaceae), is well-known as the major staple in Asian cuisine. It has long been used in traditional Asian medicines as well as Italian remedies, including for aesthetic benefits for skin.

L.O. Gueitas, C.C. Benevenuto, R.B. Rigon, F.C. Alvés, G.R. Leonardi, Avaliação da firmeza e textura da pele através de técnicas biofísicas e análise de imagem, Congresso Colamig, São Paulo, May 21-23, 2019

Há uma grande necessidade de técnicas que complementem a avaliação das propriedades viscoelásticas da pele com intuito de melhorar a avaliação da flacidez cutânea de forma global através da análise de diferentes aspectos da condição e morfologia da pele

K.C. Lee, A. Bamford, F. Gardiner, A. Agovino, B. ter Horst, J. Bishop, L. Grover, A. Logan, N. Moiemmen, Burns objective scar scale (BOSS): Validation of an objective measurement devices based burn scar scale panel, Burns (2019)

Aims: Hypertrophic scars in burn survivors are a major cause of morbidity but the development of evidence based treatments is hampered by the lack of objective measurements of these scars. The objective of our study is to investigate the most accurate parameters for objective scar assessment and to create a combination score to facilitate the use of a panel of objective scar measurement tools. Methods: Three independent assessors evaluated fifty five scar sites on fifty five burn patients with both the subjective modified Vancouver Scar Scale (mVSS) and a panel of objective measurement tools including the DSM II Colormeter, Cutometer, Dermascan high frequency ultrasound. The sensitivity and specificity of the objective scar parameters in predicting a mVSS score of 6 or more using the Receiving Operator Characteristic Area under the curve (ROC AUC) was then calculated and the most accurate parameters were combined to create an objective global scar score. Results: The ROC AUC values were found to be highest for the Dermascan scar thickness (0.897), dermal intensity and intensity ratio (0.914 and 0.919), Cutometer R0 value (0.942), and R0 ratio (0.944). For colour measurements, ratios of scar to normal skin performed better than the single parameters for both erythema and pigmentation measurements: DSM II Erythema ratio vs Erythema (0.885 vs 0.818), DSM II a* ratio vs a* (0.848 vs 0.741); DSM II Melanin ratio vs Melanin (0.854 vs 0.761), DSM II L* ratio vs L* (0.862 vs 0.767). Analysis of the ROC AUC with chisquare test values showed that the highest AUC (0.786) was obtained with the combination of the Cutometer R0, Dermascan scar thickness, intensity and their respective scar to normal skin ratios. A total score of 5 and above (out of 6 parameters) had the highest combined sensitivity (69.0%) and specificity (83.3%). Conclusion: The objective parameters for the DSM II Colormeter, Cutometer and Dermascan high frequency ultrasound were all found to have moderate to

strong ROC AUC values and combination of the Cutometer R0 and Dermascan scar thickness and intensity values can be used to create an objective global scar scale that can accurately differentiate patients with hypertrophic burn scarring from non-hypertrophic scars or normal skin.

J. Elrod, D. Moellmeier, C. Schiestl, C. Mohr, K. Neuhaus, Comparative analysis of functional and aesthetic outcomes of retroauricular full thickness versus plantar glabrous split thickness skin grafts in pediatric palmar hand burns, Burns (2019)

Background: Optimal management of palmar hand burns in children is controversial. We aimed to compare function and aesthetics of retroauricular full thickness skin grafts (FTSG) to plantar glabrous split thickness skin grafts (STSG). Methods: 32 palmar grafts in paediatric burn patients were analysed: 19 retroauricular FTSG (group 1) and 13 thick plantar glabrous STSG (group 2). The latter were harvested at a thickness of 0.5 mm. The resulting plantar donor defects were covered with a STSG from the scalp, a sequential surgical technique we termed the “Zurich move”. Clinical examination, Cutometer and Colorimeter assessment and validated patient and observer questionnaires were used. Donor site complications and subjective complaints were recorded. Results: Colorimeter results were superior in group 2 with an erythema score of 5.73 ± 2.64 (group 1) versus 2.33 ± 1.97 (group 2, $p < 0.001$) and a pigmentation score of 9.82 ± 5.42 (group 1) and 1.89 ± 1.92 (group 2, $p < 0.001$). Observers’ scar evaluation using VSS and POSAS showed significantly superior results in group 2 for almost all items. Conversely, group 1 grafts were less stiff with mean normalized tissue extension R0 of 0.80 ± 0.21 versus 0.57 ± 0.24 in group 2 grafts ($p < 0.05$). In both groups donor sites complications were rare. Conclusion: Plantar glabrous STSG showed superior functional and aesthetic results when compared to FTSG in pediatric palmar hand burns. In addition, the “Zurich Move” is safe and provides uncomplicated donor site healing on the scalp and the foot allowing rapid restoration of full function.

H. Neubauer A. Stolle, S. Ripper, F. Klimitz, H. Ziegenthaler, M. Strupat, U. Kneser, L. Harhaus, Evaluation of an International Classification of Functioning, Disability and Health-based rehabilitation for thermal burn injuries: a prospective non-randomized design, Trials (2019) 20: 752

Background: Severe burn injuries result in relevant restrictions of physical capacity as well as psychological and social integrity and require a specialized rehabilitation. There is a common agreement, among national as well as international burn associations, that burn rehabilitation is a complex, dynamic process which needs an interdisciplinary and specialized treatment team. There is wide agreement that more research is needed in this field. Methods/design: The aim of the study is to examine the effectiveness and efficiency of our new ICF (International Classification of Functioning, Disability and Health)-based rehabilitation for thermal injuries. Because of ethical reasons, we have chosen a prospective non-randomized design, which takes place at two different rehabilitation centers. At center A, a newly developed ICF-based rehabilitation program was established; at rehabilitation center B, a well-established rehabilitation program has existed for 20 years and is used as reference. The primary research question addresses the “Pre-post comparison of the physical and psychological outcome measurements,” secondary question I looks at the “Examination of the non-inferiority of the new treatment concept with the established concept,” and secondary question II is the “Analysis of the rehabilitation process based on the rehabilitation cycle.” Only patients of the two burn rehabilitation centers who are insured by workers’ compensation will be asked to participate in this study to avoid outcome bias by insurance status. A physical examination (physical working capacity testing, grip strength, range of motion, and scar evaluation by Cutometer and Vancouver Scar Scale) and a standardized questionnaire battery (Burn Specific Health Scale-Brief, Short Form 36, Impact of Event Scale-Revised, the German version of the Symptom Checklist, the Freiburg Social Support Questionnaire, Patient/Client Satisfaction Questionnaire, Disabilities of the Arm, Shoulder and Hand, and Lower Extremity Functional Scale) measure physical and psychological conditions. Data will be taken on admission, during stay, and on discharge of the rehabilitation program and at follow-up 3 and 12 months after discharge. A minimum of 162 participants will be enrolled in this clinical longitudinal, prospective, observational study. Discussion: The proof of the effectiveness of the ICF-based rehabilitation program for thermal injuries will give evidence in a comprehensive way for the first time in this field. As result, a standardized rehabilitation concept will be introduced, which can be provided to other rehabilitation institutions treating thermal injuries.

K.C. Lee, A. Bamford, F. Gardiner, A. Agovino B. ter Horst, J. Bishop, A. Stich, L. Grover, A. Logan, N.S. Moiemien, Investigating the intra- and inter-rater reliability of a panel of subjective and objective burn scar measurement tools, Burns 45 (2019), p. 1311 – 1324

Background: Research into the treatment of hypertrophic burn scar is hampered by the variability and subjectivity of existing outcome measures. This study aims to measure the inter- and

intra-rater reliability of a panel of subjective and objective burn scar measurement tools. Methods: Three independent assessors evaluated 55 scar and normal skin sites using subjective (modified Vancouver Scar Scale [mVSS] & Patient and Observer Scar Assessment Scale [POSAS]) and objective tools. The intra-class correlation coefficient was utilised to measure reliability (acceptable when >0.70). Patient satisfaction with the different tools and scar parameter importance were assessed via questionnaires. Results: The inter-rater reliabilities of the mVSS and POSAS were below the acceptable limit. For erythema and pigmentation, all of the Scanoskin and DSM II measures (except the b* value) had acceptable to excellent intra and inter-rater reliability. The Dermascan ultrasound (dermal thickness, intensity) had excellent intra- and inter-rater reliability (>0.90). The Cutometer R0 (firmness) had acceptable reliability but not R2 (gross elasticity). All objective measurement tools had good overall satisfaction scores. Patients rated scar related pain and itch as more important compared to appearance although this finding was not sustained when corrected for multiple comparisons. Conclusion: The objective scar measures demonstrated acceptable to excellent intra- and inter-rater reliability and performed better than the subjective scar scales.

M. Barbagallo, Eco-friendly strategy to improve body silhouette, PERSONAL CARE EUROPE, April 2019, p. 71-74

Body imperfections are 'evergreen aesthetic problems' that affect both women and men of different ages. If cellulite is a 'privilege' almost exclusive to women, given the structure of their subcutaneous adipose tissue, sagging skin, loss of tone or love handles do not make distinctions, involving both genders. Behind these imperfections there are several factors and causes such as inflammation, hormonal imbalances/ diet, genetic predispositions, sedentary lifestyle. Counteracting body imperfections is often a challenge for consumers, because it requires an important effort. Therefore, they look for multi-target products able to act as fast as they can.

M.L. Vazquez-Gonzalez, G. Rodriguez, L. Rubio, J. Nestor, E. Fernandez, L. Barbosa-Barros, O. López, Intelligent ageing repair with skin superfoods, PERSONAL CARE EUROPE, April 2019, p. 157-162

The many environmental factors related to modern lifestyle generate a skin imbalance that leads to premature ageing. In this study, we evaluate the capacity of a new skin delivery system based on bicosomes (named bicosome-xanthin) to provide intense detox and revert the signs of ageing. This system was specially designed to incorporate, stabilise and deliver microalgae extract into deep skin layers. Bicosomexanthin proved to be effective in protecting the skin against pollution particles and to prevent 90% of the damage caused by blue light. This extraordinary ingredient also proved *in vivo* to boost the skin's antioxidant capacity and barrier function, to accelerate epidermal cell renewal, improve skin brightness and firmness, and visibly reduce wrinkles.

A. Erkiert-Polguj, B. Algiert-Zielinska, K. Zdunska, A. Markiewicz, J. Skubalski, H. Rotsztejn, The evaluation of elasticity after nonablative radiofrequency rejuvenation, Journal of Cosmetic Dermatology, Volume 18, Issue 2, April 2019, p. 511-516

Background: Laxity and rhytides are manifestations of photodamage on the face and chest. Nonablative radiofrequency (RF) is one of the most common procedures used for skin rejuvenation. Aim: The aim of this study was to assess the elasticity of face and chest skin after multipolar radiofrequency. Patients/Methods: Thirty women, aged 43-68, were included in the study. Twenty women were postmenopausal and 10 were premenopausal. They received 4 treatment sessions with an application of nonablative radiofrequency in 2-week intervals. Biomechanical properties of the skin were measured with the use of a Cutometer. Results: The objective evaluation in a cutometric analysis showed a statistically significant improvement between measurements taken in the pretreatment period and 3 months after the treatment. Conclusions: The study is an objective confirmation that RF treatment improves skin elasticity. The method may appear to be beneficial for women of any age and skin types. It is a noninvasive treatment with a low risk of complications.

P. Daigle, E. Loing, From tree skin to human skin: a circular economy concept, H&PC Today, Vol. 14(2) March/April 2019

From tree skin to human skin, red maple extract has proved to be a good source of protective bioactive molecules. The extract protects the skin from oxidative insults and low-grade chronic inflammation, supports dermal regeneration and restores the skin barrier, for visible, clinically demonstrated, anti-ageing benefits in the form of wrinkle reduction and increased skin firmness. At the same time, red maple extract maximises bark eco-valorisation, thus improving wood circular economy.

M.M. Fossa Shirata, G.A.D. Alves, P.M.B.G. Maia Campos, Photoageing related skin changes in different age groups: a clinical evaluation by biophysical and imaging techniques, International

Objectives: In view of the lack of studies about the morphological and structural changes caused by solar radiation in young people, the aim of the present study was to evaluate the photoageing related changes in the skin of different age groups by biophysical and imaging techniques. **Methods:** Forty four healthy female subjects were divided into two age groups: Group 1 (G1): 18-35 years old and Group 2 (G2): 40-60 years old. The skin of malar region of the face was evaluated in terms of mechanical properties, disorder in the pigmentation pattern, morphological and structural changes using the Cutometer®, Colorimeter®, Visioface® and Dermascan C® devices and reflectance confocal microscopy (Vivascope®). **Results:** The results showed that the main changes in the skin of G1 were related to the pigmentation pattern, the papilla format and depletion of thin collagen fibres. These alterations were also observed in the skin of G2, but with more pronounced effects. **Conclusion:** The knowledge about the skin changes caused by photoageing obtained in this study is very important for the development of dermocosmetic products for more effective treatments particularly focused on this type of skin. Finally, objective characterization of photoageing showed the importance of photoprotective habits since the first years of life in order to retard the appearance of skin changes caused by solar radiation.

F. Barone, S. Bashey, F.W. Woodin Jr., **Clinical Evidence of Dermal and Epidermal Restructuring from a Biologically Active Growth Factor Serum for Skin Rejuvenation**, J Drugs Dermatol. 2019 Mar 1;18(3): p. 290-295

Background: Topical skin care products use various technologies to promote skin repair. Growth factors of human, animal, and plant-derived origins have clinically demonstrated the ability to repair skin by promoting collagen, elastin, and glycosaminoglycan (GAG) production to reconstruct and reinforce skin's extracellular matrix (ECM). Human skin cells respond to instructions from highly specialized proteins or hormones referred to as growth factors. These growth factors initiate cellular communication that instigates cellular replication, production, or proliferation. The production of elastin and collagen dermal connective fibers slows, and, with age, the regenerative rates of GAGs become delayed. These biological issues can be exacerbated by extrinsic factors such as sun exposure, pollutants, and various other factors. Growth factor-based products have become important topical treatment modalities for addressing signs of skin aging such as fine lines, deep wrinkles, dryness, laxity, and textural irregularities. **Objective:** The aim of a 12-week clinical trial of a growth factor composition was to assess its effectiveness at restoring skin health through dermal and epidermal restructuring of aged skin. **Results:** Data from expert grading, and from corneometer and cutometer evaluations, as well as 2D and 3D image analysis, reflected significant improvements in facial skin appearance, firmness, elasticity, and hydration. Elements that improved most dramatically in investigators' assessments included radiance, firmness, tactile elasticity, textural smoothness, overall appearance, and crow's feet. Ultrasound imaging showed continual increases in dermal and epidermal restructuring throughout the study duration. Subject assessments reflected positive product tolerability and positive perception across a broad range of efficacy attributes through 12 weeks of usage. **Conclusion:** The results verified the ability of a multi-modal plant and enzymatically derived growth factor-based product to achieve skin rejuvenation improvements by stimulating dermal ECM and fibrous tissue regeneration to reduce fine lines and coarse wrinkles, and improve skin firmness and elasticity, while restoring skin to a properly hydrated state.

L.-Y. Lin, S.-C. Chiou, S.-H. Wang, C.-C. Chi, **Effects of Facial Threading on Female Skin Texture: A Prospective Trial with Physiological Parameters and Sense Assessment**, Evidence-Based Complementary and Alternative Medicine, Volume 2019

Background: Facial threading is a common tradition in Taiwan, Southeast Asia (called "Bande Abru"), Middle East (called "KHITE"), and Egypt (called "Fatlah"). In addition to the ability to remove facial vellus hairs, facial threading can make the skin fairer and shinier. However, there has been a lack of hard evidence regarding the effects of facial threading on the skin. **Objective:** To examine the effects of facial threading on skin physiology as well as visual and touch senses by using scientific instruments. **Methods:** A total of 80 participants were allocated to receive facial threading, application of powder only, exfoliation, and shaving. Prior to and following the assigned treatment, a noninvasive skin condition detection device was used to measure skin coarseness, hydration, melanin, and erythema index. Sense assessment and image analysis were also performed. **Results:** This study showed that facial threading was found to improve the facial skin roughness indices with significant decreases by 30.4%, 35.9%, and 16.7%, respectively, for the participants' forehead, cheek, and mouth corner skin. No significant adverse changes in moisture levels and skin pigment indices were detected. In addition, there was improvement in subjects' touch sense of their skin and feelings about skin color. **Conclusions.** Traditional facial threading can remove facial vellus hairs and lower skin roughness levels, thereby improving the skin

texture. However, pricking sensation appeared during the facial threading process, which might cause concerns about irritation.

M.E. Carrière, K.A.A. Kwa, L.E.M. de Haas, A. Pijpe, Z. Tyack, J.C.F. Ket, P.P.M. van Zuijlen, H.C.W. de Vet, L.B. Mokkink, Systematic Review on the Content of Outcome Measurement Instruments on Scar Quality, *Plast Reconstr Surg Glob Open* 2019;7:e2424

Background: Measurements of scar quality are essential to evaluate the effectiveness of scar treatments and to monitor scars. A large number of scar scales and measurement devices have been developed, which makes instrument selection challenging. The aim of this study was to provide an overview of the content (ie, included items) of all outcome measurement instruments that measure scar quality in different types of scars (burn, surgical, keloid, and necrotizing fasciitis), and the frequency at which the instruments and included items are used. **Methods:** A systematic search was performed in PubMed and Embase.com up to October 31, 2018. All original studies reporting on instruments that measured at least 1 characteristic of scar quality were included and the instrument's content was extracted. **Results:** We included 440 studies for data extraction. Included instruments (N = 909) were clinician-reported scales (41%), measurement devices (30%), patient-reported scales (26%), and combined clinician- and patient-reported scales (3%). The Observer scale of the Patient and Observer Scar Assessment Scale, the Cutometer, the Patient Scale of the Patient and Observer Scar Assessment Scale, and the modified Vancouver Scar Scale were the most often used instrument in each of these categories, respectively. The most frequent assessed items were thickness, vascularity, pigmentation, pliability, pain, and itch. **Conclusion:** The results of this study lay the foundation for our future research, which includes an international Delphi study among many scar experts, and an international focus group study among scar patients, aiming to elucidate how scar quality must be defined and measured from both professional and patient perspectives.

A.K. Langton, S. Alessi, M. Hann, A. Lien-Lun Chien, S. Kang, C.E. Maitland Griffiths, R.E.B. Watson, Aging in Skin of Color: Disruption to Elastic Fiber Organization Is Detrimental to Skin's Biomechanical Function, *Journal of Investigative Dermatology* (2019) 139, p. 779-788

Skin aging is a complex process involving the additive effects of time-dependent intrinsic aging and changes elicited via skin's interaction with the environment. Maintaining optimal skin function is essential for healthy aging across global populations; yet most research focuses on lightly pigmented skin (Fitzpatrick phototypes IeIII), with little emphasis on skin of color (Fitzpatrick phototypes VeVI). Here, we explore the biomechanical and histologic consequences of aging in black African-American volunteers. We found that healthy young buttock and dorsal forearm skin was biomechanically resilient, highly elastic, and characterized histologically by strong interdigitation of rete ridges, abundant organized fibrillar collagen, and plentiful arrays of elastic fibers. In contrast, intrinsically aged buttock skin was significantly less resilient, less elastic, and was accompanied by effacement of rete ridges with reduced deposition of both elastic fibers and fibrillar collagens. In chronically photoexposed dorsal forearm, significant impairment of all biomechanical functions was identified, with complete flattening of rete ridges and marked depletion of elastic fibers and fibrillar collagens. We conclude that in skin of color, both intrinsic aging and photoaging significantly impact skin function and composition, despite the additional photoprotective properties of increased melanin. Improved public health advice regarding the consequences of chronic photoexposure and the importance of multimodal photoprotection use for all is of global significance.

J.S. Lee, J. Ha, K. Shin, H. Kim, S. Cho, Different Cosmetic Habits Can Affect the Biophysical Profile of Facial Skin: A Study of Korean and Chinese Women, *Ann Dermatol* 31(2), p. 175-185, 2019

Background: Previous studies on the age-, climate, and skin care habit-related changes of biophysical parameters have mainly focused on Caucasians, and studies on Asians are in paucity. **Objective:** This study was aimed to investigate the variations of cutaneous biophysical parameters in Chinese and Korean women (northeast Asians) and to assess the association between those parameters and age, climate, and cosmetic habits. **Methods:** A cross-sectional study included 361 healthy Chinese and Korean women between 18 and 49 years of age in 4 cities (Guangzhou, Nanjing, and Shijiazhuang in China, and Suwon in Korea). We measured skin surface temperature, hydration, transepidermal water loss (TEWL), sebum, elasticity, skin pore, wrinkle, and skin tone (brightness) using non-invasive instruments. Demographic profiles and cosmetic habits were assessed using a questionnaire. **Results:** Skin elasticity and tone decreased, and pore size and wrinkle increased with age. Subjects in Suwon (Korean) showed higher hydration level, lower TEWL and lower sebum, less severe wrinkle and brighter skin than those in the 3 cities in China. After adjusting for age and region, using sunscreen everyday, wearing base makeup daily, and using moisturizers improved hydration,

TEWL, and elasticity significantly. Conclusion: Women in Suwon (Korea) were found to have a better profile of biophysical parameters than women in the 3 Chinese cities, which might be attributed to cosmetic habits, besides age and climatic factors. The fact that appropriate cosmetic habits are associated with favorable skin biophysical parameters underscores the importance of daily skin care routine in preserving skin functions.

*J.I. Yablonski, D.R. Winne, **Beginner's Guide to Natural Organic – Product Safety, Claims Support and Preservation**, Cosmetics & Toiletries, Volume 134, No. 2, February 2019, p. 18-31*

Browsing a cosmetic counter, searching online or tuning into home shopping networks, one cannot help but notice the ever-increasing number of cosmetic and personal care products purporting to be *green*, *natural* or *organic* that are obviously targeting the rapidly growing environmentally conscious consumer and spa markets. Entire sections of exhibitions and trade shows have been dedicated.

*B. Nedelec, M.A. Couture, V. Calva, C. Poulin, A. Chouinard, D. Shashoua, N. Gauthier, J.A. Correa, A. de Oliveira, B. Mazer, L. LaSalle, **Randomized controlled trial of the immediate and long-term effect of massage on adult postburn scar**, Burns, 2019 Feb; 45(1): p. 128-139*

Background: One objective of massage therapy applied to hypertrophic scar (HSc), is to improve the structural properties so skin possesses the strength and elasticity required for normal mobility. However, research supporting this effect is lacking. The objective of this study was to characterize the changes in scar elasticity, erythema, melanin, and thickness immediately after a massage therapy session and after a 12-week course of treatment compared to intra-individual matched control scars. Method: We conducted a prospective, randomized, single-blinded, pragmatic, controlled, clinical trial evaluating the impact of a 12-week course of massage therapy. Seventy burn survivors consented to participate and 60 completed the study. Two homogeneous, intra-individual scars were randomized to usual care control or massage therapy plus usual care. Massage, occupational or physical therapists provided massage treatment 3x/week for 12 weeks. Scar site characteristics were evaluated weekly immediately before and after massage treatment including elasticity (Cutometer), erythema and melanin (Mexameter), and thickness (high-frequency ultrasound). Analysis of covariance (ANCOVAs) were performed to test for immediate and long-term treatment effects. A mixed-model approach was used to account for the intra-individual scars. Results: Scar evaluation immediately before and after massage therapy at each time point revealed changes for all scar characteristics, but the group differences were predominantly present during the early weeks of treatment. The within group long-term analysis revealed a significant increase in elasticity, and a reduction in thickness, during the 12-week treatment period for both the control scar (CS) and massage scar (MS). The increase in elasticity reached significance at week 8 for the MS and week 10 for the CS and the reduction in thickness at week 5 for the CS and week 7 for the MS. There was no significant within group long-term differences for either erythema or melanin. There were group differences in erythema at week 8 and 11 where the CS was less erythematous than the MS. Conclusion: The immediate impact of forces applied during massage therapy may lead patients and therapists to believe that there are long-term changes in elasticity, erythema, and pigmentation, however, once baseline measures, the control scar, and time were incorporated in the analysis there was no evidence of long-term benefit. Massage therapy applied with the objective of increasing scar elasticity or reducing erythema or thickness over the long-term should be reconsidered.

*C. Messaraa, L. Doyle, A. Mansfield, C. O'Connor, A. Mavon, **Ageing profiles of Caucasian and Chinese cohorts – focus on hands skin**, International Journal of Cosmetic Science, Volume 41, Issue 1, 2019*

Objective: In spite of hand care being a dynamic segment of skin care, hands skin physiology has been receiving little attention in comparison to facial skin. In the present study, we aimed at gathering a comprehensive set of skin data from the dorsal part of the hand to study age related-changes in two ethnic groups (Caucasian and Chinese). Methods: Skin topographic, skin colour/colour heterogeneities, skin chromophores and skin biophysical measurements of 116 Caucasian and Chinese female volunteers aged 30– 65 years old were collected in Ireland and in China as part of a cross-sectional study. Results: Topographic alterations happened at both micro and macro scales with a noticeable delay in the onset of 10 years for the Chinese cohort. Similar evolution of skin colour with ageing was observed between the two cohorts and strong dissimilarities were seen when it came to colour heterogeneities and melanin hyper concentration, with a 20-year delay in severity for the Chinese cohort. A similar sharp drop of skin hydration occurred when reaching the 60's regardless of the group and substantial differences were recorded for skin biomechanical properties of the skin. Conclusion: These results provide additional insights about hand skin physiology in relation to ageing and ethnic

differences, especially when put into perspective with what is currently known about facial ageing. This research yield additional material for hand cream product rationale and strategies for mitigating the appearance of ageing hands.

B. Algiert-Zielińska, P. Mucha, H. Rotsztein, Effects of lactobionic acid peel, aluminum oxide crystal microdermabrasion, and both procedures on skin hydration, elasticity, and transepidermal water loss, J Cosmet Dermatol. January 2019

Background: Topical applications of alpha-hydroxy acids and poly hydroxy acids in the form of peels gained popularity. To enhance the effect of these substances, aluminum oxide crystal microdermabrasion can be used in one procedure. Aims: The assessment of skin hydration, elasticity, and TEWL after using lactobionic acid in the form of 20% peel and lactobionic acid in the form of 20% peel combined with aluminum oxide crystal microdermabrasion. Material and Methods: The study involved 20 Caucasian female subjects. Six treatments were performed at weekly intervals, using the Split face method-20% LA was used on the left side of the face and aluminum oxide crystal microdermabrasion followed by 20% LA application on the right side of the face. Results: Corneometric measurement showed statistically significant differences between the hydration level for sessions 1 and 3 and 1 and 6. A higher hydration level was found on the side with the combined procedure. Tewametric measurement showed that the TEWL values were different for sessions 1 and 3 and 1 and 6-they decreased. There were no statistically significant differences between the two procedures. The cutometric measurement indicated statistically significant differences between skin elasticity for pairs in session 1 and 3 and 1 and 6. Conclusions: The results of the study indicate that the combination of LA peel with microdermabrasion increases its moisturizing effect and improves skin elasticity. The use of both procedures also contributed to the decrease in TEWL; however, greater exfoliation of the epidermis in combined procedures resulted in slightly higher TEWL values.

M. Kerscher, A.T. Nurrisyanti, C. Eiben-Nielson, S. Hartmann, J. Lambert-Baumann, Skin physiology and safety of microfocused ultrasound with visualization for improving skin laxity, Dove Press, January 2019 Volume 2019:12, p. 71-79

Purpose: The efficacy of microfocused ultrasound with visualization (MFU-V; Ultherapy®) has been demonstrated in clinical studies and daily practice. However, data addressing skin physiology after MFU-V treatment are lacking. This observational evaluation was aimed to assess skin physiology before and after MFU-V treatment using noninvasive biophysical measurements. Patients and methods: Twenty-two female patients with moderate-to-severe skin sagging at the jawline and submental region on the Merz Aesthetics Scale obtained a single MFU-V treatment according to protocol. Skin function measurements focused on short-term effects up to 3 days and long-term effects up to 24 weeks after treatment. Skin temperature, transepidermal water loss, skin hydration, erythema, elasticity, and skin thickness and density were evaluated under standardized conditions. Pain was assessed using a validated numeric visual analog scale. Results: Skin temperature remained in a physiologic range and no significant increase was noted at day 3 after MFU-V treatment. Transepidermal water loss, hydration, and erythema values were fairly stable and showed no significant differences at short- and long-term measurements vs baseline. At week 4 after a single MFU-V treatment, gross and net elasticity values were significantly decreased ($P=0.003$ and $P=0.0001$, respectively), followed by significantly increased values at week 12 ($P=0.015$, $P=0.046$) and week 24 ($P=0.001$, $P=0.049$). Edema due to MFU-V treatment resolved without sequelae. For all patients, pain diminished shortly after treatment. No adverse events occurred during the 24-week follow-up period. Conclusions: MFU-V treatment is well tolerated and it does not alter the epidermal barrier function or physiology of skin. Significant increase in the elasticity of skin was observed at 12 and 24 weeks after a single treatment, which reflects improvement in dermal tissue function. These short- and long-term effects are congruous with the mode of action of MFU-V due to a proven intrinsic tissue remodeling process.

Z.M. Rashaan, P. Krijnen, K.A.A. Kwa, C.H. van der Vlies, I.B. Schipper, R.S. Breederveld, Flaminal® versus Flamazine® in the treatment of partial thickness burns: a randomized controlled trial on clinical effectiveness and scar quality (FLAM study), Wound Repair Regen. 2019 January

Although partial thickness burns are the most frequently reported burn injuries, there is no consensus on the optimal treatment. The objective of this study was to compare the clinical effectiveness and scar quality of Flaminal® Forte to silver sulfadiazine (Flamazine®) in the treatment of partial thickness burns. In this two-arm open label multi-center randomized controlled trial, adult patients with acute partial thickness burns and an affected total body surface area of less than 30% were randomized between Flaminal® Forte and Flamazine® and followed for 12 months. Dressing changes in the Flamazine® group were performed daily, and in the Flaminal® group during the first three days post burn and thereafter every other day until complete wound healing or surgery. Forty-one patients were randomly allocated to

Flaminal® Forte and 48 patients to Flamazine®. The primary outcome was time to wound healing, which did not differ between the groups: median 18 days with Flaminal® Forte (range 8-49 days) versus 16 days with Flamazine® (range 7-48 days; $p=0.24$). Regarding the secondary outcomes during hospital admission, there were no statistically significant differences between the groups concerning need for surgery, pain scores, pruritus, or pain-related and anticipatory anxiety. More patients in the Flaminal® group developed wound colonisation (78% versus 32%, $p<0.001$), but the treatment groups did not differ regarding the incidence of local infections and use of systemic antibiotics. In terms of scar quality, no statistically significant differences between both treatment groups were found regarding subjective scar assessment (Patient and Observer Scar Assessment Scale (POSAS)), scar melanin and pigmentation (DermaSpectrometer®) and scar elasticity and maximal extension (Cutometer®) during 12 month post-burn. In conclusion, time to wound healing did not differ, but the use of Flaminal® Forte seemed favourable because less dressing changes are needed which lowers the burden of wound care.

A. Jeanneau, Botanical Alternative, COSSMA 12 2018

The demand for both natural and effective cosmetics is still increasing worldwide, especially in anti-ageing skin care. In this area, natural hyaluronic acid boosters flood the market to offer alternatives to hyaluronic acid fillers. Indeed, the reputation of hyaluronic acid fillers has suffered lately and is no longer compatible with cosmetic products supporting claims as “better ageing” or “ageing well”.

S.W. Jacobs, E.J. Culbertson, Effects of Topical Mandelic Acid Treatment on Facial Skin Viscoelasticity, Facial Plast Surg. 2018 Dec; 34(6): p. 651-656

Mandelic acid is an α -hydroxy acid with reported benefit in treating acne and hyperpigmentation. The authors have developed a topical mandelic acid formulation that subjectively improves the quality of aged skin. Although the gold standard for assessing outcomes, photographic documentation is limited by subjective interpretation. Tools for measuring physical skin properties allow for an objective assessment of changes in skin quality. The authors sought to objectively study the viscoelastic changes to the skin following treatment with topical mandelic acid, using the Cutometer MPA 580. Twenty-four patients, twenty females and four males, aged 42 to 68 years, were studied over a four-week period. Mandelic acid was applied topically to the face twice a day for four weeks. The lower eyelid skin viscoelastic properties were assessed weekly using the Cutometer. After four weeks of topical mandelic acid treatment, the elasticity of lower eyelid skin increased 25.4% ($P=.003$). Skin firmness increased 23.8% ($P=.029$). Improvement in photographic appearance correlated with these findings. Mandelic acid is another topical treatment option for improving skin quality, and is well tolerated by patients. The authors feel that the Cutometer or similar device should be used routinely in facial plastic surgery to objectively assess outcomes of various treatment modalities.

M. Yiman, Y.-C. Lee, M. Hong, L. Brownell, Q. Jia, A Randomized, Active Comparator-controlled Clinical Trial of a Topical Botanical Cream for Skin Hydration, Elasticity, Firmness, and Cellulite, J Clin Aesthet Dermatol. 2018; 11(8): p. 51–57

Background: The skin is where initial visual signs of aging manifest, including increased skin dryness and decreased firmness and elasticity. Cellulite, a skin condition characterized by changes in the skin morphology due to excessive lipid deposition in subcutaneous adipose tissue, is another characteristic of skin aging. Objective: We sought to assess the effectiveness of a topical botanical cream on cellulite, skin hydration, firmness, and elasticity after two, four, and eight weeks of use compared to an active comparator. Design: The study was a single-blind, randomized, controlled study conducted on subjects with mild-to-severe cellulite on the thighs. Subjects were treated with a topical botanical cream (UP1307) and an active comparator for eight weeks. A total of 44 women 18 to 59 years of age were enrolled. Test products were gently applied in a circular motion to the area identified by subjects as the target cellulite area twice per day. Measurements: Measurements using Corneometer® (for skin hydration) and Cutometer® (for skin elasticity and firmness) were carried out at each visit in addition to expert clinical grader evaluations for cutaneous changes and cellulite. Outcomes were also assessed by patients using subject questionnaires. Results: Patients reported significant improvement in skin hydration, firmness, and elasticity over time. Findings were corroborated with objective instrumental measurements. At Week 8, 44.4- and 42.7-percent improvement in appearance of cellulite was also observed for the UP1307 cream and the active comparator group, respectively. Conclusion: Use of UP1307 cream produced significant improvements in skin hydration, firmness, and elasticity, with associated improvement in cellulite appearance. There was overall superiority of UP1307 between groups. Progressive subject perceptions of product effects are reported.

V. Mazzarello, M. Ferrari, P. Ena, Werner syndrome: quantitative assessment of skin aging, Clinical, Cosmetic and Investigational Dermatology 2018; 11, p. 397–402

Background: Werner syndrome (WS) is a rare autosomal recessive disorder characterized by premature aging in adults. Although not sufficient to diagnose WS, persistent short stature and alteration of the dentition are among the few early signs that appear at puberty and can lead to a suspected diagnosis. **Objective:** The study aimed at quantifying the signs of WS skin aging through biophysical parameters to find new parameters to be applied together with clinical observations in order to diagnose the disease early. **Patients and methods:** The skin disorders induced by the disease were studied using noninvasive techniques: Tewameter TM300, Corneometer CM825, Skin-pH-Meter PH900, Mexameter MX16, Visioscan VC98, and Cutometer MPA580. Twenty-four patients divided into young group, WS group, and elderly group were recruited for the study. **Results:** The WS skin is quite similar to aged skin, with some differences concerning the barrier function and skin elasticity; for instance, a WS patient of 30 years of age has the same skin roughness of a 50/60 years old subject with a more severe skin condition leading to higher dryness, high transepidermal water loss, and less distensibility correlating with skin indurations. **Conclusion:** In patients with WS, the biophysical parameters can quantify the damage induced on the skin by the disease. In order to stage the degree of the disease, biophysical parameters could be used in the future as a diagnostic procedure in the initial stages of the disease as they may reveal lesions not yet clinically perceptible or in advanced stages.

H. Sano, Y. Hokazono, R. Ogawa, Distensibility and Gross Elasticity of the Skin at Various Body Sites and Association with Pathological Scarring: A Case Study, J Clin Aesthet Dermatol. 2018; 11(6): p. 15–18

Objective: Pathological scars, including hypertrophic scars and keloids, have a strong predilection for specific regions of the body. Such site specificity might reflect regional differences in skin properties. Greater knowledge about the characteristics of the skin at various body regions can promote the development of clinical approaches to skin incision and flap design and reduce the formation of cutaneous scars. It could also help elucidate the etiology of pathological scar development and progression. Thus, we measured the distensibility and gross elasticity of the skin at various body sites. **Methods:** Five healthy adult volunteers were enrolled. In each, the cutaneous viscoelasticity at 16 sites (forehead, superior eyelid, lower jaw, earlobe, deltoid, outside and medial side of the upper arm, palm, scapular region, anterior chest, upper abdomen, lateral abdomen, lower abdomen, lateral thigh, anterior lower leg, and planta) was examined using a Cutometer MPA 580® (Courage Khazaka electronic GmbH, Cologne, Germany). **Results:** The skin was particularly distensible at the medial side of the upper arm, followed by the earlobe, lower jaw, upper abdomen, lateral abdomen, lower abdomen, and superior eyelid. It was poorly distensible at the planta, followed by the anterior lower leg, palm, and forehead. The skin was poorly elastic at the earlobe, superior eyelid, planta, and palm and highly elastic at the lateral and upper abdomen, scapular region, and deltoid. **Conclusions:** Except for the earlobe, all regions with poorly distensible and hard skin are not prone to pathological scarring. This association between these skin properties and abnormal scarring could be useful for skin surgeons.

N. Nishimura, S. Inoue, K. Yokoyama, S. Iwase, Effect of spraying of fine water particles on facial skin moisture and viscoelasticity in adult women, Skin Research & Technology, November 2018

Background/purpose: It is known that the elderly and adult women with reduction in sebum secretion have reduced skin barrier function, drying of the skin in a low humidity environment is accompanied by physiological distress. As our hypothesis, when fine water particles are sprayed on the skin, the water content of the corneal layer is significantly increased. In the present study, we examined the ability of fine water particles to improve facial skin moisture levels in adult women. **Methods:** We examined skin conductance, transepidermal water loss (TEWL), and skin elasticity as an index of skin barrier function at the cheek in 17 healthy adult women in the spraying of fine water particles, in the environment temperature at 24°C and 34.5% relative humidity. **Results:** The skin conductance of stratum corneum after 120 minute of spraying, A condition (peak particle size below 0.5 µm) was $119.7 \pm 25.1\%$, B condition (peak particle size 1.8 µm) was $100.4 \pm 31.7\%$, C condition (peak particle size 5.4 µm) was $110.1 \pm 25.0\%$, and the A condition was significantly higher than the B condition. Also, skin elasticity in the A condition tended to be higher value than in the other conditions. Transepidermal water loss (TEWL) after 120 minute of spraying showed a lower value in the A condition than in the other conditions. In the A condition, the skin conductance steadily maintained their initial levels up to 360 minute after spraying. **Conclusion:** Especially, by spraying smallest fine water particles, skin barrier function at the cheek was improved. These data indicated that non-charged fine water particles played an important role on moisten skin in a low humidity environment.

J. Pierre, G. Francois, A.M. Benize, V. Rubert, J. Coutet, F. Flament, Mapping, in vivo, the uniformity of two skin properties alongside the human face by a 3D virtual approach, Int J Cosmet Sci., 2018 Oct; 40(5): p. 482-487

Objective: To determine the homogeneity in the distribution of two cutaneous functions (hydration and elasticity) along the entire human face. **Material and Methods:** The half faces (right or left, randomly chosen) of two groups of Caucasian women were measured on 24 different small sites (elasticity) and 41 others (hydration), by instruments of small-sized probes (Cutometer and Corneometer, respectively). Hydration of the face was recorded at different times (up to 24 h), post application of a highly hydrating product. **Results:** The recorded values (left and right half faces) were further gathered and digitally positioned on a virtual feminine face and their intensity was illustrated through a colored white (lower values)-blue (higher values) scale. The reconstitution of the mapping of the two measured parameters (from the left and right sides of different subjects), shows a perfect symmetry vis à vis the nose axis. However, both parameters present slightly variable but significant values along the human face. Sites from the temple are less elastic than chin or forehead. The upper and lower parts of the forehead show slight disparities in their elasticity values. Cheeks are significantly less prone at retaining their imparted hydration status (lost 2 h after application of a hydrating product) as compared to sub-ocular regions or chin that retain their hydration up to 24 h. Attempts to establish a mutual relationship between the two skin properties unsurprisingly failed. **Conclusion:** The two studied skin properties show a slight but highly symmetric disparity along the entire human face

S. Akita, K. Hayashida, H. Yoshimoto, M. Fujioka, C. Senju, S. Morooka, G. Nishimura, N. Mukae, K. Kobayashi, K. Anraku, R. Murakami, A. Hirano, M. Oishi, S. Ikenoya, N. Amano, H. Nakagawa, Novel Application of Cultured Epithelial Autografts (CEA) with Expanded Mesh Skin Grafting Over an Artificial Dermis or Dermal Wound Bed Preparation, Int. J. Mol. Sci. 2018, 19, 57

Cultured epithelial autografts (CEA) with highly expanded mesh skin grafts were used for extensive adult burns covering more than 30% of the total body surface area. A prospective study on eight patients assessed subjective and objective findings up to a 12-month follow-up. The results of wound healing for over 1:6 mesh plus CEA, gap 1:6 mesh plus CEA, and 1:3 mesh were compared at 3, 6, and 12 months using extensibility, viscoelasticity, color, and transepidermal water loss by a generalized estimating equation (GEE) or generalized linear mixed model (GLMM). No significant differences were observed among the paired treatments at any time point. At 6 and 12 months, over 1:6 mesh plus CEA achieved significantly better expert evaluation scores by the Vancouver and Manchester Scar Scales ($p < 0.01$). Extended skin grafting plus CEA minimizes donor resources and the quality of scars is equal or similar to that with conventional low extended mesh slit-thickness skin grafting such as 1:3 mesh. A longitudinal analysis of scars may further clarify the molecular changes of scar formation and pathogenesis.

A. Sakata, K. Abe, K. Mizukoshi, T. Gomi, I. Okuda, Relationship between the retinacula cutis and sagging facial skin, Skin Research & Technology, 2018, 24: p. 95-98

Background: Sagging skin is one of the most concerning esthetic issues for elderly individuals. Although reduced skin elasticity has been reported as the cause of sagging skin, a loss of skin elasticity alone is insufficient to explain sagging facial skin. This study investigated the mechanisms underlying sagging skin, with a focus on the subcutaneous network of collagenous fibers known as the retinacula cutis (RC). **Methods:** To evaluate the structure of the RC noninvasively, tomographic images of the face were obtained using magnetic resonance imaging (MRI). The RC was identified by comparing MRI results with histological specimens of human skin. A descriptive scale was used to evaluate the degree of sagging, and a device equipped with a 6-mm-diameter probe was used to measure the elasticity of deeper skin layers and evaluate the physical properties of the skin. **Results:** The density of RC in subcutaneous tissue correlated negatively with sagging scores and positively with elasticity. **Conclusion:** These results imply that a sparse RC structure contributes to a reduction in the elasticity of subcutaneous tissue, resulting in a greater degree of sagging facial skin. These findings are expected to contribute to the understanding of the mechanisms underlying sagging skin.

M. Barbero, S. Rodríguez, I. Zaldívar, PB Serum Wrinkle Hyaluronic Complex, ZURKO research Laboratories Information

Facial skin is one of the most sensitive parts of our body, as it is the one that suffers the wear of weather, temperature changes, closed environments, stress, etc. Therefore, the face loses elasticity over the years and expression lines appear. The objective of the present study is to demonstrate that the exclusive lyophilized cocktail based on Keratinase KerA PB333 and hyaluronic acid, has a high capacity of reducing wrinkles and expression lines. The unique biologic active KerA PB333 acts on the skin promoting an effective and soft peeling effect, without altering skin balance or reducing its natural hydration. The Hyaluronic acid penetrates in the skin smoothing wrinkles.

J.L. Schiefer, R. Rath, E. Ahrens, D. Grigutsch, I. Gräff, J.-P. Stromps, P.C. Fuchs, A. Schulz, Evaluation of scar quality after treatment of superficial burns of the hands and face with Dressilk or Biobrane—An intra-individual comparison, Burns 44 (2018), p. 305 – 317

Introduction: The aesthetic outcome after burn of exposed areas such as the hand and face is of high importance. A number of wound dressings used for the treatment of superficial and partial thickness burns promise rapid wound healing and reduced scarring. Previously, wound healing of hands and faces with superficial burns treated with Dressilk1 compared to Biobrane1 was evaluated intra-individually with similar results. Nevertheless, up to date objective information regarding the scarring after superficial burns treated with Dressilk1 does not exist. **Methods:** Therefore, 30 patients with superficial burns of the hand and face that were treated with Dressilk1 and Biobrane1 simultaneously were included in the study. An objective scar evaluation was performed analyzing melanin and erythema levels, skin elasticity, transepidermal water loss and scar perfusion three and six and 12 months after injury. Furthermore, a subjective scar evaluation was performed with the patient and observer scar assessment scale (POSAS) and the Vancouver scar scale (VSS). **Results:** Dressilk1 and Biobrane1 both lead to an aesthetic pleasing outcome after superficial burns of the hands and faces. Regarding the objective scar evaluation only trans-epidermal water loss of burned hands after 6 months showed significant differences between the two dressings. However, these differences were not detected in the 12-month follow up examination. In the subjective scar evaluation no statistical differences could be found between the dressings. All patients stated high satisfaction of scar quality. **Conclusion:** Dressilk1 is an interesting alternative to Biobrane1 for the treatment of superficial burns of aesthetic and functional important areas.

A.K. Dabrowska, F. Spano, S. Derler, C. Adlhart, N.D. Spencer, R.M. Rossi, The relationship between skin function, barrier properties, and body-dependent factors, Skin Research & Technology 2018; 24: 165-174

Background: Skin is a multilayer interface between the body and the environment, responsible for many important functions, such as temperature regulation, watertransport, sensation, and protection from external triggers. **Objectives:** This paper provides an overview of principal factors that influence human skin and describes the diversity of skin characteristics, its causes and possible consequences. It also discusses limitations in the barrier function of the skin, describing mechanisms of absorption. **Methods:** There are a number of in vivo investigations focusing on the diversity of human skin characteristics with reference to barrier properties and body-dependent factors. **Results:** Skin properties vary among individuals of different age, gender, ethnicity, and skin types. In addition, skin characteristics differ depending on the body site and can be influenced by the body-mass index and lifestyle. Although one of the main functions of the skin is to act as a barrier, absorption of some substances remains possible. **Conclusions:** Various factors can alter human skin properties, which can be reflected in skin function and the quality of everyday life. Skin properties and function are strongly interlinked.

S. Iizaka, Frailty and body mass index are associated with biophysical properties of the skin in community-dwelling older adults, Journal of Tissue Viability (2018)

Aim of the study: This study aimed to investigate the association of frailty and body mass index (BMI) with biophysical properties of the skin in community-dwelling older people. **Materials and methods:** A cross-sectional study was conducted in a suburban Japanese city. Older adults aged >65 years and participating in a health checkup program were recruited (n = 128). Stratum corneum hydration, clinical manifestations of dry skin, skin elasticity and condition of the dermis (as measured by ultrasonography) were evaluated on the volar forearm. Frailty phenotype and BMI were also evaluated. **Results:** The mean age of participants was 74.5 years, and 96.1% were women. Skin thickness was significantly decreased in frail participants compared with non-frail participants in an age-adjusted multivariate model (p = 0.009). Frail participants showed significantly lower skin elasticity values than non-frail participants in a univariate analysis (p = 0.024), but this was not significant in the multivariate model. In participants with BMI >25kg/m², clinical manifestations of dry skin were significantly decreased compared with BMI <21.5kg/m² (p = 0.002). Participants with BMI >25kg/m² and with 21.5 kg/m² < BMI <25kg/m² showed significantly higher skin elasticity values than participants with BMI < 21.5kg/m² (p = 0.014 and p = 0.042, respectively). **Conclusion:** Frailty was associated with decreased skin thickness and decreased skin elasticity partially via the influence of chronological aging. Low body mass was associated with increased xerosis manifestations and decreased skin elasticity in community-dwelling older adults.

F. Alvim Sant'Anna Addor, J. Cotta Vieira, C. Sirieiro Abreu Melo, Improvement of dermal parameters in aged skin after oral use of a nutrient supplement, Clinical, Cosmetic and Investigational Dermatology 2018;11, p. 195–201

Purpose: Skin aging is a progressive and degenerative process caused by a decrease in the

physiological functions of the skin tissue. In addition, environmental factors as well as concomitant diseases and lifestyle (nutrition, sedentary lifestyle, smoking, etc) negatively impact the aging process. An association between oral administration of collagen peptides combined with vitamin C and extracts of *Hibiscus sabdariffa* and *Aristotelia chilensis* (Delphynol®) (Eximia Firmalize Age complex®) on dermal thickness was studied and the improvement in aging signs was evaluated. Patients and methods: Female adult patients received an oral nutritional supplement containing collagen peptides, vitamin C, *H. sabdariffa*, and *A. chilensis* (Delphynol) in a sachet and were instructed to consume 1 sachet diluted in 200 mL of water once daily for 12 weeks. They were evaluated clinically, by high frequency ultrasound and cutometry. Results: There was a significant improvement of firmness and elasticity and an increase in dermal thickness by ultrasound after 3 months of use. Conclusion: The association of collagen peptides, vitamin C, *H. sabdariffa* and *A. chilensis* (Delphynol) could improve the signs of dermal skin aging.

V. Carvalho Canela, C. Nicoletti Crivelaro, L. Zacchi Ferla, G. Marques Pelozo, J. Azevedo, R. Eloin Liebano, C. Nogueira, R. Michelini Guidi, C. Grecco, E. Sant'Ana, **Synergistic effects of Combined Therapy: nonfocused ultrasound plus Aussie current for noninvasive body contouring**, Clinical, Cosmetic and Investigational Dermatology 2018;11, p. 203–211

Background and objectives: Nowadays, there are several noninvasive technologies being used for improving of body contouring. The objectives of this pilot study were to verify the effectiveness of the Heccus® device, emphasizing the synergism between nonfocused ultrasound plus Aussie current in the improvement of body contour, and to determine if the association of this therapy with whole-body vibration exercises can have additional positive effects in the results of the treatments. Subjects and methods: Twenty healthy women aged 20–40 years participated in the study. Ten patients received Combined Therapy treatment (G1) and the other 10 participants received Combined Therapy with additional vibratory platform treatment (G2). Anthropometric and standardized photography analysis, ultrasonography, cutometry and self-administered questionnaires of tolerance and satisfaction levels with the treatment were used. Results: Compared with baseline values, reduction of fat thickness was observed by ultrasonography in the posterior thigh area in the G1 group ($P<0.05$) and in the buttocks ($P<0.05$) and the posterior thigh areas ($P<0.05$) in the G2. All the treated areas in both groups showed reduction in cellulite degree in the buttocks, G1 ($P<0.05$) and G2 ($P<0.05$), and in posterior thigh areas, G1 ($P<0.05$) and G2 ($P<0.05$). Optimal improvement of skin firmness (G1, $P<0.0001$; G2, $P=0.0034$) in the treated areas was observed in both groups. Conclusion: We conclude that the synergistic effects of the Combined Therapy (nonfocused ultrasound plus Aussie current) might be a good option with noninvasive body contouring treatment for improving the aspect of the cellulite, skin firmness and localized fat. If used in association with the whole-body vibratory platform, the results can be better, especially in the treatment of localized fat. Further studies with larger sample size should be performed to confirm these results.

M. Aust, H. Pototschnig, S. Jamchi, K.-H. Busch, **Platelet-rich Plasma for Skin Rejuvenation and Treatment of Actinic Elastosis in the Lower Eyelid Area**, Cureus 10(7), 2018

Background: Treatment of the lower eyelid region to rejuvenate the skin or treat actinic elastosis often proves difficult. Established treatment options, such as hyaluronic acid injections, botulinum toxin injections, microneedling, skin resurfacing (microdermabrasion, chemical peel (exfoliation), laser treatment), as well as blepharoplasties and autologous fat transfers, can be associated with significant risks and increased patient burden. Furthermore, they may not be effective for treating the signs of skin aging or actinic elastosis, including dark rings under the eyes, a lack of volume and cutis laxa. A minimally invasive treatment approach which visibly improves the above-mentioned conditions and which involves minimal risk and patient burden would be a desirable alternative. Materials & methods: Twenty patients were treated a total of three times at monthly intervals with PRP (platelet-rich plasma). The patients were examined on the days of treatment and one month after the third injection. The PRP was obtained directly prior to treatment using the Arthrex ACP double syringe at the point of care. The injections (2 ml PRP per side) were administered laterally using 27 G 38 mm cannulas. Accurate photographic documentation and skin elasticity measurements using a cutometer were performed to objectify the subjective assessments from the patient and practitioner questionnaires. Results: A progressive improvement in the esthetic outcome and a high level of patient satisfaction were determined. The cutometer measurements showed a statistically significant higher level of skin firmness (due to increased collagen production) and a statistically significant increase in skin elasticity (thanks to increased elastin production). Other than the anticipated visible swelling directly after the PRP injection, no other undesirable side effects or complications occurred. The typical burning sensation during the injection had not been reported. Conclusion: The results indicate that a series of PRP injections in the lower eyelid region is a safe, efficient, virtually pain-free, simple and rapid treatment option for an area

with otherwise limited treatment alternatives.

D.-U. Kim, H.-C. Chung, J. Choi, Y. Sakai, B.-Y. Lee, Oral Intake of Low-Molecular-Weight Collagen Peptide Improves Hydration, Elasticity, and Wrinkling in Human Skin: A Randomized, Double-Blind, Placebo-Controlled Study, *Nutrients* 2018, 10, 826

Collagen-peptide supplementation could be an effective remedy to improve hydration, elasticity, and wrinkling in human skin. The aim of this study was to conduct a double-blind, randomized, placebo-controlled trial to clinically evaluate the effect on human skin hydration, wrinkling, and elasticity of Low-molecular-weight Collagen peptide (LMWCP) with a tripeptide (Gly-X-Y) content >15% including 3% Gly-Pro-Hyp. Individuals ($n = 64$) were randomly assigned to receive either placebo or 1000 mg of LMWCP once daily for 12 weeks. Parameters of skin hydration, wrinkling, and elasticity were assessed at baseline and after 6 weeks and 12 weeks. Compared with the placebo group, skin-hydration values were significantly higher in the LMWCP group after 6 weeks and 12 weeks. After 12 weeks in the LMWCP group, visual assessment score and three parameters of skin wrinkling were significantly improved compared with the placebo group. In case of skin elasticity, one parameter out of three was significantly improved in the LMWCP group from the baseline after 12 weeks, while, compared with the placebo group, two parameters out of three in the LMWCP group were higher with significance after 12 weeks. In terms of the safety of LMWCP, none of the subjects presented adverse symptoms related to the test material during the study period. These results suggest that LMWCP can be used as a health functional food ingredient to improve human skin hydration, elasticity, and wrinkling.

E. Tamura, J. Ishikawa, K. Sugata, K. Tsukahara, H. Yasumori, T. Yamamoto, Age-related differences in the functional properties of lips compared with skin, *Skin Res Technol.* 2018; 24: p. 472-478

Background/aims: Lips can easily become dry and rough and their biggest problems are drying and chapping. The cause of those problems is considered to be that the stratum corneum (SC) moisture is small and its barrier function is low. However, those problems decrease in subjects as they approach 40 years of age, after which problems due to their shape and color increase. The purpose of this study was to investigate relationships between SC properties of the lips during aging and to clarify the cause(s) of lip problems. Methods: One hundred and 38 Japanese female subjects with normal skin ranging in age from 16 to 78 years were enrolled in the study. The capacitance and transepidermal water loss (TEWL) values, viscoelasticity, and color of their lips were measured and compared with their cheeks. Results: The capacitance values for the lip and the cheek increased and TEWL values for both areas decreased with age. TEWL values for the lip decreased until ~30 years of age and this is considered to be related to the problem of drying. Although the maximum amplitude U_f of the lip increased with age, the U_r/U_f had no correlation with age. As for color, the L^* and a^* values decreased with age. Conclusion: Age-related changes with regard to SC functions, viscoelasticity and color of the lips have been clarified for the first time, and it is clear that these changes are related to problems of the lips. Compared with the cheeks, differences with the lips are more apparent.

P. Rouaud-Tinguely, R. Vyumvuhore, J. Corvo, D. Boudier, M. Le Guillou, B. Clos, Quantifying Well Aging, *Cosmetics & Toiletries*, Vol. 133, No. 8, September 2018

The age distribution of the world's population is dramatically shifting; longevity rises while fertility rates remain flat. According to demographic studies, 2020 will be a turning point, wherein individuals 60 years and older will outnumber children younger than five. Today, it is no longer a rarity to live 80 years or more in many parts of the world. This increasing longevity has led to new challenges in the medical field. Today's population expects to live longer and in good health — i.e., without facing the declines previously associated with aging. This status is referred to as healthy aging, aging gracefully or aging well; it was defined by Rowe and Kahn as freedom from disease, high cognitive and physical functioning, and a rich social life. An added element of aging well is one's perceived age. In elderly individuals, a perceived age lower than their chronological age is associated with high survival.⁴ Among consumers 50 years and older, there are two main outlooks on the signs of aging. The first is negative, where individuals do not accept their age and seek to erase the signs of time; e.g., the use of anti-aging products, in attempt to look younger. The second is positive, where individuals assume aging as part of their personal identity.

A. Aubert, F. Vial, A. Lan, B. Chen, K Lee, D Kang, K Lintner, East West synergy in cosmetics: Demonstration of an increased efficacy of an anti-ageing cream combined with Chinese Herbal Medicine, *IFSCC Congress*, Munich, September 2018

This paper is based on the idea that Western “Evidence based cosmetics” (EBC) and Eastern “Traditional Chinese Medicine” (TCM), can find synergies, especially in the field of bioactive peptides. Is the mechanistic approach of EBC compatible with the holistic concepts of TCM? The paper presents

a clinical study of such a combination of philosophies in anti-ageing and well-being strategies. Why peptides? Synthetic oligopeptides of defined amino acid composition and sequence have been introduced as cosmetic active ingredients about 25 years ago and have since then become a major staple of quality skin care formulations, as well as a continuing subject of research. These peptides have the great advantage of being analytically well defined, associated with high potency at very low use levels, with often high specificity of bioactivity. Increasingly, scientific literature shows that peptides also play a role in TCM, thus possibly mirroring the EBC approach to skin care activity. A short clarification of what we mean by EBC and by TCM is proposed.

Y. Seo, H. Jeong, J. Koh, Comparison of biophysical parameters of the skin aging in face and hand, IFSCC Congress, Munich, September 2018

Background: In today's society, improving the quality of life makes people look younger than their chronological age, and therefore increases their interest in anti-aging. Most of the aging studies have been done on facial skin and only little known about the body aging. Among body parts, the hands are exposed like a face, making them a good part to assess aging externally. So far, the studies have led to hand wrinkles, volume of cavity assessment due to loss of fat and change in elasticity and skin texture. In this study, we aimed to aging patterns by comparing facial and hand skin aging parameters. **Method:** A preliminary test was carried out on 9 subjects (3 each in their 20s, 40s and 60s) and the main test is planned to be carried out after confirming the possibility. Those in their 20s, 40s and 60s were divided into three groups. Skin moisture, elasticity, roughness, wrinkle grading, skin tone evenness and skin volume of cavity were evaluated. Also, the level of the advanced glycation end products (AGEs) was measured as an aging protein. **Result:** As a result, skin hydration was no difference between age in face and hand, and skin elasticity, wrinkle grading, and AGEs level were difference with age in both face and hand. Skin roughness showed a tendency to increases with age in the face and hands for the 60s only, and the skin volume of cavity showed increases with age in the 60s in the case of the hands. Skin tone evenness tends to increase with age of the hands. **Conclusion:** This study has shown that the skin elasticity, wrinkle grading and AGEs levels are possible indicators of aging parameters in the face and hands. For further continuations of this study need a greater number of subjects to confirm correlation between aging parameters on the face and hands.

A. de Lago, E. Hernandez, T.Z. Reyes, J.R. Pinto, V.C. Albarici, G. Facchini, M.S. Silva, A. Pinheiro, A.S. Pinheiro, S. Eberlin, Pre-clinical and Clinical evaluation of antiaging properties of a dermocosmetic formulation, IFSCC Congress, Munich, September 2018

Studies has shown many factors, such skin inflammatory process and prolonged exposure to sunlight, could affect the skin barrier and extracellular matrix inducing a decrease in the synthesis of the major dermal proteins, collagen, elastin and hyaluronic acid, clinically characterized by wrinkles, rough skin, loss of water and skin tone. In this study, we evaluated *in vivo* effects of a dermocosmetic formulation in the increase of firmness, elasticity and hydration of the skin by instrumental techniques and perceived efficacy. Preclinical studies consisted on the production of collagen and hyaluronic acid using an *in vitro* model of human fibroblasts. Clinical evaluation was performed after 14, 30 and 60 days of treatment with the dermocosmetic product and consisted in the sensorial analysis of perceived efficacy through the application of a questionnaire answered by the participants of research. In addition, the following instrumental analysis was performed: cutometry - to evaluate skin firmness and elasticity, corneometry for hydration and image analysis to evaluate wrinkles and expression lines. Human dermal fibroblasts were incubated with noncytotoxic concentrations of dermocosmetic formulation. Cell culture medium and treatment of cell cultures were replaced each 2 days. Culture supernatants were collected after 1, 14 and 30 days incubation. The levels of total collagen and hyaluronic acid were measured using commercially available kits. ANOVA test was used followed by Bonferroni post-test with a 5% significance level. The instrumental results obtained for firmness and elasticity parameters revealed progressive increases after 14, 30 and 60 days of cosmetic treatment on the face and neck. The analysis of cutaneous hydration, evaluated after 24 hours of application, revealed a 12% increase by corneometry technique. Imaging of the depth and size of wrinkles also revealed significant reductions. In the evaluation of the perceived efficacy, over 80% of the volunteers reported improvements in the attributes of nutrition, softness, luminosity, appearance of wrinkles and expression lines, after 14, 30 and 60 days of cosmetic treatment. *In vitro* results corroborated the clinical findings demonstrating an increase in the production of total collagen and hyaluronic acid in cultures of fibroblasts treated with the dermocosmetic formulation. According to the results obtained, we can conclude that then dermocosmetic formulation has the ability to stimulate the synthesis of total collagen and hyaluronic acid when compared to untreated group. This effect is directly related to the improvement in skin support, favoring tissue repair and regeneration. In addition, the stimulation in the production of extracellular matrix components contributes to the reduction in formation of expression lines and wrinkles, one of the

most important changes in skin aging, conferring an anti-aging activity to the evaluated product.

R. Kurfürst, L. Sobilo, C. Heusèle, P. Mondon, F. Ossant, O. Jeanneton, E. Lespessailles, H. Toumi, S. Schnebert, In vitro and in vivo study of a combination of rosemary and Albizia julibrissin for stimulating TGFbeta inducible early gene 1 (TIEG-1) and skin regeneration, IFSCC Congress, Munich, September 2018

Skin aging is the consequence of both intrinsic and extrinsic factors leading to a gradual alteration of skin properties. The integrity of the skin is related to the capacity of dermal and epidermal cells to respond to these aggressions, by activating pathways involved in tissue regeneration. Cutaneous tissue regeneration is dependent on TGF-beta/Smad pathway but strategies targeting TGF-beta have been challenged. In order to avoid approaches based on TGF-beta, we focused on TGF-beta inducible early gene-1 (TIEG-1), a downstream effector of the TGF-beta cascade. TIEG-1 was first identified in human fetal osteoblasts [1]. TIEG1 transcript is induced by TGF-beta treatment in osteoblasts and TIEG1 activity is essential to exert the effect of TGF-beta on cell growth and function [1]. Overexpression of TIEG1 is a positive regulator of TGF-beta signaling [2]. TIEG-1 promotes TGF- β receptor-regulated Smad2 phosphorylation, a critical step in the formation of the Smad2/4 complex and its translocation to the nucleus to regulate target gene transcription. In addition, TIEG-1 has been shown to inhibit Smad7, whose function is to feedback negatively on TGF-beta signaling [2]. These results indicate that TIEG1 increases the activity of the TGF-beta /Smad signal by both relieving the negative feedback loop through repression of Smad7 and by inducing Smad2 expression and phosphorylation [3].

M. Hisama, A. Kishita, N. Yamaguchi, C. Takeuchi, S. Matsuda, K. Yoshio, H. Kanayama, K. Masui, T. Miyazawa, R. Takimi, Age Related Changes of Human Skin Investigated on Biophysical, Physiological and Histological Characteristics, IFSCC Congress, Munich, September 2018

Japan's life expectancy has increased steadily over the past century, and currently stands as the highest in the world at almost eighty-four years. As life expectancy increases and with it the proportion of the aged in the population appropriate care of elderly skin becomes a medical concern of increasing importance. The skin is the largest multifunctional organ in the body. It functions as a protective physical barrier by absorbing UV radiation, preventing microorganism invasion and chemical penetration, and controlling the passage of water and electrolytes. The skin has a major role in thermoregulation of body, in addition to immunological, sensory, and autonomic functions. As skin ages, the intrinsic structural changes that are a natural consequence of passing time are inevitably followed by subsequent physiological changes that affect the skin's ability to function as the interface between internal and external environments. As numbers of the elderly increase, cosmetic dermatological interventions will be necessary to optimize the quality of life for this segment of the population. It is important to examine the associations between elderly skin condition and aging for development of anti-aging care products for elderly skin. Understanding the physiological, chemical, and biophysical characteristics of the skin helps us to arrange a proper approach to the management of skin diseases. However, it is critical to consider the influence of genetic and environmental factors on most of the skin characteristics. In this study, we investigated the comparison between the elderly skins in five different age groups on biophysical, physiological and histological characteristics by *in vivo* measurements in order to quantify aging processes on human skin.

N. Braun, S Binder, H Grosch, C Theek, J Ülker, H Tronnier, U. Heinrich, Effect of microgravity on skin physiology: new findings, IFSCC Congress, Munich, September 2018

The skin is the largest organ of the human body and has several functions, such as protection, thermal regulation, sensation and endocrine functions. Despite recorded skin problems in space and the fact that the skin is easily accessible and can be continuously examined by means of a large number of non-invasive test methods, investigations of the effects of space flight on skin are underrepresented so far. A first pilot study (SkinCare) was performed by Tronnier et al. on a single astronaut during a 6 month mission. Different skin compartments, namely the surface, epidermis and dermis were analyzed before, during and after the mission. Here, main skin physiological changes observed were a coarsening of the epidermis and a loss of skin elasticity confirmed by changes in the ultrasound picture on the skin. These changes appear to be reversible because after a year, the skin's condition returns to normal [1]. The aim of the present Skin B project was to validate these results on an increased number of astronauts with advanced devices and additional measurements. Therefore, measurements were carried out on 6 astronauts with respect to skin hydration, transepidermal water loss / barrier function and surface evaluation of the living skin in-orbit. Additional measured parameters on ground were skin elasticity, skin density and thickness as well as microcirculation. Thus, the Skin B experiment will complement the SkinCare experiment and aims to confirm the changes observed in the original experiment. However,

the skin is not the only or primary focus of the project, but rather serves as a model for all organs covered with epithelial and connective tissue. This study will help the astronauts to prepare for a long stay in space and to set up space travels, e.g. planned exploration of the moon and deeper space.

Q. Peijin, C. Jianjie, J. Lili, D. Gan, W. Yue, Composition and diversity of microbial community of Chinese female facial skin from different age and its association with skin characteristics, IFSCC Congress, Munich, September 2018

Skin is the largest organ of the human body. As the interface between the body and the external environment, skin is the first line to protect the human body against the pathogen invasion. Meanwhile human skin harbors a variety of commensals, including bacteria, fungi and viruses. Each area of human body hosts its unique microbial community. Many factors contribute to the structure and function of skin microbiome, for example the host, their age, genetic variation, hygiene, life style and it shifts according to the characteristics of the micro-environments. The adverse shifts might cause a dysbiosis state and it has been reported to be associated with skin disease, such as atopic dermatitis, acne and dandruff. Therefore, exploration of skin microbiome not only helps us understand the correlation between microorganisms and the skin physiological status, but also provide a new perspective to pathogenic factors and new therapeutic targets. In previous study, skin microbiota was demonstrated that varies from different body sites and individuals. However, the reports mainly focused on the Western people and limited study on Chinese skin microbiome. In preliminary work, researchers paid more attention on skin microbiome associated with skin disorders, especially in AD patients, while the relationship between descriptive skin-related characteristics of individual (like wrinkles, hydration, etc.) and skin microbiota is ambiguous. In this work, 34 Chinese female volunteers living in Shanghai were recruited for facial skin microbial community study. Skin samples were collected and Miseq gene sequencing platform was operated. To achieve overall and details of skin appearances, the skin types and characteristics were clinically graded by dermatologist and measured by instruments. The goal of this study is to characterize the composition and variability of the skin microbiota in health people divided into age groups. Moreover, the aim of study is to evaluate the association of the skin microbial distribution with skin physical and physiological properties and the interaction of microorganisms themselves. In our study, it is suggested that *Proteobacterium* is prevalent in elder group together with wrinkles. Additionally, higher trans-epidermal water loss is correlated with *S. aureus* and this may in turn to design a product to recover the skin microbiome balance. In addition, gain more knowledge about microbes interaction with each other is critical to design the skin care products with probiotics and prebiotics. These findings expand our insights in health skin microbiome and will be useful in clinical treatment near the further.

N. Zacula Juárez, A. Galvan, Gerardo, L. Gómez, Evaluation of the recovery of the biomechanical properties in hypertrophic burn scar: Looking for a suitable treatment and Care, IFSCC Congress, Munich, September 2018

Background: The skin is the largest organ of the human body and serves as physical and chemical barrier to the environment. Burn injuries are one of the most common traumatic wounds, this represents a costly public health problem. Many of burned patients develops a hypertrophic scar that can cause an aesthetic and functional problems. The aim of this research was had a better understanding of the recovery of biomechanical properties in hypertrophic burn scar to find new therapeutic strategies to control adverse scarring. Method: Cutometer MPA 580 is a non-invasive an objective suction device to make measurements of scar components as melanin, erythema, hydration, sebum, elasticity and viscoelasticity. Nine patients on the upper extremities with hypertrophic burn scars were evaluated with Cutometer MPA 580 to determine the recovery of the biomechanical properties respect a counterpart without burn injury. The analysis of the different biomechanical parameter was performed with a 2 mm aperture probe and a negative pressure of 450 mbar with 2 seconds of suction and 2 seconds to relaxation in a series 10 suction/relaxation, by triplicate. Also were evaluated *stratum corneum* hydration values by Corneometer, the presence of melanin and erythema by Mexameter and sebum production by Sebumeter probe. Nine patients with an age range between 26-37 years, a skin phototype III, IV and V, a mean value 30.6% of the Total Body Surface Area (TBSA), second and third degree burns were treated with autograft. For this study, approval from the Ethics Committee of the Instituto Nacional de Rehabilitación in Mexico City was obtained (26/15) and Informed consent was obtained from all patients. Results: The results are presented as a percentage (%). In the melanin Index of hypertrophic scars, there is an increase of 13.8 % respect a counterpart without injury or hyperpigmentation in autograft. The results of the erythema index rise with 29.5% of scars, the hydration value of *stratum corneum* decreased a 19 % and the sebum production decreased a 68 % on hypertrophic scar. The relative biomechanical parameters R0 (Maximal deformation), R5 (Net elasticity) and R6 (indicates a relative contribution of viscoelastic, viscous and elastic deformation "viscoelasticity"). The maximal deformation (R0) in hypertrophic scar decreased by 49%, there is a

reduction of 33% in net elasticity (R5) and was observed a increase of 5.6% in R6 "viscoelasticity". The biomechanical properties (R0, R5 and R6) and hydration, sebum, melanin and erythema in hypertrophic burn scar was altered. Conclusion: This data can be useful for a better diagnosis and find new strategies suitable for the treatment of hypertrophic burn scars and contribute to outpatient burn care.

*T. Alkazaz, M. Danaher, J. Goodman, E. Segura, D. Scholz, **Natural Antimicrobials and the Microbial Population of the Skin Microbiome**, IFSCC Congress, Munich, September 2018*

Just as every individual has a distinct fingerprint, each and every person has their own unique microbiome. The skin microbiome is an accumulation of the microbial communities that inhabit the skin and are key players in host defense. Commensal microflora on our skin is responsible for maintaining skin health through restoring immunity and communication with the lymphatic system. The action of indiscriminate microbial destruction, employed by preservatives, often unintentionally alters the thriving ecosystem of the skin microbiome. The current innovative study investigates variations in the population of microbial species after the application of antimicrobial peptides. Novel research analyzing activity of the histone deacetylase (HDAC) enzyme has concluded that some naturally derived antimicrobials are able to destroy pathogenic bacteria while maintaining commensal microflora on the skin – supporting the balance of the microbiome and promoting overall skin health. HDAC expression was used as an indicator to compare the effects of the skin's microbiome with traditional biocides versus natural antimicrobials. The application of topical antimicrobials altered levels of HDAC expression and decreased the population of the microbiome. While this research suggested HDAC is channel of communication between microflora and the skin, the messenger of the microbial crosstalk has yet to be determined. In this study, a more conventional approach was taken to analyze the effects of the population of species in the skin microbiome. The effect of the microbial population present on the skin with the application of three antimicrobial peptides (Leuconostoc Radish Root Ferment Filtrate, Lactobacillus Ferment, and Lactobacillus & Cocos Nucifera (Coconut) Fruit Extract) was compared to a negative control (water) and a positive control (Triclosan). Microbiome population was determined by DANN extraction, 16S ribosomal RNA (rRNA) polymerase chain reaction (PCR) amplification and sequencing. A less conventional approach was taken in regards to panel size and evaluation during this study. Large subject panels allow for trend recognition between subjects. However, with the individuality of each person's microbiome in mind, it would be difficult to establish trends within a group of subjects. Examining the nasolabial folds of each subject isolates of the geographic location of the microbiome, however the person-to-person variation of microflora is uncontrollable. Patterns in microbial change on each test subject were evaluated individually.

*T. Ezure, M. Sugahara, S. Amano, K. Matsuzaki, N. Ohno, **A New Skincare Paradigm Targeting the Skin Anti-Aging System, the "Dermal-Cell Network"- "Digital-3D Skin" Technology: A New Frontier in Internal Skin Structure Analysis**, IFSCC Congress, Munich, September 2018*

Dermal cell (fibroblast) aging is a fundamental event in skin aging, leading to loss of skin firmness and an aged facial appearance. But it is unclear how the cellular condition is controlled in real skin, so there is no rational basis for skincare to rejuvenate cells and facial appearance. We developed a revolutionary technology to observe the actual status of cells and their community in real skin. We digitally reconstructed skin at an ultrafine structure level based on a new scanning electron microscopy technique and an artificial intelligence-based auto-classification of structures (machine learning system). The resulting "digital-3D skin" can be freely explored in an unprecedented way onscreen ("digital anatomy" and "digital sorting" of every structure). Inspection of this digital-3D skin revealed that fibroblasts, generally considered to be scattered and isolated in the dermal layer, are actually interconnected via fine dendrites, forming a network throughout the whole skin. This network, designated the dermal cell network, is degraded with aging, leading to an aged facial appearance. Thus, the dermal cell network is a control system of fibroblasts in real skin, serving as an anti-aging system of the skin. The "digital-3D skin" technology provides a modal shift of skin analysis methodology from instrumental observation to onscreen exploration and is shareable online, providing a common resource for the cosmetics industry. Discovery of the "dermal cell network" changes the commonsense view of cosmetology, offering a new paradigm for rejuvenating skin and facial appearance by targeting the skin anti-aging system.

*J. Schleusener, C.K. Nowbary, M.E. Darvin, S.B. Lohan, J. Lademann, M.C. Meinke, **Influencing the Cutaneous Carotenoid Status and Skin-physiological Parameters by Ingesting Antioxidants in the Form of Curly-kale Containing Food Supplements**, sofw journal 1144 109/18*

Antioxidants are important radical scavengers protecting the body from the consequences of oxidative stress. They have to be ingested by food rich in fruits and vegetables or by food supplements. The effects of the intake of curly-kale containing food supplements on the skin are described in this

paper. For this purpose, verum and placebo groups had been investigated for several months noninvasively *in vivo* by determining their cutaneous antioxidative status, their collagen-to-elastin index of the dermis, and various age-related skin parameters. While in the verum groups the cutaneous antioxidative status and the skin moisture increased significantly, only small changes were found in the placebo groups. The collagen content in the skin of the verum group showed a tendency towards increasing. Besides a healthy nutrition, a selected supplementation consisting of low-dosed natural carotenoids at a physiological concentration can improve the antioxidative capacity of the skin, thus counteracting an age-related degradation of collagen I in the dermis.

A. Esplugas, E. Ferreira, J. A. Boras, S. Pastor, Deep Arctic Marine Extract for Deep Extracellular Matrix Engineering and Digital Anti-Aging Efficacy, söfw journal 1144 109/18

Little of the ocean and its intertwined ecosystems have been explored, although it is the most untapped potential source for the discovery of novel cosmetic active ingredients. From an Arctic scientific expedition, a novel active ingredient was discovered (Arctalis: Pseudoalteromonas Ferment Extract) aimed at restructuring ECM key components with an excellent wrinkle smoothing and firming effect. Arctalis restores skin hydration and natural glow while also protecting skin from digital pollution or blue light.

M. Portugal-Cohen, Z. Ma'or, M. Oron, Full Scale Customization, Cosmetics & Toiletries, Vol 133, No. 9, September 2018

The drive for personalized consumer products is no longer a passing fad. Personalization stems from deep motivations. The emotional wish to purchase products created "especially for me" comes across with an understanding of diversity between individuals and the prospects for more effective solutions to meet each individuals special needs. However, efforts to introduce personalized skin care—i.e., for unique skin with distinctive characteristics — on an industrial scale means products formulated for generalized needs, which could not be as effective.

G. Boyer, N. Lachmann, G. Bellemere, C. De Bellovsky, C. Baudouin, Effects of pregnancy on skin properties: A biomechanical approach, Skin Res Technol. 2018; 24, p. 551-556

Background: A woman's skin is dramatically affected by pregnancy. Its biomechanical properties are critical for resisting highly stressed areas. The aim of this work was to evaluate the impact of pregnancy on the mechanical properties of skin, as well as to evaluate the imprint that pregnancy leaves on the skin after delivery. Materials and Methods: Suction tests using a cutometer were performed on 15 nonpregnant women and 26 pregnant women at 8 months of pregnancy and 4 months after delivery. Areas of abdomen and thighs were studied. Results: Significant differences between the non-pregnant and 8-month pregnant groups were observed. Our data demonstrate that skin becomes less elastic and less deformable on the abdomen during pregnancy. On the thighs, a loss of elasticity and firmness was also observed. At 4 months after delivery, the skin did not return to its initial state. Conclusion: This study showed that the mechanical properties of skin changed drastically during pregnancy compared to the non-pregnant condition and that these properties remain altered 4 months after delivery. In addition to alterations in abdominal skin during pregnancy, we also observed mechanical changes on the thighs, which are less subject to stretching.

L. Rocha Mota, L. Jansiski Motta, I. da Silva Duarte, A.C. Ratto Tempestini Horliana, D. de Fátima Teixeira da Silva, C. Pavani, Efficacy of phototherapy to treat facial ageing when using a red versus an amber LED: a protocol for a randomized controlled trial, BMJ Open 2018; 8

Introduction: The skin undergoes morphological and physiological changes with the advancing age of an individual. These changes may be caused by intrinsic and extrinsic factors that contribute to cellular ageing and consequent skin ageing. The term photoageing is used to characterise the ageing of the skin caused by solar radiation. Clinically, the skin becomes more flaccid, thicker and hyperpigmented, while there is an early appearance of wrinkles and other skin changes, such as skin cancer. Nowadays, there are numerous treatments for ageing skin, and one of them is with the use of phototherapy, which uses light-emitting diodes (LEDs). The objective of this study will be to evaluate the percentages of reduction in the volume of periorcular wrinkles when treated with red and amber LEDs. Methods and analysis: All of the participants will receive photobiomodulation to treat their periorcular wrinkles. They will be using red and amber LEDs, with one colour being used on each hemiface. The facial side to be treated with each colour will be randomised. After an interval of 180 days, the participants will receive a cross-treatment. The primary variable of the study is the volume of periorcular wrinkles (crow's feet), which will be measured by a VisioFace equipment. The secondary variables are elasticity (measured by Cutometer) and hydration (measured by Corneometer). Quality of life and self-assessment of the participants will be measured using the adapted Melasma Quality of Life scale –

Brazilian Portuguese adaption (MelasQoL-BP) and Skindex-29 questionnaires. All of the variables will be measured before and after a group of 10 sessions.

L. Skedung, C. El Rawadi, M. Arvidsson, C. Farcet, G.S. Luengo, L. Breton, .M.W. Rutland, Mechanisms of tactile sensory deterioration amongst the elderly, Scientific Reports 8, Article number: 5303 (2018)

It is known that roughness-smoothness, hardness-softness, stickiness-slipperiness and warm-cold are predominant perceptual dimensions in macro-, micro- and nano- texture perception. However, it is not clear to what extent active tactile texture discrimination remains intact with age. The general decrease in tactile ability induces physical and emotional dysfunction in elderly, and has increasing significance for an aging population. We report a method to quantify tactile acuity based on blinded active exploration of systematically varying micro-textured surfaces and a same-different paradigm. It reveals that elderly participants show significantly reduced fine texture discrimination ability. The elderly group also displays statistically lower finger friction coefficient, moisture and elasticity, suggesting a link. However, a subpopulation of the elderly retains discrimination ability irrespective of cutaneous condition and this can be related to a higher density of somatosensory receptors on the finger pads. Skin tribology is thus not the primary reason for decline of tactile discrimination with age. The remediation of cutaneous properties through rehydration, however leads to a significantly improved tactile acuity. This indicates unambiguously that neurological tactile loss can be temporarily compensated by restoring the cutaneous contact mechanics. Such mechanical restoration of tactile ability has the potential to increase the quality of life in elderly.

I.I. Shuvo, K. Chakma, D. Toutant, Prospect of 3D Warp Knitted Spacer Fabric and its Effect on Pressure Relieve for Reducing the Prevalence of Pressure Ulcers for Immobile Patients, Journal of Textile Science & Engineering, Volume 8, Issue 1, 2018

Many hospitals use paper thin bed sheets with high friction coefficients which are not ideal for patients with pressure ulcers and who are at risk of developing. These patients suffer a great deal of pain, which could have been prevented. Lying on a weak bed sheet with no regards to regulating micro-climate is a clear promoter of pressure ulcers. Another key factor of a hospital bed sheet is they are to be easily washed or disposed of because of all the unknown fluids that could seep onto the sheet. Therefore, the sheet must not only be to comfort those with pressure ulcers but to be easily washable and reusable. Again, in a hospital setting being able to easily wash the sheet and for it to hold its form is significant for reducing the cost of throwing away sheets less often. Therefore a theory has been proposed to design a 3D knit spacer bed sheet that will allow patients with pressure ulcers to be comfortable by ensuring a low friction coefficient between their skin and the material. The friction coefficient will be reduced by not only the structure but by the 70 percent polyester, 22 percent polypropylene and eight percent spandex blend. The friction coefficient will stay low due to a high wicking and evaporation capability to ensure the skin stays dry as well as the material. The 3D knit spacer bed sheet also has a higher compressibility which distributes pressure more evenly as well as enabling a care giver to easily rotate an immobile person into a new position. The proposed bed sheet will be easily washable to ensure all bodily fluids such as vomit, blood, and others have been removed. This blanket will be slightly more expensive but is expected to last longer than a typical hospital bed sheet.

S. Hettwer, E. Besic Gyenge, B. Suter, S. Breitenbach, B. Obermayer, Natural alternatives for retinoic-acid-like anti-ageing, PERSONAL CARE EUROPE, June 2018

Use of vitamin A derivatives - the retinoids - is common in cosmetic formulations targeting the anti-ageing area. While retinoid acid is banned in the European Union as a cosmetic ingredient, other retinoids such as retinol are permitted. However, retinoids can provoke unwanted effects such as dry and itchy skin, especially when exposed to sunlight. Here we show that an alternative, namely natural bioflavonoids from *Madura cochinchinensis*, is able to bind the target receptors of retinoic acid and create retinoidacid-like efficacy *in vivo*.

K. Kimori, C. Konya, M. Matsumoto, Venipuncture-Induced Hematomas Alter Skin Barrier Function in the Elderly Patients, SAGE Open Nursing, June 2018

We aimed to compare the barrier function of the skin site with the color of hematoma induced by venipuncture and the area surrounding the skin site to help improve skin care for hospitalized elderly patients. There were 50 patients with a median age of 84 years who were included in the analysis. There was no significant difference between the hematoma site-induced venipuncture and the area surrounding the hematoma site in terms of transepidermal water loss and skin sebum level. The status of stratum corneum hydration and skin elasticity on the hematoma sites was significantly lower than that on nonhematoma sites. The median skin pH was significantly higher on hematoma sites than that on

nonhematoma sites. The study variables did not reveal any significant correlation with the intensity of skin erythema. These findings showed that hematoma formation in the subcutaneous tissue affected the skin barrier function and that these sites need moisturizing skin care regardless of the intensity of skin erythema.

J. Matiasek, P. Kienzl, L.W. Unger, C. Grill, R. Koller, B.R. Turk, An intra-individual surgical wound comparison shows that octenidine-based hydrogel wound dressing ameliorates scar appearance following abdominoplasty, Int Wound J, 2018 Jun 29

Hypertrophic scar formation because of surgical procedures is associated with higher levels of pain, a lower quality of life, and poor cosmetic outcome and requires more resources in follow-up management. An octenidine-based hydrogel has been shown to modulate immunological function in an in vitro wound model, suggesting an improved scar formation. In this prospective, randomised, observer-blinded, and intra-patient-controlled study, 45 patients who underwent abdominoplasty or mastectomy with transverse rectus abdominis muscle (TRAM) flap reconstruction were given both a standard postoperative wound dressing on one wound side and an octenidine-based hydrogel with transparent film dressing, covered with standard postoperative dressing on the other side. Four instances of hypertrophy were reported in the gel side versus 12 in the standard dressing side. Visual Analogue Scale (VAS) pain scores taken during postoperative dressing changes showed reduced scores on the gel side at all time points. Vancouver Scar Scale (VSS) scores showed improvement in the gel side at 3, 6, and 12 months postoperatively. Skin distensibility measured using a cutometer showed significantly improved measures in gel-treated wounds, similar to measures of healthy skin. Trans-epidermal water loss (TEWL), measured using a tewameter, showed improved values on the gel side soon after surgery, with both the control and the gel side normalising after approximately 6 months. The octenidine-based wound dressing demonstrates improved wound healing associated with a lower incidence of hypertrophic scar formation.

Z. Xu, J. Dela Cruz, C. Fthenakis, C. Saliou, A novel method to measure skin mechanical properties with three-dimensional digital image, Skin Research & Technology, June 2018

Background: Measuring skin mechanical properties has been of great interest in the skincare industry. It is a high accuracy and non-invasive optical technique which quantitatively tracks skin movement and deformation under mechanical perturbations. Methods: A study was conducted with female subjects (25-65 years old). A refined speckle pattern applied onto the skin surface was used for DIC measurements. A unidirectional force pulled the skin at a constant velocity, while the deformation process was quantified by the DIC. Prior to the DIC measurement, Cutometer® readings were taken on the same area. The DIC protocol's reproducibility across multiple pattern applications, the measurement's repeatability, and the sensitivity in differentiating skin mechanical properties were investigated. Results: Subjects were clustered with statistical significance according to their skin mechanical properties described by six DIC metrics (μ [major strain], σ [major strain], μ [minor strain], σ [minor strain], μ [displacement], and σ [displacement]). Most measurement random errors are below 6%. This is several folds smaller in magnitude than the difference in the mean response between the clusters. Several Cutometer® parameters also showed good agreement with μ (displacement). Conclusions: DIC was able to differentiate skins of different mechanical qualities. We also proposed the physical significance of the DIC metrics. Some of the DIC metrics potentially offer new insights into skin mechanical properties that complement those revealed by conventional instruments. Accurate measurements, large measurement areas along with ease of direct visualization are substantial advantages of DIC.

H. Sano, Y. Hokazono, R. Ogawa, Distensibility and Gross Elasticity of the Skin at Various Body Sites and Association with Pathological Scarring: A Case Study, J Clin Aesthet Dermatol. 2018; 11(6): p. 15–18

Objective: Pathological scars, including hypertrophic scars and keloids, have a strong predilection for specific regions of the body. Such site specificity might reflect regional differences in skin properties. Greater knowledge about the characteristics of the skin at various body regions can promote the development of clinical approaches to skin incision and flap design and reduce the formation of cutaneous scars. It could also help elucidate the etiology of pathological scar development and progression. Thus, we measured the distensibility and gross elasticity of the skin at various body sites. Methods: Five healthy adult volunteers were enrolled. In each, the cutaneous viscoelasticity at 16 sites (forehead, superior eyelid, lower jaw, earlobe, deltoid, outside and medial side of the upper arm, palm, scapular region, anterior chest, upper abdomen, lateral abdomen, lower abdomen, lateral thigh, anterior lower leg, and planta) was examined using a Cutometer MPA 580® (Courage Khazaka electronic GmbH, Cologne, Germany). Results: The skin was particularly distensible at the medial side of the upper arm,

followed by the earlobe, lower jaw, upper abdomen, lateral abdomen, lower abdomen, and superior eyelid. It was poorly distensible at the planta, followed by the anterior lower leg, palm, and forehead. The skin was poorly elastic at the earlobe, superior eyelid, planta, and palm and highly elastic at the lateral and upper abdomen, scapular region, and deltoid. Conclusions: Except for the earlobe, all regions with poorly distensible and hard skin are not prone to pathological scarring. This association between these skin properties and abnormal scarring could be useful for skin surgeons.

A. Rigal, R. Michael-Jubeli, A. Bigouret, A. Nkengne, A. Baillet-Guffroy¹, A. Tfayli, Lipides: Systèmes Analytiques et Biologiques, ISBS Conference San Diego, May 2018

Introduction: Clinical manifestations of skin aging like xerosis, wrinkles and slackness are related to underlying complex molecular phenomena in the different layers of the skin. The combinations of classical biometric measurements with more complex and informative techniques like *in vivo* Raman spectroscopy can provide interesting information on the organization of lipids in the *Stratum Corneum* (SC), their barrier function and on water content and mobility, in order to better characterize the skin aging. Methodology: Biometric information (TEWL, corneometry, sebumetry, skin pH, mechanical stress) and Raman spectra and in-depth profiles were collected from the forehead of twenty-two young women (18- 24 years old) and eighteen elderly women (70-75 years old). Results and Conclusions: Important modifications on biometric skin parameters, structure of the SC and water mobility can be observed for elderly. Our results show a good association between biometric parameters and *in vivo* Raman descriptors. Interestingly, higher compacity of lipids, higher total water content and lower unbound water content are observed for elderly.

K. Mizukoshi, M. Kuribayashi, Y. Hamanaka, M. Kurosumi, The Examination of Age-Related Changes by Visualizing and Measuring the Viscoelasticity of the Dermic and Subcutaneous Fat Layers Using Ultrasound Elastography, Poster Presentation at ISBS Conference San Diego, May 2018

Introduction: The viscoelasticity of the inner part of the skin which consists of many layers was not examined in detail. In this study, we visualized and digitized viscoelasticity of the skin depth wise using elastography, with the aim of ascertaining the characteristic age-related changes. Methodology: The study included 140 women aged 20 – 69 years. The region of the face measured was the left cheek. For the elastography measurement, we used the Hitachi Noblus (Hitachi, Japan). The elastographic images were divided into seven areas in the depth direction. The mean measured value was calculated within each area. Results and Conclusions: On measuring the dermic layer which was divided into two layers, in the only lower layer, viscoelasticity decreased statistically significantly with age. On measuring the subcutaneous fat layer, in the upper and middle layer, viscoelasticity decreased statistically significantly with age. In the lower layer, there were no clear age-related changes observed. The present study showed that, depth wise, for both the dermic and subcutaneous fat layer, age-related changes in viscoelasticity tended to differ.

M. Mendes Fossa Shirata, P.M. Berardo Gonçalves Maia Campos, Evaluation of Young Skin Photoaging Using Biophysical and Imaging Techniques, Poster Presentation at ISBS Conference San Diego, May 2018

Introduction: Photoaging is associated to an intense solar exposure, thus the photoaging signs can be observed also in the young skin, mainly in countries with high UV incidence, like Brazil. The aim of this study was to evaluate the skin changes resulted from photoaging in Brazilian young skin in comparison to photoaged mature skin. Methodology: Thirty participants were divided in two groups: the first between 18 to 35 years old and the second, 40 to 60 years old. Analyzes were performed on the randomized facial malar region. TEWL, stratum corneum water content, sebum content, high resolution imaging, echogenicity and dermis thickness, skin color and elasticity parameters were analyzed. Results and Conclusions: The obtained results showed that sun exposure can cause changes even in the young skin, with the appearance of spots and the reduction of the echogenicity of the dermis, besides there were no significant differences between young skin and mature skin in most parameters. In conclusion, signs of photoaging may be frequent even in young skin.

L. Salomão Calixto, C. Picard, G. Savary, P.M. Berardo Gonçalves Maia Campos, Application of Topical Formulations Containing Natural Origin Actives and UV-Filters in the Prevention of Photoaging in French and Brazilian Skin, Poster Presentation at ISBS Conference San Diego, May 2018

Introduction: The study of skin from different populations brings an essential knowledge to the development of skin treatments. The aim of this study was to evaluate the immediate effects of topical formulations using biophysical techniques and to compare the skin biology of the participants. Methodology: 36 subjects, 18 French and 18 Brazilians, were enrolled. Transepidermal water loss,

stratum corneum water content, skin viscoelasticity and skin brightness were evaluated before and 60 minutes after formulations application. Results and Conclusions: Brazilian skin had a lower TEWL and less gloss on the skin surface when compared with French skin. There was no difference in hydration and viscoelastic profile. After 60 minutes, there was a significant increase in stratum corneum water content and skin brightness, a significant decrease in TEWL and no difference in skin viscoelasticity in both groups. In conclusion, biophysical differences were found on the groups and the formulations were effective in both populations.

M. Mateu, A. Esplugas, S. Pastor, P. Carulla, M. Gorostiaga, Tightening efficacy of a selfie-ready freezing blast, PERSONAL CARE ASIA, May 2018, p. 46-48

Nowadays, 24 hours are not enough for busy lifestyles. Whether your little spare time is due to work and personal duties or social events, your skin needs to be taken care of. Imagine applying a cosmetic product that acts while you are dressing or deciding how to take a selfie. An on-the-go recharging beauty wind to keep up with your daily rhythm.

L. von Oppen-Bezalel, Urban pollution protection for beautiful, balanced skin, PERSONAL CARE EUROPE, April 2018, p. 122-124

In our urbanised and industrialised environments, we are exposed to increasingly abundant environmental pollutants. Heavy metals, PAHs and aldehydes is just a short list of toxic compounds surrounding us, having detrimental effects on our skin and body, causing respiratory diseases, headaches, asthma and skin rashes, which are just a few health aspects to mention. High Energy Visible (HEV) light including blue light is another type of 'pollution' affecting among others our skin. Our appearance is the first to be affected, with early signs of ageing, wrinkles, pigmentation spots, disrupted barrier, overall dryness and skin imperfections all associated with polluted environments. IBR-UrBioTect, an extract of *Inula helenium*, may help repair and reverse the effects of pollution, according to results of a clinical study in a smoking environment (cigarette smoke). In this study, reduction of early signs of ageing in a smoking environment has been achieved using a formula containing 1% IBR-UrBioTect. The extract has also been shown to chelate and neutralise pollutants such as heavy metals which cause accumulated damage to the skin, as efficiently protect skin cells from HEV induced ROS production. We propose here a natural and innovative solution to relieve and repair the effects of pollution on the skin and the appearance of early signs of aging in a polluted environment, promoting a lighter skin tone as well as reducing wrinkle count, and improving skin elasticity and barrier function.

A. Markiewicz, M. Zasada, A. Erkiert-Polguj, M. Wieckowska-Szakiel, E. Budzisz, An evaluation of the antiaging properties of strawberry hydrolysate treatment enriched with L-ascorbic acid applied with microneedle mesotherapy, Journal of Cosmetic Dermatology, April 2018

Background: Mature skin is characterized by a loss of elasticity, hyperpigmentation, and dehydration. L-ascorbic acid stimulates the synthesis of collagen type I, inhibits melanogenesis, and helps to maintain correct skin hydration. Combining microneedle mesotherapy with the application of preparations rich in vitamin C results in better therapeutic effects due to the improved absorption of active substances. The study evaluates the effectiveness of the application of strawberry hydrolysate enriched with L-ascorbic acid using microneedle mesotherapy. Materials and Methods: Seventeen volunteers aged 45-70 years underwent a series of four microneedle mesotherapy treatments with vitamin C serum, performed every 10 days. The 20% L-ascorbic acid solution (pH = 3.5) was prepared immediately before application. After the treatment, the participants gave a subjective assessment of the effectiveness. Cutometer® was used to measure skin elasticity and firmness, Corneometer® to measure skin hydration, and Mexameter® skin tone. Results: The results of the survey showed improvements in skin hydration and elasticity. In vivo studies confirmed the effectiveness of serum and the impact of the active substance on skin firmness and elasticity, the degree of hydration and skin tone. Conclusion: Microneedling with vitamin C improves skin tone, hydration and firmness, and decreases the visibility of hyperpigmentation.

Y. Ogura, Y. Tanaka, E. Hase, T. Yamashita, T. Yasui, Texture analysis of second-harmonic-generation images for quantitative analysis of reticular dermal collagen fibre in vivo in human facial cheek skin, Exp Dermatol. 2018 Apr 15

Second-harmonic-generation (SHG) microscopy is a powerful tool for in vivo visualisation of collagen fibres in human skin because of its specific collagen selectivity without the need for staining, non-invasiveness and high-resolution three-dimensional imaging. Although texture analysis of SHG images is a promising method for the quantitative analysis of well-orientated collagen fibre structure in the tendon and cornea, there are few attempts to assess cutaneous ageing. In this study, we applied two texture analysis techniques, namely autocorrelation (2D-AC) analysis and two-dimensional Fourier

transform (2D-FT), to evaluate the age-dependent changes in reticular dermal collagen fibres in in vivo human cheek skin. Age-dependent changes in the reticular dermal collagen fibres of female subjects in their 20s, 40s and 60s clearly appeared in these texture analyses. Furthermore, the parameter from 2D-AC analysis showed a significantly higher correlation with skin elasticity measured by a Cutometer®. These results clearly indicate that 2D-AC analysis of SHG images is highly promising for the quantitative evaluation of age-dependent change in facial collagen fibres as well as skin elasticity. An appropriate texture analysis will help to provide quantitative insight into collagen fibre structure and will be useful for the diagnosis of pathological conditions as well as cutaneous ageing in skin.

G. Kang, T.N.T. Tu, S. Kim, H. Yang, M. Jang, D. Jo, J. Ryu, J. Baek, H. Jung, Adenosine-loaded dissolving microneedle patches to improve skin wrinkles, dermal density, elasticity and hydration, Int J Cosmet Sci. 2018 Apr; 40(2): p. 199-206

Objective: Although dissolving microneedle patches have been widely studied in the cosmetics field, no comparisons have been drawn with the topical applications available for routine use. In this study, two wrinkleimproving products, adenosine-loaded dissolving microneedle patches and an adenosine cream, were evaluated for efficacy, with respect to skin wrinkling, dermal density, elasticity, and hydration, and safety in a clinical test on the crow's feet area. **Methods:** Clinical efficacy and safety tests were performed for 10 weeks on 22 female subjects with wrinkles around their eyes. The adenosine-loaded dissolving microneedle patch was applied once every 3 days, in the evening, for 8 weeks to the designated crow's feet area. The adenosine cream was applied two times per day, in the morning and evening, for 8 weeks to the other crow's feet area. Skin wrinkling, dermal density, elasticity, and hydration were measured by using PRIMOS premium, Dermascan C, Cutometer MPA580, and Corneometer CM 825, respectively. In addition, subjective skin irritation was evaluated by self-observation, and objective skin irritation was assessed through expert interviews. **Results:** The adenosine-loaded dissolving microneedle patches had a similar or better efficacy than the adenosine cream. Both groups showed statistically significant efficacy for almost all parameters ($P < 0.05$). The dissolving microneedle patches had a long-lasting effect on the average wrinkle depth ($P < 0.05$), only showed efficacy in dermal density ($P < 0.05$), had an early improving effect on elasticity ($P < 0.05$), and demonstrated better hydration efficacy ($P < 0.001$). No adverse effects were observed in either group during the test period. In the clinical efficacy test of four skin-improvement parameters, adenosine-loaded dissolving microneedle patches showed the same or better effect than the adenosine cream, although the weekly adenosine dose was 140 times lower. **Conclusion:** The dissolving microneedle patches caused no adverse reactions. These adenosine-loaded dissolving microneedle patches are expected to be safe, effective, and novel cosmetics for skin improvement.

A. de Groef, M. van Kampen, P. Moortgat, M. Anthonissen, E. van den Kerckhove, M.-R. Christiaens, P. Neven, I. Geraerts, N. Devoogdt, An evaluation tool for Myofascial Adhesions in Patients after Breast Cancer (MAP-BC evaluation tool): Concurrent, face and content validity, PLoS ONE 13(3), March 2018

Purpose: To investigate the concurrent, face and content validity of an evaluation tool for Myofascial Adhesions in Patients after Breast Cancer (MAP-BC evaluation tool). **Methods:** Concurrent validity of the MAP-BC evaluation tool was investigated by exploring correlations (Spearman's rank Correlation Coefficient) between the subjective scores (0 –no adhesions to 3 –very strong adhesions) of the skin level using the MAP-BC evaluation tool and objective elasticity parameters (maximal skin extension and gross elasticity) generated by the Cutometer Dual MPA 580. Nine different examination points on and around the mastectomy scar were evaluated. 2) Face and content validity were explored by questioning therapists experienced with myofascial therapy in breast cancer patients about the comprehensibility and comprehensiveness of the MAP-BC evaluation tool. **Results:** Only three meaningful correlations were found on the mastectomy scar. For the most lateral examination point on the mastectomy scar a moderate negative correlation (-0.44 , $p = 0.01$) with the maximal skin extension and a moderate positive correlation with the resistance versus ability of returning or 'gross elasticity' (0.42 , $p = 0.02$) were found. For the middle point on the mastectomy scar an almost moderate positive correlation with gross elasticity was found as well (0.38 , $p = 0.04$) 2) Content and face validity have been found to be good. Eighty-nine percent of the respondent found the instructions understandable and 98% found the scoring system obvious. Thirty-seven percent of the therapists suggested to add the possibility to evaluate additional anatomical locations in case of reconstructive and/or bilateral surgery. **Conclusions:** The MAP-BC evaluation tool for myofascial adhesions in breast cancer patients has good face and content validity. Evidence for good concurrent validity of the skin level was found only on the mastectomy scar itself.

M. Pensalfini, J. Weickenmeierb, M. Rominger, R. Santoprete, O. Distler, E. Mazza, Location-specific

mechanical response and morphology of facial soft tissues, Journal of the Mechanical Behavior of Biomedical Materials 78 (2018), p. 108–115

The facial tissue of 9 healthy volunteers (m/f; age: 23–60 y) is characterized at three different locations using a procedure combining suction measurements and 18 MHz ultrasound imaging. The time-dependent and multilayered nature of skin is accounted for by adopting multiple loading protocols which differ with respect to suction probe opening size and rate of tissue deformation. Over 700 suction measurements were conducted and analyzed according to location-specific mechanical and morphological characteristics. All corresponding data are reported and made available for facial tissue analysis and biomechanical modeling. Higher skin stiffness is measured at the forehead in comparison to jaw and parotid; these two regions are further characterized by lower creep deformation. Thicker tissue regions display a tendency towards a more compliant and less dissipative response. Comparison of superficial layer thickness and corresponding mechanical measurements suggests that connective tissue density determines the resistance to deformation in suction experiments.

S. Nisbet, H. Mahalingam, C.F. Gfeller, E. Biggs, S. Lucas, M. Thompson, M.R. Cargill, D. Moore, S. Bielfeldt, Cosmetic benefit of a biomimetic lamellar cream formulation on barrier function or the appearance of fine lines and wrinkles in randomized proof of concept clinical studies, International Journal of Cosmetic Science / Volume 41, Issue 1, 2018

Objective: Two studies were designed to evaluate the potential cosmetic benefit of a biomimetic, niacinamide containing moisturizing cream for the first time in humans. **Methods:** In both studies, healthy women were randomized to use two treatments, one for the left side of the body and one for the right, from three options: the test cream, a positive control or no treatment (use of standard cleanser only). Treatments were applied twice daily for 4 weeks to the face and forearms (Study 1) or the face only (Study 2). Instrumental and clinical skin assessments were performed by trained technicians. Study 1 involved tape stripping and a 5 day no treatment ('regression') period at the end of the 4 weeks. Independent lay graders were asked to grade the skin texture of subjects in Study 2 from high resolution photographs. **Results:** In Study 1 ($n = 66$), the test cream significantly decreased the transepidermal water loss (TEWL) values on the forearm, and in the cheek area of the face, relative to baseline and compared to no treatment, and increased skin Corneometer values. The improvements were partially retained during a subsequent 5 day period of no treatment. Increases in TEWL values on skin subjected to tape stripping were significantly lower after 4 weeks of using the test cream compared to no treatment. In Study 2 ($n = 72$ subjects with visible signs of ageing), there was a favourable trend in the change from baseline of a skin roughness parameter, Ra, for the test cream compared to no treatment. There were statistically significant improvements in the Fitzpatrick wrinkle score compared to no treatment, decreases in TEWL and increased Corneometer values and Cutometer values (R5 elasticity parameter). Grading of high resolution images failed to detect the improvements in skin texture (defined as pores, smoothness and unevenness) for the test cream vs. no treatment. No treatment related serious or severe adverse events were reported. **Conclusion:** Twice daily application of the test cream over 4 weeks had beneficial effects on skin barrier function, ppp moisturization, wrinkle dimensions and elasticity compared to no treatment. These studies provide prc concept evidence and highlight the cosmetic benefit of the biomimetic lamellar cream formulation.

T.D. Dobbs, T.H. Jovic, Z.M. Jessop, A. Kyle, H.A. Hutchings, I.S. Whitaker, Objective and Patient-reported Assessments of Skin Grafts and Keystone Flaps—A Pilot Retrospective Cohort Study, Plast Reconstr Surg Glob Open 2018

Background: The keystone perforator island flap provides a versatile form of reconstruction. Perceived benefits include better donor-recipient color match, less contour defect, and fewer complications. To date, there has been no high-quality evidence comparing keystone flaps to split-thickness skin grafts (SSG) from both a qualitative and quantitative point of view. **Methods:** The Objective and Patient Reported Assessments of Skin grafts versus Keystone flap cohort study compares keystone flaps with SSGs for the reconstruction of skin cancer defects. Patient-reported outcome measures were collected using the EuroQol 5 dimension scale and Patient and Observer Scar Assessment Scale (POSAS) questionnaires. Objective assessments of skin quality were assessed with the Courage and Khazaka system. Cost analysis was also performed. **Results:** Thirty-eight patients were studied: 20 keystone flaps and 18 SSGs. The keystone group had higher EuroQol 5 dimension scale scores (keystone median = 1.0; SSG median = 0.832; $P = 0.641$) indicating better general quality of life and lower POSAS scores indicating better disease/condition specific quality of life (keystone mean = 27.7; SSG mean = 35.7; $P = 0.323$). Observer POSAS scores were significantly lower in the keystone group compared with the SSG group (keystone mean = 10.889; SSG mean = 17.313; $P < 0.001$). Preservation of sensation was significantly better in keystone flaps ($P = 0.006$). There was an average £158/\$207 (15%) saving when performing a keystone flap. **Conclusion:** This pilot study demonstrates a

number of possible benefits of keystone flaps over SSGs. The results demonstrate the need for further research comparing these reconstructive options. We propose a prospective, controlled study using the methods developed in this pilot study.

*J. István, V. Tünde, **Diagnosztikai lehetőségek és jelentőségük a sebkezelésben** (in Hungarian), XXI. évfolyam, 2018. 1. Szám*

A sebkezelő legfontosabb feladata, hogy a sebgyógyulás komplex folyamata menedzselése során a lehető legoptimálisabb feltételeket biztosítsa, azaz a hatékony sebgyógyuláshoz szükséges terápiás döntéseket folyamatosan meghozza. Ehhez megfelelő információra van szüksége, amely a sebkezelésben a diagnosztikus tevékenységünk fontosságára hívja fel a figyelmet. A seb gyógyítása során akkor dolgozhatunk leghatékonyabban, vagy számíthatunk egyáltalán a seb záródására, ha az általános sebkezelési feladatok mellett megfelelő hangsúlyt fektetünk a változatos etiológiának megfelelő oki kezelésre. Súlyos hibát véthetünk - mely a kezelésünk eredményességét veszélyezteti, ha a sebkezelés diagnózis felállítása nélkül indul el, vagy ha nem megfelelő diagnózis születik.

*G. Boyer, N. Lachmann, G. Bellemère, C. De Belilovsky, C. Baudouin, **Effects of pregnancy on skin properties: A biomechanical approach**, Skin Research & Technology, Feb. 2018*

Background: A woman's skin is dramatically affected by pregnancy. Its biomechanical properties are critical for resisting highly stressed areas. The aim of this work was to evaluate the impact of pregnancy on the mechanical properties of skin, as well as to evaluate the imprint that pregnancy leaves on the skin after delivery. Materials and Methods: Suction tests using a cutometer were performed on 15 non-pregnant women and 26 pregnant women at 8th months of pregnancy and 4 months after delivery. Areas of abdomen and thighs were studied. Results: Significant differences between the non-pregnant and 8-month pregnant groups were observed. Our data demonstrate that skin becomes less elastic and less deformable on the abdomen during pregnancy. On the thighs, a loss of elasticity and firmness was also observed. At 4 months after delivery, the skin did not return to its initial state. Conclusion: This study showed that the mechanical properties of skin changed drastically during pregnancy compared to the non-pregnant condition and that these properties remain altered 4 months after delivery. In addition to alterations in abdominal skin during pregnancy, we also observed mechanical changes on the thighs, which are less subject to stretching.

*B. Walzel, B. Senti, S. Banziger, U. Batz, **The natural solution to pollution**, PERSONAL CARE ASIA PACIFIC, January 2018*

Exposure to air pollutants is one of the major threats to skin health. Contaminants attack the skin on several levels: they induce oxidative stress, they stimulate inflammatory pathways, and they accelerate the ageing process of skin. As a consequence, consumers demand functional cosmetics that prevent and repair pollution-induced skin damage. In this respect, the most promising approach is using the body's endogenous detoxification machinery, which is composed of a multitude of cell-protective and detoxifying mechanisms. These powerful systems are capable of neutralising thousands of toxic molecules per second, whereas the mere application of antioxidants is much less efficient, as one antioxidant molecule is capable of neutralising only one free radical. HerbaShield URB addresses these concerns. The COSMOS-approved multicomponent active ingredient targets three mechanisms to naturally reduce pollution-induced skin damage: (1) It strengthens the skin's barrier through hydrogenated lecithin; (2) it protects from radical oxygen species through natural antioxidants; and (3) it enhances the endogenous detoxification machinery through natural activators of detoxifying enzymes. The presented anti-pollution ingredient is a perfect fit for anti-ageing cosmetics and to be formulated in skin care applications, such as face care, body care, and cleansing products.

*P. Likhitthummaguna, P. Koonngamb, A. Seeremasapun, **Anti-aging effect of oral very high proline complex collagen (DERMOFIX®) on skin properties: a randomized, double-blind, placebo-controlled clinical study***

Taking collagen supplement to rejuvenate skin is now finding public favor due to antiaging trend. Synthesizing collagen, the body needs a specific amino acid group –Proline, Hydroxyproline and Glycine called “Proline complex” to make a core structure of every type of collagen fiber in human body. DERMOFIX®, which is a new very high proline complex containing-collagen supplement, helps promoting collagen synthesis naturally leading to antiaging effects on skin properties as well as other collagen-containing organs. The objective is to study the anti-aging effects of the oral very high proline complex collagen (VHPCC) primarily on skin properties compared to placebo and commercially available collagen (CAV) in Thailand, and secondarily on knee joint. In this randomized, double blind, placebo-controlled clinical trial, 50 women aged 30-45 years old were randomized to receive the VHPCC 10 g, CAV 10 g or placebo 10 g once daily for 8 weeks. Six aging related skin properties, which are skin

elasticity, hydration, melanin index, transepidermal water loss, smoothness and wrinkle were objectively measured at 0, 1, 2, 4, 8 weeks. Knee joint assessments, photo-shooting, blood tests for CBC, creatinine and *sirt1* gene expression level were evaluated before and after the study. Results: The VHPCC showed statistically significant improvement and gave faster effects than the CAV and placebo, in skin elasticity, hydration, melanin index, transepidermal water loss, smoothness and wrinkles. Most effects by VHPCC showed significant improvement since the first week while CAV showed improvement mostly at fourth or eighth week. Safety blood tests are normal in all groups. However, the Sirt1 gene expression did not increase in any groups. No adverse effect was reported throughout the study. Conclusion: The study demonstrated that the VHPCC (DERMOFIX®) supplement was proved safe, gave much faster and more effective effects than CAV in anti-aging of skin properties, knee joints and collagen-containing organs.

K. Podgórna, A. Kotodziejczak, H. Rotsztein, Cutometric assessment of elasticity of skin with striae distensae following carboxytherapy, J Cosmet Dermatol., 2017 Dec

Objective: The aim of the study was to evaluate the effectiveness of carboxytherapy in the treatment of striae distensae. Additionally, discomfort and side effects associated with the treatment were assessed. Material and Method: This study involved 15 women aged 22-40 years. They underwent 3 sessions of carboxytherapy at one-week intervals. Treatment was performed in skin area within stretch marks located on stomach, buttocks, and thighs. Cutometric probe was used to evaluate skin elasticity. Four measurements were performed immediately before each treatment and one month after the last session. Photographic documentation was made before and after a series of treatment to perform clinical evaluation of changes in skin condition. Results: Statistical analysis of results obtained with the use of Cutometer (R2 and R8 parameters) demonstrated that carboxytherapy significantly improved skin elasticity within stretch marks ($P < .05$). The analysis of photographic documentation revealed 58% improvement in stretch mark visibility. The width and length of stretch marks decreased, and their color became more like the natural color of the skin. Carboxytherapy is associated with moderate pain/discomfort. The occurrence of hematoma is the main side effect of this procedure. Conclusion: Carboxytherapy seems to be an effective method of reducing stretch marks. This procedure is safe, and it can be performed without the risk of complications. Moreover, it does not require special postoperative convalescence. Photographic documentation is a method of assessment of aesthetic procedures effectiveness, which is complementary to other objective methods (eg, the use of MPA probes).

E. Merinville, C. Messara, C. O'Connor, G. Grennan, A. Mavon, What Makes Indian Women Look Older—An Exploratory Study on Facial Skin Features, cosmetics, December 2017

It remains important to investigate skin ageing signs across different skin types for targeted solutions. Limited data is available on Indian skin changes throughout ageing, hence three fields were investigated: skin features during the ageing process, their relationship with perceived age and self-declared skin ageing concerns. Photographs, skin topography, colour and biophysical measurements of 202 Indian female volunteers, 30–65 years old, were collected. Another panel of 693 naïve graders, 20–65 years old, estimated the age of photographs previously collected. Associations between 28 skin features and real/perceived age were assessed using linear correlation coefficients. Skin feature scores of an older perceived group were compared versus the scores of a younger perceived group, to establish skin features that lead to an older appearance. Additionally, the naïve graders were asked to rank 12 skin ageing concerns by importance. Twenty-four features correlated with real and perceived age. The ages of the volunteers were overestimated, especially those in their 30s. Skin features related to skin brightness suggested an older look for volunteers in their 30s. From the 40s onwards, wrinkles around the eye area, glabellar and corner of the mouth were also drivers for looking older. In the 50s, features such as upper lip wrinkles, hydration and roughness on the crow's feet were worse in the older perceived group, while nasolabial folds suggested an older appearance in the 60s. By having identified skin features that worsen with age and contribute to an older perceived face, this research will facilitate the creation of tailored products and communication for Indian women to look after their skin concerns throughout the ageing process.

J.W. Park, Influence of Diabetes Mellitus on the Biomechanical Properties of the Human Skin as Measured Using the Cutometer: A Case-Control Study, Soonchunhyang Medical Science 23(2): p. 97-103, December 2017

Objective: Longstanding diabetes mellitus has been suggested to cause several skin problems associated with biomechanical skin properties. However, the association between impaired skin properties and diabetic peripheral neuropathy (DPN) has not been clarified. This study aimed to investigate the biomechanical properties of the diabetic human skin and their relationship with DPNs. Methods: This case-control study included 39 chronic diabetic patients and 41 matched healthy controls. The diabetic group was divided into subgroups according to the presence of diabetic sensorimotor

polyneuropathy (DSPN) and peripheral autonomic neuropathy (PAN) as determined by the results of nerve conduction study and sympathetic skin response test, respectively. Different skin regions were measured using the non-invasive Cutometer instrument (Courage and Khazaka Electronic GmbH, Cologne, Germany). The following skin parameters were compared between the groups: distensibility (U_f), elasticity (U_a/U_f and U_r/U_f), and viscoelasticity (U_v/U_e). The impact of DPNs, participant age, and diabetes duration on the investigated skin properties was analyzed. Results: The diabetic group showed higher U_f values, and lower U_a/U_f , U_r/U_f , and U_v/U_e values, compared to the control group. However, no significant differences in biomechanical skin properties were noted between diabetic patients with PAN and without PAN. There were also no differences in the investigated skin properties between diabetic patients with DSPN and without DSPN. Diabetes duration and participant age of both groups had a significant impact on the skin properties. Conclusion: A long-term hyperglycemic state could induce inferior biomechanical skin properties in the peripheral limbs; however, this phenomenon seems unrelated to DPNs.

A. Aguirre, E. Gil-Quintana, M. Fenaux, S. Erdozain, I. Sarria, Beneficial Effects of Oral Supplementation with Ovoderm on Human Skin Physiology: Two Pilot Studies, J Diet Suppl. 2017 Nov 2;14(6): p. 706-714

Collagens and hyaluronic acid have long been used in pharmaceuticals and food supplements for the improvement of skin elasticity and hydration. These compounds provide the building blocks of the skin. Ovoderm is an oral supplement obtained from eggshells that contains naturally occurring collagen and glycosaminoglycans, such as hyaluronic acid. We evaluated the efficacy of Ovoderm on skin biophysical parameters related to cutaneous aging such as elasticity, hydration, and pigmentation. Two pilot studies were run to assess the effect of daily oral supplementation with 300 mg Ovoderm on skin parameters. The first consisted of a self-assessment questionnaire intended to perform an assessment on skin, hair, and nail health after 50 days of treatment. The second measured the effect of 5-week treatment on hydration by corneometry, on elasticity with the cutometer, and on pigmentation with the mexameter. In the pilot study 1, participants were predominantly satisfied with the effects obtained on general face (100% volunteers satisfied) and body (94% volunteers satisfied) skin condition and skin properties (100% volunteers satisfied with facial skin softness, 94% with facial skin hydration, and 89% with body skin hydration) and partly with effects on hair (67% volunteers satisfied) and nail (50% volunteers satisfied) condition. The study 2 revealed a statistically significant improvement in skin elasticity (12% increase, $p = .0136$), a tendency to reduce skin pigmentation (5% decrease), and no significant change in skin hydration. Our study reflects that oral supplementation with Ovoderm is efficacious to reduce the gradual loss of skin elasticity characteristic of aged skin, which helps to improve the appearance of the skin.

S.Y. Choi, H.J. Kwon, G.R. Ahn, E.J. Ko, K.H. Yoo, B.J. Kim, C. Lee, D. Kim, Hyaluronic acid microneedle patch for the improvement of crows feet wrinkles, Dermatol Ther. 2017 Nov; 30(6)

Hyaluronic acid (HA) has an immediate volumizing effect, due to its strong water-binding potential, and stimulates fibroblasts, causing collagen synthesis, with short- and long-term effects on wrinkle improvement. We investigated the efficacy and safety of HA microneedle patches for crow's feet wrinkles. Using a randomized split-face design, we compared microneedle patches with a topical application containing the same active ingredients. We enrolled 34 Korean female subjects with mild to moderate crow's feet wrinkles. The wrinkle on each side of the subject's face was randomly assigned to a HA microneedle patch or HA essence application twice a week for 8 weeks. Efficacy was evaluated at weeks 2, 4, and 8. Skin wrinkles were measured as average roughness using replica and PRIMOS. Skin elasticity was assessed using a cutometer. Two independent blinded dermatologists evaluated the changes after treatment using the global visual wrinkle assessment score. Subjects assessed wrinkles using the subject global assessment score. Skin wrinkles were significantly reduced and skin elasticity significantly increased in both groups, although improvement was greater in the patch group at week 8 after treatment. In the primary and cumulative skin irritation tests, the HA microneedle patch did not induce any skin irritation. The HA microneedle patch is more effective than the HA essence for wrinkle improvement and is a safe and convenient without skin irritation.

J. Comas, O. Laporta, M. Ollagnier, S. Venkataraman, R. Delgado, A firmer skin from the elixir of life mushroom, PERSONAL CARE EUROPE, November 2017, p. 85-87

Shiitake mushroom has been recognised throughout history for its youth-promoting benefits, even being acknowledged as an elixir of life. In terms of its application in skin care, a shiitake mushroom-based extract has been recently selected to provide rejuvenating and firming effects to the skin of the face, neck and décolleté. More specifically, Actifcol advanced botanical ingredient has shown to offer a holistic care of the collagen protein, by helping increase its synthesis, improve its quality, through the

PLOD1 gene, and reduce its deterioration process caused by carbamylation. When evaluated on mature skin, it showed to enhance firmness and to achieve a more isotropic skin behaviour, typical of a younger skin.

K.B. Biswas, K. Tanaka, S. Takayama, A. Iddamalgoda, A solution for pollution induced ageing of skin, PERSONAL CARE ASIA PACIFIC, November 2017, p. 36-38

Environmental pollution has now become the talk of the world. It is very important to keep in mind that more than half of the world's population now lives in an urban area. It is assumed that by 2030, 60% of the world's population will be living in towns and cities, rising to 70% by 2050.' As skin is the first line of defence when it comes to air pollution contact, we should be aware of the harmful effects of pollution on skin in general. Pollution, in fact, is not a problem limited to China or India only, it is almost common, for example, in London, Paris, New York and Milan as well. As urbanisation is the main cause of environmental pollution, it could be speculated that most of the people in the world are going to face higher levels of such pollution than ever before, and it will be very difficult for us to escape from that.

D. Schmid, F. Wandrey, F. Zulli, Stimulating endorphins and sex hormones in the skin, PERSONAL CARE ASIA PACIFIC, November 2017, p. 49-51

DHEA is the precursor for both sex hormones, the female oestrogen as well as the male ones, testosterone and dihydrotestosterone. Circulating DHEA is mainly produced by the adrenal glands. Production is highest when we are in our thirties but then starts to decline leading to the so called 'adrenopause' which occurs in both sexes. In the peripheral tissues, DHEA is transformed to the final sex hormones, depending on the tissue's needs. Oestrogen plays a very important role in skin health and skin ageing. It stimulates the production of collagen and elastin and inhibits the breakdown of the existing fibres. Declining oestrogen levels therefore result in laxity of the skin and a decreased general skin tonicity which leads to sagging and wrinkles. In men, the decrease of the testosterone level results at the skin level in a loss of skin density and in lower elasticity. For a couple of years it has been known that the skin not only represents a target for circulating DHEA, oestrogen, and testosterone but has itself the capacity to produce from the lipid precursor cholesterol the steroid hormone DHEA and all the final sex steroids.

L. von Oppen-Bezael, Detoxification and protection against pollution and UV, PERSONAL CARE ASIA PACIFIC, November 2017, p. 59-61

Air pollution, caused mainly by industry, vehicle fumes, cigarette smoke together with high energy sunlight (UV), are known to have a detrimental effect on our skin and body, starting from our appearance, such as early signs of ageing including wrinkles, pigmentation spots, disrupted skin barrier, overall dryness and skin imperfections. Pollution and smog are not a single substance, but are rather a highly complex mixture of molecules and particles that are breathed in and absorbed through the skin. A major unmet need of the industry is for effective, natural and safe means to protect the body and the skin specifically as our outer protective layer against pollution to which it is exposed daily

U. Magnet, C. Urbanek, D. Gaisberger, E. Tomeva, E. Dum, A. Pointner, A.G. Haslberger, Topical equol preparation improves structural and molecular skin parameters, Int J Cosmet Sci, 2017 Oct;39(5): p. 535-542

Objective: Equol has been shown to improve skin health and regeneration, due to its antioxidative, phytoestrogenic and epigenetic characteristics. The effects of a topical intervention on skin structure, telomere length and epigenetic markers in skin cells were analysed. Methods: Sixty-four participants were divided in four groups and three of them treated topically with the following: emulsion with Equol powder (Isoflavandiol-E-55-RS®); emulsion with microencapsulated Equol (Vesisorb® Isoflavandiol-E-55-RS®) and an emulsion with lecithin (Vesisorb® placebo). A control group of 6 volunteers did not receive any intervention. The active compound was a 0.5% equol-racemate. For 58 participants, all samples were collected. Structural analysis, molecular analysis and questionnaires were performed at the start of the study and after 8 weeks of intervention, twice a day. Structural skin parameters were analysed by Visioscan® VC 98 and Cutometer® dual MPA 580. Molecular analyses from epidermal cells collected by skin stripping of the forehead included telomere length and LINE-1 methylation, following DNA extraction, bisulfite conversion and qPCR as well as high-resolution melting curve analysis. Effects of nutrition and lifestyle habits were evaluated with a standardized food and lifestyle questionnaire. Results and Discussion: The surface analysis showed significant improvements in skin roughness, skin texture and skin smoothness after both interventions. Cutometer® dual MPA 580 measurement revealed improvement of skin firmness and elasticity parameters for both preparations. A decrease in mean LINE-1 methylation (n.s.) and telomere length (sign. $P < 0.05$) was observed in the sample group with age. In the treated groups, significantly longer telomeres were observed after

intervention. Whether changes in telomere length reflect changes in the regulation of telomerase, epigenetic interactions or turnover of keratinocytes needs further research. Stability and availability of preparations in skin seems to be high as not many significant differences in the activity of pure or encapsulated substances were seen. Conclusion: The results of this study indicate that equol has beneficial effects on structural as well as molecular skin parameters and encourages further investigations to decipher the epigenetic regulation of skin ageing and interactions of equol.

M.P. Wakeman, An open-label forearm-controlled pilot study to assess the effect of a proprietary emollient formulation on objective parameters of skin function of eczema-prone individuals over 14 days, Clinical, Cosmetic and Investigational Dermatology 2017:10, p. 275–283

Background: This study examines the efficacy of a new plant-based emollient and assesses product acceptability. Methods: Primary efficacy endpoints were improvement in transepidermal water loss, hydration, skin elasticity and firmness, erythema, and skin roughness and smoothness as measured using the versions of Tewameter, Corneometer, Cutometer, Mexameter, and Visioscan VC98, respectively. The cream was applied twice daily by 32 participants to an area of one forearm unaffected by eczema, while the same area of the other forearm was used as a control. Measurements were taken at day 0 and day 14. Secondary endpoints assessed the acceptability of the product. Results: At the end of 2 weeks, transepidermal water loss, hydration, skin elasticity and firmness, erythema, and skin roughness and smoothness improved. All changes were statistically significant ($p < 0.01$). The rate of satisfaction with the emollient properties was 82%, and the rate of absorption into the skin was 88%. Results show that the emollient hydrates and repairs eczema-prone skin with high levels of acceptability.

G. Buehrer, A. Arkudas, R.E. Horsch, Treatment of standardised wounds with pure epidermal micrografts generated with an automated device, Int Wound J, 2017 Oct;14(5): p. 856-863

In this study, we analysed the effects of pure epidermal micrografts generated with an automated device in a standardised human wound model. Epidermal micrografts were harvested using an automated device. Micrografts were then transplanted onto split-skin donor sites. The target area was only partially covered with transplants to create an intra-individual control area. Wounds were evaluated by subjective assessment as well as measurements with combined laser and white light spectroscopy and cutometry. The epidermal graft sites remained completely stable, whereas control sites offered partially unstable and blistering areas. Statistically, no measurable difference in the speed of initial reepithelialisation could be shown. However, there was an increased pliability and softness of the treated areas that correlated with the subjective impression of both investigators and patients. There was a significantly higher relative haemoglobin concentration, measurable in treated and untreated areas at 4 weeks and 6 months. Cutometry showed no differences in skin properties between treated and untreated areas. This study shows an effect of epidermal micrografts in a standardised human wound model and supports the positive impact of keratinocytes on early wound healing as described in literature. Long-term effects of epidermal grafting deserve further studies.

A. Garre, G. Martinez-Masana, J. Piquero-Casals, C. Granger, Redefining face contour with a novel anti-aging cosmetic product: an open-label, prospective clinical study, Clinical, Cosmetic and Investigational Dermatology 2017:10, p. 473–482

Background: Skin aging is accelerated by multiple extrinsic factors: ultraviolet radiation, smoking and pollution increase oxidative activity, damaging cellular and extracellular components such as DNA, proteins, and lipids. With age, collagen and hyaluronic acid levels decline, resulting in loss of elasticity and moisture of the skin. Over time this damage leads to characteristic signs that make the skin look older: altered facial contour, sagging skin, wrinkles, and an uneven complexion. This study evaluated the anti-aging effects of a new facial cream formulated with carnosine, *Alteromonas* ferment extract, crosspolymer hyaluronic acid, and a tripeptide. Methods: An open-label intra-individual study to assess the anti-aging efficacy of the investigational product in 33 women aged 45 to 65 years. The product was applied twice daily for 56 days. Facial contour and skin deformation, elasticity, hydration, and complexion were measured with specialized equipment at baseline and days 28 and 56. Additionally, subjects completed questionnaires at days 28 and 56 on the perceived efficacy and cosmetic characteristics of the product. Results: After 56 days of use of the investigational product, a redefining effect was observed, with a significant decrease in sagging jawline (7%). Skin was significantly more hydrated (12%), firmer (29%), and more elastic (20%) ($P < 0.001$ for all). On complexion assessment, skin texture (a measure of skin smoothness) and spots (brown and red skin lesions) also improved significantly (12% and 6% decrease, respectively). In the subjective self-evaluation, the majority of subjects reported that the skin was visibly tightened and more elastic, flexible, and moisturized (91%, 88%, 91%, and 90%, respectively). The product was well tolerated with no adverse events reported during the study. Conclusion: This new cosmetic product demonstrated anti-aging effects after 56 days

of use, most notably a redefined facial contour and improved complexion. It is a safe and effective anti-aging product.

Y. Xu, R. Ma, J. Juliandri, X. Wang, B. Xu, D. Wang, Y. Lu, B. Zhou, D. Luo, **Efficacy of functional microarray of microneedles combined with topical tranexamic acid for melasma - A randomized, self-controlled, split-face study**, *Medicine* 2017

To evaluate the efficacy of a functional microarray of microneedles (MNs) plus topical tranexamic acid (TA) for melasma in middleaged women in China. Thirty female subjects with melasma were enrolled in this study. The left or right side of the face was chosen randomly to be pretreated with a functional microarray of MNs, followed by topical 0.5% TA solution once per week for 12 weeks. The other half-face was the control, treated with a sham device plus topical 0.5% TA solution. At baseline and at weeks 4, 8, and 12 of treatment, clinical (photographic) evaluations and parameters determined by Visia were recorded. At baseline and week 12, patient satisfaction scores and the biophysical parameters measured by Mexameter were also recorded. Side effects were evaluated at baseline and at the end of the 12 weeks. In total, 28 women (93.3%) completed the study. The brown spots' scores measured by Visia were significantly lower on the combined therapy side than on the control side at 12 weeks after starting treatment; there was no significant difference between sides at 4 or 8 weeks. After 12 weeks, melanin index (MI) decreased significantly in both 2 groups, and the MI was significantly less on the combined side at week 12. Transepidermal water loss, roughness, skin hydration, skin elasticity, and erythema index showed no significant differences between 2 sides at baseline, 4, 8, and 12 weeks after treatment. Physicians' evaluations of photographs showed better results at week 12with combined therapy: >25% improvement was observed in the MNs plus TA side in 25 patients, and in the TA side in only 10 patients. Subjective satisfaction scores on both sides increased significantly. The participants were more satisfied with the results of the combined therapy side than the control side. No obvious adverse reactions were observed throughout the study. Combined therapy with a functional microarray of MNs and topical TA solution is a promising treatment for melasma.

C.E. Coltman, J.R. Steele, D.E. McGhee, **Effect of aging on breast skin thickness and elasticity: implications for breast support**, *Skin Research and Technology* 2017; 23: 303-311

Background: The skin overlying a woman's breast acts as an anatomical support structure to the breast. Although aging is known to affect the thickness and elasticity of human skin, limited research has examined age-related changes to skin covering the breast or related these changes to breast support requirements. The purpose of this study was to determine the effect of age on female breast skin thickness and elasticity. Methods: The left breast of 339 women (18-84 years), classified into four age groups (18-24 years, 25-44 years, 45-64 years, and 65 + years), was divided into four quadrants. Skin thickness (dermal layer; 20 MHz ultrasound probe) and skin elasticity (Cutometer® MPA 580) were measured for each breast quadrant and then compared to determine whether there was any significant ($P < 0.05$) effect of aging on breast skin. Results: Breast skin thickness significantly decreased from 45 years of age onwards. A significant decline in breast skin elasticity was evident from the mid 20's. Conclusion: Aging is associated with a significant decline in breast skin thickness and elasticity, which is likely to reduce anatomical breast support. Women might therefore benefit from increased external breast support (i.e. a more supportive bra) with increasing age.

C. Rosado, F. Antunes, R. Barbosa, R. Fernando, M. Estudante, H.N. Silva, L.M. Rodrigues, **About the in vivo quantitation of skin anisotropy**, *Skin Research and Technology* 2017; 23: 429-436

Background/purpose: Human skin anisotropy is difficult to quantify. The Cutiscan®, is allegedly, the first biometrical system to provide information on the elastic and viscoelastic properties, as well as on anisotropy and directionality of the human skin *in vivo*. Thus, this study aims to contribute to characterize this new device and its applicability, and to compare its behavior with two other well-known devices— the Cutometer® and the Reviscometer®. Methods: Measurements were conducted with each device inthree different anatomical sites (forehead, forearm and leg) of 20 female volunteers engaged after informed consent. The participants in the study were aged 19-73 years (mean age 37 ± 18.7 years old), and were divided in two groups ($n = 10$), based on their age - Group I, mean age 22 ± 1.3 years; Group II, mean age 52 ± 13.7 years. Results: All devices were useful tools to explore the anatomical and the age dependant changes in biomechanical terms, showing different discriminative capacities. Interesting correlations were established between the variables provided by the equipment. Conclusion: The Cutiscan® descriptors delivered excellent relationships with those from Cutometer® and Reviscometer®, while providing more detailed information about skin anisotropy through a full 360° analysis.

S. Weschawalit, S. Thongthip, P. Phutrakool, P. Asawanonda, **Glutathione and its antiaging and**

antimelanogenic effects, Clin Cosmet Investig Dermatol. 2017; 10: p. 147–153

Background: Previous studies showed that supplementation of reduced form of glutathione (GSH, 500 mg/d) has a skin-lightening efficacy in humans. This study was designed to evaluate the influences of both GSH and oxidized form (GSSG), at doses lower than 500 mg/d, on improving skin properties. Patients and methods: A randomized, double-blind, placebo-controlled, parallel, three-arm study was conducted. Healthy female subjects were equally randomized into three groups and took GSH (250 mg/d), GSSG (250 mg/d), or placebo orally for 12 weeks. At each visit at baseline and for 12 weeks, skin features including melanin index, wrinkles, and other relevant biophysical properties were measured. Blood samples were collected for safety monitoring. Results: In generalized estimating equation analyses, melanin index and ultraviolet spots of all sites including face and arm when given GSH and GSSG tended to be lower than placebo. At some sites evaluated, subjects who received GSH showed a significant reduction in wrinkles compared with those taking placebo. A tendency toward increased skin elasticity was observed in GSH and GSSG compared with placebo. There were no serious adverse effects throughout the study. Conclusion: We showed that oral glutathione, 250 mg/d, in both reduced and oxidized forms effectively influences skin properties. Overall, glutathione in both forms are well tolerated.

M.E. van Baar, H. Goei, C.H. van der Vlies, E. Tuinebreijer, P.M.M. Van Zuijlen, E. Middelkoop,
Predictive validity of short term scar quality on final burn scar outcome using the Patient and Observer Scar Assessment Scale, Oral Presentation, 17th European Burn Association Congress EBA, Barcelona, September 2017

Objectives: Early recognition of burn patients who are prone to develop scar morbidity is important. The aim of this study was to assess the predictive validity of the Patient and Observer Assessment Scale (POSAS), in order to determine whether it can be used to predict final scar quality. Methods: Patients with a maximum TBSA burned of 20% who were treated in a Dutch burn center and participated in two scar assessments at 3 months and >18 months post-burn were included. Scar quality assessment consisted of the POSAS, Dermaspectrometer (color) and Cutometer (elasticity). Predictive validity was determined in three ways: (1) the discriminative ability to distinguish good from reduced long term scar quality, (2) correlations between POSAS items score at the two subsequent assessments and (3) linear regression was conducted to identify POSAS items as independent predictors. Additionally, reliability, construct validity and interpretability were assessed. Results: A total of 141 patients were included with a mean TBSA burned of 5.2% (SD 4.5). The ability of the Patient scale to discriminate between good and reduced long term scar quality was adequate with an area under the curve (AUC) of 0.728 (95% CI 0.640–0.804), the ability of the Observer scale was good with an AUC of 0.854 (95% CI 0.781–0.911). Correlations between items scored at 3 months and over 18 months were at least adequate. On item level, pain and stiffness (Patient) and pliability and relief (Observer) were identified as significant predictors for reduced long term scar quality. The POSAS was reliable, construct validity was adequate at three months but declined at >18 months. Conclusion: Long term scar quality after burns can be predicted by an early POSAS assessment at three months. These results might be helpful in the decisionmaking of selecting patients for outpatient follow-up in specialized burn care.

A. Schulz, P.C. Fuchs, J.P. Stromps, H. Heinel, **Bromelain based enzymatic debridement versus traditional surgical debridement in the treatment of deep dermal facial burn injury**, Oral Presentation, 17th European Burn Association Congress EBA, Barcelona, September 2017

Introduction: Tissue preserving debridement is essential for an optimal long term aesthetic outcome in deep dermal facial burns. Tangential burn eschar excision is still the gold standard. In the recent past promising results were reported for selective and precise eschar removal by NexoBrid, a Bromelain based enzymatic debridement agent. Methods: In a single-centre clinical trial we compared 13 versus 13 patients which received enzymatic and surgical debridement in deep dermal facial burn injury. We assessed time to complete healing, complications in healing process and scar quality after more than 12 months for both groups. Results: 77% of the facial burns that had been debrided enzymatically were found more superficial burned than initially assessed. Enzymatic debridement significantly reduced time to complete wound closure after admission (19.85 days versus 42.23 days, $p=0.002$), and after enzymatic eschar removal (18.92 days versus 35.62 days, $p=0.042$). The number of procedures to complete debridement (1.00 versus 1.77, $p=0.003$) and the need of autografting (15% versus 77%, $p=0.002$) were significantly reduced in the enzymatic debridement group. Scar quality was superior compared to surgical debridement after 12 months regarding pigmentation ($p=0.016$), thickness ($p=0.16$), relief ($p=0.10$), pliability ($p=0.01$), surface area ($p=0.004$), stiffness ($p=0.023$), thickness (0.011) and scar irregularity ($p=0.011$). Regarding erythema and melanin, viscoelasticity and pliability, transepidermal water loss or laser tissue oxygen saturation, haemoglobin level and microcirculation we

found no significant differences for treated and untreated skin in the enzymatic debridement group. Conclusion: Compared to our current SOC we found promising results for enzymatic debridement of deep dermal facial burns with NexoBrid® regarding healing potential, time-efficient treatment and long term caring.

*J. Meirte, M. Anthonissen, U. van Daele, C. Lafaie, L. de Cuyper, K. Maertens, P. Moortgat, **The effects of shockwave-therapy on burn scars, a randomised comparative trial**, Oral Presentation, 17th European Burn Association Congress EBA, Barcelona, September 2017*

Objectives: Extracorporeal shockwave-therapy (ESWT) is emerging as a new non-invasive type of mechanotherapy to treat both wounds and scars. This study aims to investigate the added value of ESWT in the treatment of hypertrophic burn scars after delayed wound healing. Methods: Evaluations included the Patient and Observer Scar Assessment Scale (POSAS) for clinical assessment, tristimulus colorimetry for redness and cutometry for elasticity. Patients were randomly assigned to a group and treated with pressure garments, silicone and moisturisers. The intervention group was additionally treated with ESWT once a week during 10 weeks. Patients were tested at baseline, after one, three and six months. An intention to treat analysis with the last observation carried forward was applied. Sensitivity analyses were carried out to detect significant differences between the analysis with or without the missing data. To detect significant differences between the groups a repeated measures ANOVA was used with the intervention being the between-subjects factor and time + scar outcome parameter (e.g. elasticity) being the within-subjects factor. Results: Final results for 20 patients in each group after six months are presented. Average age was 44,4 years ($\pm 18,2$) in the intervention group and 39,1 years ($\pm 14,89$) in the control group. Scars were on average 2,4 months ($\pm 1,42$) and 2,7 months ($\pm 1,81$) old. Results of the clinical assessments showed a trend towards a better performance for the intervention group with statistically significant EBA 17TH European Burns Association Congress 57 ORAL PRESENTATIONS improvement for elasticity, global opinion and total sum of POSAS scores assessed by the patient and observer. Results of the objective assessments showed a statistically significant better performance of the intervention group for elasticity assessed with cutometry ($p=.011$, $\eta^2p=0,107$, $d=-1,23$) and revealed no statistically significant differences between the groups for redness assessed with tristimulus colorimetry. Conclusions: ESWT could give added value to the noninvasive treatment of hypertrophic scars especially to improve elasticity.

*J. Poetschke, U. Dornseifer, M.T. Clementoni, M. Reinholz, H. Schwaiger, S. Steckmeier, T. Ruzicka, G.G. Gauglitz, **Ultrapulsed fractional CO2 laser treatment of hypertrophic burn scars: evaluation of an in-patient controlled, standardized treatment approach**, Oral Presentation, 17th European Burn Association Congress EBA, Barcelona, September 2017 and Lasers Med Sci, 2017 Jul;32(5): p. 1031-1040*

Objective: In this study, we aimed to quantify the effects of fractional ablative carbon dioxide laser therapy in the treatment of widespread hypertrophic burn scars. Background: While many different pilot studies have described the potential of the technology and expert groups and current guidelines, alike, recommend its use, the level of evidence for the efficacy of fractional CO2-laser treatment for burn scars is currently very low. Methods: 10 patients (3 male, 7 female) with hypertrophic burn scars were treated with a single course of fractional CO2-laser therapy in an in-patient controlled setup, using a standardized treatment paradigm. Documentation was based on modern scar scales and questionnaires, like the VSS, POSAS and DLQI, as well as state of the art clinical measurements (PRIMOS, Cutometer). Results: Over the course of six months after treatment, VSS and POSAS scores showed significant improvement in the rating of scar parameters, as did the quality of life rating according to the DLQI. In the treated scars surface relief improved significantly, as S_{max} decreased by $1893\mu m$ (-36.92%) ($p = 0.0273$) and S_z by $1615\mu m$ (-36.37%) ($p = 0.0488$). Scar firmness in treated scars could be reduced by 30% after one treatment session, as R_0 improved by $0.0797mm$ ($+30.38\%$) ($p= 0.0212$). Conclusions: Fractional ablative CO2-laser treatment is a safe and efficacious option for the treatment of hypertrophic burn scars. While more treatment sessions are required for satisfying results, significant improvement is already apparent after a single course of treatment.

*K.C. Lee, A. Bamford, F. Gardiner, A. Agovino, B. Ter Horst, K. Al-Tarrah, J. Bishop, L. Grover, A. Logan, N. Moimen, **The reliability and cross validation of a panel of objective measurement tools for the burn scar**, Oral Presentation, 17th European Burn Association Congress EBA, Barcelona, September 2017*

Introduction: Traditionally, burns scars have been measured using subjective scores however objective measurements are required to improve the reproducibility of clinical and study outcomes. This study aimed to evaluate the intra- & inter-rater reliability of a panel of objective scar measuring tools consisting of the DSM-II-Colormeter, Dermascan ultrasound & Cutometer and cross-validate them with

the modified Vancouver Scar Scale (mVSS) and Patient & Observer Scar Assessment Scale (POSAS). Methods: 3 independent assessors evaluated 50 scar sites on 50 burn patients. The Intraclass Correlation Coefficient (ICC) was utilised to measure reliability (acceptable when >0.70). Pearsons correlation was used to investigate correlations between measures. Results: The inter-rater reliability of the total score & individual subscales of both mVSS & POSAS fell below the acceptable limit. DSM-II intra- & inter-rater reliability for a* & Erythema values were acceptable for the measurement of erythema but only the Erythema value correlated significantly with the mVSS vascularity subscale (Pearsons=0.325, $p=0.021$). L* & Melanin values (but not b* value) had acceptable intra- & inter-rater reliability for pigmentation and correlated significantly with mVSS & POSAS pigmentation subscales ($p<0.05$). Thickness measurements correlated significantly with both mVSS Height and POSAS Thickness subscales (Pearsons=0.52 & 0.69, $p<0.01$) pliability subscales. Conclusion: The DSM II, Dermascan and Cutometer demonstrated acceptable to excellent intra- and inter-rater reliability and outperformed subjective scar scales. Their significant correlations with the matching mVSS and POSAS subscales confirm that these tools are measuring the same traits but in a more objective and reliable manner.

*M. Held, J.R. Rothenberger, J. Schiefer, W.P. Petersen, A.R.S. Rahmanian-Schwarz, H.E. Schaller, A. Daigeler, **Alteration of biomechanical properties of burned skin***, Poster Presentation, 17th European Burn Association Congress EBA, Barcelona, September 2017

Background: The prevalence of burns in the general population is high. Despite new research findings, skin burns and its resulting tissue damage are still not entirely understood. In particular, little is known about the depth-dependent alteration of skin biomechanical properties of these wounds.

Methods: Thirty-six burn wounds with six different depths were generated on the abdomen of six Göttingen minipigs. The alteration of skin biomechanical properties was evaluated objectively after 15 and 360 min using a Cutometer device. Biopsies for histological evaluation were taken and the depth of burn was correlated with biomechanical properties.

Results: Firmness of skin (R0), overall elasticity (R8) and calculated elasticity (Ue) demonstrated a continuous decrease with an increasing depth of burn 15 min after wound generation. Gross elasticity (R2), net elasticity (R5) and amount of elasticity of the whole curve (R7), however, showed an increase of values with increasing depth of injury. A further decrease of elasticity was demonstrated 360 min after wound generation. Conclusion: The alteration of skin biomechanical properties is a function of damaged tissue structures. The presented results demonstrate a depth-dependent decrease of principal elastic parameters with an increasing depth of burn and the results indicate progressive tissue damage over the time.

*M. Anthonissen, A. Sharma, J. Meirte, C. Lafaie, L. De Cuyper, K. Maertens, P. Moortgat, **Correlation of pliability with (Visco-) elastic properties of burn scars***, Poster Presentation, 17th European Burn Association Congress EBA, Barcelona, September 2017

Background and objectives: Patient and Observer Scar Assessment Scale (POSAS) and Cutometer® are the most frequently used assessment tools to investigate pliability of burn scars, subjectively and objectively. We aim to investigate the correlations between POSAS pliability items and the (visco-) elastic properties of scarred skin measured with the Cutometer®. These results could provide information necessary to determine minimal clinically important differences (MCID) for POSAS pliability items and Cutometer®. Methods: Fifty-eight measurements on 20 patients with burn or surgical scars are performed. Patients completed the POSAS-P, whilst observers assessed pliability using POSAS-O and Cutometer®. Results: The Cutometer® R0 parameter was most strongly negatively correlated with both POSAS-O-pliability ($r=-0.597$; $p=.006$). When correlating the POSAS pliability scores with the R0 values, a downwards trend is demonstrated. There appear to be 'levels' of change, only showing significant differences between the 'levels' and not between the consecutive individual scores. We observed a significant positive correlation between the observer- and patient-reported pliability scores ($r=0.443$; $p=.001$), however imperfect. Discussion: The strong correlations of the R0 parameter with POSAS pliability scores imply that the Cutometer® could also serve as an anchor to determine the MCID for the POSAS pliability parameter since a cut-off score ≥ 0.3 is present. The presence of 'levels' of change suggests that observers can distinguish between 'levels' of severity, but the differences between certain scores appears arbitrary. The significant but imperfect correlation between the observer- and patient-reported pliability scores suggest that observers and patients are not attributing the pliability in the same way. A difference in the assessment protocol for the observer and the patient could explain this. Conclusion: The Cutometer® is a valid instrument for measuring the characteristic of pliability when using the R0 parameter, and can serve as an anchor to determine the MCID for POSAS pliability.

*U. van Daele, P. Moortgat, R. Clijse, J. Meirte, M. Anthonissen, K. Maertens, P. Clarys, **Bioavailability of scarred skin during application of a vaso-active substance**, Poster Presentation, 17th European Burn Association Congress EBA, Barcelona, September 2017*

Objectives: The skin acts as a mechanical or insulation barrier in physiotherapy interventions. The evidence of topical applications in physiotherapy is poor or lacking in skin and (burn) scar research. In this study, non-invasive skin measurements will be used to evaluate bioavailability of scarred skin during application of a vaso-active substance. **Methods:** Two groups consisting of 14 scar sites and 8 healthy skin sites are selected based upon predefined inclusion and exclusion criteria. Baseline measurements on a 6cm² scar/skin site include skin color, trans epidermal water loss, skin hydration and epidermal and dermal thickness. A filter disk saturated with a Methylnicotinate (MN) solution (0.005M) is applied for 30 seconds on the marked scar/skin site. Bioavailability is assessed by quantification of an MN-induced skin redness observed with the Chromameter® over 65 minutes after the MN application by a standardised protocol. Change in skin color is compared using a repeated measures ANOVA. Spearman correlations between skin color and all independent variables are calculated. Between group differences are tested by the Mann-Whitney U. Spearman correlation coefficients between skin hydration outcome measures are calculated. **Results:** A significant group x time effect for chroma Δ^* values is demonstrated ($p=0,044$). A significant difference between both groups is found for the sum of total color change ($p=0,02$) and for dermal thickness ($p=0,044$). A significant difference between both groups is found for the sum of total color change ($p=0,02$) and for dermal thickness ($p<0,0001$). A correlation between the latter parameters is significant ($r=,587$, $p=0,004$). Hydration values of the Corneometer correlate significantly with the Grey Index T of the Moisture Map® ($r=0,427$, $p=0,047$). **Conclusion:** The dermal thickness is a determining factor for bioavailability of MN in scars. Epidermal thickness and TEWL were no significant factors of influence on skin color within the current study. The Moisture Map® can be used as an assessment tool for skin hydration, especially the Grey Index T seems a valuable parameter based upon the current primary study results.

*U. van Daele, J. Meirte, M. Anthonissen, K. Maertens, C. Lafaire, L. De Cuyper, P. Moortgat, **Proof of concept for tension reducing taping as a mechanotherapy for hypertrophic post trauma and burn scars**, Poster Presentation, 17th European Burn Association Congress EBA, Barcelona, September 2017*

Objective: There is strong acknowledgement that mechanical forces can regulate inflammation and fibrosis and therefore may be used therapeutically to stimulate tissue repair and remodeling. This mechanism is referred to as "mechanotherapy". Although the pathophysiological background of mechanotherapy is well described, evidence based practical applications are lacking within scar treatment. The goal of this study is to obtain a proof of concept for a newly developed taping technique that can reduce tension on pathological post trauma and burn scars. In a previous study we developed a technique consisting of one piece of elastic therapeutic tape with a longitudinal incision made in the middle of the tape. The latter technique is most suitable for scars in between joints. The current technique is innovative for scars located over joints. **Methods:** Scar patients are selected based upon predefined inclusion and exclusion criteria. Two pieces of tape are applied in a standardised way, thus reducing tension at the scar site. The tape makes no direct contact with the scar site, thereby avoiding maceration of the scar. Distensibility, which has an inverse relationship with tension, is measured before application of the elastic therapeutic tape with a Cutometer, which measures the vertical deformation of the skin in millimetres when the skin is pulled by means of a controlled vacuum into the circular aperture of a probe. This measurement is repeated after the application of the tape, one, two and three days later. The more the skin can be deformed, the more tension is reduced on that skin site. Standard descriptive statistics including means and standard deviations are used to summarise patient demographic and presentation data. Paired sample T-tests are used to calculate the difference in the scores for distensibility. **Results:** Currently data collection is being finalized and results can be presented at the conference.

*M. Mateu, A. Esplugas, S. Pastor, P. Carulla, M. Gorostiaga, **Tightening efficacy of a selfie-ready freezing blast**, PERSONAL CARE EUROPE, September 2017, p. 42-44*

Nowadays, 24 hours are not enough for busy lifestyles. Whether your little spare time is due to work and personal duties or social events, your skin needs to be taken care of. Imagine applying a cosmetic product that acts while you are dressing or deciding how to take a selfie. An on-the-go recharging beauty wind to keep up with your daily rhythm. Sirtalice™ is a marine ingredient from a microorganism collected near Reunion Island, where coral barriers form shallow lagoons of turquoise waters that shelter thousands of marine species. The microorganism was collected during the Malaspina expedition around the world at 3,400 m depth and 1.5°C. Sirtalice is an on-the-go freezing energy blast

to help breathe out your true beauty, offering an instant lifting and a V-reshape of face contour with long-lasting efficacy.

D. Schmid, F. Wandrey, F. Zulli, Stimulating endorphins and sex hormones in the skin, PERSONAL CARE EUROPE, September 2017, p. 86-87

The peptide hormone beta-endorphin and the steroid hormone dehydroepiandrosterone (DHEA) play important roles in the skin. The fact that they are also synthesised locally in the skin makes them interesting targets for cosmetic ingredients. An extract of monk's pepper (*Vitex agnus-castus*) was found to perform like beta-endorphin and to stimulate the synthesis of DHEA. In a clinical study, the extract showed significant effects on skin elasticity and density.

N.G. Lapatina, T. Pavlenko, Diluted Calcium Hydroxylapatite for Skin Tightening of the Upper Arms and Abdomen, J Drugs Dermatol. 2017 Sep 1;16(9):900-906

Background: The collagen-stimulating properties of Radiesse® (calcium hydroxylapatite, CaHA) can be used for skin-tightening procedures by hyper-diluting the product with lidocaine or saline. Objective: To evaluate the effectiveness and safety of diluted CaHA for skin tightening in two case series of women with skin laxity in the upper arms or abdomen. Methods: For each case series, 10 female subjects were enrolled. In the upper arms, CaHA diluted 1:2 with normal saline solution and 2% lidocaine was injected subdermally using a short, linear-threading technique. Skin elasticity was assessed at baseline and Months 1 and 3 using a cutometer. In the abdominal wall, CaHA diluted 1:4 with saline solution was injected subdermally using a linear-threading technique. Subjects underwent pre- and post-treatment (70 days) ultrasound scans to determine dermal thickness around the umbilicus and sides of the abdomen. Subjects and physicians assessed treatment outcomes using the 5-point Global Aesthetic Improvement Scale (GAIS). Adverse events and tolerability were recorded. Results: Cutometry results for upper arm skin showed an increase in skin elasticity from 72 U at baseline to 82 U at Month 3 ($P \leq 0.05$). Ultrasound measures of the abdominal wall demonstrated statistically significant increases in dermal thickness after injection of diluted CaHA of 0.7 mm (umbilicus) and 0.4 mm (sides of abdomen). Diluted CaHA resulted in an overall increase in dermal thickness of 26.7% ($P \leq 0.05$). In both case series, 90% of subjects and physicians rated treatment outcomes on GAIS as much or very much improved. Treatment was well tolerated. Conclusion: Diluted CaHA improved skin elasticity and increased dermal thickness in the upper arms and abdomen after only a single treatment. The procedures were well tolerated, and subject and investigator satisfaction with treatment results was very high. Injection of diluted CaHA is an effective procedure for skin tightening in the upper arms and abdomen.

Find Beauty from Within, Household and Personal Care Today - Vol. 12(5) September/October 2017, p. 6-7

GENENCARE® OSMS MI is myo-inositol and, like GENENCARE® OSMS BA, extracted from sugar beets (*Beta vulgaris*). Inositol exists in 9 stereoisomers: L and Dchiro, myo, neo, scyllo, muco, cis, epi and alloinositol, of which the most prominent form, widely occurring in nature, is myoinositol. GENENCARE® OSMS MI is myo-inositol, and will be referred to as inositol in this article. GENENCARE OSMS MI is highly purified and suitable for many skin care applications. It is a water-soluble crystalline compound, extracted from non-GM sugar beet, 100% bio-based, Ecocert and Natrue certified.

M. Nomura, D. Velleman, J. Pierre, F. Flament, Quantitating the lateral skin stiffness by a new and versatile electro-mechanical instrument. Preliminary studies, Skin Research and Technology 2017; 23: p. 272-282

Background: A new electro-mechanical device for measuring the lateral stiffness of the skin is now available. It basically allows to recording the forces that the skin opposes to a lateral displacement (1-2 mm) of a pinching type movement. Preliminary assays of this device to various skin sites and an artificial substrate aimed at defining its major characteristics (sensitivity, reproducibility, variations according to skin site). Methods: The calibration of the device (Khelometer) and assessment of its reproducibility were carried out through the use of elastometer substrates of various stiffness's. The device was then used, *in vivo*, at different skin sites (scalp, inner and outer forearms, cheeks) of 213 healthy Japanese women of various ages. The short-time effect of a hydrating regimen (7% glycerol) was recorded on the outer forearm. Results: This new device offers an appreciable reproducibility *in vitro* and *in vivo* (coefficient of variation of 2-4% and 5- 14%, respectively). Unlike other biophysical methods, the Khelometer " can be easily applied onto the human scalp that shows a higher stiffness than the two other skin sites, increasing with age and presence of alopecia. In all the three studied skin sites, the impact of age leads to significantly higher lateral skin stiffness (LSS, expressed as N/mm) values. The latter were found significantly different between the two sides of the forearms where the outer (sun-exposed) side showed statistically slightly higher LSS, than the unexposed inner side. LSS

values found on cheeks (≈ 0.5 N/mm) were about four times lower than those of the scalp (N/mm) and about half those of forearms (>1 N/mm). The effect of a 7% glycerol based formula was recorded 20 min post application onto the forearm, leading to a slight drop in LSS (approx. 15%) as compared to a vehicle-applied skin site. Conclusion: These preliminary studies clearly indicate that this new device, applicable to any skin site, offers appreciable assets such as sensitivity and reproducibility. Accordingly, it appears as a new approach in the non-invasive biophysical measurements of the skin surface, in both advanced and applied research investigations.

*E.J. Ko, J.Y. Hong, T.R. Kwon, E.J. Choi, Y.-J. Jang, S.Y. Choi, K.H. Yoo, S.Y. Kim, B.J. Kim, **Efficacy and safety of non-invasive body tightening with high-intensity focused ultrasound (HIFU)**, Skin Research and Technology 2017; 23: p. 558-562*

Background: Noninvasive skin-tightening devices have become increasingly popular in response to increasing demand for improvements in skin laxity and tightening with minimal risk and recovery time. Objective: We evaluated the efficacy and safety of HIFU for skin tightening in the face and body. Methods: A total of 32 Korean subjects enrolled in this prospective clinical trial. The subjects were treated with HIFU to both cheeks, lower abdomen, and thigh. Skin elasticity was measured before and after treatment using a Cutometer (CT575, Courage and Khazaka *, Cologne, Germany). Three blinded, experienced dermatologists evaluated paired pre- and post-treatment (week 4 and 12) photographs according to the Global Aesthetic Improvement Scale (GAIS). Participants also completed self-assessments using GAIS. Subjects rated their pain on a numeric rating scale (NRS) immediately, 7 days, 4 weeks, and 12 weeks after treatment. Results: Skin elasticity measured via a Cutometer was significantly improved 12 weeks after treatment at all treated sites ($P < .05$). Both IGAIS and SGAIS showed significant improvements 12 weeks after treatment. Immediately after treatment the mean NRS score was 3.00 ± 1.586 , but no pain was reported at 4 and 12 weeks post-treatment. No serious adverse effects were observed during the follow-up period. Conclusion: HIFU safely and effectively improves skin elasticity and clinical contouring of the face and body.

*M.O. Visscher, S.A. Burkes, D.M. Adams, A.M. Hammill, R.R. Wickett, **Infant skin maturation: Preliminary outcomes for color and biomechanical properties**, Skin Research and Technology 2017; 23: p. 545-551*

Background: Newborn infant skin changes after birth but studies have focused on the epidermal barrier. Dermal properties are relevant for care, but literature on postnatal changes is sparse. We further characterized skin maturational changes in lightness, color and response to biomechanical stress. Methods: Normal skin sites from subsets of participants in a trial on the progression and stage of infantile hemangiomas were retrospectively examined. Standardized photographs were analyzed as L^* , a^* , and b^* images. Biomechanics were measured with the Cutometer®. Results: Color changed significantly with increasing age. Skin was darker and redder at 2.0 vs. 5.4, 8.5 and 12.8 months. Yellow color increased, with higher values at 12.8 vs. 2.0, 3.5 and 5.4 months. Chest tissue was consistently more elastic than arm and face sites, with significantly higher elasticity for the youngest and oldest age groups. Biological elasticity, elastic recovery, and total recovery were significantly greater for the oldest subjects. Viscoelasticity and elastic deformation were lower at 5.5 vs. 8.8 and 17.6 months. Arm viscoelastic creep was highest at 2.8 months. Conclusion: Skin maturation continues into year two. Increasing elasticity and decreasing viscoelasticity may reflect increased collagen structure/function. The findings have implications for prevention of skin injury associated with mechanical forces.

*A.K. Langton, H.K. Graham, J.C. McConnell, M.J. Sherratt, C.E.M. Griffiths, R.E.B. Watson, **Organization of the dermal matrix impacts the biomechanical properties of skin**, British Journal of Dermatology (2017) 177, p. 818-827*

Background: Human skin has the crucial roles of maintaining homeostasis and protecting against the external environment. Skin offers protection against mechanical trauma due to the reversible deformation of its structure; these biomechanical properties are amenable to dynamic testing using noninvasive devices. Objectives: To characterize the biomechanical properties of young, black African/African-Caribbean and white Northern European skin from different anatomical sites, and to relate underlying skin architecture to biomechanical function. Methods: Using cutometry and ballistometry, the biomechanical properties of buttock and dorsal forearm skin were determined in black African/African-Caribbean ($n = 18$) and white Northern European ($n = 20$) individuals aged 18–30 years. Skin biopsies were obtained from a subset of the volunteers (black African/African-Caribbean, $n = 5$; white Northern European, $n = 6$) and processed for histological and immunohistochemical detection of the major elastic fibre components and fibrillar collagens. Results: We have determined that healthy skin from young African and white Northern European individuals has similar biomechanical properties (F3): the skin is resilient (capable of returning to its original position following deformation, R1), exhibits

minimal fatigue (R4) and is highly elastic (R2, R5 and R7). At the histological level, skin with these biomechanical properties is imbued with strong interdigitation of the rete ridges at the dermoepidermal junction (DEJ) and candelabra-like arrays of elastic fibres throughout the papillary dermis. Dramatic disruption to this highly organized arrangement of elastic fibres, effacement of the rete ridges and alterations to the alignment of the fibrillar collagens is apparent in the white Northern European forearm and coincides with a marked decline in biomechanical function. Conclusions: Maintenance of skin architecture – both epidermal morphology and elastic fibre arrangement – is essential for optimal skin biomechanical properties. Disruption to underlying skin architecture, as observed in the young white Northern European forearm, compromises biomechanical function.

T. Tomova-Simitchieva, A. Lichterfeld-Kottner, U. Blume-Peytavi, J. Kottner, Comparing the effects of 3 different pressure ulcer prevention support surfaces on the structure and function of heel and sacral skin: An exploratory cross-over trial, International Wound Journal, 2017; p. 1–9

Special support surfaces are key in pressure ulcer prevention. The aim of this study was to measure the effects of 3 different types of mattresses (reactive gel, active alternating air, basic foam) on skin properties of the sacral and heel skin after 2 hours loading. Fifteen healthy females (median age 66 years) were included. Transepidermal water loss, skin surface temperature, erythema, stratum corneum hydration, epidermal hydration, skin extensibility, elastic function, and recovery as well as skin roughness parameters were measured under controlled room conditions before loading, immediately after loading, and 20 minutes postloading in the supine position on the different mattresses. The highest increases in transepidermal water loss, skin temperature, and erythema were observed for the foam mattress after loading, indicating higher deformation and occlusion. Cutaneous stiffness decreased in all 3 groups, indicating structural changes during loading. There was a substantial decrease of mean roughness at the heel skin in the foam group, leading to a flattening of the skin surface. Study results indicate that the type of support surface influences skin structure and function during loading. The gel and air mattress appeared to be more protective compared with the foam mattress, but the differences between the gel and air were minor.

M. Schario, T. Tomova-Simitchieva, A. Lichterfeld, H. Herfert, G. Dobos, N. Lahmann, U. Blume-Peytavi, J. Kottner, Effects of two different fabrics on skin barrier function under real pressure conditions, Journal of Tissue Viability 26 (2017), p. 150 -155

Background: Pressure Ulcers (PUs) are a severe form of skin and soft tissue lesions, caused by sustained deformation. PU development is complex and depends on different factors. Skin structure and function change during prolonged loading on PU predilection sites and surfaces being in direct contact with skin are likely to have an impact as well. Little is known about the influence of fabrics on skin function under pressure conditions. Objectives: To investigate skin responses to sustained loading in a sitting position and possible differences between two fabrics. Methods: Under controlled conditions 6 healthy females (median age 65.0 (61.0e67.8) years) followed a standardized immobilization protocol of a sitting position for 45 min on a spacer and on a cotton fabric. Before and after the loading period skin surface temperature, stratum corneum hydration, transepidermal water loss (TEWL), erythema, skin elasticity and 'relative elastic recovery' were measured at the gluteal areas. Results: A 45 min sitting period caused increases of skin surface temperature and erythema independent of the fabric. Loading on spacer fabric showed a two times higher increase of TEWL compared to cotton. Stratum corneum hydration showed slight changes after loading, skin elasticity and 'relative elastic recovery' remained stable. Conclusions: Sitting on a hard surface causes skin barrier changes at the gluteal skin in terms of stratum corneum hydration and TEWL. These changes are influenced by the fabric which is in direct contact to the skin. There seems to be a dynamic interaction between skin and fabric properties especially in terms of temperature and humidity accumulation and transport.

U. Schlossberger, T. Jansen, Wirksamkeit eines neuartigen transdermalen Applikationssystems in der Therapie von gealterter und chronisch lichtgeschädigter Haut, Dermatologie am Alter Markt, Köln, Germany

In einer offenen Pilotstudie wurde die Wirksamkeit eines neuartigen transdermalen Applikationssystems (Dermadrop®, Omega Diagnostics GmbH, Reinbek), bei dem mit Hilfe von hochkonzentriertem Sauerstoff definierte Wirkstoffe wie Hyaluronsäure in die Dermis eingebracht werden, bei Frauen mit gealterter und chronisch lichtgeschädigter Haut untersucht. Die Applikation erfolgte nach einem standardisierten Protokoll konsekutiv in 3 Sitzungen im Abstand von 1 Woche in der Periorbital- und der Oberlippenregion. Die Evaluierung fand vor Therapiebeginn, dann wöchentlich jeweils vor der Applikation sowie 1 Woche nach der letzten Applikation statt. An festgelegten Meßpunkten kamen biophysikalische Methoden zur Bestimmung verschiedener Hautfunktionsparameter wie SELS-Verfahren (Visioscan®), Cutometrie und Corneometrie (Courage u.

Khazaka, Köln) zur Anwendung. Die klinischen Befunde wurden im Verlauf mit Hilfe von digitaler Photographie dokumentiert und miteinander verglichen. Die objektiven Befunde wurden mit der subjektiven Probandenzufriedenheit, die anhand von standardisierten Fragebögen ermittelt wurde, korreliert. Die Ergebnisse der Studie geben erste Hinweise auf die Wirksamkeit des Dermadrop®-Verfahrens in der Therapie von gealterter und chronisch lichtgeschädigter Haut. Es handelt sich um ein neuartiges dermatologisch-ästhetisches Therapiesystem, das eine Penetration von unterschiedlichen Wirkstoffen nicht-invasiv und schmerzfrei in die Dermis ermöglicht. Weitere Untersuchungen zur Evaluierung der Wirksamkeit des transdermalen Applikationssystems bei verschiedenen Indikationen sind vorgesehen.

H. Buntrock, M. Davids, M. Streker, M. Kerscher, Evaluation von Wirksamkeit und Verträglichkeit eines kosmetischen Produktes mit 53% Thermalwasser, Hyaluronsäure-Fragmenten, Glycoleol und Pro-Tocopherol zur Minderung von Hautalterungssymptomen im Gesicht über 12 Wochen

Zielsetzung: Ziel der Anwendungsuntersuchung war die Evaluation von Wirksamkeit und Verträglichkeit eines kosmetischen Präparates mit 53% Thermalwasser sowie Hyaluronsäurefragmente, Glycoleol und Pro-Tocopherol im Gesicht. **Methoden:** 20 hautgesunde Patientinnen (50–65 Jahre) behandelten ihre Gesichtshaut über 12 Wochen 2-mal täglich ausschließlich mit dem Prüfprodukt und einer ausgehändigten Reinigungslotion. Zur Evaluierung der Behandlungseffekte erfolgten am Untersuchungstag 0, 42 und 84 verschiedene Hautoberflächenmessungen: PRIMOS, Cutometrie und Glossymetrie sowie eine standardisierte Fotodokumentation. Die Patientinnen füllten eigenhändig einen Evaluationsbogen zum Thema Hautqualität aus. Ferner wurden zur Ermittlung der Verträglichkeit des Prüfproduktes der pH-Wert, TEWL und die Stratum corneum Hydratation gemessen. **Ergebnisse:** Nach 12-wöchiger Applikation des Prüfproduktes nahm die Hautfestigkeit (R0) signifikant zu ($p = 0,01$), die durchschnittliche Faltentiefe verringerte sich deutlich von 0,47mm (Tag 0) auf 0,35mm (Tag 84) und die Fotos zeigten zur Abschlussuntersuchung ein deutlich strafferes Erscheinungsbild sowie gefestigte Konturen. Die Patientinnen beurteilten eine signifikante Zunahme der Hautfeuchtigkeit um 22% nach 42 Tagen ($p = 0,013$) sowie um 19% nach 84 Tagen ($p = 0,006$). Außerdem empfanden sie nach 84 Tagen eine signifikant verbesserte Ausstrahlung ihrer Haut ($p = 0,010$), was evtl auf den leicht gestiegenen Glow zurückzuführen ist. TEWL und pH-Wert blieben über den gesamten Untersuchungszeitraum im physiologischen Bereich. **Schlussfolgerung:** Die Ergebnisse zeigen den positiven Einfluss einer Formulierung mit 53% Thermalwasser, Hyaluronsäure, Glycoleol und ProTocopherol auf die Hautqualität. Bei guter Verträglichkeit wurde eine deutliche Faltenreduktion sowie eine signifikante Verbesserung der Hautfestigkeit und -feuchtigkeit über drei Monate festgestellt. Zudem verbesserte sich die subjektive Wahrnehmung der Hautqualität durch die Probanden signifikant.

C. Korponya, E. Szél, Z. Behány, E. Varga, G. Mohos, Á. Dura, S. Dikstein, L. Kemény, G. Erös, Effects of Locally Applied Glycerol and Xylitol on the Hydration, Barrier Function and Morphological Parameters of the Skin, Acta Derm Venereol. 2017

Glycerol and xylitol hydrate the skin and improve its barrier function over a short period. We studied the effects of glycerol and xylitol on the physiological properties and morphology of the skin after longer-term application. Twelve volunteers with dry skin were examined. Three areas on the arms were determined. Area 1 served as untreated control. The vehicle was applied to area 2, while area 3 was treated twice daily with a formulation containing glycerol (5%) and xylitol (5%) for 14 days. Transepidermal water loss (TEWL), hydration and biomechanical properties of the skin were monitored. Biopsies were taken for routine histology and immunohistochemistry for flaggrin and matrix metalloproteinase-1 (MMP-1). The polyols increased the skin hydration and protein quantity of flaggrin, elevated the interdigitation index, decreased the TEWL and improved the biomechanical properties of the skin, but did not change the protein expression of MMP-1. A combination of glycerol and xylitol can be useful additional therapy for dry skin.

M.N Busche, A.-C. J. Thraen, A Gohritz, H.-O. Rennekampff, P.M. Vogt, Burn Scar Evaluation Using the Cutometer® MPA 580 in Comparison to “Patient and Observer Scar Assessment Scale” and “Vancouver Scar Scale”, Journal of Burn Care & Research, 2017

The effect of the “Patient and Observer Scar Assessment Scale” (POSAS) and “Vancouver Scar Scale” (VSS) on patients’ quality of life and their correlation with objective scar assessment tools, such as the Cutometer®, is not fully elucidated. In addition, long-term results of the dermal substitute Matriderm® used in combination with split-thickness skin grafting (STSG) remain unclear. We evaluated burn scars of 45 patients at least 2 years postburn injury using the Cutometer® MPA 580, the VSS, and the POSAS with three additional questions regarding quality of life and correlated the results. Study groups were: 1) scars following conservative treatment, 2) scars following STSG, and 3) scars following

STSG in combination with Matriderm®. Cutometer® measurements demonstrated better elastic qualities in the Matriderm® group compared with the STSG group. VSS and extended POSAS were rated best for the conservative group, followed by the STSG group and the Matriderm® group. There was a significant correlation between POSAS and VSS, quality of life and the objective Cutometer® measurements. Conservatively treated superficial dermal burns do not reach the elastic qualities of healthy skin, and the use of Matriderm® significantly improves the long-term elastic qualities of STSG in deep dermal and full-thickness burns 2 years post injury. Results from the VSS and the POSAS correlate with restrictions in the quality of life of patients and also with objective Cutometer® measurements and are therefore useful tools in scar evaluation following burn injury.

F. Medved, A. Wurm, M. Held, Facial Microcirculatory and Biomechanical Skin Properties after Single High Energy (Er): YAG Laser Application, Lasers in Surgery and Medicine 49: p. 891–898 (2017)

Objective: Owing to skin aging and the growing demand for skin rejuvenation, minimal invasive aesthetic treatments such as laser procedures are increasingly coming into focus. However, until now, little has been known about the objective effects of these procedures with respect to skin microcirculation or changes in skin elasticity. **Study Design:** Facial skin rejuvenation was performed on 32 volunteers using ablative Erbium: YAG laser. Skin microcirculation and skin elasticity have then been evaluated objectively. **Methods:** Microcirculation (flow, SO₂, velocity, and rHB) has been analyzed before and directly after the laser session by using the O₂C device. Skin elasticity has been evaluated by using the Cutometer device (U_f, U_a, U_r, and U_e) before and directly after the laser treatment, as well as 1 week and then 1, 3, and 6 months post treatment. Further, the outcome for the volunteers regarding their satisfactory level after laser treatment was evaluated. **Results:** Twenty volunteers were available for a complete follow-up. Microcirculation displayed statistically significant increase in all values to 2 mm depth. The biomechanical skin parameter of firmness of skin displayed statistically significant improvement in superficial skin layer after 6 months. **Conclusion:** Concerning microcirculation and skin elasticity the ablative Erbium: YAG laser treatment revealed similar effects on the skin like a superficial burn injury. In contrast to the determined skin elasticity parameters, firmness of skin objectively revealed a skin tightening effect after 6 months. Along with the important epidermal effect, the suitability of ablative laser treatment for skin rejuvenation has been proved in a long-term follow-up.

J. M. Jackson, G.L. Grove, K. Allenby, T. Houser, DFD-01 Reduces Transepidermal Water Loss and Improves Skin Hydration and Flexibility, Dermatol Ther (Heidelb) (2017) 7: p. 507–514

Introduction: In plaque psoriasis, the benefit of topical steroids is well established. The vehicle formulation of topical steroids may also provide benefit in addition to the effects of the steroid itself. DFD-01 (betamethasone dipropionate spray, 0.05%) is a formulation composed of a topical steroid in an emollient-like vehicle that enhances penetration to the target site of inflammation in the skin. The aim of this study was to assess the effect of DFD-01 and its vehicle on skin hydration and barrier function in compromised skin and to evaluate its effect on flexibility in healthy skin. **Methods:** Eighteen healthy white volunteers were enrolled in each of two studies. In Study 1, dry shaving of volar forearms created a compromised skin barrier, through which transepidermal water loss (TEWL) was measured using an evaporimeter. Capacitance, a measure of epidermal hydration, was also measured at baseline and at 1, 2 and 4 h after application of DFD-01 or its vehicle formulation. In Study 2, intact skin flexibility was tested with a cutometer before and at 1, 2 and 4 h after application of DFD-01 or vehicle. **Results:** In Study 1, both DFD-01 and its vehicle were effective at reducing TEWL through the compromised stratum corneum. Capacitance measurements confirmed this finding; razor-chafed skin treated with either DFD-01 or vehicle exhibited levels of skin hydration similar to unshaved control skin. Study 2 found softening and greater flexibility of normal skin treated with either DFD-01 or vehicle compared with nontreated control skin samples. **Conclusions:** These tests suggest that the DFD-01 formulation and its vehicle are each effective at retaining moisture within a damaged skin barrier and for softening and increasing the flexibility of intact skin.

N. Cameli, M. Mariano, I. Cordone, E. Abril, S. Masi, M.L. Foddai, Autologous Pure Platelet-Rich Plasma Dermal Injections for Facial Skin Rejuvenation: Clinical, Instrumental, and Flow Cytometry Assessment, Dermatol Surg. 2017 Jun;43(6): p. 826-835

Background: Platelet-rich plasma (PRP) is an emerging treatment in dermatology recently proposed for skin rejuvenation. **Objective:** To evaluate the efficacy and safety of autologous pure PRP dermal injections on facial skin rejuvenation, investigating the cellularity of PRP samples. **Material and Methods:** Twelve patients underwent 3 sessions of PRP injection at 1-month intervals. The clinical and instrumental outcomes were evaluated before (T₀) and 1 month (T₁) after the end of treatment by means of transepidermal water loss, corneometry, Cutometer, Visioscan, and Visioface. A flow cytometry

characterization on PRP and peripheral blood (PB) samples was performed. Results: Clinical and patient evaluation showed improvement of skin texture. Skin gross elasticity, skin smoothness parameters, skin barrier function, and capacitance were significantly improved. No difference between PRP and PB lymphocyte immunological asset was observed. A leukocyte population (mainly CD3) and neutrophils depletion were documented in all the PRP samples. Conclusion: This instrumental study demonstrated that PRP poor in leukocytes can provide objective improvements in skin biostimulation. Flow cytometry showed no variability among the PRP samples using a reproducible separation system and a low content in proinflammatory cells. Although a pilot study, it may be helpful for future investigations on PRP cellularity.

S. Mac-Mary, J.-M. Sainthillier, P. Humbert, Mesure instrumentale de l'hydratation cutanée, EMC - Cosmétologie et Dermatologie esthétique, June 2017

L'eau joue un rôle fondamental dans les propriétés physiques de la peau en permettant d'assurer sa solidité, sa flexibilité et une perméabilité minimale pour que l'eau endogène puisse jusqu'à la surface cutanée activer les enzymes responsables de la desquamation. Dans la couche cornée, elle est fixée sur des substances hydrosolubles et hygroscopiques intracellulaires appelées *natural moisturizing factors*. Cette eau représente l'aspect statique de l'hydratation cutanée.

N. Cameli, Platelet-rich plasma injections show efficacy in facial skin biostimulation, Dermatologic Surgery, June 2017, Volume 43, Issue 6, p. 826–835

Background: Platelet-rich plasma (PRP) is an emerging treatment in dermatology recently proposed for skin rejuvenation. Objective: To evaluate the efficacy and safety of autologous pure PRP dermal injections on facial skin rejuvenation, investigating the cellularity of PRP samples. Materials and Methods: Twelve patients underwent 3 sessions of PRP injection at 1-month intervals. The clinical and instrumental outcomes were evaluated before (T0) and 1 month (T1) after the end of treatment by means of transepidermal water loss, corneometry, Cutometer, Visioscan, and Visioface. A flow cytometry characterization on PRP and peripheral blood (PB) samples was performed. Results: Clinical and patient evaluation showed improvement of skin texture. Skin gross elasticity, skin smoothness parameters, skin barrier function, and capacitance were significantly improved. No difference between PRP and PB lymphocyte immunological asset was observed. A leukocyte population (mainly CD3⁺) and neutrophils depletion were documented in all the PRP samples. Conclusion: This instrumental study demonstrated that PRP poor in leukocytes can provide objective improvements in skin biostimulation. Flow cytometry showed no variability among the PRP samples using a reproducible separation system and a low content in proinflammatory cells. Although a pilot study, it may be helpful for future investigations on PRP cellularity.

C. Uhl, D. Khazaka, Test equipment supports anti-pollution claims, PERSONAL CARE ASIA PACIFIC, May 2017, p. 27-29 and PERSONAL CARE EUROPE, September 2017, p. 74-76

Pollution and its impact on the skin have recently become the main topic at all important cosmetic events, and products claiming to protect the skin from pollution effects are a major trend in the cosmetic and personal care industry.

G. Nicoletti, P. Perugini, S. Bellino, P. Capra, A. Malovini, O. Jaber, M. Tresoldi, A. Faga, Scar Remodeling with the Association of Monopolar Capacitive Radiofrequency, Electric Stimulation, and Negative Pressure, Photomedicine and Laser Surgery, Volume 35, Number 5, 2017

Objective: A study was established to objectively assess the effects of low-intensity electromagnetic and electric stimulation plus negative pressure on mature scars. Background: Radiofrequency plus negative pressure therapy demonstrated a favorable reorganization and regeneration of the collagen and elastic fibers and was proposed for the treatment of cellulitis and skin stretch marks. Methods: Twenty-six mature scars in 20 Caucasian patients (15 females and 5 males) were enrolled in the study. The treatments were carried out with a Class I, BF-type electromedical device equipped with a radiofrequency generator, an electric pulse generator, and a vacuum pump twice a week for 3 months. Corneometry, transepidermal water loss, elastometry, colorimetry, and three-dimensional skin surface pattern were objectively assessed with Multi Probe Adapter System MPA and PRIMOS pico. A subjective assessment was carried out with the VAS and PSAS scales. Each scar was compared before and after the treatment and with the skin in the corresponding healthy contralateral anatomical area at the same times. Results: Reduction of the scar surface wrinkling and overall scar flattening were demonstrated after the treatment. The scar slightly tended to approach the color and elasticity of healthy skin too. Conclusions: The combined local treatment of mature scars with low-intensity electromagnetic and electric stimulation in association with negative pressure might suggest a favorable synergic effect on the scar collagen and elastic fiber remodeling.

K. Boron Biswas, K. Tanaka, S. Takayama, A. Iddamalagoda, A solution for pollution induced ageing of skin, PERSONAL CARE EUROPE, April 2017, p. 131 - 134

Environmental pollution has now become the talk of the world. It is very important to keep in mind that more than half of the world's population now lives in an urban area. It is assumed that by 2030, 60% of the world's population will be living in towns and cities, rising to 70% by 2050.¹ As skin is the first line of defence when it comes to air pollution contact, we should be aware of the harmful effects of pollution on skin in general. Pollution, in fact, is not a problem limited to China or India only, it is almost common, for example, in London, Paris, New York and Milan as well.

E. Yenilmez, Y. Yazan, Formulation, Characterization and in vivo Efficacy of α -Tocopherol Imprinted Polymeric System for Cosmetic Application, European International Journal of Science and Technology, Vol. 6 No. 3, April 2017

The purpose of this study was to formulate an antioxidant topical cosmetic molecularly imprinted system for skin aging and was to evaluate the formulation in vivo on human volunteers. Molecularly imprinted cyclodextrins (CDs) were prepared by cross-linking cyclodextrins (CD) in the presence of a vitamin E (VE) as template molecule. Characterization studies were performed on molecularly imprinted polymers (MIP) and non-imprinted polymers (NIP). Antioxidant effects of formulations prepared were investigated by 2,2-diphenyl-1-picrylhydrazyl (DPPH) test. In vivo skin measurements were done on human volunteers including sebum, moisture, pH, net elasticity and roughness parameters. It was seen that temperature increase influenced the particle size of imprinted polymers. It was determined that MIP systems have an antioxidant effect. Formulations showed a positive effect on skin roughness parameter was determined statistically ($p \leq 0.01$). The preparation method of MIP is simple and quick and it will provide opportunities in future on specific cosmetic formulations.

V. Zorin, A. Zorina, V. Cherkasov, R. Deev, P. Kopnin, A. Isaev, Clinical-instrumental and morphological evaluation of the effect of autologous dermal fibroblasts administration, J Tissue Eng Regen Med. 2017 Mar;11(3): p. 778-786

Basic molecular mechanisms, associated with the main cell population of the dermis - fibroblasts - are the basis of skin aging. The number of functionally active fibroblasts in the skin and their biosynthetic activity decreases with age, thus enhancement of their cell density with synthetically active cells is accepted as one of the most effective methods. The objective of the present study was to evaluate the safety and effectiveness of intradermal administration of autologous dermal fibroblasts in a year after treatment of 17 patients, aged 45-65 years. Results obtained with modern instrumental skin diagnostic methods (vacuum cutometry, optical profilometry, VISIA photometric analysis, etc.) demonstrate the safety and clinical effectiveness of dermal autofibroblast therapy: after transplantation, cultured autofibroblasts keep their biosynthetic activity and produce extracellular matrix for at least 12 months. As a result, remodelling of the dermis microstructures is observed, accompanied by a progressive increase of collagen content and thickness of the dermis (up to $62.5 \pm 6.7\%$ in 12 months). This is clinically expressed by increase of skin elasticity ($24.0 \pm 4.3\%$ in periorbital area) and thickness of the skin, and by decrease in the number and depth of wrinkles ($46 \pm 7\%$ by the end of observation period).

A.M. Kołodziejczak, H. Rotsztein, Mexametric and cutometric assessment of the signs of aging of the skin area around the eyes after the use of non-ablative fractional laser, non-ablative radiofrequency and intense pulsed light, Dermatol Ther. 2017 Mar; 30(2)

The assessment of the signs of aging within eyes area in cutometric (skin elasticity) and mexametric (discoloration and severity of erythema) examination after the treatment with: non-ablative fractional laser, non-ablative radiofrequency (RF) and intense light source (IPL). This study included 71 patients, aged 33-63 years (the average age was 45.81) with Fitzpatrick skin type II and III. 24 patients received 5 successive treatment sessions with a 1,410-nm non-ablative fractional laser in two-week intervals, 23 patients received 5 successive treatment sessions with a non-ablative RF in one-week intervals and 24 patients received 5 successive treatment sessions with an IPL in two-week intervals. The treatment was performed for the skin in the eye area. The Cutometer and Mexameter (Courage + Khazaka electronic) reference test was used as an objective method for the assessment of skin properties: elasticity, skin pigmentation and erythema. Measurements of skin elasticity were made in three or four sites within eye area. The results of cutometric measurements for R7 showed the improvement in skin elasticity in case of all treatment methods. The largest statistically significant improvement ($p < .0001$) was observed in case of laser and RF, during treatment sessions, at sites at upper and lower eyelid. The smallest change in skin elasticity for the laser, RF and IPL - $p = .017$, $p = .003$ and $p = .001$, respectively - was observed in a site within the outer corner of the eye. In all sites

of measurements and for all methods, the greatest improvement in skin elasticity was demonstrated between the first and second measurement (after 3rd procedures). The majority of the results of mexametric measurements-MEX (melanin level) and ERYT (the severity of erythema) are statistically insignificant. Fractional, non-ablative laser, non-ablation RF and intense light source can be considered as methods significantly affecting elasticity and to a lesser extent erythema and skin pigmentation around the eyes. Fractional non-ablative laser is a method which, in comparison to other methods, has the greatest impact on skin viscoelasticity. These procedures are well tolerated and are associated with a low risk of side effects.

*B. Hersant, J. Niddam, S. La Padula, W. Noel, K. Ezzedine, A.-M. Rodriguez, J.-P. Meningaud, **Efficacy of autologous platelet-rich plasma combined with hyaluronic acid on skin facial rejuvenation: A prospective study**, J AM ACAD DERMATOL, Volume 77, No. 3, 2017*

It has been reported that hyaluronic acid (HA) and autologous platelet-rich plasma (PRP) play an important role in the tissue regeneration process by stimulating cell signaling at the injection site. The aim of this open label prospective study was to assess the clinical benefit of combining PRP and HA (PRP-HA) effectors, which have synergic effects on skin firmness and elasticity, using objective assessment by a Cutometer MPA 580 (Courage+Khazaka Electronic GmbH, Cologne, Germany) 1 of the software-evaluated skin mechanical parameter R:R5 (net elasticity) together with a validated subjective scale, the FACE-Q.

*S. Shin, J.U. Shin, Y. Lee, W.Y. Chung, K.-H. Nam, T.G. Kwon, J.H. Lee, **The Effects of Multi-Growth Factors-Containing Cream on Post-Thyroidectomy Scars: A Preliminary Study**, Ann Dermatol Vol. 29, No. 3, 2017*

Background: Growth factors play important roles in wound healing. However, the evidence for the effects of growth factors on post-thyroidectomy scars is limited. Objective: We performed a prospective study to assess the preventive and therapeutic effect of a multi-growth factor (MGF)-containing cream on post-thyroidectomy scars. Methods: Twenty-one patients with thyroidectomy scars applied MGF cream twice a day. We assessed the changes in erythema, pigmentation, skin elasticity, and skin hydration status using the erythema index, melanin index, cutometer, and corneometer, respectively. In addition, Vancouver scar scale (VSS) and patient satisfaction were assessed at 10 days after surgery (baseline), 2 weeks, 6 weeks, and 12 weeks after baseline. Results: The mean total VSS scores were significantly lower at 6 weeks (3.24 ± 1.51 vs. 1.91 ± 1.38) and 12 weeks (3.24 ± 1.51 vs. 1.71 ± 1.59) compared to the baseline. The degree of pigmentation was significantly lower at 12 weeks compared to the baseline, and the skin elasticity, and the skin hydration status were significantly higher at 12 weeks compared to the baseline. Over 85% of the patients were satisfied with the use of MGF cream without any adverse effect. Conclusion: MGF cream might have additive or supportive effect for scar formation after thyroidectomy.

*L. Ma, Y. Tan, S. Zheng, J. Li, C. Jiang, Z. Chen, X. Wang, **Correlation study between image features and mechanical properties of Han Chinese facial skin**, Int J Cosmet Sci., 2017 Feb;39(1):p. 93~100*

Objective: Mechanical properties are considered to be vital factors that influence skin physiology during ageing. Wrinkles and skin roughness are the two main features in aged skin. The purpose of this study is to characterize the relationship between facial skin mechanical properties and image features using quantitative methods. Methods: Two hundred and forty healthy male and female volunteers living in Shanghai, China (aged 20-70 years), were examined in this study. Facial images were photographed by VISIA-CR. Wrinkle volume of middle forehead and skin roughness of upper cheek were analysed by Skin Surface Analyzer (SSA) software. Mechanical parameters at the middle forehead and upper cheek were measured using Cutometer®MPA 580 and Reviscometer® RVM 600. Results: Skin wrinkles and roughness increased during ageing, where men have a higher level and earlier manifestation than women. Skin mechanical parameters R2, R5, R7 and RRT were found decreased with age. Moreover, mechanical parameters including R2, R7, RRT and anisotropy showed significant correlations with wrinkle volume and/or skin roughness. Conclusion: The facial image features including wrinkle volume and skin roughness are significantly correlated with skin elasticity and anisotropy, which could well describe the skin features of Han Chinese.

*J. Fabrowska, A. Kapucinska, B. Łeska, K. Feliksik-Skrobich, I. Nowak, **In Vivo Studies and Stability Study of Cladophora Glomerata Extract as a Cosmetic Active Ingredient**, Acta Poloniae Pharmaceutica - Drug Research, Vol. 74 No. 2, p. 633-641, 2017*

Marine algae are widely used as cosmetics raw materials. Likewise, freshwater alga *Cladophora glomerata* may be a good source of fatty acids and others bioactive agents. The aims of this study was to find out if the addition of the extract from the freshwater *C. glomerata* affects the stability of prepared

cosmetic emulsions and to investigate *in vivo* effects of the extract in cosmetic formulations on hydration and elasticity of human skin. Extract from the freshwater *C. glomerata* was obtained using supercritical fluid extraction (SFE). Two forms of O/W emulsions were prepared: placebo and emulsion containing 0.5% of *Cladophora* SFE extract. The stability of obtained emulsions was investigated by using Turbiscan Lab Expert. Emulsions were applied by volunteers daily. Corneometer was used to evaluate skin hydration and cutometer to examine skin elasticity. Measurements were conducted at reference point (week 0) and after 1st, 2nd, 3rd and 4th week of application. The addition of *Cladophora* extract insignificantly affected stability of the emulsion. The extract from *C. glomerata* in the emulsion influenced the improvement of both skin hydration and its elasticity. Thus, freshwater *C. glomerata* extract prepared *via* SFE method may be considered as an effective cosmetic raw material used as a moisturizing and firming agent.

I. Göllner, W. Voss, U. von Hehn, S. Kammerer, Ingestion of an Oral Hyaluronan Solution Improves Skin Hydration, Wrinkle Reduction, Elasticity, and Skin Roughness: Results of a Clinical Study, Journal of Evidence-Based Integrative Medicine, 2017

Intake of oral supplements with the aim of a cutaneous antiaging effect are increasingly common. Hyaluronic acid (HA) is a promising candidate, as it is the key factor for preserving tissue hydration. In our practice study, we evaluated the effect of an oral HA preparation diluted in a cascadefermented organic whole food concentrate supplemented with biotin, vitamin C, copper, and zinc (Regulatpro Hyaluron) on skin moisture content, elasticity, skin roughness, and wrinkle depths. Twenty female subjects with healthy skin in the age group of 45 to 60 years took the product once daily for 40 days. Different skin parameters were objectively assessed before the first intake, after 20 and after 40 days. Intake of the HA solution led to a significant increase in skin elasticity, skin hydration, and to a significant decrease in skin roughness and wrinkle depths. The supplement was well tolerated; no side effects were noted throughout the study.

M.-A. Boucher, M. Royer, A. Jeanneau, Acer rubrum Bark Extract, the new Natural and Eco-responsible Anti-ageing Ingredient Obtained from a Coproduct of the Canadian Forest Industry, Global Ingredients Formulation Guide 2017

Forest industry produces large amounts of coproducts such as barks that can be valorized through the extraction of bioactive molecules commonly called “extractives”. The Canadian boreal forest biomass is a great sustainable source of new natural compounds that can be used to help maintaining or restoring skin health and fight against skin ageing. Red maple (*Acer rubrum*) is a famous Canadian tree species which has been widely used by native people for its medicinal properties. Its bark contains a high level of polyphenols that have already shown to be powerful antioxidants. This study demonstrates that red maple bark extract is a new natural anti-ageing active with procollagen and proelastin properties. Indeed, this extract stimulates dermal regeneration by increasing collagen production while inhibiting collagenase enzyme synthesis that degrades collagen with age. Moreover, red maple bark extract increases elastin synthesis. Clinical studies reveal the complete and long-term anti-ageing efficacy of this polyphenolic extract with measured wrinkle amplitude reduction as well as visible effects on women proved by pictures before and after treatment with a cream containing the extract at 0.25%. Moreover, red maple extract improves significantly several biomechanical parameters of the skin after only 28 days’ use of the cream.

C. Graizeau, Natural olive-derived active helps slow skin ageing, PERSONAL CARE ASIA PACIFIC, January 2017, p. 34-36

The skin is protected naturally by a hydro-lipidic film. However, this is subjected to oxidative stress, which generates free radicals and reactive oxygen species (ROS). In the meantime, glycation alters the elasticity of the skin through collagen crosslinking and leads to uneven skin tone through the accumulation of advanced glycation endproducts (AGE). It is these processes of lipid peroxidation and glycation that trigger a vicious circle of ageing. Plantasens® Olive Active HP is an anti-ageing active ingredient derived from olive that acts as a protective shield. It protects against UV-induced lipid peroxidation by scavenging reactive oxygen species. It also prevents the formation of AGEs and limits collagen crosslinking. It thus helps to maintain the skin's natural balance and smooth appearance, and its elasticity. Through those mechanisms, Plantasens Olive Active HP aims to sustainably preserve the skin's natural beauty for longer.

M.E. Jaspers, K.M. Brouwer, A.J. van Trier, M.L. Groot, E. Middelkoop, P.P. van Zuijlen, Effectiveness of Autologous Fat Grafting in Adherent Scars: Results Obtained by a Comprehensive Scar Evaluation Protocol, Plast Reconstr Surg., 2017 Jan;139 (1): p. 212-219

Background: Nowadays, patients normally survive severe traumas such as burn injuries and necrotizing fasciitis. Large skin defects can be closed but the scars remain. Scars may become adherent to underlying structures when the subcutaneous fat layer is damaged. Autologous fat grafting provides the possibility of reconstructing a functional sliding layer underneath the scar. Autologous fat grafting is becoming increasingly popular for scar treatment, although large studies using validated evaluation tools are lacking. The authors therefore objectified the effectiveness of single-treatment autologous fat grafting on scar pliability using validated scar measurement tools. **Methods:** Forty patients with adherent scars receiving single-treatment autologous fat grafting were measured preoperatively and at 3-month follow-up. The primary outcome parameter was scar pliability, measured using the Cutometer. Scar quality was also evaluated by the Patient and Observer Scar Assessment Scale and the DSM II ColorMeter. To prevent selection bias, measurements were performed following a standardized algorithm. **Results:** The Cutometer parameters elasticity and maximal extension improved 22.5 percent ($p < 0.001$) and 15.6 percent ($p = 0.001$), respectively. Total Patient and Observer Scar Assessment Scale scores improved from 3.6 to 2.9 on the observer scale, and from 5.1 to 3.8 on the patient scale (both $p < 0.001$). Color differences between the scar and normal skin remained unaltered. **Conclusions:** For the first time, the effect of autologous fat grafting on functional scar parameters was ascertained using a comprehensive scar evaluation protocol. The improved scar pliability supports the authors' hypothesis that the function of the subcutis can be restored to a certain extent by single-treatment autologous fat grafting.

Y.A. Yutskovskaya, E.A. Kogan, Improved Neocollagenesis and Skin Mechanical Properties After Injection of Diluted Calcium Hydroxylapatite in the Neck and Decolletage: A Pilot Study, J Drugs Dermatol. 2017 Jan 1; 16(1): p. 68-74

Background: Calcium hydroxylapatite (CaHA; Radiesse (R)) provides safe and effective correction of moderate-to-deep lines, volume replacement, lift and contour, and induction of neocollagenesis and neoeLASTogenesis for improved skin quality. CaHA hyperdilution takes advantage of its skintightening properties without a volumizing effect. **Objective:** To evaluate the collagen- and elastin-stimulating effects of diluted CaHA in subjects with skin laxity in the neck and decolletage. **Methods:** Twenty subjects with skin laxity in the neck and decolletage received multiple, linear, subdermal injections of CaHA diluted with preserved saline at baseline and 4 months: 1:2 dilution (normal skin), 1:4 dilution (thin skin), and 1:6 dilution (atrophic skin). Subjects also received deep subdermal injection of CaHA (~0.1 ml) of the same dilution in the peri-auricular area for skin biopsy. Biopsy tissue was obtained at baseline, 4 months, and 7 months for immunohistochemical evaluation of neocollagenesis. Changes to skinmechanical properties were measured by ultrasound scanning and cutometry. Subject and investigator satisfaction was evaluated using the Global Aesthetic Improvement Scale. **Results:** Immunohistochemical analysis of biopsy tissue demonstrated significant increases in collagen expression at 4 months (P less than 0.05) and 7 months (P less than 0.00001) compared with baseline. Increases in collagen III levels were also significant at 4 months (P less than 0.00001); they declined by 7 months but remained above baseline. Staining for elastin and angiogenesis significantly increased at 4 months (P less than 0.05 and P less than 0.01, respectively) and 7 months (P less than 0.00001 for both) compared with baseline. Immunohistochemical data correlated with improvements in skin elasticity and pliability evaluated by cutometry, and with ultrasound-assessed increases in dermal thickness. Subject and investigator satisfaction was high, and the procedure was well tolerated. **Conclusion:** Injection of diluted CaHA is very effective for skin tightening of the neck and decolletage.

A.K. Lanaton, H.K. Graham, J.C. McConnell, M.J. Sherratt, C.E. Griffiths, R.E. Watson, Organisation of the dermal matrix impacts the biomechanical properties of skin, Br J Dermatol. 2017 Jan 2

Background: Human skin has the crucial roles of maintaining homeostasis and protecting against external environment. It offers protection against mechanical trauma due to the reversible deformation of its structure; these biomechanical properties are amenable to dynamic testing using non-invasive devices. **Objectives:** To characterise the biomechanical properties of young, white Caucasian and black African/African-Caribbean skin from different anatomical sites; and to relate underlying skin architecture to biomechanical function. **Methods:** Using cutometry and ballistometry, the biomechanical properties of buttock and dorsal forearm skin were determined in black African/African-Caribbean ($n=18$) and white Caucasian ($n=20$) individuals aged 18-30 years. Skin biopsies were obtained from a subset of the volunteers (black African/African-Caribbean: $n=5$; white Caucasian: $n=6$) and processed for histological and immunohistochemical detection of the major elastic fibre components and fibrillar collagens. **Results:** We have determined that healthy skin from young African and Caucasian individuals has similar biomechanical properties (F3) in that skin is resilient (capable of returning to its original position following deformation; R1), exhibits minimal fatigue (R4) and is highly elastic (R2, R5 and R7). At the histological level, skin with these biomechanical properties is imbued with strong interdigitation of

the rete ridges at the dermal-epidermal junction (DEJ) and candelabra-like arrays of elastic fibres throughout the papillary dermis. Dramatic disruption to this highly organised arrangement of elastic fibres, effacement of the rete ridges and alterations to the alignment of the fibrillar collagens is apparent in white Caucasian forearm and coincides with a marked decline in biomechanical function. Conclusions: Maintenance of skin architecture - both epidermal morphology and elastic fibre arrangement is essential for optimal skin biomechanical properties. Disruption to underlying skin architecture, as observed in young white Caucasian forearm, compromises biomechanical function.

M. Kanlayavattanakul, N. Lourith, P. Chaikul, Jasmine rice panicle: A safe and efficient natural ingredient for skin aging treatments, Journal of Ethnopharmacology, Volume 193, 4 December 2016, p. 607-616

Ethnopharmacological relevance: While rice is one of the most important global staple food sources its extracts have found many uses as the bases of herbal remedies. Rice extracts contain high levels of phenolic compounds which are known to be bioactive, some of which show cutaneous benefits and activity towards skin disorders. This study highlights an assessment of the cellular activity and clinical efficacy of rice panicle extract, providing necessary information relevant to the development of new cosmetic products. Materials and methods: Jasmine rice panicle extract was standardized, and the level of phenolics present was determined. *In vitro* anti-aging, and extract activity towards melanogenesis was conducted in B16F10 melanoma cells, and antioxidant activity was assessed in human skin fibroblast cell cultures. Topical product creams containing the extract were developed, and skin irritation testing using a single application closed patch test method was done using 20 Thai volunteers. Randomized double-blind, placebo-controlled efficacy evaluation was undertaken in 24 volunteers over an 84 d period, with the results monitored by Corneometer® CM 825, Cutometer® MPA 580, Mexameter® MX 18 and Visioscan® VC 98. Results: Jasmine rice panicle extract was shown to have a high content of p-coumaric, ferulic and caffeic acids, and was not cytotoxic to the cell lines used in this study. Cells treated with extract suppressed melanogenesis *via* tyrosinase and TRP-2 inhibitory effects, which protect the cell from oxidative stress at doses of 0.1 mg/ml or lower. The jasmine rice panicle preparations (0.1-0.2%) were safe (MI=0), and significantly ($p<0.05$) increased skin hydration levels relative to baseline. Skin lightening, and anti-wrinkle effects related to skin firmness and smoothness were observed, in addition to a reduction in skin wrinkling. Improvements in skin biophysics of both 0.1% and 0.2% extracts were showed to be comparable ($p>0.05$). Conclusions: Jasmine rice panicle extract having high levels of phenolics shows cutaneous benefits as the basis for skin aging treatments, as indicated through *in vitro* cytotoxicity assessments and skin testing in human subjects.

J. Seok, J.Y. Hona, S.Y. Choi, K.Y. Park, B.J. Kim, A potential relationship between skin hydration and stamp-type microneedle intradermal hyaluronic acid injection in middle-aged male face, J Cosmet Dermatol. 2016 Dec;15(4): p. 578-582

There is an increasing interest in skin rejuvenation using hyaluronic acid (HA) fillers beyond the improvement of deep wrinkles and volume deficiencies, which have been primary research foci in the past. We conducted a pilot study using a sample of six middle-aged male subjects. Using an automatic intradermal injector with 0.020 mL of material contained in each injection point with a total of 100 points, 2 mL of non-cross-HA filler was injected into the entire face at every treatment session. We administered injections of HA for a total of three sessions per subject at 2-week intervals and evaluated the results using a corneometer, TEWL, cutometer, measures of patient satisfaction, and the global aesthetic improvement scale (GAIS). Corneometer values increased steadily at each measurement, while the average value of TEWL increased in comparison with baseline after each application of the procedure. However, values returned to readings similar to those at 4 weeks after complete termination of the procedures. Cutometer values differed between the baseline and after procedures. All patients were assessed as "very much improved" or "much improved" according to GAIS, and all were pleased with the outcomes of treatment in terms of the enhancement of moisture, elasticity, and brightness.

A. Augustyniak, H. Rotsztein, Nonablative fractional laser treatment for the skin in the eye area - clinical and cutometric analysis, J Cosmet Dermatol. 2016 Dec; 15(4): p. 399~406

Objective: The purpose of the research was to evaluate skin elasticity and reduction in the aging eye area using a 1410-nm nonablative fractional laser treatment, cutometric measurements and photographic documentation. Materials and Methods: This study included 24 patients (21 women, three men), aged 33-50 years (the average age was 44.6) with Fitzpatrick skin type II and III. They received five successive treatment sessions with a 1410-nm nonablative fractional laser in 2-week intervals. Biomechanical properties of the skin were measured by using Cutometer (Courage+Khazaka electronic). Measurements of skin elasticity were made in three places of the eye area. A photographic documentation was used to compare changes after the series of treatment sessions. Additionally, the

patients filled in a survey in which they were asked to make a self evaluation of the administered procedure. Results: Cutometric analysis showed a significant improvement of skin elasticity. Changes in the measurements of R2 and R6 parameters indicate that the statistical significance level is mostly $P < 0.0001$ for the differences in the measurements. The analysis of clinical results of the therapy, using photographic documentation, showed a 47% decrease in the quantity and depth of wrinkles in the eye area. Conclusions: A 1410-nm nonablative fractional laser treatment seems to be an effective method aiming at reducing wrinkles in the eye area and improving tightness. Cutometric measurements provide invaluable help in the objective evaluation of the anti-aging treatment and the photographic documentation is an excellent addition to the clinical analysis.

A. Augustyniak, H. Rotsztejn, Intense pulsed light (IPL) treatment for the skin in the eye area - clinical and cutometric analysis, J Cosmet Laser Ther. 2016 Nov 23: p. 1-7

Objective: the aim of the research was to establish the influence of IPL treatment on skin ageing in the eye area. Material and Methods: This study included 24 women, aged 38-63 years (mean age was 48.04) with Fitzpatrick skin type II and III who underwent five successive treatment sessions with an IPL in two-week intervals. The Cutometer (Courage + Khazaka electronic) reference test was an objective method for the assessment of the biomechanical properties of the skin. The measurements were made in three places around the eye. The photo documentation was used to compare state of skin before and after three months of treatments. Additionally, patients filled in a questionnaire, which contained questions concerning self-assessment of the procedure effects. Results: Cutometric analysis showed significant improvement of skin elasticity (statistical significance level is mostly < 0.0001). The comparison of clinical changes in the therapy, based on photo documentation, showed a 25% improvement. Conclusions: This treatment was used in order to improve skin elasticity and decrease the amount and depth of wrinkles. It is a non-invasive treatment, with low risk of complications.

A. Augustyniak, H. Rotsztejn, Nonablative radiofrequency treatment for the skin in the eye area - clinical and cutometrical analysis, J Cosmet Dermatol. 2016 Dec; 15(4): p. 427-433

Objective: The purpose of the research was to evaluate skin elasticity and reduction in the aging eye area after using a nonablative radiofrequency treatment. Material and Methods: This study included 23 patients, aged 34-58 years with Fitzpatrick skin type II and III. They received five treatment sessions with a nonablative radiofrequency in 1-week intervals. Biomechanical properties of the skin were measured using Cutometer. A photodocumentation was used to compare changes before and after the series of treatment sessions. Additionally, the patients filled in a questionnaire in which they were asked to make a self-evaluation of the procedure. Results: Cutometrical analysis showed improvement of skin elasticity. Changes in the measurements of R2 and R6 parameters indicate that the statistical significance level is mostly $P < 0.0001$ for the differences in the measurements. The comparison of clinical changes in the therapy, based on photodocumentation, showed a 33.26% improvement. Conclusions: This treatment was used to improve skin tightness and decrease the amount and depth of wrinkles. It is a noninvasive treatment, with low risk of complications. The cutometrical measurements seem to be useful to assess improvement of elasticity of the skin after cosmetology or esthetic dermatology treatments.

N.S. Sadick, Y. Harth, A 12-week clinical and instrumental study evaluating the efficacy of a multisource radiofrequency home-use device for wrinkle reduction and improvement in skin tone, skin elasticity, and dermal collagen content, J Cosmet Laser Ther. 2016 Dec; 18(8): p. 422-427

This study was performed in order to evaluate the safety and efficacy of a new handheld home-use multisource radiofrequency device on facial rejuvenation. Forty-seven male and female subjects were enrolled. All subjects received a NEWA 3DEEP home-use device (EndyMed Medical, Caesarea, Israel) to be used on facial skin three times per week for the first four weeks and then reduced to two times per week for the following eight weeks. Assessments included expert clinical grading for efficacy, instrumental evaluation, image analysis, and photography. Forty-five subjects completed the study; all subjects reported the treatment to be painless with only mild erythema lasting up to 15 minutes post-treatment. No other adverse events were reported. Statistically significant improvements were noted in the appearance of marionette lines, skin brightness, elasticity, firmness, lift (facial), lift (jawline), texture/smoothness, tone, and radiance/luminosity by expert visual assessment. Statistically significant improvements in skin firmness and elasticity were found using a Cutometer MPA 580, as well as in collagen and hemoglobin content of the skin using a SIAscope. The results of this study indicate that the NEWA multisource radiofrequency home-use device is effective in selfadministered skin rejuvenation.

T. Ezure, E. Yagi, S. Amano and K. Matsuzaki, Dermal anchoring structures: convex matrix structures at the bottom of the dermal layer that contribute to the maintenance of facial skin morphology, Skin Research and Technology 2016; 22: 152-157

Background/Purpose: Facial skin must be linked to underlying structures to maintain facial morphology and prevent sagging, but the mechanism of facial skin retention is largely unknown. We aimed to elucidate this mechanism.

B. Nedelec, N.J. Forget, T. Hurtubise, S. Cimino, F. de Muszka, A. Legault, W.L. Liu, A. de Oliveira, V. Calva, J.A. Correa, Skin characteristics: normative data for elasticity, erythema, melanin, and thickness at 16 different anatomical locations, Skin Research and Technology 2016; 22: 263-275

Background: The clinical use of non-invasive instrumentation to evaluate skin characteristics for diagnostic purposes and to evaluate treatment outcomes has become more prevalent. The purpose of this study was to generate normative data for skin elasticity, erythema (vascularity), melanin (pigmentation), and thickness across a broad age range at a wide variety of anatomical locations using the Cutometer (6 mm probe), Mexameter, and high-frequency ultrasound in a healthy adult sample.

A. Houcine, A. Delalleau, S. Heraud, B. Guiraud, B. Payre, H. Duplan, M.-B. Delisle, O. Damour, S. Bessou-Touya, How biophysical in vivo testing techniques can be used to characterize full thickness skin equivalents, Skin Research and Technology 2016; 22: 284-294

Background: The reliability of the biophysical properties of skin equivalents (SEs) remains a challenge for medical applications and for product efficacy tests following the European Directive 2003/15/EC2 on the prohibition of animal experiments for cosmetic products.

K. Mizukoshi, T. Nakamura, A. Oba, The relationship between dermal papillary structure and skin surface properties, color, and elasticity, Skin Research and Technology 2016; 22: 295-304

Background/purpose: The skin contains an undulating structure called the dermal papillary structure between the border of the epidermis and dermis. The physiological importance of the dermal papillary structures has been discussed, however, the dermal papillary structures have never been evaluated for their contribution to skin appearance. In this study, we investigated the correlation between the dermal papillary structure and skin color and elasticity. In addition, the relationship was validated with skin model experiments.

M. Tanaka, Y. Yamamoto, E. Misawa, K. Nabeshima, M. Saito, K. Yamauchi, F. Abe, F. Furukawa, Effects of Aloe Sterol Supplementation on skin elasticity, hydration, and collagen score: a 12-week double-blind, randomized, controlled trial, Skin Pharmacol Physiol 2016; 29: 309-317

Abstract: Background/Aims: Our previous study confirmed that Aloe sterol stimulates collagen and hyaluronic acid production in human dermal fibroblasts. This study aims to investigate whether Aloe sterol intake affects skin conditions. Methods: We performed a 12-week, randomized, double-blind, placebo-controlled study to evaluate the effects of oral Aloe sterol supplementation on skin elasticity, hydration, and the collagen score in 64 healthy women (age range 30-59 years; average 44.3 years) who were randomly assigned to receive either a placebo or an Aloe sterol-supplemented yogurt. Skin parameters were measured and ultrasound analysis of the forearm was performed. Results: ANCOVA revealed statistical differences in skin moisture, transepidermal water loss, skin elasticity, and collagen score between the Aloe sterol and placebo groups. The gross elasticity (R2), net elasticity (R5), and biological elasticity (R7) scores of the Aloe sterol group significantly increased with time. In addition, skin fatigue area F3, which is known to decrease with age and fatigue, also increased with Aloe sterol intake. Ultrasound echogenicity revealed that the collagen content in the dermis increased with Aloe sterol intake. Conclusion: The results suggest that continued Aloe sterol ingestion contributes to maintaining healthy skin.

K.C. Lee, J. Dretzke, L. Grover, A. Logan, N. Moiemmen, A systematic review of objective burn scar measurements, Lee et al. Burns & Trauma (2016) 4:14

Abstract: Background: Problematic scarring remains a challenging aspect to address in the treatment of burns and can significantly affect the quality of life of the burn survivor. At present, there are few treatments available in the clinic to control adverse scarring, but experimental pharmacological anti-scarring strategies are now beginning to emerge. Their comparative success must be based on objective measurements of scarring, yet currently the clinical assessment of scars is not carried out systematically and is mostly based on subjective review of patients. However, several techniques and devices are being introduced that allow objective analysis of the burn scar. The aim of this article is to evaluate various objective measurement tools currently available and recommend a useful panel that is suitable for use in clinical trials of anti-scarring therapies.

A. Firooz, H. Zartab, B. Sadr, L. Naraghi Bagherpour, A. Masoudi, F. Fanian, Y. Dowlati, A. Hooshang Ehsani, A. Samadi, **Daytime Changes of Skin Biophysical Characteristics: A Study of Hydration, Transepidermal Water Loss, pH, Sebum, Elasticity, Erythema, and Color Index on Middle Eastern Skin**, Iranian Journal of Dermatology, Dec. 2016

Background: The exposure of skin to ultraviolet radiation and temperature differs significantly during the day. It is reasonable that biophysical parameters of human skin have periodic daily fluctuation. The objective of this study was to study the fluctuations of various biophysical characteristics of Middle Eastern skin in standardized experimental conditions. Materials and Methods: Seven biophysical parameters of skin including stratum corneum hydration, transepidermal water loss, pH, sebum, elasticity, skin color, and erythema index were measured at three time points (8 a.m., 12 p.m. and 4 p.m.) on the forearm of 12 healthy participants (mean age of 28.4 years) without any ongoing skin disease using the CK MPA 580 device in standard temperature and humidity conditions. Results: A significant difference was observed between means of skin color index at 8 a.m. (175.42 ± 13.92) and 4 p.m. (164.44 ± 13.72 , $P = 0.025$), between the pH at 8 a.m. (5.72 ± 0.48) and 4 p.m. (5.33 ± 0.55 , $P = 0.001$) and pH at 12 p.m. (5.60 ± 0.48) and 4 p.m. (5.33 ± 0.55 , $P = 0.001$). Other comparisons between the means of these parameters at different time points resulted in nonsignificant P values. Conclusion: There are daytime changes in skin color index and pH. Skin color index might be higher and cutaneous pH more basic in the early morning compared to later of the day.

K.L. Gardien, R.E. Marck, M.C. Bloemen, T. Waaijman, S. Gibbs, M.M. Ulrich, E. Middelkoop, **Outcome of Burns Treated With Autologous Cultured Proliferating Epidermal Cells: A Prospective Randomized Multicenter Inpatient Comparative Trial**, Cell Transplant. 2016;25,31: p.437-448

Standard treatment for large burns is transplantation with meshed split skin autografts (SSGs). A disadvantage of this treatment is that healing is accompanied by scar formation. Application of autologous epidermal cells (keratinocytes and melanocytes) may be a suitable therapeutic alternative, since this may enhance wound closure and improve scar quality. A prospective, multicenter randomized clinical trial was performed in 40 adult patients with acute full thickness burns. On two comparable wound areas, conventional treatment with SSGs was compared to an experimental treatment consisting of SSGs in combination with cultured autologous epidermal cells (ECs) seeded in a collagen carrier. The primary outcome measure was wound closure after 5-7 days. Secondary outcomes were safety aspects and scar quality measured by graft take, scar score (POSAS), skin colorimeter (DermaSpectrometer) and elasticity (Cutometer). Wound epithelialization after 5-7 days was significantly better for the experimental treatment (71%) compared to the standard treatment (67%) ($p = 0.034$, Wilcoxon), whereas the take rates of the grafts were similar. No related adverse events were recorded. Scar quality was evaluated at 3 ($n = 33$) and 12 ($n = 28$) months. The POSAS of the observer after 3 and 12 months and of the patient after 12 months were significantly better for the experimental area. Improvements between 12% and 23% ($p < 0.010$, Wilcoxon) were detected for redness, pigmentation, thickness, relief, and pliability. Melanin index at 3 and 12 months and erythema index at 12 months were closer to normal skin for the experimental treatment than for conventional treatment ($p < 0.025$ paired samples t-test). Skin elasticity showed significantly higher elasticity ($p = 0.030$) in the experimental area at 3 months follow-up. We showed a safe application and significant improvements of wound healing and scar quality in burn patients after treatment with ECs versus SSGs only. The relevance of cultured autologous cells in treatment of extensive burns is supported by our current findings.

M. Zasada, R. Debowska, M. Pasikowska, E. Budzisz, **The assessment of the effect of a cosmetic product brightening the skin of people with discolorations of different etiology**, J Cosmet Dermatol. 2016 Dec; 15(4): p. 493~502

Background: Hyperpigmentations are disorders displayed with a change in the color of the skin, its strange shape, the lack of symmetry, and irregular placement. They appear no matter on the age, gender, and often as a congenital defect. Disorder connected with overproduction of melanin by pigmentary cells. The change of color is due to endogenous and exogenous cause. Objectives: The aim of this thesis was to conduct a research in vivo. This will allow to judge the effectiveness of the cosmetic product which brightens the skin with hyperpigmentation problems. The characteristics of dermocosmetics were tested on people with various etiology of hyperpigmentation. The aim of the research was to assess the effect of the active substances used daily on skin hyperpigmentation. Methods: The tests were carried out on groups of patients with hyperpigmentations. The application of the pharmaceutical and the use of specific apparatus measurements were taken on every medical checkup. A survey was conducted to assess the changes in the face, neck, and neckline skin. The research was based on the apparatus analysis of the skin condition (MPA®, VISIA®). Results: Regular application of the pharmaceutical caused brightening of hyperpigmentations ($P < 0.05$). General

improvement in skin condition was also observed - the increase in skin elasticity, smoothness, and the enhancement of hydration levels. Conclusions: Dermocosmetics for people with hyperpigmentation are an essential part of their medical treatment. In case of epidermal hyperpigmentation, the recipe of individually chosen and tested combination of ingredients enables us to reach satisfactory results.

*H. Chajra, D. Auriol, F. Joly, A. Pagnon, M. Rodrigues, S. Allart, G. Redziniak, F. Lefevre, **Reactivating the extracellular matrix synthesis of sulfated glycosaminoglycans and proteoglycans to improve the human skin aspect and its mechanical properties**, Clinical, Cosmetic and Investigational Dermatology 2016:9 p. 461–472*

Background: The aim of this study was to demonstrate that a defined cosmetic composition is able to induce an increase in the production of sulfated glycosaminoglycans (sGAGs) and/or proteoglycans and finally to demonstrate that the composition, through its combined action of enzyme production and synthesis of macromolecules, modulates organization and skin surface aspect with a benefit in antiaging applications. Materials and methods: Gene expression was studied by quantitative reverse transcription polymerase chain reaction using normal human dermal fibroblasts isolated from a 45-year-old donor skin dermis. De novo synthesis of sGAGs and proteoglycans was determined using Blyscan™ assay and/or immunohistochemical techniques. These studies were performed on normal human dermal fibroblasts (41- and 62-year-old donors) and on human skin explants. Dermis organization was studied either ex vivo on skin explants using bi-photon microscopy and transmission electron microscopy or directly in vivo on human volunteers by ultrasound technique. Skin surface modification was investigated in vivo using silicone replicas coupled with macrophotography, and the mechanical properties of the skin were studied using Cutometer. Results: It was first shown that mRNA expression of several genes involved in the synthesis pathway of sGAG was stimulated. An increase in the de novo synthesis of sGAGs was shown at the cellular level despite the age of cells, and this phenomenon was clearly related to the previously observed stimulation of mRNA expression of genes. An increase in the expression of the corresponding core protein of decorin, perlecan, and versican and a stimulation of their respective sGAGs, such as chondroitin sulfate and heparan sulfate, were found on skin explants. The biosynthesis of macromolecules seems to be correlated at the microscopic level to a better organization and quality of the dermis, with collagen fibrils having homogenous diameters. The dermis seems to be compacted as observed on images obtained by two-photon microscopy and ultrasound imaging. At the macroscopic level, this dermis organization shows a smoothed profile similar to a younger skin, with improved mechanical properties such as firmness. Conclusion: The obtained results demonstrate that the defined cosmetic composition induces the synthesis of sGAGs and proteoglycans, which contributes to the overall dermal reorganization. This activity in the dermis in turn impacts the surface and mechanical properties of the skin.

*J. Lademann, T. Veraou. M.E. Darvin, A. Patzelt, M.C. Meinke, C. Voit, D. Papakostas, L. Zastrow, W. Sterry, O. Doucet, **Influence of Topical, Systemic and Combined Application of Antioxidants on the Barrier Properties of the Human Skin**, Skin Pharmacol Physiol. 2016:29, 11: p. 41-6*

Background: The formation of free radicals in human skin by solar ultraviolet radiation is considered to be the main reason for extrinsic skin aging. The antioxidants in human tissue represent an efficient protection system against the destructive action of these reactive free radicals. In this study, the parameters of the skin, epidermal thickness, stratum corneum moisture, elasticity and wrinkle volume, were determined before and after the treatment with antioxidant- or placebo-containing tablets and creams. Methods: The study included 5 groups of 15 volunteers each, who were treated for 2 months with antioxidant-containing or placebo tablets, creams or a combination of antioxidant-containing tablets and cream. The skin parameters were measured at time point 0 and at week 8 utilizing ultrasound for the determination of epidermal thickness, a corneometer for stratum corneum moisture measurements, skin profilometry for quantifying the wrinkle volume and a cutometer for determining the elasticity. Results: The verum cream had a positive influence on epidermal thickness, elasticity and skin moisture, but the verum tablets improved the epidermal thickness only. The combined application of verum tablets and creams led to a significant improvement of all investigated skin parameters, whereas the application of placebo tablets or cream did not influence any parameters. Conclusion: The topical and oral supplementation of antioxidants can be an instrument to improve several skin parameters and potentially counteract or decelerate the process of extrinsic skin aging.

*N. Cameli, M. Mariano, M. Serio, E. Berardesca, **Clinical and instrumental evaluation of a cross-linked hyaluronic acid filler dermal injection: effects on nasolabial folds skin biophysical parameters and augmentation from a single-dose, monocentric, openlabel trial**, G Ital Dermatol Venereol. 2016 Oct; 151(5): p 507-14*

Background: When a hyaluronic acid dermal device to fill soft tissues is chosen, efficacy, safety

and durability are key concerns. This is an open-label prospective study to instrumentally evaluate the effects of HA filler dermal injection on nasolabial folds skin biophysical parameters and augmentation. Methods: A single Italian site treated female subjects aged 40-55, for nasolabial folds, with a single standardized injection. The outcome was evaluated with objective quantitative measurements after 90 (T1) and 180 days (T2) from the injection comparing to baseline (TO) by means of Corneometer (skin hydration measurement), Cutometer (skin elasticity measurement), and Visioface devices for digital and UV computerized image analysis. Secondary endpoints were safety assessment, subject investigator satisfaction with the intervention. Assessment of aesthetic results included photographic documentation. Results: The computerized image analysis confirmed the clinical assessment showing statistically significant reduction in nasolabial folds both at T1 and T2. Visioface® indexes showed a marked and statistical significant response. An excellent profile of satisfaction of the product at T2 from investigators and patients was recorded. Skin hydration and elasticity did not show significant changes. Conclusions: In our study, a standardized HA filler dermal injection on nasolabial folds did not influence skin biophysical parameters such as skin hydration and elasticity. Nasolabial folds showed a persistent and significative response at T2 confirmed by instrumental evaluation. The tolerability and safety profile of the product was excellent.

M. Kerscher, Bestimmung der mechanischen Hauteigenschaften, <https://www.chemie.uni-hamburg.de/bc/kerscher/Cutometrie.htm>

Aufgrund ihrer komplexen Zusammensetzung aus elastischen Feststoffen und viskosen Flüssigkeiten sind die mechanischen Eigenschaften der Haut nicht ausschließlich elastisch oder viskos, sondern viskoelastisch. Typisch für viskoelastische Materialien sind nichtlineare Verformungseigenschaften bei Belastung. Außerdem ist die Verformung abhängig von der Dauer der Belastung und geht meistens mit einem Kriechphänomen einher.

J. Pardeike, R. Müller, Bestimmung der Hautfeuchtigkeit, Hautelastizität und des Transepidermalen Wasserverlusts (TEWL), pharmazie-lehrbuch.de

Hintergrund: Zur Bestimmung der Effektivität und Wirksamkeit von dermal zu applizierenden Arzneizubereitungen, kosmetischen Produkten und Rohstoffen sind die Bestimmung der Hautfeuchtigkeit, Hautelastizität und des transepidermalen Wasserverlusts (TEWL) weit verbreitete Methoden.

M.-A. Yoo, Y.-K. Seo, M.-K. Shin, J.-S. Koh, How much related to skin wrinkles between facial and body site? Age-related changes in skin wrinkle on the knee assessed by skin bioengineering techniques, *Skin Research and Technology* 2016; 22: 69-74

Background/Purpose: Skin ageing has been focused the wrinkle on the face than on the body, so most studies have been studied the change of Crow's feet for ages. Only little is known about the age-dependent changes of wrinkles on body sites. The aim of this study was to establish new grading criteria for severity of wrinkles on knees and to investigate the relationship of wrinkle severity with age- and site-dependent. Methods: The skin on the knee of thirty-eight healthy Korean female volunteers, divided into two groups young and old, were photographed. Standard photograph for body wrinkle was established (grade 0~7), and then visual assessment, skin wrinkle, and skin elasticity were evaluated on Crow's feet and the knee. We examined for any significant differences and the correlation of skin ageing parameters with age and two different sites.

M. Tanaka, Y. Yamamoto, E. Misawa, K. Nabeshima, M. Saito, K. Yamauchi, F. Abe, F. Furukawa, Aloe sterol supplementation improves skin elasticity in Japanese men with sunlight-exposed skin: a 12-week double-blind, randomized controlled trial, *Clinical, Cosmetic and Investigational Dermatology* 2016;9, p. 435-442

Background/objective: Recently, it was confirmed that the daily oral intake of plant sterols of *Aloe vera* gel (*Aloe sterol*) significantly increases the skin barrier function, moisture, and elasticity in photoprotected skin. This study aimed to investigate whether *Aloe sterol* intake affected skin conditions following sunlight exposure in Japanese men. Methods: We performed a 12-week, randomized, double-blind, placebo-controlled study to evaluate the effects of oral *Aloe sterol* supplementation on skin conditions in 48 apparently healthy men (age range: 30-59 years; average: 45 years). The subjects were instructed to expose the measurement position of the arms to the sunlight outdoors every day for 12 weeks. The skin parameters were measured at 0 (baseline), 4, 8, and 12 weeks. Results: Depending on the time for the revelation of the sunlight, the b^* value and melanin index increased and the skin moisture decreased. After taking an *Aloe sterol* tablet daily for 12 weeks, the skin elasticity index (R2, R5, and R7) levels were significantly higher than the baseline value. There were no differences between the groups in these skin elasticity values. In the subgroup analysis of subjects aged <46 years, the

change in the R5 and R7 was significantly higher in the *Aloe* group than in the placebo group at 8 weeks ($P=0.0412$ and $P=0.0410$, respectively). There was a difference in the quantity of sun exposure between each subject, and an additional clinical study that standardizes the amount of ultraviolet rays is warranted. No *Aloe* sterol intake-dependent harmful phenomenon was observed during the intake period. Conclusion: *Aloe* sterol ingestion increased skin elasticity in the photodamaged skin of men aged <46 years.

M. Held, A.S. Enaelke, P.S. Tolzmann, A. Rahmanian-Schwarz, H.E. Schaller, J. Rothenberaer, Biomechanical Skin Property Evaluation for Wounds Treated With Synthetic and Biosynthetic Wound Dressings and a Newly Developed Collagen Matrix During Healing of Superficial Skin Defects in a Rat Models, Wounds, 2016 Sep;28(9): p. 334-340

Introduction: There is a high prevalence of superficial wounds such as partial-thickness burns. Treatment of these wounds frequently includes temporary application of wound dressings. The aim of this study was to compare a newly developed collagen matrix with commonly used temporary skin dressings for treatment of partial-thickness skin defects. Materials and Methods: Through a skin dermatome, 42 standardized superficial skin defects were generated on the back of 28 adult male Lewis rats. The wounds were treated with a synthetic wound dressing (Suprathel, Polymedics Innovations Inc, Woodstock, GA) ($n = 14$), a biosynthetic skin dressing (Biobrane, Smith & Nephew, Hull, UK) ($n = 14$), or a newly developed bovine collagen matrix, Collagen Cell Carrier (Viscofan BioEngineering, Weinheim, Germany) ($n = 14$). Biomechanical properties of the skin were determined and compared every 10 days over a 3-month period of using the Cutometer MPA 580 (Courage + Khazaka Electronic GmbH, Cologne, Germany). Results: As opposed to healthy skin, statistically significant differences were detected between days 10 and 30, and between days 60 and 80, for calculated elasticity (Ue), firmness of skin (R0), and overall elasticity (R8). After 3 months, no statistically significant differences in skin elasticity were detected between the different wound dressings. Conclusions: The presented results give an opportunity to compare the wound dressings used for treatment with respect to skin elasticity and reveal the potential of the bovine collagen matrix in the treatment of superficial skin defects; therefore the results facilitate further evaluation of collagen matrix in surgical applications and regenerative medicine.

H. Chajra, D. Auriol, F. Joly, A. Pagnon, M. Rodrigues, S. Allart, G. Redziniak, F. Lefevre, Reactivating the extracellular matrix synthesis of sulfated glycosaminoglycans and proteoglycans to improve the human skin aspect and its mechanical properties, Clinical, Cosmetic and Investigational Dermatology 2016;9 p. 461–472

Background: The aim of this study was to demonstrate that a defined cosmetic composition is able to induce an increase in the production of sulfated glycosaminoglycans (sGAGs) and/or proteoglycans and finally to demonstrate that the composition, through its combined action of enzyme production and synthesis of macromolecules, modulates organization and skin surface aspect with a benefit in antiaging applications. Materials and methods: Gene expression was studied by quantitative reverse transcription polymerase chain reaction using normal human dermal fibroblasts isolated from a 45-year-old donor skin dermis. De novo synthesis of sGAGs and proteoglycans was determined using Blyscan™ assay and/or immunohistochemical techniques. These studies were performed on normal human dermal fibroblasts (41- and 62-year-old donors) and on human skin explants. Dermis organization was studied either ex vivo on skin explants using bi-photon microscopy and transmission electron microscopy or directly in vivo on human volunteers by ultrasound technique. Skin surface modification was investigated in vivo using silicone replicas coupled with macrophotography, and the mechanical properties of the skin were studied using Cutometer. Results: It was first shown that mRNA expression of several genes involved in the synthesis pathway of sGAG was stimulated. An increase in the de novo synthesis of sGAGs was shown at the cellular level despite the age of cells, and this phenomenon was clearly related to the previously observed stimulation of mRNA expression of genes. An increase in the expression of the corresponding core protein of decorin, perlecan, and versican and a stimulation of their respective sGAGs, such as chondroitin sulfate and heparan sulfate, were found on skin explants. The biosynthesis of macromolecules seems to be correlated at the microscopic level to a better organization and quality of the dermis, with collagen fibrils having homogenous diameters. The dermis seems to be compacted as observed on images obtained by two-photon microscopy and ultrasound imaging. At the macroscopic level, this dermis organization shows a smoothed profile similar to a younger skin, with improved mechanical properties such as firmness. Conclusion: The obtained results demonstrate that the defined cosmetic composition induces the synthesis of sGAGs and proteoglycans, which contributes to the overall dermal reorganization. This activity in the dermis in turn impacts the surface and mechanical properties of the skin.

L. von Oppen-Bezalel, A. Shtevi, Rosacea and dark circle relief via palm date seed extract, PERSONAL CARE EUROPE, September 2016, p. 65-67

IBR-CalmDeAge® is an extract from palm date (*Phoenix dactylifera*) seeds. The date seeds' extraction preserves the inherent botanical capital of the date seed and delivers it for the most natural active effect on the skin, resulting in a global anti-ageing effect as well as reduction of dark circles and rosacea. Ancient 2000 year-old date seeds were found in an archaeological site, planted, and were able to germinate and grow. The dormins, preserving the seed of youth for such a long period are able to slow down skin cell proliferation, slow down the biological clock and affect intrinsic ageing factors to maintain skin youthfulness.

S.Y. Choj, Y.A. No, S.Y. Kim, B.J. Kim, M.N. Kim, Tightening effects of high-intensity focused ultrasound on body skin and subdermal tissue: a pilot study, J Eur Acad Dermatol Venereol. 2016 Sep; 30 (9): p. 1599-602

Background: High-intensity focused ultrasound (HIFU) has been introduced as a new treatment modality for skin tightening through application mainly to the face and neck. Objectives: This pilot study assessed the efficacy and safety of HIFU for body tightening in Asian females. Methods: Six Asian female adults were enrolled in this pilot study. All subjects were treated with HIFU to the both cheek, upper arm, lower abdomen, thigh and calf using the following probes: 7 MHz, 1.5 mm focal depth; 2 MHz, 3.0 mm focal depth; 2 MHz, 4.5 mm focal depth; 2 MHz, 6.0 mm focal depth and 2 MHz, 9.0 mm focal depth. Three blinded independent dermatologists assessed results using the Investigator Global Aesthetic Improvement Scale (GAIS) using paired pre- and post-treatment (week 4) standardized photographs. Also, we evaluated skin elasticity at all treated sites using a cutometer. Participants used the subject GAIS to assess their clinical improvement after treatment and rated their pain using a visual analogue scale (VAS) immediately, 1 and 4 weeks after treatment. Results: The three blinded evaluators judged all treated sites as showing clinical improvement 4 weeks after treatment. Skin elasticity measured via cutometer was significantly improved 4 weeks after treatment at all treated sites ($P < 0.05$). All patients scored themselves subjectively as more than 'improved' on the GAIS Immediately after treatment the mean VAS score was 5.17 ± 2.48 , but no pain was reported at weeks 1 and 4. No permanent adverse effects were observed during the follow-up period. Conclusion: For body tightening, we applied HIFU using transducers with a lower frequency and deep focal depth to effectively deliver ultrasound energy to skin tissues. HIFU appears to be a safe and effective treatment modality for dermal and subdermal tightening.

E.J. Kim, H.I. Kwon, U.C. Yeo, J.Y. Ko, Lower face lifting and contouring with a novel internal real-time thermosensing monopolar radiofrequency, Lasers Med Sci, 2016 Sep; 31(7): p. 1379-1389

As demand for a youthful appearance has increased, various techniques for face lifting and contouring have been used to reduce excess fat deposition and improve skin laxity. Recently, radiofrequency (RF)-assisted lipolysis and liposuction (RFAL) has been introduced for body and face contouring. This study aimed to evaluate the clinical improvement and safety of a new RFAL device for face lifting and contouring. A prospective study was conducted in 20 Korean patients who underwent an internal real-time thermosensing monopolar RFAL procedure. Prior to treatment and 12 and 24 weeks after treatment, digital photographs were taken, and the degree of improvement as measured by investigators and patients was recorded. Skin elasticity was measured using a Cutometer (CT575, Courage and Khazaka®, Cologne, Germany). Safety profiles were also evaluated at each visit. Results showed favorable improvement in skin laxity and fat deposition. Both investigators' evaluations and patients' evaluation showed significant improvement between 12 and 24 weeks. Although the changes in skin elasticity measured by the Cutometer were not statistically significant, all three treated regions showed a trend toward improvement. No major side effects such as infection or burn were observed. The internal, real-time thermosensing monopolar RFAL device showed clinical efficacy and safety. After further studies with more patients and longer follow-up periods, internal real-time thermosensing monopolar RF devices might become one of the popular treatment options for face lifting and contouring.

M. Lee, Y. Jung, E. Kim, H.K. Lee, Comparison of skin properties in individuals living in cities at two different altitudes: an investigation of the environmental effect on skin, J Cosmet Dermatol. 2016 Sep 11

Background: Skin properties vary depending on exogenous factors. Various studies have been used for comparing skin properties between cities for studying environment influence on skin properties. However, for comparison of skin properties between cities, various environmental factors have to be considered. Objectives: The purpose of this study therefore was to compare skin properties in individuals of the same ethnicity and sex (Indonesian women) between different altitudes and to interpret the environmental effect on skin. Methods: In this study, we reanalyzed the data obtained from previous

study. The data were for healthy Sundanese Indonesian females [(n = 136) at Jakarta (n = 49) and Bandung (n = 87)], and the data consisted of published data (skin hydration, sebum level, pH, elasticity, and transepidermal water loss) and unpublished data [skin color (L*, a*, and b*)]. The skin parameters were measured on Indonesian females aged 20-34 using C+K devices (corneometer, sebumeter, pH meter, and cutometer), Delfin vapometer, and Minolta spectrophotometer, respectively. Results: Sundanese Jakarta (low-altitude) females had higher sebum level and greater redness (a*) value in the forehead than Sundanese Bandung (high-altitude) females. In contrast, Bandung females had higher skin pH, brighter skin color, and greater forehead skin elasticity than Jakarta females. Conclusions: The skin properties can be influenced by changing altitude because different altitudes have different environments such as air temperature, humidity, UV radiation, and so on, and it is also necessary to investigate the factors which can influence with perceived skin condition such as skin type and skin concerning.

*J. Poetschke, H.Schwaiaer, S. Steckmeier, T. Ruzicka, G.G. Gualitz, **Anti-wrinkle creams with hyaluronic acid: how effective are they?**, (Abstract – Full article in German), MMW Fortschr Med. 2016 May 25; 158 Suppl 4: p. 1-6*

Background: Anti-wrinkle creams containing hyaluronic-acid are often advertised as an efficacious option for the treatment of wrinkles and have even been presented as an option equal to some medical procedures in this regard. Evidence from conclusive and systematic research supporting those claims, however, is widely lacking. Objectives: During this trial we examined whether the daily use of anti-wrinkle creams containing hyaluronic acid has an influence on the depth of wrinkles as well as skin tightness and elasticity. Methods: We split up 20 patients into four groups, each of which were assigned an anti-wrinkle cream containing hyaluronic acid for daily use. Four different creams within different price ranges were chosen (Balea, Nivea, Lancome, Chanel). Before and after the 3 month trial, wrinkle depth was assessed using the PRIMOS(pico) (GFMeestechnik, Teltow, Germany) and skin-tightness and elasticity were evaluated using the Cutometer MP580 (Courage+Khazaka, Cologne, Germany). Additionally, after the trial, questionnaire data on patient satisfaction with their individual product was collected. Results: The depth of perioral and orbital wrinkles decreased significantly in all groups, with depth reduction ranging between 10% and 20%. Skin-tightness increased significantly in all groups, rising by 13 to 30%. Minimal significant changes in skin-elasticity could only be shown in individual groups. Conclusion: The regular use of hyaluronic-acid containing anti-wrinkle creams for over 3 months showed clear and positive effects on wrinkle-depth and skin-tightness. Due to the design of the study, however, no clear indication on the efficacy of hyaluronic acid could be shown.

*M. Dumoulin, D. Gaudout, B. Lemaire, **Clinical effects of an oral supplement rich in antioxidants on skin radiance in women**, Clinical, Cosmetic and Investigational Dermatology 2016:9 p. 315-324*

Background: Environmental factors impact the skin aging resulting in decrease of skin radiance. Nutrition and particularly antioxidants could help to fight against skin degradation. Objective: The aim of this study was to evaluate the effects of an oral supplement rich in specific antioxidants, SkinAx2, on the improvement of the skin radiance in women. Methods: The open-label clinical study enrolled 35 women, aged 40-70, with facial dull complexion. Subjects were supplemented orally with a daily dosage of 150 mg of an antioxidant-rich formulation containing superoxide dismutase-rich melon concentrate, grape seed extract rich in monomers of flavanols, vitamin C, and zinc for 8 weeks. Each subject served as her own control. The C.L.B.T. test has been used to evaluate facial skin coloring (C), luminosity (L), brightness (B), and transparency (T) involved in skin radiance. Facial skin imperfections have been assessed by clinical assessment. Firmness has been evaluated by clinical assessment and cutometer measurement. Finally, an auto-questionnaire has been carried out in order to evaluate the satisfaction of the subjects concerning different parameters involved in skin radiance and the global efficacy of the supplement. Results: Skin “red pink” and “olive” colors were significantly improved after supplementation (fP<0.0001). Luminosity was increased by 25.9% (jPcO.OOOI) whereas brightness and transparency were not affected by the supplementation. Facial skin imperfections were significantly reduced after the antioxidant-rich formulation intake (global reduction: -18.0%; P<0.0001). Indeed, dark circles, redness, and spots significantly diminished after oral treatment. Firmness and elasticity have been shown to be improved. Subjects were globally satisfied by the product (82.4%) and have found improvements on their facial skin. Furthermore, 64.7% reported to look better at the end of the supplementation. Conclusion: The oral supplement containing the antioxidant-rich formulation was found to improve skin radiance by reducing skin coloring, increasing face luminosity, reducing imperfections, and improving skin firmness in women with dull complexion.

*M. Saito, M. Tanaka, E. Misawa, R. Yao, K. Nabeshima, K. Yamauchi, F. Abe, Y. Yamamoto, F. Furukawa, **Oral administration of Aloe vera gel powder prevents UVB-induced decrease in skin***

elasticity via suppression of overexpression of MMPs in hairless mice, Bioscience, Biotechnology and Biochemistry, 2016 Vol. 80 No. 7, 1416-1424

This study reports the effects of oral Aloe vera gel powder (AVGP) containing Aloe sterols on skin elasticity and the extracellular matrix in ultraviolet B (UVB)-irradiated hairless mice. Ten-week-old hairless mice were fed diets containing 0.3% AVGP for 8 weeks and irradiated UVB for 6 weeks. Mice treated with AVGP showed significant prevention of the UVB-induced decrease in skin elasticity. To investigate the mechanism underlying this suppression of skin elasticity loss, we measured the expression of matrix metalloproteinase (MMP)-2, -9, and -13. AVGP prevented both the UVB-induced increases in MMPs expressions. Moreover, we investigated hyaluronic acid (HA) content of mice dorsal skin and gene expression of HA synthase-2 (Has2). In the results, AVGP oral administration prevented UVB-induced decreasing in skin HA content and Has2 expression and attenuates the UVB-induced decrease in serum adiponectin, which promotes Has2 expression. These results suggested that AVGP has the ability to prevent the skin photoaging.

R.E. Marck, K.L. Gardien, C.M. Stekelenburg, M. Vehmeijer, D. Baas, W.E. Tuinebreijer, R.S. Breederveld, E. Middelkoop, The application of platelet-rich plasma in the treatment of deep dermal burns: A randomized, double-blind, intra-patient controlled study, Wound Repair Regen. 2016 Jul: 24(4): p. 12-20

Platelet-rich plasma (PRP) is a fraction of blood with a platelet concentration above baseline. When platelets get activated, growth factors involved in wound healing are released. The application of PRP has shown good results in wound care, however, up to date no substantial research has been performed on the effect of PRP in burn treatment. This randomized double blind intra-patient controlled study investigates the effect of autologous PRP on wound healing in burns that require surgery with a meshed split skin graft (SSG). Fifty-two patients with various areas of deep dermal to full thickness burns, receiving surgery with a SSG were included after informed consent. Comparable study areas A and B (intra-patient) were appointed, randomized and either treated with a SSG and PRP or with a SSG alone. At day 5 to 7 postoperative, the epithelialization and graft take rate were assessed. Three, six, and twelve months postoperative, follow-up measurements were performed in the form of POSAS-questionnaires, DermoSpectroMeter, and Cutometer measurements. There was no statistically significant difference between the mean take rate nor the mean epithelialization rate at day 5-7 between the PRP-treated and control areas. However, PRP-treated wound areas showed more often better or equal epithelialization and take rates at day 5-7 than the standard treated areas. Minor effects were also seen in the reoperated and early operated subgroups. At 3, 6, and 12 months postoperative, POSAS scores from the patients and the observers, DermoSpectro-, and Cutometer measurements did not depict a significant difference between the PRP and standard treated areas. Concluding, the addition of PRP in the treatment of burn wounds did not result in improved graft take and epithelialization, nor could we demonstrate better scar quality. There was, however, a considerable variation in our clinical population.

B. Hersant, M. SidAhmed-Mezi, A. Chossat, J.P. Meninaud, Multifractional microablative laser combined with spacially modulated ablative (SMA) technology for facial skin rejuvenation, Lasers Surg Med. 2016 Jul 18

Background and Objective: Due to the increasing demand for aesthetic procedures, especially facial aesthetic surgery, a new laser technology has been developed for facial skin rejuvenation and wrinkle treatment. The aim of this study was to objectively and subjectively assess the clinical efficacy and safety of Erbium:YAG laser combined with Spatially Modulated Ablation (Er:YAG + SMA) on facial skin rejuvenation. **Study Design/Materials and Methods:** Patients with Fitzpatrick skin type's I-IV were prospectively included. Inclusion criteria consisted of having wrinkles and irregular skin texture. All patients underwent two Er:YAG + SMA sessions (1 month apart) to stimulate tissue regeneration. Er:YAG laser emits wavelength at 2,940 nm and when combined with SMA, a resonance effect is produced in the dermis to promote tissue regeneration. Facial skin elasticity and firmness were objectively assessed by Cutometer at baseline and month 6 (M6). Aesthetic improvement was qualitatively assessed using digital photographs. Patient satisfaction with regard to their facial appearance was self-assessed using the validated FACE-Q scale and the patient perceived age VAS scale at baseline, M1, and M6. Side effects were investigated after each session. **Results:** Thirty-four patients were included, 50% (18 patients) had Fitzpatrick skin type III and 41% (14 patients) were smokers. Skin elasticity indices were significantly improved: from 0.335 ± 0.015 at baseline to 0.387 ± 0.021 at M6 ($P = 0.05^*$) for R5 (net elasticity). Skin firmness was assessed through R7 (biological elasticity) and R6 (viscoelastic ratio) at baseline and M6: a significant increase from 0.235 ± 0.01 to 0.2709 ± 0.009 ($P < 0.03^{**}$) and decrease from 0.486 ± 0.022 to 0.3918 ± 0.023 ($P < 0.006^{***}$) were respectively observed. A negative value for R6 corresponded to an improved skin condition. The FACE-

Q scores were significantly increased from 39.4 ± 6.7 at baseline to 45.4 ± 9.1 at M1 ($P < 0.006^{***}$) and 50.4 ± 9.8 at M6 ($P < 0.0001^{***}$), reflecting wrinkle reduction and enhanced rejuvenation. According to the age appraisal VAS scale, results showed that patients felt younger by -2.92 years at M1 ($P < 0.0001^{***}$) and -4.13 years ($P < 0.0001^{***}$) at M6. No adverse reaction was reported. Conclusion: The Er:YAG + SMA technology offers an effective and safe treatment alternative for facial skinrejuvenation. It reduces the recovery time compared to conventional lasers such as carbon dioxide laser.

P. Min, Z. Zhang, L. Grassetti, A.T. Perdanasari, M. Torresetti, Z. Pu, Y. Zhang, S. Han, R. Marsili, Y.X. Zhang, G. di Benedetto, D. Lazzeri, Alteration of Skin Mechanical Properties in Patients Undergoing Botulinum Toxin Type A Injections of Forehead Rhytides, Aesthetic Plast Surg. 2016 Jun;40(3): p.410-20

Background: Although application of botulinum toxin type A (BTX-A) for the treatment of forehead rhytides has become very popular, the effects of its intramuscular injections on the skin mechanical properties remain unclear. Objectives: We prospectively investigated the alterations in the mechanical properties of the skin of patients who received intramuscular injections of botulinum toxin A (BTX-A) for forehead rhytides and compared two injection doses. Methods: Of the 42 enrolled patients, one randomly assigned half received intramuscular injections of two units (group I), and the other half received four units (group II) of BTX-A in each injection point. The baseline and post-treatment skin mechanical parameters, including gross elasticity (R2), net elasticity (R5), viscoelastic ratio (R6) and biological elasticity (R7), were measured using the Cutometer® and compared. Results: Treatment with BTX-A resulted in significant overall alterations in the mechanical properties of skin at the injection sites of both treatment groups during the 16-week period, and no significant differences were observed between groups. Significant decreases in biological elasticity, net elasticity and viscoelasticity properties were observed at 2 weeks follow-up and began to recover at that time. All of the skin mechanical properties recovered to baseline levels by 16 weeks of follow-up in both dosage groups, which indicates that the higher dosage (4 units) did not delay relapse compared to the two-unit dosage. Conclusion: We concluded that intramuscular injections of BTX-A significantly regulated the gross elasticity, net elasticity, functional elasticity and viscoelastic elasticity at the injection point over a radius of 1.5 cm at 2, 4 and 8 weeks follow-up. The alteration in the skin measurements had completely diminished by the 16-week follow-up.

M.A. Amirkhani, A. Shoaee-Hassani, M. Soleimani, S. Hejazi, L. Ghalichi, M.A. Nilforoushzadeh, Rejuvenation of facial skin and improvement in the dermal architecture by transplantation of autologous stromal vascular fraction: a clinical study, BiolImpacts, 2016, 6(3), 149-154

Introduction: The rejuvenation characteristics of fat tissue grafting has been established for many years. Recently it has been shown that stromal vascular fraction (SVF) of fat tissue contributes to its rejuvenation properties. As the SVF is a minimal processed cell population (based on FDA guidance), therefore it is a suitable cell therapy for skin rejuvenation. This clinical trial was aimed to evaluate the ultrastructural improvement of aging skin in the facial nasolabial region after transplantation of autologous SVF. Methods: Our study was conducted in 16 patients aged between 38 and 56 years old that were interested in face lifting at first. All of the cases underwent the lipoaspiration procedure from the abdomen for sampling of fat tissue. Quickly, the SVF was harvested from 100 mL of harvested fat tissue and then transplanted at dose of 2.0×10^7 nucleated cells in each nasolabial fold. The changes in the skin were evaluated using Visioface scanner, skin-scanner DUB, Visioline, and Cutometer with multi probe adpater. Results: By administration of autologous SVF, the elasticity and density of skin were improved significantly. There were no changes in the epidermis density in scanner results, but we noticed a significant increase in the dermis density and also its thickness with enrichment in the vascular bed of the hypodermis. The score of Visioface scanner showed slight changes in wrinkle scores. The endothelial cells and mesenchymal progenitors from the SVF were found to change the architecture of the skin slightly, but there was not obvious phenotypic changes in the nasolabial grooves. Conclusion: The current clinical trial showed the modification of dermis region and its microvascular bed, but no changes in the density of the epidermis. Our data represent the rejuvenation process of facial skin by improving the dermal architecture.

M.S. Reisch, Making cosmetic claims that stick, Chemical and Engineering News online, May 2016

Cosmetic bottles line retail store shelves festooned with an array of claims. Many promise to rejuvenate and tone the face or erase skin wrinkles. Others promise to repair dull hair and make it soft and shiny. But how many of those promises are empty and what role do scientists play in making claims that stick? Read on to get an inside look at the cosmetic chemistry labs set up to verify claims before they ever go on a bottle.

J. Poetschke, H. Schwaiger, S. Steckmeier, T. Ruzicka, G.G. Gauglitz, Anti-wrinkle creams with hyaluronic acid: how effective are they?, MMW Fortschr Med, 2016 May 25;158 Suppl 4: p. 1-6

Background: Anti-wrinkle creams containing hyaluronic-acid are often advertised as an efficacious option for the treatment of wrinkles and have even been presented as an option equal to some medical procedures in this regard. Evidence from conclusive and systematic research supporting those claims, however, is widely lacking. Objectives: During this trial we examined whether the daily use of anti-wrinkle creams containing hyaluronic-acid has an influence on the depth of wrinkles as well as skin tightness and elasticity. Methods: We split up 20 patients into four groups, each of which were assigned an anti-wrinkle cream containing hyaluronic acid for daily use. Four different creams within different price ranges were chosen (Balea, Nivea, Lancôme, Chanel). Before and after the 3 month trial, wrinkle depth was assessed using the PRIMOS(pico) (GF Messtechnik, Teltow, Germany) and skin-tightness and elasticity were evaluated using the Cutometer MP580 (Courage+Khazaka, Cologne, Germany). Additionally, after the trial, questionnaire data on patient satisfaction with their individual product was collected. Results: The depth of perioral and orbital wrinkles decreased significantly in all groups, with depth reduction ranging between 10% and 20%. Skin-tightness increased significantly in all groups, rising by 13 to 30%. Minimal significant changes in skin-elasticity could only be shown in individual groups. Conclusions: The regular use of hyaluronic-acid containing anti-wrinkle creams for over 3 months showed clear and positive effects on wrinkle-depth and skin-tightness. Due to the design of the study, however, no clear indication on the efficacy of hyaluronic acid could be shown.

S. Wiener, R. Bianchini, P. Matravets, S. Kligman, A. Dahl, S. Schwartz, R. Frumento, **An eight week clinical study evaluating lifting and contouring efficacy of a face cream**, JAAD, May 2016, Volume 74, Issue 5, Supplement 1, p. AB13

Facial aging is attributed to the deterioration and descent of cutaneous structures ...

G. Maramaldi, The silky option for natural eye and skin care, Personal Care May 2016

The skin is made of three components: epidermis, dermis and hypodermis. The epidermis consists of four layers and completely regenerates itself in a 30-day cycle known as skin turnover time. The dermis is the main component of the skin and consists of collagen and elastin, which maintain the firmness and elasticity of skin, respectively, as well as of hyaluronic acid and water. Hyaluronic acid is a jelly-like substance filling gaps between collagen and elastin. Early changes in visco-elastic properties of the skin include sagging and increased extensibility.

F. Perin, In vivo anti-ageing studies without protocol consensus, Personal Care May 2016

Life expectancy in most countries has been regularly increasing over the past decades as a result of advances in medicine and economic development. But whereas the world population is ageing, the cult of youth and beauty is constantly glorified by the media. Because our skin (and its appendages) is the only body organ directly visible to others, its deteriorated appearance caused by ageing is a source of concern in many people.

T.J. Stephens, M.I. Sigler, J.H. Herndon Jr, L. Dispensa, A. le Moigne, A placebo-controlled, double-blind clinical trial to evaluate the efficacy of Imedeen® Time Perfection® for improving the appearance of photodamaged skin, Clinical, Cosmetic and Investigational Dermatology, March 2016, Volume 9

Objective: To assess the efficacy of Imedeen Time Perfection for improving the appearance and condition of photoaged skin in healthy women. Methods: This randomized, double-blind, placebo-controlled clinical trial enrolled healthy women, 35–60 years of age, with Fitzpatrick I–III and Glogau II–III skin types and mild-to-moderate facial fine lines/wrinkles. The eligible subjects were randomized to receive two tablets daily of either Imedeen Time Perfection (Imedeen) or a matching placebo for 12 weeks. Efficacy assessments included investigator rating of 16 photoaging parameters (ie, global facial appearance and 15 individual facial parameters and the average of all parameters), instrumentation (ie, ultrasound dermal density, moisture level of the stratum corneum, transepidermal water loss, cutometry), and subjects' self-assessment. Differences in the mean change from baseline to week 12 values on these outcomes were compared between Imedeen and placebo using analysis of variance or a paired t-test. Results: Seventy-four subjects with primarily Fitzpatrick skin type III (78%–79%) and Glogau type III (53%–58%) completed the study (Imedeen: n=36; placebo: n=38). The mean difference in change from baseline to week 12 for global facial assessment significantly favored Imedeen over placebo (–0.52; $P=0.0017$). Additionally, the mean differences in the average of all facial photoaging parameters (–0.29), mottled hyperpigmentation (–0.25), tactile laxity (–0.24), dullness (–0.47), and tactile roughness (–0.62) significantly favored Imedeen over placebo ($P\leq 0.05$). Significantly greater increases in ultrasound dermal density (+11% vs +1%; $P\leq 0.05$) and stratum corneum moisturization

(+30% vs +6%; $P \leq 0.05$) were also observed for Imedeen than for placebo. There were no significant differences on other instrumental outcomes. Conclusion: The results of this study suggest that Imedeen Time Perfection can positively affect the appearance of photoaged skin, moisturization, and skin density over 12 weeks of treatment.

L. Brancalion Catapani, A. da Costa Gonçalves, N. Morano Candeloro, L. Aparecida Rossi, E. Caldeira de Oliveira Guirro, Influence of therapeutic ultrasound on the biomechanical characteristics of the skin, Journal of Therapeutic Ultrasound (2016) 4:21

Background: Skin function is dependent on its biomechanical characteristics, resistance, malleability, and elasticity. Therapeutic ultrasound may increase cutaneous malleability thus and optimize the rehabilitation process on specific diseases. The aim of this study is to evaluate possible alterations of biomechanical characteristics of the normal skin after therapeutic ultrasound application. Methods: Thirty-one volunteers took part of the study, and the average age was 31.61 ± 8.37 years old. Biomechanical characteristics evaluation of the skin was performed with the Cutometer MPA 580 (Courage + Khazaka Electronic—Köln, Germany) of 2-mm probe hole and 500-mbar vacuum. Skin characteristics were analyzed before and after therapeutic ultrasound application, and the variables R0 (distensibility), R2 (gross elasticity), and R6 (viscoelasticity) were used for the study. Areas of therapeutic ultrasound application (continuous, 3 MHz, 1 W/cm² SATA) were defined at the upper limbs and standardized using a neoprene template. Sociodemographic data of volunteers were analyzed using SPSS 15.0. To analyze the distribution of the data, the Shapiro-Wilk test was used, which showed the normal distribution for R0 values, R2 and R6. For this procedure, the PROC TTEST from SAS® 9.0 software and Minitab 16 software, with significance, was set at the 0.05 level. Results: In relation to R0, a significant increase ($p = 0.001$) was observed for the distensibility, when compared to values of pre- (0.3273 mm) and immediately post- (0.3795 mm) resource application which feature a greater distensibility. Related to R2 values, a significant increase ($p = .001$) of the gross elasticity at pre- (0.8419) and post- (0.8884) therapeutic ultrasound application was found. Conclusions: Therapeutic ultrasound promotes significant alterations of the biomechanical characteristics of the skin.

V. Mengeaud, Évaluation de l'effet hydratant, in: A.-M. Pénse-Lhéritier (Editor): Évaluation des produits cosmétiques, in: A.-M. Pénse-Lhéritier (Editor): Évaluation des produits cosmétiques, Lavoisier Paris, Tec & Doc, chapter 3, p. 32-57, 2016

La peau constitue l'interface principale entre l'environnement extérieur et notre organisme, qui est équipée à son extrême surface d'une très fine couche tissulaire appelée *stratum corneum* (SC) dont la fonction spécifique de «barrière» est indispensable à notre survie terrestre. Elle est non seulement protectrice vis-à-vis des agressions extérieures qu'elles soient physiques, chimiques ou microbiologiques, mais aussi capable de limiter les pertes hydriques corporelles. Ainsi, l'une des fonctions majeures de la peau est d'assurer son rôle de barrière entre l'organisme et le milieu extérieur tout en préservant des échanges avec celui-ci. La fonctionnalité de cette barrière dépend donc d'un équilibre dynamique. En effet, au niveau de cette interface, sont mis en jeu des mécanismes régulés de manière dynamique et réactive, qui concourent au maintien d'un milieu interne stable alors que l'environnement extérieur subit des variations: ces mécanismes garantissent l'homéostasie cutanée.

P. Barlier, V. Couturaud, Évaluation de l'effet antirides et des propriétés biomécaniques, Lavoisier Paris, Tec & Doc, chapter 4, p. 58-81, 2016

En vieillissant, les organes du corps humain, dont la peau fait partie, se mettent à fonctionner de façon moins efficace. Ce processus, programmé par notre profil génétique, peut être amplifié par l'environnement et par nos habitudes de vie.

A.C. da Silva Marques, Biometrologic Evaluation of Cosmetic Products, Dissertation in pharmaceutical sciences at the University of Coimbra, Portugal, 2016

Given the growing importance that cosmetic products have on human's health and in our daily life, it is important to increase the control of these products, both in terms of safety and effectiveness. Taking into account that conducting animal tests for the production and validation of cosmetic products is prohibited by law, producers of these products have to resort to alternative methods. Biophysical methods have gained an important highlight in the scientific community, in particular the non-invasive methods. They allow a safe and faster evaluation of cosmetics. The purpose of this work is to describe some methods and equipments used at national and European level to test the effectiveness of cosmetic products and correlate the parameters evaluated with the alleged properties in the products. The methods include evaluation tests of the following skin properties: hydration, elasticity, coloring, sebum production and perspiration.

A. Formann, **Eine Interventionsstudie mit dem Nahrungsergänzungsmittel Pycnogenol® und dessen physiologische und molekular-genetischen Auswirkungen auf postmenopausale Frauen**, Dissertation an der medizinischen Fakultät der Heinrich-Heine-Universität, Düsseldorf, 2016

Die Haut ist mit einer Fläche von circa 1,5 bis 2 m² das größte Organ des menschlichen Körpers.

T. Ezure, **Facial Fat as a Key Anti-aging Target**, <http://www.cosmeticsandtoiletries.com/research/biology>, March 2016

Enormous public and commercial interest exists for treatments that improve aging-related changes in facial morphology. There also are many skin care products designed to improve superficial changes in facial skin, such as fine wrinkles and pigmentation, but few products have been established to address substantial changes such as sagging.

H. Buntrock-Döpke, **Randomisierte doppelblinde Vergleichsuntersuchung eines monophasischen versus eines biphasischen Hyaluronsäurefillers zur Korrektur der Nasolabialfalten**, Dissertation im Fachbereich Chemie, Abteilung Biochemie und Molekularbiologie der Universität Hamburg, März 2016

Hyaluronsäure (HA) hat sich in der ästhetischen Medizin zum "Goldstandard" der injizierbaren Filler entwickelt, sodass ihre intradermale Injektion aktuell zu den am häufigsten eingesetzten minimalinvasiven Verfahren zur Augmentation von Falten, insbesondere der Nasolabialfalten (NLF), zählt. Es gibt jedoch eine große Anzahl an verschiedenen Produkten, die wesentliche Unterschiede im Herstellungsprozess, den damit verbundenen Eigenschaften (z.B. Partikelgröße, Quervernetzungsgrad, Molekulargewicht und HA-Konzentration) sowie ihrem rheologischen und histologischen Verhalten aufweisen. In Abhängigkeit vom Herstellungsprozess werden monophasische und biphasische HA-Filler unterschieden. Während die ausgezeichnete Wirksamkeit und Verträglichkeit von biphasischer NASHATM (Non Animal Stabilized Hyaluronic Acid) hinlänglich bekannt sind, gibt es nur wenige klinische Studien zum Vergleich von biphasischer NASHA und monophasischer CPM®HA (Cohesive Polydensified Matrix). Deshalb war das Ziel der vorliegenden Arbeit, die intraindividuelle in vivo Evaluierung der Langzeiteffekte eines monophasischen CPMHA-Fillers mit denen eines biphasischen NASHA-Fillers auf die Hautphysiologie, Patientenwahrnehmung und Verträglichkeit über 12 Monate darzustellen. In den randomisierten, doppelblinden Halbseitenvergleich wurden 20 Patienten im Alter von 35 bis 65 Jahren mit einer symmetrischen Ausprägung der Nasolabialfalten (WSRS für NLF Grad 3-4) eingeschlossen. Die Patienten wurden einmalig mit einem monophasischen CPMHA-Filler und einem biphasischen NASHA-Filler zu gleichen Injektionsvolumina behandelt; Touch-ups waren nicht erlaubt. Mittels validierter Scores, einem Patientenfragebogen und biophysikalischer Messmethoden wurden 2, 24 und 48 Wochen nach Studienbeginn die Faltentiefe (WSRS, Patientenfragebogen, PRIMOS®) und die ästhetische Verbesserung (GAIS, Patientenfragebogen), der Injektionsschmerz und die Patientenzufriedenheit sowie die Hautelastizität (Cutometrie, Patientenfragebogen) als auch die Hautdicke- und -dicke (Sonographie) erhoben. Zudem wurde die Faltenausprägung (WSRS) anhand standardisierter, verblindeter Fotos durch einen unabhängigen Rater beurteilt. Die Sicherheit der Behandlung wurde durch die Dokumentation unerwünschter und schwerwiegender unerwünschter Ereignisse (UE, SUE) sowie anhand eines Patiententagebuchs erfasst.

T. Venter, L.T. Fox, M. Gerber, J.L. du Preez, S. van Zyl, B. Boneschans, J. du Plessis, **Physical stability and clinical efficacy of Crocodylus niloticus oil lotion**, Revista Brasileira de Farmacognosia 26 (2016), p. 521–529

The stability and the anti-ageing, skin hydrating and anti-erythema effects of a commercialized Crocodylus niloticus Laurenti, 1768, Crocodylidae, oil lotion was determined. The lotion was stored at controlled conditions over six months during which several stability tests were performed. For the clinical efficacy studies lotion was applied on volar forearm skin (female volunteers) and compared to a liquid paraffin-containing reference product. Skin hydrating and anti-ageing effects were determined with a Corneometer®, Cutometer® and Visioscan®, following single (3 h) and multiple applications (12 weeks). The Vapometer® and Mexameter® were utilized to determine this lotion's anti-erythema effects on sodium lauryl sulfate irritated skin. The lotion demonstrated good stability over 6 months. The reference product increased skin hydration and decreased skin wrinkles to a larger extent than the C. niloticus lotion after a single application, whereas the C. niloticus lotion decreased skin scaliness better than the reference product. During the long-term study, the reference product overall increased skin hydration more than the C. niloticus lotion, whereas C. niloticus lotion increased skin elasticity to a larger extent than the reference product. C. niloticus lotion increased skin wrinkles and decreased skin scaliness over 12 weeks. Compared to non-treated, irritated skin, C. niloticus lotion demonstrated some potential anti-inflammatory characteristics.

J.-C. Kattenstroh, **Einfluss oral zugeführter Kollagen-Peptide auf Hautfeuchtigkeit, Hautelastizität, Faltenvolumen und Cellulite**, *Aesthetische Dermatologie* 2/2016

Mit zunehmendem Alter sowie durch äußere Einflüsse wie UV-Exposition oder Nikotinabusus kommt es zu einer Beeinträchtigung der dermalen extrazellulären Matrix und des Kollagengerüsts. Die Folge ist eine Abnahme der Dicke, Elastizität und Feuchtigkeit der Haut, die mit einer verstärkten Faltenbildung einhergeht. Welchen Einfluss kurzkettige Kollagen-Peptide auf diese Parameter haben, zeigen aktuelle Studien.

R. Eberhart, C.J. Chuona, P. Zimmermann, **Exploring biomechanical methods to study the human vaginal wall**, *Neurourol Urovn.* 2016 Feb

Aims: To critically review studies of the biomechanical properties of connective tissue in the normal and prolapsed human vaginal wall and to identify criteria that are suitable for in vivo measurements which could improve patient management. **Methods:** This review covers past and current ex vivo and in vivo instrumentation and analytical methods related to the elastic and viscoelastic properties of vaginal wall connective tissues. **Results:** Classical methods, including digital evaluation of the vagina, histological and biomechanical studies of fresh and frozen-thawed extracts, and biomechanical cadaveric tissue studies have important limitations and have yielded inconsistent results. Newer biomechanical methods may resolve these inconsistencies. One of the more promising is transient, vacuum-induced tissue expansion and relaxation, via cutometer-like devices. The technique permits noninvasive observation, applicable to longitudinal studies of patients. In vivo and ex vivo biomechanical methods may better match vaginal wall tissue properties to help with the design of surgical mesh materials, thus improving surgical support and healing. **Conclusion:** Methods have been identified to characterize the in vivo biomechanical behavior of the prolapsing vagina which may serve to advance the care of affected women.

H. Haeusler, **The key to effective skincare: customized hyaluronic acid gels**, *NutraCos Cosmetics*; January/April 2016

A multi-faceted ingredient: Hyaluronic acid (HA) is a well-established ingredient in various cosmetic products and offers numerous benefits. It controls the proliferation of skin cells via the CD44 receptor and has anti-inflammatory effects of the skin (1). In addition, HA influences the growth of keratinocytes, which protect the epidermis from aging, and, thanks to the double bond structure of its D-glucuronic acid moiety (2), HA also has antioxidant properties. The molecular weight of HA is a key aspect of product formulation: the smaller molecule, the deeper the penetration (3).

D. Qu, G.P. Seehra, **Improving the accuracy of skin elasticity measurement by using Q-parameters in Cutometer**, *J Cosmet Sci.* 2016 Jan-Feb; 67(1): p. 37-44

Abstract: The skin elasticity parameters (U_e , U_v , U_f , U_r , U_a , and R_0 through R_9) in the Cutometer are widely used for in vivo measurement of skin elasticity. Their accuracy, however, is impaired by the inadequacy of the definition of a key parameter, the time point of 0.1 s, which separates the elastic and viscoelastic responses of human skin. This study shows why an inflection point ($t(IP)$) should be calculated from each individual response curve to define skin elasticity, and how the Q-parameters are defined in the Cutometer. By analyzing the strain versus time curves of some pure elastic standards and of a population of 746 human volunteers, a method of determining the $t(IP)$ from each mode 1 response curve was established. The results showed a wide distribution of this parameter ranging from 0.11 to 0.19 s, demonstrating that the current single-valued empirical parameter of 0.1 s was not adequate to represent this property of skin. A set of area-based skin viscoelastic parameters were also defined. The biological elasticity thus obtained correlated well with the study volunteers' chronological age which was statistically significant. We conclude that the Q-parameters are more accurate than the U and R parameters and should be used to improve measurement accuracy of human skin elasticity.

M. Aust, S. Jamchi, K.-H. Busch, **Platelet-Rich Plasma – Eine minimalinvasive Methode zur Behandlung alternder Haut am Unterlid**, *Face* 1/2016

Nicht nur in den chirurgischen Fachdisziplinen haben Wundheilungsforschung und Regenerationsmedizin immer mehr an Bedeutung gewonnen. Auch in der Ästhetischen Medizin nehmen regenerative Behandlungsmethoden eine immer zentralere Rolle ein. Der Einsatz von plättchenreichem Plasma stellt eine Erfolg versprechende Ergänzung zur bisherigen Auswahl dieser Möglichkeiten dar, wie insbesondere die Anwendung in der unteren Lidregion zeigt.

G.W. Nam, J.H. Baek, J.S. Koh, J.K. Hwang, **The seasonal variation in skin hydration, sebum,**

scaliness, brightness and elasticity in Korean females, Skin Research and Technology 2015; 21: p. 1-8

Background/purpose: Age, gender, regional, and ethnic differences influence skin conditions. The purpose of this study was to observe the effects of environments, especially the air temperature, relative humidity, air pressure, duration of sunshine, and precipitation on skin and the seasonal variation in skin hydration, sebum, scales, brightness, and elasticity in Korean females.

J.C. Bernengo, H. Adhoute, D. Mougin, Measurement of the time off light of photons into the skin: influence of site, age and gender, correlation with other skin parameters, Skin Research and Technology 2015; 21: p. 25-34

Background/purpose: The speed of light (time of flight) into the skin is obviously related to its structure, and might appear as a tool for non-invasive investigation of skin physico-chemical properties, among them aging is of primary importance. Though already published, such time of flight measurements have never been extensively correlated with other well-documented skin parameters such as localization, the influence of gender and age, the elasticity and roughness, and the water trans-epidermal diffusion (TEWL).

S.I. Jang, E.J. Kim, H. Park, H.J. Kim, J.M. Suk, B.J. Kim, J.H. Lee, H.K. Lee, A quantitative evaluation method using processed optical images and analysis of age-dependent changes on nasolabial lines, Skin Research and Technology 2015; 21: p. 106-206

Background/Purpose: Nasolabial lines (NL) and wrinkles of the face are major features of aging. Wrinkles have been studied widely by morphological methods using 3-dimensional (3D) photographic analysis instrument, but NL were evaluated by visual scoring usually. To evaluate NL quantitatively, another method is needed. This study is purposed to find out quantitative method for evaluating of NL.

G.N. Stamatas, A. Lopes-DaCunha, A. Nkengne, C. Bertin, Biophysical properties of striae distensae evaluated in vivo using non-invasive assays, Skin Research and Technology 2015; 21: p. 254-258

Background: Striae Distensae (SD) or stretch marks are manifestations of epidermal atrophy that occurs after tissue tearing due to rapid growth or over-stretching and are characterized by distinct microstructural features. The objective of this in vivo study was to investigate the biophysical properties of SD lesions, including skin barrier function, skin surface hydration, mechanical properties, and chromophore concentrations, compared to normal adjacent skin.

P. Dykes, Increase in skin surface elasticity in normal volunteer subjects following the use of copper oxide impregnated socks, Skin Research and Technology 2015; 21: 272-277

Background: Copper is an essential mineral involved in the formation and stabilisation of extracellular skin proteins. As copper can be absorbed through intact skin, we reasoned that using socks containing copper-impregnated fibres may have an effect on skin elasticity.

H. Haeusler, Combinations for better results, Cossma 12/2015

Hyaluronic acid (HA) is widely used in health and beauty applications. New research indicates some promising new findings for HA gels in topical anti-ageing cosmetics. HA is a well-established ingredient in various cosmetic products and offers numerous benefits. It controls the proliferation of skin cells via the CD44 receptor and has some anti-inflammatory effects on the skin. In addition, it influences the growth of keratinocytes, which protect the epidermis from ageing and, thanks to the double bond structure of its D-glucuronic acid moiety, it also has antioxidant properties.

I. Vervier, C. Bougaran, I. Van Reeth, Skin tightening boosted in anti-ageing applications, Personal Care, November 2015

Tight, moisturised skin is a universal symbol of youth and health, and the desire for skin perfection is a global beauty endeavour among consumers. Given the world's ageing population, the market for products that support the vitality and wellbeing of skin at any age can only continue to grow.

J-F. Nicolay, E. Coste, M. Fréchet, Dermal-epidermal junction: a key target for anti-ageing, Personal Care, November 2015

The dermal epidermal junction (DEJ) is a complex structure (Fig. 1) primarily responsible for epidermis to dermis attachment. The DEJ thus warrants cohesion and mechanical resistance of the skin. It also behaves as a selective permeability barrier controlling cell migration (immune cells, for example) and molecular exchanges (growth factors and nutrients, stress signals). Epidermal cells'

interaction with the DEJ regulates their proliferation, differentiation and migration, which is critical for epidermal renewal, barrier function setup, and wound healing.

A. Tuzuner, S. Akdagli, T. Sen, S. Demirci, N. Tarimci, R. Caylan, **An objective analysis of sebum, pH and moisture levels of the external ear canal skin**, American Journal of Otolaryngology (2015) 424-428

Objective: To determine sebum, pH and moisture levels of external ear canal skin, and compare the patients who complain of ear itching and the normal population for these parameters. And evaluate the improvement subjectively in the ones given dexamethasone sodium phosphate (DSP) cream or placebo-water in oil emulsion type cream, and to determine the changes in sebum, pH and moisture levels after the treatment. Methods: 32 females with the complaint of isolated external ear canal itching and 42 healthy women were included in this randomized prospective controlled study. The sebum, pH and moisture levels of ear skin of the patients and the controls were determined from baseline and following treatment. Patients used DSP in their right and the placebo in their left ears for 15 days. Subjective analysis of itching level was measured at baseline, and on 15th and 30th days using visual analog scale (VAS).

K. von Oppen-Bezael, **Shielding against pollution for pristine clear skin**, Personal Care November 2015

A major unmet need the cosmetic industry is the effective, natural and safe means to protect and detoxify the skin against environmental pollution to which it is exposed daily. Pollution in general and air pollution specifically have detrimental effects on skin health and appearance. Constant exposure to environmental toxins leads to accumulated damage in two main ways: DNA damage and chronic inflammation, which over time produces premature signs of ageing.

K. Azevedo Tadini, D. Garcia Mercurio, P.M.B.G. Maia Campos, **Acetyl hexapeptide-3 in a cosmetic formulation acts on skin mechanical properties - clinical study**, Brazilian Journal of Pharmaceutical Sciences, Vol. 51, N. 4, Oct./Dec., 2015

Acetyl hexapeptide-3 has been used in anti-aging topical formulations aimed at improving skin appearance. However, few basic studies address its effects on epidermis and dermis, when vehiculated in topical formulations. Thus, the objective of this study was to determine the clinical efficacy of acetyl hexapeptide-3 using biophysical techniques. For this purpose, formulations with and without acetyl hexapeptide-3 were applied to the ventral forearm and the face area of forty female volunteers. Skin conditions were evaluated after 2 and 4-week long daily applications, by analyzing the stratum corneum water content and the skin mechanical properties, using three instruments, the Corneometer® CM 825, Cutometer® SEM 575 and Reviscometer® RV600. All formulations tested increased the stratum corneum water content in the face region, which remained constant until the end of the study. In contrast, only formulations containing acetyl hexapeptide-3 exhibit a significant effect on mechanical properties, by decreasing the anisotropy of the face skin. No significant effects were observed in viscoelasticity parameters. In conclusion, the effects of acetyl hexapeptide-3 on the anisotropy of face skin characterize the compound as an effective ingredient for improving conditions of the cutaneous tissue, when used in anti-aging cosmetic formulations.

G. Schlippe; L. Bolke, W. Voss, **Einfluss oraler Einnahme von Kollagen-Peptiden auf relevante Parameter der Hautalterung: Hautfeuchtigkeit, Hautelastizität und Hautrauigkeit**, Aktuelle Dermatologie 2015; 41: 529-534

Zusammenfassung: Mit zunehmendem Alter und unter Einfluss weiterer Noxen, wie UV-Exposition und Nikotinabusus, kommt es zu einer Abnahme der dermalen extrazellulären Matrix und des Kollagengerüsts. Dies führt zu einer Abnahme der Hautdicke, Elastizität und Feuchtigkeit und damit einhergehend zu einer verstärkten Faltenbildung. Studien haben gezeigt, dass die orale Aufnahme von speziellen Kollagen-Peptiden über einen längeren Zeitraum die Hautphysiologie positiv beeinflusst. In der vorliegenden klinisch-dermatologischen Prüfung zeigte die Einnahme von kurzkettigen Kollagen-Peptiden (Prüfpräparat: ELASTEN®) über einen Zeitraum von 3 Monaten signifikant positive und nachhaltige Effekte auf die Hautparameter Elastizität, Feuchtigkeit und Hautrauigkeit.

Abstract: With increasing age, the dermal matrix and collagen content decreases which results in a loss of skin hydration, elasticity and increased wrinkling. In addition to the normal ageing process, several other factors like UV radiation or smoking negatively influence skin physiology. Prior studies demonstrated that the oral intake of bioactive collagen peptides induces beneficial effects on human skin structure and functioning. In this study the oral intake of special collagen peptides (investigational product: ELASTEN®) for 3 months results in significant and sustainable improvements in skin parameters including skin hydration, elasticity and roughness.

G. Dobos, A. Gefen, U. Blume-Peytavi, J. Kottner, **Weight-bearing-induced changes in the microtopography and structural stiffness of human skin in vivo following immobility periods**, Wound Rep Reg (2015) 23; 37-43

Pressure ulcers (PUs) are injuries to the skin and underlying tissues, caused by sustained deformations and occur frequently in aged patients. Skin microtopography and stiffness affect the interaction of skin with contact surfaces contributing to PU development. We simulated immobility in 20 healthy females (mean age 69.9 years). Skin microtopography and stiffness were measured at the PU predilection sites before and after loading. Skin roughness decreased at the heels by 18.1% after 90 minutes (p50.022), but remained unchanged at the sacrum and the upper back. Structural elasticity and elastic deformations increased at all skin areas; changes over time were significant at the sacrum (p50.005) and the heel, (p50.002). The residual skin deformation increased at all skin areas after loading significantly at the sacrum (32.0%, p50.013) and upper back (20.6%, p50.007). The structural "biological" elasticity of the skin decreased significantly at the upper back after loading, but remained unchanged at the heels. All skin changes recovered after unloading. Results indicate that prolonged loading causes structural skin changes in humans in vivo in PU predilection sites. The pathogenesis of PUs is different at the heels, the sacral and upper back skin.

G. Schlippe, L. Bolke, W. Voss, **Einfluss oraler Einnahme von Kollagen-Peptiden auf relevante Parameter der Hautalterung: Hautfeuchtigkeit, Hautelastizität und Hautrauhigkeit**, Akt Dermatol 2015; 41: p. 529-534

Mit zunehmendem Alter und unter Einfluss weiterer Noxen, wie UV-Exposition und Nikotinabusus, kommt es zu einer Abnahme der dermalen extrazellulären Matrix und des Kollagengerüsts. Dies führt zu einer Abnahme der Hautdicke, Elastizität und Feuchtigkeit und damit einhergehend zu einer verstärkten Faltenbildung. Studien haben gezeigt, dass die orale Aufnahme von speziellen Kollagen-Peptiden über einen längeren Zeitraum die Hautphysiologie positiv beeinflusst. In der vorliegenden klinisch-dermatologischen Prüfung zeigte die Einnahme von kurzkettigen Kollagen-Peptiden (Prüfpräparat: ELASTEN®) über einen Zeitraum von 3 Monaten signifikant positive und nachhaltige Effekte auf die Hautparameter Elastizität, Feuchtigkeit und Hautrauhigkeit.

K.L.M. Gardien, R.E. Marck, M.C.T. Bloemen, T. Waaijman, S. Gibbs, M.M.W. Ulrich, E. Middelkoop, **Outcome of Burns Treated with Autologous Cultured Proliferating Epidermal Cells: A Prospective Randomized Multicenter Intra-Patient Comparative Trial**, Cell Transplantation, 2015

Standard treatment for large burns is transplantation with meshed split skin autograft (SSG). A disadvantage of this treatment is that healing is accompanied by scar formation. Application of autologous epidermal cells (keratinocytes and melanocytes) may be a suitable therapeutic alternative, since this may enhance wound closure and improve scar quality. A prospective, multicenter randomized clinical trial was performed in 40 adult patients with acute full thickness burns. On two comparable wound areas, conventional treatment with SSG was compared to an experimental treatment consisting of SSG in combination with cultured autologous epidermal cells (EC) seeded in a collagen carrier. Primary outcome measure was wound closure after 5-7 days. Secondary outcomes were safety aspects and scar quality measured by graft take, scar score (POSAS), skin colorimeter (DermaSpectrometer®) and elasticity (Cutometer®). Wound epithelialization after 5-7 days was significantly better for the experimental treatment (71%) compared to the standard treatment (67%) (p=.034, Wilcoxon), whereas the take rates of the grafts were similar. No related adverse events were recorded. Scar quality was evaluated at 3 (n=33) and 12 (n=28) months. The POSAS of the observer after 3 and 12 months and of the patient after 12 months were significantly better for the experimental area. Improvements between 12 and 23% (p≤.010, Wilcoxon) were detected for redness, pigmentation, thickness, relief and pliability. Melanin index at 3 and 12 months and erythema index at 12 months were closer to normal skin for the experimental treatment than for conventional treatment (p ≤ 0.025 paired samples T-test). Skin elasticity showed significantly higher elasticity (p=.030) in the experimental area at 3 months follow-up. We showed a safe application and significant improvements of wound healing and scar quality in burn patients after treatment with EC versus SSG only. The relevance of cultured autologous cells in treatment of extensive burns is supported by our current findings.

A. Sakata, K. Abe, K. Mizukoshi, T. Gomi, I. Okuda, **Breakthrough in improving the skin sagging with focusing on the subcutaneous tissue structure, retinacula cutis**, IFSCC 2015 Zurich

Skin sagging is one of the most prominent aging signs and a concerning issue for people over middle age. Although many cosmetic products are challenging the reduction of the skin sagging by improving the dermal elasticity, which decreases with age, the effects are insufficient for giving drastic changes to the facial morphology. This study focused on subcutaneous tissue for investigating a skin

sagging mechanism. Subcutaneous tissue consists of predominantly adipose tissue with fibrous network structures, called retinacula cutis (RC), which is reported to have a possibility to maintain the soft tissue structure and morphology. This study investigated the effect of subcutaneous tissue physical property alteration due to RC deterioration on the skin sagging. For evaluating RC structure noninvasively, the tomographic images of faces were obtained by magnetic resonance (MR) imaging. Subcutaneous tissue network structures observed by MR imaging were indicated to be RC by comparing MR images and the histological specimens of human skin. The density of RC was measured by image analysis. For evaluating sagging degree and physical properties of the skin, sagging scoring and the measurement of elasticity of deeper skin layers were performed. The density of RC was correlated with the elasticity data of deeper skin layers, and the sagging scores tended to increase with decreasing the density. These results suggested that the sparse RC structure gave a decrease in the elasticity of subcutaneous tissue layer, which consequently would be the cause of facial sagging. This study would be a pathfinder for the complete elimination of skin sagging.

S.-H. Bae, J.-J. Park, E.-J. Song, J.-A. Lee, H.-J. Kim, B. Kim, N.-S. Kim, G.-S. Choi, T.-K. Moon, The comparison of the melanin content and UV exposure affecting aging process: seven countries in Asia, IFSCC 2015 Zurich

Background: The skin brightness is determined according to the amount and type of melanin. People with darker skin have a greater amount of melanin that makes their skin less susceptible to UV damages. They live in lower latitude and receive a greater amount of the intensity of the UV radiation. So, we wanted to know how the latitude and skin brightness affect skin aging. Method: Three thousand subjects from seven countries (Korea, China, India, Thailand, Vietnam, Indonesia, and Malaysia), aged 20-59 years, participated in this study. We measured skin brightness, Ra (wrinkles parameter), and R2 (elasticity parameter) under controlled environmental conditions.

*L. Phetcharat, K. Wongsuphasawat, K. Winther, The effectiveness of a standardized rose hip powder, containing seeds and shells of *Rosa canina*, on cell longevity, skin wrinkles, moisture, and elasticity, Clinical Interventions in Aging 2015;10, p. 1849–1856*

Objective: To evaluate the effects of a rose hip powder (Hyben Vital®) made from seeds and shells on cell senescence, skin wrinkling, and aging. Methods: A total of 34 healthy subjects, aged 35–65 years, with wrinkles on the face (crow's feet) were subjected to a randomized and double-blinded clinical study of the effects of the rose hip powder, as compared to astaxanthin, a well-known remedy against wrinkles. During the 8-week study, half of the participants ingested the standardized rose hip product, while the other half ingested astaxanthin. Objective measurements of facial wrinkles, skin moisture, and elasticity were made by using Visioscan, Corneometer, and Cutometer at the beginning of the study, after 4 weeks, and after 8 weeks. Evaluation of participant satisfaction of both supplements was assessed using questionnaires. In addition, the effect of the rose hip preparation on cell longevity was measured in terms of leakage of hemoglobin through red cell membranes (hemolytic index) in blood samples kept in a blood bank for 5 weeks. Significance of all values was attained with $P \leq 0.05$. Results: In the double-blinded study, the rose hip group showed statistically significant improvements in crow's-feet wrinkles ($P, 0.05$), skin moisture ($P, 0.05$), and elasticity ($P, 0.05$) after 8 weeks of treatment. A similar improvement was observed for astaxanthin, with P -values 0.05, 0.001, and 0.05. Likewise, both groups expressed equal satisfaction with the results obtained in their self-assessment. The rose hip powder further resulted in increased cell longevity of erythrocyte cells during storage for 5 weeks in a blood bank. Conclusion: Results suggest that intake of the standardized rose hip powder (Hyben Vital®) improves aging-induced skin conditions. The apparent stabilizing effects of the rose hip product on cell membranes of stored erythrocyte cells observed in this study may contribute to improve the cell longevity and obstructing skin aging.

R.C. Killaars, T.R. Penha, E.M. Heuts, R.R. van der Hulst, A.A. Piatkowski, Biomechanical Properties of the Skin in Patients with Breast Cancer Related Lymphedema Compared to Healthy Individuals, Lymphat Res Biol. 2015 Sep;13(3): p. 215-21

Background: Biomechanical skin changes in breast cancer-related lymphedema (BRCL) have barely been described and objectively tested. This study aims to compare the skin of upper limb lymphedema with skin of the healthy contralateral arm, in order to demonstrate changes of elasticity, viscoelasticity, and level of hydration of the skin in BRCL. The secondary aim is to investigate the correlation between biomechanical skin changes and measurements that are currently used in clinical practice, such as volume measurement and lymph-ICF score. Methods and Results: Eighteen patients with BRCL and 18 healthy individuals were included in the study. A Cutometer® was used for measurements for skin elasticity and viscoelasticity on both arms of each subject. A Corneometer® was used for measurements of skin hydration. Measurements of both test groups were compared. In BRCL

patients, there was a significant difference ($p < 0.028$) between the elasticity of the skin of the lymphedema arm compared to the healthy contralateral arm. There were no significant differences for level of skin hydration or viscoelasticity in lymphedema patients between the measurements on the skin of the lymphedematous and healthy arm. In healthy individuals, there were no significant differences for all measurements between skin of both arms. Spearman's correlation was significant ($p < 0.01$) for difference in volume and difference in elasticity in BCRL patients. Conclusion: This study shows an impaired elasticity for the skin of the lower arm in patients with lymphedema compared to the contralateral healthy arm. Promising evidence is suggested for the use of the Cutometer device in the diagnostic evaluation of BCRL.

F. Hashmi, C. Wright, C. Nester, S. Lam, The reliability of non-invasive biophysical outcome measures for evaluating normal and hyperkeratotic foot skin, Journal of Foot and Ankle Research (2015) 8:28

Background: Hyperkeratosis of foot skin is a common skin problem affecting people of different ages. The clinical presentation of this condition can range from dry flaky skin, which can lead to fissures, to hard callused skin which is often painful and debilitating. The purpose of this study was to test the reliability of certain non-invasive skin measurement devices on foot skin in normal and hyperkeratotic states, with a view to confirming their use as quantitative outcome measures in future clinical trials. Methods: Twelve healthy adult participants with a range of foot skin conditions (xerotic skin, heel fissures and plantar calluses) were recruited to the study. Measurements of normal and hyperkeratotic skin sites were taken using the following devices: Corneometer® CM 825, Cutometer® 580 MPA, Reviscometer® RVM 600, Visioline® VL 650 Quantiride® and Visioscan® VC 98, by two investigators on two consecutive days. The intra and inter rater reliability and standard error of measurement for each device was calculated. Results: The data revealed the majority of the devices to be reliable measurement tools for normal and hyperkeratotic foot skin (ICC values > 0.6). The surface evaluation parameters for skin: SEsc and SEsm have greater reliability compared to the SEr measure. The Cutometer® is sensitive to soft tissue movement within the probe, therefore measurement of plantar soft tissue areas should be approached with caution. Reviscometer® measures on callused skin demonstrated an unusually high degree of error. Conclusions: These results confirm the intra and inter rater reliability of the Corneometer®, Cutometer®, Visioline® and Visioscan® in quantifying specific foot skin biophysical properties.

M. Held, J. Rothenberger, D. Tolzmann, W. Petersen, H.-E. Schaller, A. Rahmanian-Schwarz, Alteration of Biomechanical Properties of Skin During the Course of Healing of Partial-thickness Wounds, Wounds 2015; 27(5): p. 123-128

The incidence of partial-thickness wounds is high and, until recently, little was known about the alteration of the biomechanical properties of the skin in these wounds during the course of healing. The aim of this study was to demonstrate the biomechanical changes in skin elasticity. Materials and Methods: Fourteen standardized skin defects were created on the back of fourteen adult male Lewis rats (Charles River Laboratories International, Inc, Wilmington, MA) using a skin dermatome. Biomechanical properties of the skin were determined every 10 days over a period of 3 months using a skin elasticity measurement device (Cutometer MPA 580, Courage and Khazaka, Cologne, Germany). Calculated elasticity (UE), firmness of skin (R0), and overall elasticity (R8) were assessed. In addition, histological evaluation was performed in regard to quality of skin. Results: After an initial decrease of UE, R0, and R8 until 30 days after surgery, the values of R0 and R8 increased between day 50 and day 60. Starting on day 60, a further decrease of values was indicated. Conclusion: The alteration of biomechanical properties of skin is a function of tissue structure. The presented results demonstrate the complex changes of skin biomechanical properties in the course of healing of partial-thickness wounds. This study could serve as a model to compare the effectiveness of different wound dressings in regard to skin elasticity. Acute trauma, burn injuries, and chronic diseases often lead to skin defects. Partial-thickness skin defects play an important role in wound management because of their high incidence. These wounds are commonly treated with a broad range of wound dressings¹⁻⁶ that protect the wound from further damage, promote healing, improve functional and aesthetic outcomes, and reduce hospitalization time and medical costs.⁷ Wound dressings imitate important features of natural skin, such as the releasing of water vapor, acting as a microbial barrier, and providing elasticity⁸ to accelerate epithelialization and wound healing while avoiding dehydration of the wounds. Every type of wound, whether acute, chronic, dry, or moist, requires a specific kind of dressing.⁹ Synthetic as well as biological substances, such as collagen, are used for wound coverage.¹⁰ The choice of the best wound dressing is still challenging and an objective determination of the outcomes is difficult. Skin elasticity and skin plasticity are indicators for biological age of skin. Changes in biomechanical properties of skin may be due to trauma, ultraviolet light, mechanical and chemical strain, nicotine, alcohol, genetic

predispositions, diseases, and others. Stiff and clustered networks of collagen and elastic fibers may influence skin quality.¹¹ Many factors may influence wound healing, and thus also influence the quality of newly formed skin. The authors think choice of wound dressing is a major factor that influences skin quality. In this context, the aim of the present study was to demonstrate the process of changes in biomechanical properties of skin during the course of healing of partial-thickness wounds.

J.M. Gillbro, E. Merinville, K. Cattley, T. Al-Bader, E. Hagforsen, M. Nilsson, A. Mavon, In vivo topical application of acetyl aspartic acid increases fibrillin- 1 and collagen IV deposition leading to a significant improvement of skin firmness, International Journal of Cosmetic Science, 2015, 37 (Suppl. 1), p. 41–46

Objective: Acetyl aspartic acid (A-A-A) was discovered through gene array analysis with corresponding Cmap analysis. We found that A-A-A increased keratinocyte regeneration, inhibited dermal matrix metalloprotease (MMP) expression and relieved fibroblast stiffness through reduction of the fibroblast stiffness marker F-actin. Dermal absorption studies showed successful delivery to both the epidermal and dermal regions, and in-use trial demonstrated that 1% A-A-A was well tolerated. In this study, the aim was to investigate whether A-A-A could stimulate the synthesis of extracellular matrix supporting proteins in vivo and thereby improving the viscoelastic properties of human skin by conducting a dual histological and biophysical clinical study. **Method:** Two separate double-blind vehicle-controlled in vivo studies were conducted using a 1% A-A-A containing oil-in-water (o/w) emulsion. In the histological study, 16 female volunteers (>55 years of age) exhibiting photodamaged skin on their forearm were included, investigating the effect of a 12-day treatment of AA-A on collagen IV (COLIV) and fibrillin-1. In a subsequent pilot study, 0.1% retinol was used for comparison to A-A-A (1%). The biomechanical properties of the skin were assessed in a panel of 16 women (>45 years of age) using the standard Cutometer MPA580 after topical application of the test products for 28 days. The use of multiple suction enabled the assessment of F4, an area parameter specifically representing skin firmness. **Results:** Twelve-day topical application of 1% A-A-A significantly increased COLIV and fibrillin with 13% and 6%, respectively, compared to vehicle. 1% A-A-A and 0.1% retinol were found to significantly reduce F4 after 28 days of treatment by 15.8% and 14.7%, respectively, in the pilot Cutometer study. No significant difference was found between retinol and A-A-A. However, only A-AA exhibited a significant effect vs. vehicle on skin firmness which indicated the incremental benefit of A-A-A as a skin-firming active ingredient. **Conclusion:** In this study, we showed the in vivo efficacy of 1% A-A-A both on a protein level (fibrillin and collagen IV) and on a clinical end point, specifically skin firmness, providing proof that, acetyl aspartic acid has a strong potential as an anti-ageing 'cosmeceutical' ingredient answering the needs of our key consumer base.

A. Colombin, M. Valange Comhaire, N. Frasson, I. Almeras, Proposition of Standardization of the Conditions of Use of the Cutometer to Define the Mechanical properties of the Burned Skin, Annals of Burns and Fire Disasters, Vol. XXVIII, Supplement EBA, September 2015

The lack of recognized tests in burn treatment in France entails difficulties to prove scientifically the interest and the efficiency of our care. The deviate use of the cutometer which is a measuring device initially planned for aesthetic care and dermatological research, could allow to obtain objective, reproducible data and non observer depending in burn treatment. The cutometer allows, thanks to a light, painless and non invasive punctiforme suction, to obtain precise characteristics on the mechanical properties of the cutaneous tissue. That is, resistance, elasticity, rate of hydration, scar quality... So, we hope to demonstrate our techniques, compare their efficiency and wonder about our practices to guarantee the best results. The reproducibility of the measures requires a specific installation and preparation of the cutaneous tissue. The specific burn care provided may disturb the results and every criteria must be determined: time after hydration, deadline after the care, aftereffect of the pressure garments, waiting time after their withdrawal... Thereby, we chose clearly the criteria of installation and determined the standardization of the conditions of use of the cutometer applied on our burn patients. We wish by this presentation to spread this new protocol and uniformise the researches resulting of different burn units.

S. Leoty-Okombi, F. Trombini, C. Bonnaud-Rosaye, V. André-Frei, Collrepair DG – Anti-Ageing-Wirkstoff mach 20 Jahre Hautglykation rückgängig, SOFW-Journal 141 - 09/2015

Mit Collrepair DG ist BASF ein revolutionärer Durchbruch im Bereich der Deglykation und der Beseitigung von AGEs (Advanced Glycation End Products) gelungen. AGEs bilden sich während unseres Alterungsprozesses, und es kommt mit der Zeit zu AGE-Ansammlungen. Collrepair GD ist jedoch in der Lage, glykierte Verknüpfungen sowohl intrazellulär in den Fibroblasten als auch extrazellulär innerhalb der Haut aufzuspalten. Klinisch nachgewiesen wurde, dass Collrepair DG AGE-Ansammlungen entfernt, die in etwa einem Zeitraum von 20 Jahren entsprechen, und darüber hinaus

eine etwa 17 Jahren entsprechende Gelbfärbung der Haut rückgängig machen und die Hautelastizität verbessern kann. Collrepair DG ist sowohl in Wasser als auch in Glykol löslich und für den Einsatz in Cremes, Lotionen und Tonika geeignet.

H. Haeusler, Wirksamkeit eines Hyaluronsäure Gels zur Verbesserung des Hautbildes; SOFW-Journal 141 - 09/2015

Zusammenfassung: Hyaluronsäure wird schon seit langer Zeit in diversen Anti-Aging-Produkten eingesetzt. Hierbei unterscheidet man die Hyaluronsäuren nach ihren Molekulargewichten. Es ist bekannt, dass Hyaluronsäuren mit molekularen Massen <200 kDa aktiv an der zellulären Signalübertragung mitwirken und dabei auch die extrazelluläre Matrix gestalten. Letztlich beeinflusst Hyaluronsäure das Wachstum von Keratinozyten, Zellen, die die Oberhaut vor Alterung schützen.

C. Trojahn, G. Dobos, A. Lichterfeld, U. Blume-Peytavi, J. Kottner, Characterizing Facial Skin Ageing in Humans: Disentangling Extrinsic from Intrinsic Biological Phenomena, BioMed Research International, Volume 2015

Facial skin ageing is caused by intrinsic and extrinsic mechanisms. Intrinsic ageing is highly related to chronological age. Age related skin changes can be measured using clinical and biophysical methods. The aim of this study was to evaluate whether and how clinical characteristics and biophysical parameters are associated with each other with and without adjustment for chronological age. Twenty-four female subjects of three age groups were enrolled. Clinical assessments (global facial skin ageing, wrinkling, and sagging), and biophysical measurements (roughness, colour, skin elasticity, and barrier function) were conducted at both upper cheeks. Pearson's correlations and linear regression models adjusted for age were calculated.

A randomized home use study in two parallel groups, consisting of 30 healthy subjects aged 35-70, to assess the efficacy of one anti-wrinkle regimen compared to a placebo regimen, Princeton Consumer Research Report 2015

The objective of this study was to determine the efficacy of an anti-wrinkle regimen when compared to a placebo regimen, and to demonstrate the overall improvement/deterioration in skin condition following two, four, and eight weeks of test article use.

A Double-blind, home-use study in approximately 45 healthy volunteers with aging, non-firm skin to assess the efficacy of different treatment dosages of vitamin C dietary supplement compared to a control group, Princeton Consumer Research Report 2015

A home-use study in 41 healthy volunteers with ageing, non-firm skin to assess the efficacy of different treatment dosages of a Vitamin C dietary supplement compared to a placebo control group. At Week 0 Subjects underwent cutometry and profilometry assessments on the peri-orbital area of the face, after which they were issued with an instruction sheet, diary cards and their group allocated product regime. Subjects were asked to use the article supplied to them as per the usage instructions with one sachet to be taken in the morning, one in the day, and one in the evening. 4 subjects in each group underwent DIC (Digital Image Capture). At weeks 4, 8 and 12 subjects returned to the study centre for further Cutometry and Profilometry assessments. The same 4 subjects of each group underwent further DIC. At Week 16 Subjects returned to the Test Centre on where they underwent post-treatment cutometry and profilometry assessments. Final DIC was undertaken on the 4 selected subjects of each group. Subjects then returned their completed diary cards and were compensated for their time. Individual scores, mean scores and standard deviations for cutometry and profilometry assessments at Weeks 0, 4, 8, 12 and 16 are presented in this report for the forty-one subjects who completed the study. It can be concluded that both treatment groups A and C showed statistically significant increases in skin firmness at all time-points and reduced the appearance of fine lines and wrinkles. Treatment group B showed no statistical change for any assessment type.

L. Tadlock, S. Rapaka, R. Wattenberg, N. Koski, M. Kearney, C. Jauquet, K. Wisuri, K. Ortblad, G. Peterson, Evaluation of a Sonic Applicator on Skin Elasticity and Wrinkles Compared to Manual Application and Performance With Two Eye Care Products, Pacific Biosciences Laboratories, Product Information

Pacific Bioscience Laboratories, Inc. has developed a sonic applicator that is a handheld, rechargeable infusion system used for applying cosmetic skincare products. The sonic applicator is designed using a magnetic motor that generates sonic pulses (at over 7500 times per minute) to move a soft applicator in a gentle massaging motion over the skin surface. Skin care products such as eye creams and serums are applied to the concave surface of the applicator and placed lightly on the skin surface. When the sonic applicator is turned on, users slowly move the applicator tip over the skin

surface in small circles or figure eight movements around the eye area (e.g. crow's feet and under eye area).

D. Tran, J.P. Townley, T.M. Barnes, K.A Greive, An antiaging skin care system containing alpha hydroxy acids and vitamins improves the biomechanical parameters of facial skin, Clinical, Cosmetic and Investigational Dermatology 2015:8, p. 9–17

Skin aging is the result of both intrinsic aging due to the passage of time, and extrinsic aging as a consequence of environmental damage, primarily due to ultraviolet (UV) irradiation. The fine wrinkles and reduced elasticity which characterize intrinsically aged skin are exaggerated in photoaged skin, with the development of deep wrinkles and a marked loss of elasticity, as well as dryness, roughness, and dyspigmentation. Wrinkles impair the quality of life for many people due to their perceived unsightly appearance. The demand for cosmeceutical products in the US alone is expected to increase 5.8 percent per annum to \$8.5 billion in 2015, driven by an aging population seeking to maintain the appearance of youth. In the mid-1990s, the antiaging effects of alpha hydroxy acids (AHAs) were recognized by the cosmeceutical industry leading to a proliferation of AHA-containing antiaging products.

Shields against pollution for pristine clear skin, IBRPristinizer® Product Information

Pollution in general and air pollution specifically affect skin health and appearance. Constant exposure to environmental toxins leads to accumulated damage to DNA and to chronic inflammation. Both leading to premature signs of aging. Preventing damage from pollutant, detoxifying them and enhancing skin ability to defend itself against pollution, is a major unmet need of the cosmetic industry we are trying to answer with the IBR-Pristinizer®.

M. Mehrbani, R. Choopani, A. Fekri, M. Mehrbani, M. Mosaddegh, M. Mehrbani, The efficacy of whey associated with dodder seed extract on moderate-to-severe atopic dermatitis in adults: A randomized, double-blind, placebo-controlled clinical trial, J Ethnopharmacol, 2015 Aug 22;172: p. 325-32

Ethnopharmacological Relevance: Atopic dermatitis is a common chronic inflammatory skin condition that is on the rise and adversely affects quality of life of the affected individual. Dry skin and pruritus, major characteristics of this disease, are associated with the dysfunction of the skin barrier. Though mild cases of the disease can be controlled with antihistamines and topical corticosteroids, moderate-to-severe cases often require treatment with immunomodulatory drugs, which have many side effects. It is now more common to use complementary and alternative medicines in the treatment of atopic dermatitis. In traditional Iranian medicine, the use of whey with the aqueous extract of field dodder (*Cuscuta campestris* Yunck.) seeds in severe and refractory cases of atopic dermatitis is common and has no side effects. The aim of this study was to assess the efficacy and safety of whey associated with dodder seed extract in the treatment of moderate-to-severe atopic dermatitis in adults. Materials and Methods: The study was a randomized, double-blind placebo control trial that was conducted on 52 patients with moderate-to-severe atopic dermatitis for 30 days. In this study patients received freeze dried whey powder with spray dried water extract of field dodder or the placebo for 15 days. At baseline (week zero), after the end of the 15 day treatment period (week three) and 15 days after stopping the drug or placebo (follow-up/week five), patients were evaluated in terms of skin moisture, elasticity, pigmentation, surface pH and sebum content on the forearm with Multi Skin Test Center® MC1000 (Courage & Khazaka, Germany) and the degree of pruritus and sleep disturbance in patients were also recorded. Results: 42 patients completed 30 days of treatment with the medicine and the follow-up period. At the end of the follow-up period a significant increase in skin moisture and elasticity in the group receiving whey with dodder was observed compared with the placebo group ($p < 0.001$). There was a significant difference between the two groups regarding the pruritus after 15 days of receiving treatment or the placebo ($p < 0.05$), and at the end of the 30-day study period the difference was clearly significant ($p < 0.001$). Sleep disturbance showed significant changes at the end of follow-up period ($p < 0.05$). There was no significant difference between the two groups concerning changes in skin pigmentation, however, a significant decrease was observed in the group receiving whey associated with dodder seed extract over time ($p < 0.001$). There were no significant alterations in skin surface pH and the amount of sebum between the two groups. Temporary side effects were reported including anorexia and mild gastrointestinal problems in drug use. It is noteworthy that in this study despite the fact that patients received whey with dodder for just 15 days, moisture and elasticity of the skin continued to increase in the second half of the study (follow-up period). This shows that the effect of whey with dodder is not transient and this drug really helped skin barrier reconstruction and accelerated the healing process of skin. This positively influenced the skin parameters and consequently the improvement of

pruritus and sleep disturbance. Conclusions: The results indicate that whey associated with dodder seed extract can serve as a promising alternative for the treatment of moderate-to-severe atopic dermatitis.

J.P. Bonaparte, D. Ellis, Alterations in the Elasticity, Pliability, and Viscoelastic Properties of Facial Skin After Injection of Onabotulinum Toxin A, Facial Plastic Surgery, July/August 2015, Volume 17, Number 4

Importance: This prospective cohort study provides evidence and information on the mechanism of action of onabotulinum toxin A on the reduction of skin elasticity and pliability. Understanding the natural course that onabotulinum toxin A has on the elasticity of skin may help physicians understand why there appears to be a progressive reduction in wrinkle levels with repeated treatments. Objective: To determine whether onabotulinum toxin A increases skin pliability and elasticity with a corresponding decrease in the contribution of the viscoelastic component of skin resistance. Design, Setting, and Participants: From October 1, 2012, through June 31, 2013, this prospective cohort study enrolled 48 onabotulinum toxin A-naïve women (mean [SD] age, 55.2 [11.3] years) with a minimum of mild wrinkle levels at the glabella and lateral orbit (43 completed the study). Patients were treated at a private cosmetic surgery clinic with onabotulinum toxin A and assessed at baseline and 2 weeks, 2 months, 3 months, and 4 months after injection. Interventions: Standardized onabotulinum toxin A was administered to patients' glabella, supraorbit, and lateral orbit. Main Outcome and Measures: Skin pliability, elastic recoil, and the ratio of viscoelastic resistance (Uv) to elastic resistance (Ue). Results: For the supraorbit, there was a significant effect of time on pliability ($F = 20.5$), elastic recoil ($F = 6.92$), and Uv/Ue ratio ($F = 5.6$) ($P < .001$ for all). For the glabella, there was a significant effect of time on pliability ($F = 32.23$), elastic recoil ($F = 31.66$), and Uv/Ue ratio ($F = 10.11$) ($P < .001$ for all). For the lateral orbit, there was a significant effect of time on pliability ($F = 15.83$, $P < .001$), elastic recoil ($F = 11.43$, $P < .001$), and Uv/Ue ratio ($F = 10.60$, $P = .009$). Conclusions and Relevance: This study provides further evidence that there is an alteration in biomechanical properties of the skin after injection with onabotulinum toxin A. This effect appears to last up to 4 months in the glabella and up to 3 months at other sites. The decrease in the Uv/Ue ratio suggests onabotulinum toxin A injection does not result in an increase in tissue edema suggestive of an inflammatory reaction within the skin. However, it remains unclear whether this is due to an intrinsic property of the medication or another unrecognized mechanism. Level of Evidence: 2.

S. Schwartz, T. McCraw, R. Frumento, A 16-week single blind trial evaluating the efficacy of a topical product on skin parameters on older subjects with thin/fragile skin, (Poster) JAAD May 2015

Thin, fragile skin is a common condition in older adults. The condition can lead to a number of problems, from an aged appearance and a loss of firmness and elasticity to tearing and sensitivity that leads to easy bruising.

S. Bänziger, S. Hettwer, B. Suter, B. Obermayer, Anti-Aging Moisturization, Happi May 2015

So many sophisticated cosmetic actives have been hitting the skin care market during the past few years that we have been focused too often on what can „combat wrinkles“ or „fight aging“. The natural elixir, water, and the simple task of supplying the skin with extra moisture have escaped attention. Hydration may seem simple, but in fact it is a very important, yet underestimated, anti-aging strategy.

J. Lozza, D. Schmid, F. Gafner, Extremophile cells offer UV stress protection, Personal Care April 2015

The high Alpine plant *Saponaria pumila* is a survival specialist. It weathered the last ice age growing on ice-free mountains peaks, so-called nunataks exposed to constantly low temperatures and high levels of UV radiation. To cope with a harsh environment *S. pumila* developed adaption strategies, repair mechanisms and protective compounds. These precious substances have now become available for skin care. An extract made from callus cells of *S. pumila* was shown to in vitro to protect dermal stem cells against UV-induced stress and to maintain their stem cell properties.

Y. Fukushima, Y. Takahashi, Y. Hori, Y. Kishimoto, K. Shiga, Y. Tanaka, E. Masunaga, M. Tani, M. Yokoyama, K. Kondo, Skin photoprotection and consumption of coffee and polyphenols in healthy middle-aged Japanese females, Int J Dermatol. 2015 Apr;54(4): p. 410-8

Background: Reactive oxygen species are known to mediate skin photoaging, which results in the formation of pigmented spots and wrinkles. Coffee is the largest source of polyphenols, which supplies a large number of antioxidants in one's daily life. However, little is known about how much coffee and polyphenol consumption influences skin health. Materials and Methods: In this study, a cross-sectional survey of the diet, environmental factors, and skin conditions was conducted in healthy

Japanese females to explore the influence of coffee and polyphenol consumption on skin conditions. Non-smoking, healthy female subjects with moderate sun exposure in their daily lives were recruited for this study (n = 131, age range: 30-60 years old) and recorded their food and beverage intake and life circumstances using questionnaires. The skin water content, transepidermal water loss, and elasticity were measured on the cheek of each subject using noninvasive methods: Corneometer, a Tewameter, and a Cutometer, respectively. Wrinkles and pigmented spots were evaluated using digital photograph images. Results: Consumption of coffee and total polyphenols from all sources and from coffee showed a statistically significant correlation towards a decrease in pigmented spot scores ($P < 0.05$). Subjects with high total polyphenol consumption from coffee or chlorogenic acids (the third tertile group) showed the lowest score of ultraviolet pigmented spots ($P < 0.05$). Conclusion: Coffee and polyphenol consumption was associated with low facial pigmented spots in Japanese middle-aged females. We speculated that coffee helps protect human skin from photoaging, and polyphenols, including chlorogenic acids, may contribute to the decreased hyperpigmentation of pigmented spots.

G. Nicoletti, F. Brenta, M. Bleve, T. Pellegatta, A. Malovini, A. Faga, P. Perugini, Long-term in vivo assessment of bioengineered skin substitutes: a clinical study, J Tissue Eng Regen Med, 2015 Apr;9(4): p. 460-468

The aim of the study was an objective in vivo assessment of skin properties after reconstruction with two artificial dermal substitutes, Integra® and Hyalomatrix®. Twenty-seven patients underwent reconstruction of 36 skin-loss sites with full-thickness skin graft, split-thickness skin graft, Hyalomatrix® bioengineered skin substitute and sequential split-thickness skin graft and Integra® bioengineered skin substitute and sequential split-thickness skin graft. Objective assessments were carried out using three instrumental devices: Multi Probe Adapter System MPA; 22 MHz ultrasound skin scan; and Primos Pico for a three-dimensional (3D) skin scan. The skin parameters under study in our sample were: corneometry, transepidermal water loss, elastometry, colorimetry, skin thickness and 3D skin surface pattern. A skin reconstruction with Hyalomatrix seemed to most closely approach the hydration, transepidermal water loss and skin surface 3D pattern of normal skin. A skin reconstruction with Integra seemed to demonstrate the best skin colour feature and elastic properties. Although no statistically significant differences were observed, the descriptive analysis of the outcomes might suggest a better cell regulation, regenerated extracellular matrix and neoangiogenesis with the use of Hyalomatrix, and the formation of a more elastic regenerated dermis, with overall better physical, mechanical and optical properties, with the use of Integra.

N. Srivastava, S. Gehlot, S. Singh, B.M. Singh, Application of different parameters for selecting normal and abnormal skin characteristics in determination of Prakriti in infants, Int. J. Res. Ayurveda Pharm. 6(2), Mar - Apr 2015

Prakriti (Basic physical constitution) of an individual is decided at the time of conception and subsequently during intra-uterine life, as a result of overall effect of dominant Dosha of Shukra (Sperm), Shonit (Ovum), Ahara (diet) and Vihara (regimen) of Garbhini (pregnant women), Kaalgarbhashaya (in-utero duration and condition of uterus) and Mahabhautic components. Assessment of Prakriti and Vikriti in children is essential and enables the pediatrician to evaluate metabolic imprinting, individual physiology and susceptibility to specific disease, its diagnosis, prevention, treatment as well as the prognosis after illness. There are many subjective criteria to determine the Prakriti in adults, but as far as infants are concerned, no detail description is available in Ayurvedic classics. Individual Prakriti can be determined as per the characteristics specified in Brihatrayi and Laghutrayi, which include the examination of skin, hair, nails, eyes, palm, sole and other physical and psychological features, and may be used in children for Prakriti determination. However, it can be better understood and differentiated each other by considering various methods and modern technology. Out of various characteristics of body parts, skin characteristics such as texture (roughness or smoothness, elasticity and thickness), color and temperature of skin significantly contribute in Prakriti determination. Use of objective parameters such as RGB and HSV method, Fitzpatrick Scale method and derma spectrometer for the skin color differentiation; skin-pH, stratum corneum hydration, TEWL, sebum content, cutometer and ultrasonography for skin texture as well as thermometer, thermister via pulse oxymeter for skin temperature may be very useful tools to differentiate individual Prakriti under controlled conditions. The aim of this conceptual study was to explore importance of various methodologies for differentiating Prakriti skin characteristics from the Vaikrita skin characteristics more precisely and scientifically in infants.

C. Davi, A. Giménes, E. Canadas, N. Alminana, R. Delgado, Anti-cellulite efficacy through circadian rhythms, Euro Cosmetics 3-2015

Biological rhythms regulation is important: Physiological processes of living organisms are tightly organized in biological rhythms because the movement of the Earth imposes recurrent changes of the environmental conditions. As a consequence, each process takes place at the right time and happens with to appropriate frequency. When processes repeat every 24 hours they are known as circadian rhythms (e.g. the sleep-wakefulness cycle and the variations in body temperature).

F. Sugihara, N. Inoue, X. Wang, Clinical Effects of Ingesting Collagen Hydrolysate on Facial Skin Properties, Jpn Pharmacol Ther 2015; 43: p. 67-70

Objectives: The objective of this research was to investigate the effectiveness of daily ingestion of a specific collagen hydrolysate (CH), which contains prolylhydroxyproline (Pro-Hyp) and hydroxyprolylglycine (Hyp-Gly), on facial skin properties. **Methods:** In this randomized, placebo-controlled, double-blind trial, 56 women aged 30-55 years were randomized to receive 2.5 g of CH or 5 g of placebo once daily for 8 weeks, with 28 subjects assigned to each group. The hydration, elasticity and roughness properties of facial skin were measured at week 0 (baseline), week 4 and week 8. **Results:** Levels of skin hydration, elasticity and roughness in subjects who received CH significantly improved between baseline and weeks 4 and 8, while there was no significant improvement in subjects who received placebo. Moreover, the levels of skin elasticity, roughness and the net change of skin hydration improved significantly in the CH group compared to the placebo group by both weeks 4 and 8. **Conclusion:** The present results suggest that daily ingestion of 2.5 g of CH improves facial skin hydration, elasticity and roughness.

T.F. Miller, TA-65® for Skin Reduces the Appearance of Aging Effects by Increasing Firmness and Reducing Wrinkles and Redness, T.A.Sciences, Product Information March 2015

TA-65® for Skin is a topical cream that has been developed as a novel product containing the active ingredient TA-65®, which is a pure molecule extracted from the Chinese herb, *Astragalus*. TA-65® has been extensively studied both experimentally and clinically for the impact on health and lifestyle. TA-65® for Skin has been tested in a pilot clinical study for its impact on skin's function. The study suggests that TA-65® for Skin improves skin's function by increasing firmness, reducing wrinkles and erythema.

X. Liu, D. Gad, Z. Lu, R. Lewis, M.J. Carré, S.J. Matcher, The Contributions of Skin Structural Properties o the Friction of Human Finger-pads, Proceedings of the Institution of Mechanical Engineers, Part J: Journal of Engineering Tribology, 229 (3), p. 294 – 311, 2015

This paper describes three series of tests that were designed to investigate how skin mechanical and structural properties, measured using a "Cutometer" and Optical Coherence Tomography, affect the frictional behaviour of human finger-pads. Firstly, the skin mechanical properties across all fingers and the palm in participants' dominant hands were assessed. Results showed that the distensibility of skin (total deformation in a suction test) is associated with stratum corneum thickness and that this in turn affects friction (thicker stratum corneum leads to higher friction), giving a link between distensibility and friction. Tape stripping to remove the superficial layer of the skin led to increased moisture (and/or electric charge on the skin surface) led to higher friction. No accompanying changes were seen in structural properties so it was concluded that moisture was the main cause of the adhesion increase. More work is required to isolate moisture and possible changes in electric charge using alternative measurement techniques. When rubbing with sand paper, the stratum corneum thinned considerably and friction reduced. Moisture was ruled out as a cause of friction changes in this instance. Skin normal stiffness also did not change, but lateral stiffness changes have been seen in previous work when the stratum corneum thickness has been reduced so this is likely to be the cause of the reduced friction. This will be investigated further in future work using dynamic OCT measurements.

P. Schoch, I. Pomytkin, Skin rejuvenating effects of interleukin-1 alpha: A cosmetic study on collagen deposition and elasticity in ageing skin, Aesthetics, Volume 2/Issue 3 - February 2015

Objective: The aim of this study was to test the efficacy of interleukin-1 alpha (IL-1a – trademark name Dermatopoietin) on skin renewal, in volunteers with signs of skin ageing. **Method:** A placebo-controlled and randomized clinical study on skin renewal was conducted in 21 healthy female volunteers (51 ±6 years) by administering a cosmetic formulation with and without IL-1a twice daily upon either the right or left forearm for eight weeks. **Results:** Ultrasonograms of all 21 volunteers at baseline and after 28 and 56 days of treatment with a cosmetic formulation containing IL-1a showed improvement of skin density and the partial disappearance of SLEB in all volunteers. The verum formulation containing IL-1a increased elasticity by 20.7% and 15.2% after 28 and 56 days, respectively. Verum-treated skin showed less viscoelasticity than placebo-treated skin. **Conclusion:** The results show experimental

evidence for a structural (density) and functional (elasticity) improvement of skin by topical administration of a cosmetic formulation containing IL-1a.

H. Pham, B. Reece, M. Hines, Loss of skin elasticity is more dependent on Fitzpatrick skin type than chronologic age, JAAD May 2015, Volume 72, Issue 5, Supplement 1, p. AB25

The hallmark signs of skin aging include abnormal pigmentation, wrinkling and the loss of elasticity.

R. Ohno, N. Moroishi, H. Sugawa, K. Maejima, M. Saigusa, M. Yamanaka, M. Nagai, M. Yoshimura, Y. Amakura, R. Nagai, Mangosteen pericarp extract inhibits the formation of pentosidine and ameliorates skin elasticity, J. Clin. Biochem. Nutr., July 2015, Vol. 57, No. 1, p. 27–32

The inhibition of advanced glycation end-products (AGEs) by daily meals is believed to become an effective prevention for lifestyle-related diseases. In the present study, the inhibitory effect of hot water extracts of mangosteen (*Garcinia mangostana* L.) pericarp (WEM) on the formation of pentosidine, one of AGEs, in vitro and in vivo and the remedial effect on skin conditions were measured. WEM significantly inhibited pentosidine formation during gelatin incubation with ribose. Several compounds purified from WEM, such as garcimangosone D and rhodanthone B, were identified as inhibitors of pentosidine formation. Oral administration of WEM at 100 mg/day to volunteer subjects for 3 months reduced the serum pentosidine contents. Because obtaining skin biopsies from healthy volunteers is ethically difficult, AGE accumulation in the skin was estimated by a fluorescence detector. The oral administration of WEM significantly reduced the skin autofluorescence intensity, demonstrating that WEM also reduced AGE accumulation in the skin. Furthermore, the elasticity and moisture content of the skin was also improved by WEM. These results demonstrate that intakes of WEM reduce the glycation stress and result in the improvement of skin conditions.

G. Imokawa, K. Ishida, Biological Mechanisms Underlying the Ultraviolet Radiation-Induced Formation of Skin Wrinkling and Sagging I: Reduced Skin Elasticity, Highly Associated with Enhanced Dermal Elastase Activity, Triggers Wrinkling and Sagging, Int. J. Mol. Sci. 2015, 16, p. 7753-7775

The repetitive exposure of skin to ultraviolet B (UVB) preferentially elicits wrinkling while ultraviolet A (UVA) predominantly elicits sagging. In chronically UVB or UVA-exposed rat skin there is a similar tortuous deformation of elastic fibers together with decreased skin elasticity, whose magnitudes are greater in UVB-exposed skin than in UVA-exposed skin. Comparison of skin elasticity with the activity of matrix metalloproteinases (MMPs) in the dermis of ovariectomized rats after UVB or UVA irradiation demonstrates that skin elasticity is more significantly decreased in ovariectomized rats than in sham-operated rats, which is accompanied by a reciprocal increase in elastase activity but not in the activities of collagenases I or IV. Clinical studies using animal skin and human facial skin demonstrated that topical treatment with a specific inhibitor or an inhibitory extract of skin fibroblast-derived elastase distinctly attenuates UVB and sunlight-induced formation of wrinkling. Our results strongly indicated that the upregulated activity of skin fibroblast-derived elastase plays a pivotal role in wrinkling and/or sagging of the skin via the impairment of elastic fiber configuration and the subsequent loss of skin elasticity.

P. Rouaud, D. Boudier, E. Aymard, B. Closs, The secret of a replenished face Dermis-hypodermis communication at the service of face's volume, H&PC, Vol. 10(2), March/April 2015

The distribution and functionality of adipose tissue change with age, leading to a reduction of facial volumes. While ultraviolet (UV) radiation acts indirectly on deep tissues via negative cell communication, age-related effects on adipose tissue are accentuated and accelerated in photoexposed skin. In this study, the aim is (1) to understand and to characterise the negative cellular communication between UV-stressed reticular fibroblasts and adipocytes and (2) to demonstrate that a natural active ingredient obtained from the roots of peony and rich in oligosaccharides (i.e. PRE) restores the positive communication between the dermis and the hypodermis. Through innovative in vitro models, we highlight that reticular fibroblasts stressed by a solar simulator secrete a set of pro-inflammatory molecules (i.e. secretome) that inhibits adipocyte differentiation. Tested on these models, PRE restores the positive communication between reticular fibroblasts and adipocytes. Moreover, tested in vivo on photoexposed skins, this natural active ingredient corrects slack skin and restores volumes to the face.

A. Scheel-Sailer, A. Frotzler, G. Mueller, S. Annaheim, R.M. Rossi, S. Derler, Challenges to measure hydration, redness, elasticity and perfusion in the unloaded sacral region of healthy persons after supine position, J Tissue Viability, 2015 Mar 13

Aim of the study: To combine measurement methods of biophysical skin properties in a clinical setting and to measure baseline values in the unloaded sacral region of healthy persons after lying 30

min in supine position. Methods: Hydration (Corneometer® CM 825), redness (Mexameter® MX 18), elasticity (Cutometer® MPA 580) and perfusion (PeriFlux System 5000) of the skin in the sacral region of 10 healthy participants (median age: 26.9 years) were measured consecutively in the laying position by two trained examiners. Results: The assessment duration for all four parameters lasted about 15 min. Intra-class correlation coefficients were overall moderate to strong (hydration $r = 0.594$, redness $r = 0.817$, elasticity $r = 0.719$, perfusion $r = 0.591$). Hydration (median 27.7 arbitrary units (AU)) mainly indicated dry skin conditions. Redness (median 158.5 AU) was low. Elasticity (median 0.880 AU) showed similar values as in the neck region. Perfusion (median 17.1 AU) showed values in the range of results reported in the literature. Biophysical skin properties in the sacral region after supine position can be measured within periods of 15 min. Conclusion: The results provide baseline data for the skin of healthy persons as well as insights into skin-physiological variations. But it remains challenging to optimize measurement procedures and test protocols when transferring preclinical tests in a clinical application.

A. Mohamed, Cococin rejuvenating coconut water for Skin and Hair Care, Euro Cosmetics; 1/2-2015

Cococin CG is obtained from coconut (*Cocos nucifera*) and is standardized to contain at least 30% total carbohydrates and free amino acids. It is used in hair care formulations and in rejuvenative topical preparations. It is available in liquid form. Also available is Cococin, the freeze-dried tender coconut water available in a free flowing powder form. Cococin is rich in proteins, amino acids, sugars, vitamins, minerals and growth hormones essential to promote tissue and hair growth.

J. Weickenmeier, M. Jabareen, E. Mazza, Suction based mechanical characterization of superficial facial soft tissues, Journal of Biomechanics 48 (2015) 4279–4286

The present study is aimed at a combined experimental and numerical investigation of the mechanical response of superficial facial tissues. Suction based experiments provide the location, time, and history dependent behavior of skin and SMAS (superficial musculoaponeurotic system) by means of Cutometer and Aspiration measurements. The suction method is particularly suitable for in vivo, multi-axial testing of soft biological tissue including a high repeatability in subsequent tests. The campaign comprises three measurement sites in the face, i.e. jaw, parotid, and forehead, using two different loading profiles (instantaneous loading and a linearly increasing and decreasing loading curve), multiple loading magnitudes, and cyclic loading cases to quantify history dependent behavior. In an inverse finite element analysis based on anatomically detailed models an optimized set of material parameters for the implementation of an elastic-viscoplastic material model was determined, yielding an initial shear modulus of 2.32 kPa for skin and 0.05 kPa for SMAS, respectively. Apex displacements at maximum instantaneous and linear loading showed significant location specificity with variations of up to 18% with respect to the facial average response while observing variations in repeated measurements in the same location of less than 12%. In summary, the proposed parameter sets for skin and SMAS are shown to provide remarkable agreement between the experimentally observed and numerically predicted tissue response under all loading conditions considered in the present study, including cyclic tests.

H. Dobrev, Cutometer, Non Invasive Diagnostic Techniques in Clinical Dermatology; Springer Berlin Heidelberg 2014; ISBN 978-3-642-32108-5

Introduction: The human skin possesses a complex structure and various functions which ensure the entity between the organism and the environment. Mechanical properties of the skin are of major importance for its protective function. They vary in accordance with age, sex and body sites, in some physiological and pathological skin conditions, and change due to different external and therapeutic influences. Considerable progress in the quantification of the skin mechanical functions had been achieved for the past 20 years through the introduction of modern non-invasive bioengineering methods and devices which provide the researchers with objective, quantitative, sensitive and reproducible measurements in vivo.

B. Nedelec, J.A. Correa, A. de Oliveira, L. LaSalle, I. Perrault, Longitudinal burn scar quantification, Burns. 2014 Dec; 40(8): p. 1504-1512

Quantitative studies of the clinical recovery of burn scars are currently lacking. Previous reports validate the objective, precise, diagnostic capabilities of high-frequency ultrasound to measure thickness, the Cutometer® to measure pliability and the Mexameter® to measure erythema and pigmentation of scars. Thus, we prospectively quantified clinical characteristics of patient-matched, after burn hypertrophic scar (HSc), donor site scar (D) and normal skin (N) using these instruments. One investigator measured 3 sites (HSc, D, N) in 46 burn survivors at 3, 6, and 12 months after-burn. A mixed model regression analysis, adjusting p-values for multiplicity of testing, was used to compare

means among sites and time points. Participants were 41.2 ± 13.5 years old, 87% males, predominantly Caucasian, with an average of 19.5% body surface area burned. HSc thickness decreased significantly between 3 and 6, 6 and 12, and 3 and 12 months (all $p < 0.0001$), but remained thicker than D and N skin (all $p < 0.0001$). Pliability differed significantly between HSc, D and N sites at all time points (all $p < 0.0001$), with HSc and D increasing between 3 and 12 months ($p < 0.05$) but not reaching normal. HSc and D sites were significantly more erythematous than normal skin ($p < 0.05$) at 3 and 6 months but D sites approached normal by 12 months. The only time points at which pigmentation significantly differed were the HSc and D sites at 6 months. Thickness, pliability, erythema and pigmentation of N skin remained similar over the 12 months. We found that post-burn HSc thickness, pliability and erythema differed significantly from D and N skin at 3, 6, and 12 months and does not return to normal by 12 months after-injury; however, significant improvements towards normal can be expected. Donor sites are redder than normal skin at 3 and 6 months but can be expected to return to normal by 12 months. Although the color of HSc and D sites change markedly with time these color changes are primarily due to changes in redness of the site, not melanin in this primarily Caucasian population.

S.Y. Choi, W.G. Kim, E.J. Ko, Y.H. Lee, B.G. Kim, H.J. Shin, Y.S. Choi, J.Y. Ahn, B.J. Kim, H.J. Lee, Effect of high advanced-collagen tripeptide on wound healing and skin recovery after fractional photothermolysis treatment, Clin Exp Dermatol. 2014 Dec;39(8): p. 874-80

Background: Collagens have long been used in pharmaceuticals and food supplements for the improvement of skin. Aim: We evaluated the efficacy of high advanced-collagen tripeptide (HACP) on wound healing and skin recovery. Methods: Using an in vitro model, we performed HaCaT cell migration assays and collagen gel contraction assays using HACP concentrations of 1, 10 and 100 $\mu\text{g/mL}$. In this pilot study, eight healthy volunteers were randomly divided into two groups. Both the control and experimental groups received fractional photothermolysis treatment, but in the experimental group, four subjects received 3 g/day of oral collagen peptide (CP) for 4 weeks. To assess transepidermal water loss in each patient before and after the treatment, we used a Corneometer and a Cutometer, and we also assessed the patient's Erythema Index. Results: The cell migration assay showed that HACP enhanced wound closure, but not in a dosedependent manner. The collagen gel contraction assay showed increased contractility when patients were treated with 100 $\mu\text{g/mL}$ HACP, but the results were not significantly different from those of controls. We found that post-laser erythema resolved faster in the experimental group than in the control group ($P < 0.05$). In addition, the recovery of skin hydration after fractional laser treatment was greater in the experimental group than in the control group by day 3 ($P < 0.05$), and the experimental group showed significantly improved post-treatment skin elasticity compared with the controls by day 14 ($P < 0.05$). Conclusions: Collagen tripeptide treatment appears to be an effective and conservative therapy for cutaneous wound healing and skin recovery after fractional photothermolysis treatment.

Y.S. Cho, J.H. Jeon, A. Hong, H.T. Yang, H. Yim, Y.S. Cho, D.H. Kim, J. Hur, J.H. Kim, W. Chun, B.C. Lee, C.H. Seo, The effect of burn rehabilitation massage therapy on hypertrophic scar after burn: a randomized controlled trial, Burns. 2014 Dec;40(8): p. 1513-20

Background: To evaluate the effect of burn rehabilitation massage therapy on hypertrophic scar after burn. Method: One hundred and forty-six burn patients with hypertrophic scar(s) were randomly divided into an experimental group and a control group. All patients received standard rehabilitation therapy for hypertrophic scars and 76 patients (massage group) additionally received burn scar rehabilitation massage therapy. Both before and after the treatment, we determined the scores of visual analog scale (VAS) and itching scale and assessed the scar characteristics of thickness, melanin, erythema, transepidermal water loss (TEWL), sebum, and elasticity by using ultrasonography, Mexameter[®], Tewameter[®], Sebumeter[®], and Cutometer[®], respectively. Results: The scores of both VAS and itching scale decreased significantly in both groups, indicating a significant intragroup difference. With regard to the scar characteristics, the massage group showed a significant decrease after treatment in scar thickness, melanin, erythema, TEWL and a significant intergroup difference. In terms of scar elasticity, a significant intergroup difference was noted in immediate distension and gross skin elasticity, while the massage group significant improvement in skin distensibility, immediate distension, immediate retraction, and delayed distension. Conclusion: Our results suggest that burn rehabilitation massage therapy is effective in improving pain, pruritus, and scar characteristics in hypertrophic scars after burn.

A. Giménez, Mit Chronobiologie gegen Cellulite, Cossma 12 2014

Lange Arbeitstage, zu wenig Schlaf und der Jetlag auf Urlaubsreisen gehören heutzutage modernen Leben dazu. Dass unser Terminkalender meistens nicht mit unseren biologischen Uhr übereinstimmt, kann sich ungünstig auf unsere Gesundheit und unser Aussehen auswirken. Menschen

sind wie alle anderen Lebewesen von inneren Prozessen abhängig, die so organisiert sind, dass sie sich an die zyklischen Veränderungen der Umwelt anpassen; diese Tatsache wird unter dem Begriff Biorhythmus zusammengefasst. Solche Prozesse, die sich im 24-Stunden-Takt wiederholen, werden zirkadiane Rhythmen genannt, wie etwa der Schlaf-Wach-Rhythmus.

L.T. Fox, J. du Plessis, M. Gerber, S. van Zyl, B. Boneschans, J.H. Hamman, In Vivo skin hydration and anti-erythema effects of Aloe vera, Aloe ferox and Aloe marlothii gel materials after single and multiple applications, Phcog Mag 2014;10: p. 392-403

Objective: To investigate the skin hydrating and anti-erythema activity of gel materials from Aloe marlothii A. Berger and A. ferox Mill. in comparison to that of Aloe barbadensis Miller (Aloe vera) in healthy human volunteers. Materials and Methods: Aqueous solutions of the polisaccharidic fractions of the selected aloe leaf gel materials were applied to the volar forearm skin of female subjects. The hydration effect of the aloe gel materials were measured with a Corneometer® CM 825, Visioscan® VC 98 and Cutometer® dual MPA 580 after single and multiple applications. The Mexameter® MX 18 was used to determine the anti-erythema effects of the aloe arial solutions on irritated skin areas. Results: The A. vera and A. marlothii gel materials hydrated the skin after a single application, whereas the A. ferox gel material showed dehydration effects compared to the placebo. After multiple applications all the aloe materials exhibited dehydration effects on the skin. Mexameter® readings showed that A. vera and A. ferox have anti-erythema activity similar to that of the positive control group (i.e. hydrocortisone gel) after 6 days of treatment. Conclusion: The polysaccharide component of the gel materials from selected aloe species has a dehydrating effect on the skin after multiple applications. Both A. vera and A. ferox gel materials showed potential to reduce erythema on the skin similar to that of hydrocortisone gel.

A. Giménez, C. Davi, E. Canadas, N. Alminana, R. Delgado, Nocturnin: The target for a more slender silhouette, SOFW-Journal 10-2014

Introduction: The relevance of chronobiology; Due to the fact that the movement of the Earth imposes recurrent changes on environmental conditions, physiological processes of living organisms are tightly organized in the form of biological rhythms. This ensures that each process takes place at the right time and repeats with the appropriate frequency. Processes that repeat every 24 hours are known as circadian rhythms, such as the sleep-wakefulness cycle and the changes in body temperature.

K. Shingaki, S. Kawaguchiya, Y. Hasegawa, M. Sumitani, Y. Yamamoto, K. Torii, Analysis of environmental factors and related molecular mechanisms that reduce cutaneous sensation and the development of cosmetics to prevent and improve functional decline of cutaneous sensation, IFSCC 2014 Paris

Summary: The beneficial effects of touch have been well investigated in infant psychological and physiological development and adult homeostasis. Cutaneous sensation, which facilitates the beneficial effects of touch, alters under the influence of disease and aging. However, the environmental factors that affect cutaneous sensation, their related molecular mechanisms, and the possibility of cosmetics against decline have not been well studied. In this study, we showed a significant positive correlation between age and the perception threshold of a 2000-Hz current which stimulates Aβ-fibres and a significant negative correlation between a 2000-Hz current perception threshold (CPT) and the skin's physiological parameters. In addition, ultraviolet (UV) radiation significantly increased the 2000-Hz CPT in the skin, decreased the expression of neuroprotective growth factors, and altered the expression of matrix components which are the scaffoldings of nerve fibres in the normal human dermal fibroblasts. Furthermore, we showed a significant 2000-Hz CPT decrease 1 month after treatment with cosmetics that included moisturizing ingredients and vitamins. From these results, it is suggested that chronic UV exposure induces the functional decline of cutaneous sensation by decreasing the neuroprotective functional components of the skin and that cosmetics are useful for preventing and improving the decline of cutaneous sensation.

B. Martínez Teipel, J. Boras, R. Armengol, Induction of beige adipocytes and activation of thermogenesis as a new body remodeling mechanism, IFSCC 2014 Paris

Introduction: Adipose tissue is mainly dedicated to the accumulation of lipids that form the energy reservoir, which can be used by our organism in case of necessity, and has also an important role in metabolism regulation. The subcutaneous adipose tissue, owing to its particular location just beneath the dermis, has visible effects on the silhouette and the cellulite appearance. Fatty tissue is formed mainly by adipocytes. Only very recently has become known that the human body harbors three types of adipocytes: the previously known white and brown adipocytes, and also a new kind not described until 2012, the beige adipocytes (Wu *et al.*, 2012). White adipocytes store the excess of free

fatty acids and glycerol in the form of triglycerides. Brown adipocytes have a completely different origin than the white ones, and are specialized in oxidizing triglycerides to produce heat in the process of thermogenesis.

B. Tyszczyk, B. Szczepanik, R.K. Mlosek, S. Malinowska, R. Debowska, K. Rogiewicz, I. Eris, The high frequency ultrasound as a tool for the assessment of anti-cellulite treatments efficacy, IFSCC 2014 Paris

Cellulite is nowadays a common aesthetical defect, which affects most of women worldwide. Taking into consideration the size of this phenomenon cosmetic industry is searching a new ways of fighting against it and new diagnostic tools and methods to measure anti-cellulite therapy's efficacy. Unfortunately reliable monitoring of anti-cellulite treatment still remains a problem. However, new diagnostic techniques such as high frequency ultrasound (HFultrasound) imaging can be useful tool for the assessment of cellulite-reducing efficacy of cosmetics therapy.

T. Baldecchi, L. Heider, M. Lefort, C. Cargola, C. Cartiglia, A. Bonfigli, F. Pflücker, The skin firming "Red-volution": anti-cellulite efficacy of a Papaver rhoeas extract, IFSCC 2014 Paris

The intention of this paper is to report about the in vivo efficacy of a natural active ingredient based on the seeds of a special poppy species. This Papaver rhoeas extract can significantly increase skin blood micro-flow and flatten the dermo-hypodermal junction, leading to a visual improvement of cellulite conditions. The study confirms the outcome of several in vitro and ex vivo investigations in which the extract displays both a prevention of lipogenesis and an activation of lipolysis. This set of results demonstrates that this natural ingredient may offer an attractive option to design skin firming, skin shaping, face contouring or anti-cellulite cosmetic products.

M.V. Velasco, R.P. Vieira, A.R. Fernandes, M.F. Dario, C.A. Pinto, C.A. Pedriali, T.M. Kaneko, A.R. Baby, Short-term clinical of peel-off facial mask moisturizers, Int J Cosmet Sci. 2014 Aug;36(4): p. 355-60

Objective: This study aimed to compare the efficacy of a peel-off facial mask based on polyvinyl alcohol (PVA) with an oil-in-water (o/w) emulsion and the effect of a soybean extract fermented by Bifidobacterium animale incorporated in those formulations (5% w/w). Methods: The formulations were submitted to randomized clinical studies in volunteers to evaluate the measurement effects as (a) tensor by Cutometer®, (b) moisturizing by Corneometer® and transepidermal water loss (TEWL) by Tewameter®. These effects were determined in a short-term study (3 h) in a controlled-temperature room. Results: The tensor effect and TEWL values indicated no significant difference between the use of facial mask and emulsion. On the other hand, the moisturizing effect of the facial mask on the stratum corneum was more significant than that of the emulsion according to Corneometer® measurements. Conclusions: Biometric cutaneous evaluation of peel-off facial masks (short-term study) showed that the masks promoted moisturizing effect of the stratum corneum more effectively than the oil-in-water emulsions. Thus, the facial masks were more efficient than emulsions in relation to moisturizing effects, but this efficiency is not related to the presence of fermented soybean extract. The results indicated that peel-off facial masks increase skin hydration in a process related to the occlusive effect.

R.A. Harper, M. Rencenberger, Benefits of hydrolysed jojoba esters in face masks, Personal Care July 2014

In a series of double-blind, vehicle-controlled, randomised clinical studies, Floraesters K-20W Jojoba [INCI: Hydrolyzed Jojoba Esters (and) Water (aqua)] was shown to increase skin elasticity, firmness, and hydration; decrease the number of enlarged pores and fine lines; and increase consumer preference when incorporated into nonwoven facemask solution. These data support previous findings, demonstrating the effectiveness of Floraesters K-20W Jojoba in non-woven wipe applications for skin hydration, redness reduction, and enhanced consumer preference.

A. Kreuter, N. Hunzelmann, S2k Leitlinie Diagnostik und Therapie der zirkumskripten Sklerodermie, AMWF online 07/2014

Bei der zirkumskripten Sklerodermie (ZS), im Englischen „localized scleroderma“ oder „morphea“ genannt, handelt es sich um ein Spektrum von sklerotischen Erkrankungen der Haut mit je nach Subtyp und Lokalisation möglicher Beteiligung von hautnahen Strukturen wie Fettgewebe, Muskulatur, Gelenke und Knochen. Ein Befall innerer Organe wie z.B. Herz, Lunge, Niere oder Gastrointestinal-Trakt tritt bei der ZS ebenso wenig wie ein Übergang in eine systemische Sklerodermie auf.

G.E. Piérard, T. Hermanns-Lê, U. Gaspard, C. Piérard-Franchimont, Asymmetric facial skin viscoelasticity during climacteric aging, Clinical, Cosmetic and Investigational Dermatology 2014;7, p. 111–118

Background: Climacteric skin aging affects certain biophysical characteristics of facial skin. The purpose of the present study was to assess the symmetric involvement of the cheeks in this stage of the aging process. Methods: Skin viscoelasticity was compared on both cheeks in premenopausal and postmenopausal women with indoor occupational activities somewhat limiting the influence of chronic sun exposure. Eighty-four healthy women comprising 36 premenopausal women and 48 early postmenopausal women off hormone replacement therapy were enrolled in two groups. The tensile characteristics of both cheeks were tested and compared in each group. A computerized suction device equipped with a 2 mm diameter hollow probe was used to derive viscoelasticity parameters during a five-cycle procedure of 2 seconds each. Skin unfolding, intrinsic distensibility, biological elasticity, and creep extension were measured. Results: Both biological elasticity and creep extension were asymmetric on the cheeks of the post-menopausal women. In contrast, these differences were more discrete in the premenopausal women. Conclusion: Facial skin viscoelasticity appeared to be asymmetric following menopause. The possibility of asymmetry should be taken into account in future studies of the effects of hormone replacement therapy and any antiaging procedure on the face in menopausal women.

S.M. Jegasothy, V. Zablotniaia, S. Bielfeldt, Efficacy of a New Topical Nano-hyaluronic Acid in Humans, The Journal of Clinical and Aesthetic Dermatology, 2014;7(3): p. 27–29

Background: The aim of this study was to evaluate the efficacy of a new topical low molecular nano-hyaluronic acid preparation in treating wrinkles, skin hydration, and skin elasticity in humans. Methods: Thirty-three women with an average age of 45.2 were studied for a period of eight weeks to measure the anti-wrinkle efficacy of a new nanohyaluronic acid. The measurements were performed in the periorbital regions by investigating the three-dimensional structure using a DermaTOP for wrinkles, Corneometer for skin hydration, Cutometer for skin elasticity, and a Chroma Meter for erythema. Thereafter, standardized images were taken and evaluated by six selected and trained raters at the end of the study for reduction of visible wrinkles as well as skin color uniformity and pigmentation. Results: The results of the study showed a statistically significant moisturizing effect of the product range (lotion, serum, and cream, after 2, 4, and 8 weeks of treatment. Measurement of skin roughness showed a significantly finer skin structure after two weeks of treatment, and skin elasticity showed a significant improvement after 2 and 8 weeks of treatment. Conclusion: The new nano-hyaluronic acid clearly demonstrated a significant benefit in decreasing the depth of wrinkles (up to 40%), and skin hydration (up to 96%) and skin firmness and elasticity were significantly enhanced (up to 55%) at the end of eight weeks.

P. Blanchemaison, E. Presse, R. Clement, A. Lethi, Un nouveau traitement pour améliorer l'esthétique de la peau: les infrarouges longs, GENESIS, N° 179, Juin 2014

Au Japon, les bains chauds dans une eau volcanique (« onsen-thérapie ») sont réputés rajeunir la peau. Un appareil à infrarouge longs utilisé dans les Spas ou en milieu médical peut-il prétendre à des résultats similaires ou supérieurs? Le vieillissement cutané du visage est un processus naturel inéluctable qui se traduit par l'apparition de rides et de ridules, de taches pigmentaires, d'une perte de fermeté et d'élasticité de la peau et d'une diminution de l'éclat du teint. Les facteurs de vieillissement peuvent être intrinsèques (génétiques, hormonaux,...) et extrinsèques (stress, agressions climatiques, pollution, tabac...). En dehors de la cosmétique, il existe aujourd'hui d'autres méthodes non invasives pour lutter contre les méfaits du temps sur la peau.

G. Maramaldi, Lenitive and antiphotogeing properties of C.asiatica, Personal Care, June 2014

Plant-derived elements used for pharmacological applications constitute an increasing research field. An interesting study from Italian researchers investigated a new purified extract from Madagascar gotu kola as a novel anti-inflammaging and anti-glycation agent for use against skin wrinkling and for skin protection against UV exposure. The results of this study qualify C.asiatica purified extract as an anti-ageing ingredient, addressing skin damage caused by inflammaging and glycation by relying on the synergy of triterpens and polyphenolics.

G. Peterson, C. Jauquet, K. Ortblad, K. Wisuri, L. Tadlock, S. Rapaka, Evaluation of a sonic applicator on skin elasticity and wrinkle analysis compared to manual application and performance with 2 skin care products, JAAD, May 2014, Volume 70, Issue 5, Supplement 1, p. AB16

Introduction and Objective: To measure changes in skin elasticity and wrinkle analysis around the eye area in 12 weeks ...

M. Kieć-Świrczyńska, D. Chomiczewska-Skóra, D. Świrczyńska-Machura, B. Kręćisz, Impact of wet work on epidermal barrier (tewl and stratum corneum hydration) and skin viscoelasticity in nurses (Abstract – Full article in Polish), *Med Pr.* 2014;65(5): p. 609-19

Background: Nurses are prone to develop hand eczema due to occupational exposure to irritants, including wet work. The aim of the study was to evaluate the impact of wet work on selected skin properties, reflecting epidermal barrier function--transepidermal water loss (TEWL) and stratum corneum hydration--and additionally skin viscoelasticity, in nurses. Materials and Methods: Study subjects included 90 nurses employed in hospital wards. Measurements were carried out within the dorsal aspect of the dominant hand, using a Cutometer MPA 580 equipped with Tewameter TM 300 and Corneometer CM 825 (Courage & Khazaka, Germany) probes. Examinations took place on hospital premises. Similar measurements were performed in the control group of females non-exposed to irritants. Results: In the examined group of nurses, mean TEWL was 15.5 g/h/m² and was higher than in the control group (12.99 g/h/m²). After rejecting the extreme results, the difference between the groups proved to be statistically significant ($p < 0.05$). The mean value of stratum corneum hydration was lower in the examined group (37.915) compared with the control group (40.05), but the difference was not statistically significant. Also results of viscoelasticity assessment showed no significant differences between studied groups. Conclusions: The results of the assessment of skin biophysical properties show that wet work exerts a moderately adverse impact on skin condition. A higher TEWL value and a lower stratum corneum hydration in workers exposed to irritants reflect an adverse impact of these factors on the epidermal barrier function.

M. Hayashi, H. Muramatsu, M. Nakano, Y. Tomizuka, M. Inoue, T. Onodera, E. Takahashi, M. Nakamura, Evaluation of scars treated with autologous cultured epidermis JACE – Measurements of the elasticity and flexibility of the graft site using Cutometer

We have used cultured epithelial autograft procedures for extensive burn patients at our institute. This case report presents a burn patient who was treated with meshed 6:1 split thickness autografts combined with cultured epithelial autografts. The elasticity and flexibility of the skin were measured using a special device, the Cutometer MPA580. A 19-year-old-woman suffered burn injuries when her clothing caught fire as she approached a kerosene stove. The total body surface area (TBSA) of burn was 37%. After debridement, the recipient bed preparation was managed by using artificial dermis.

G.W. Nam, E.J. Kim, Y.C. Jung, C.B. Jeong, K.H. Shin, H. K. Lee, Differences in Skin Properties of Korean Women at the Initial Aging Phase, *Journal of Cosmetics, Dermatological Sciences and Applications*, 2014, 4, p. 44-52

Many studies on aging have focused on evaluating differences between older and younger people, but only a few have focused on differences in skin properties among subjects from the same age group according to their skin aging status. In this study, we evaluated the facial skin condition and life style factors in 110 Korean women aged 25 to 35 in an attempt to evaluate factors which may affect the skin aging status in the initial aging phase. The facial skin condition of 110 healthy Korean women was assessed over two successive 6-month periods, summer and winter. Using clinical assessments including aging, wrinkles and skin's elasticity values, the subjects were divided into 7 groups. Then, various facial skin conditions and life style factors were examined between a severe aging group and mild aging group. In the severe aging group, the mean value pH was lower and the mean value of water content was slightly lower than that of women in the mild aging group. Also, the seasonal site variation in water content and sebum secretion level were significantly higher in the severe aging group than in the mild aging group. Topical sunscreen using percentage was not significantly different between the two groups. However, the number of cosmetic subject use was slightly higher in the mild aging group than in the severe aging group. The study suggested that there were several differences in skin characteristics between women in the severe aging group and in the mild aging group at the initial aging phase. Seasonal site variation between cheek and forehead was the most dominant differences. We also considered that life style factors such as cosmetic use could affect skin aging status.

O. Freis, G. Perie, A. Rathjens, Correlating Aging with Skin's Mechanical and Optical Properties, *Cosmetics and Toiletries*, April 21, 2014

The evolution of skin's biomechanical and optical properties as a function of aging and/or photoaging is one of the main targets of cosmetic and dermatological research. Many noninvasive devices to measure skin's biomechanical properties have been developed using alternative methods such as stretching, torsion, indentation and suction. Measurements of skin deformation after suction or torsion are the most widely used techniques in cosmetic research. The skin's optical properties play an

important role as well, and devices measuring these characteristics assess reflected light after illumination of the skin surface. Different noninvasive methods have been proposed for evaluating skin complexion in vivo. These include quantitative measurements of skin color, using colorimetry—i.e., $L^*a^*b^*$ and Individual Typological Angle (ITA°); or of the intensity of specular reflection and the back-scattering of light from the skin. The purpose of this study was to demonstrate the evolution of the measured parameters with aging, and to find the correlation between measured mechanical and optical properties of the skin.

M. Kang, L. Dong-Geol, Dermal Flora and Density Change Using Bifidobacteriaceae-based Re-DerMAX, SOFW Journal 140, 4-2014

Members of the genus *Lactobacillus* exist as residents in regions of the human body, such as the intestinal canal, mouth, and vagina. In early childhood, infants are germ-free and are infected by bacteria during birth through the birth canal, vagina, or air. When the number of harmful bacteria increases, children are exposed to different types of diseases. In this study, investigated microorganisms that exist in human feces and further analyzed the effect of Re-DerMAX. Microbiological effects, based on whether a microorganism exhibited mutualism or parasitism, were observed by spreading Re-DerMAX on the feces sample to evaluate this idea. Denaturing Gradient Gel Electrophoresis (DGGE) analysis was used in the D-code system for an applied test and for a test conducted on 2 groups.

J.P. Bonaparte, D. Ellis, Skin Biomechanical Changes after Injection of Onabotulinum Toxin A: Prospective Assessment of Elasticity and Pliability, Otolaryngology–Head and Neck Surgery, March 2014

Objective: This study aimed to test the hypothesis that the administration of onabotulinum toxin A will result in an increase in skin pliability and elasticity. **Study Design:** A prospective case series with planned data collection in which patients were treated with onabotulinum toxin and assessed at baseline, 2 weeks post-injection, and 2 months post-injection. **Setting:** A private cosmetic surgery clinic associated with a tertiary academic hospital. **Subjects and Methods** Forty women were prospectively enrolled to receive onabotulinum toxin A into their glabella, forehead, and lateral orbit. Outcomes were assessed at baseline, 2 weeks posttreatment, and 2 months posttreatment using the Cutometer MPA 580. Skin pliability (Uf) and the elastic recoil (Ua/Uf) were recorded as the 2 primary outcome measures. **Results:** There was a significant effect of onabotulinum toxin on skin elasticity ($f = 47.8$, $P = .001$) with a mean ($\pm$ SE) increase in elastic recoil of 20% (4.4%) for the glabellar region ($P < .001$) and 18% (4.0%) for the lateral orbit ($P < .0001$). There was a significant effect of the treatment on skin pliability ($f = 46.9$, $P < .001$) with a mean ($\pm$ SE) increase of 26% (5.4%) for the lateral orbit ($P = .001$) and 52% (8.3%) for the glabellar region ($P < .001$). **Conclusion:** Injection of onabotulinum toxin into the lateral orbital, forehead, and glabellar regions results in skin that has increased pliability as well as increased elastic recoil. Although this study demonstrates the positive effect of onabotulinum toxin on biomechanical parameters, it is unclear what specific histological changes are occurring within the skin.

J.P. Bonaparte, J. Chung, The effect of probe placement on inter-trial variability when using the Cutometer MPA 580, J Med Eng Technol. 2014 Mar;38(2): p. 85-9

There is limited data independently assessing the optimal use of the Cutometer MPA580. The purpose of this study is to test the hypothesis that the assessment of elastic recoil is significantly different when utilizing two different probe placement protocols. In protocol A, four trials were performed, in which the probe was removed from the skin between trials. In protocol B, the probe was not removed from the skin between trials. Fifty-four patients were enrolled and all completed the testing. When assessing elasticity (Ua/Uf), the inter-class correlation was 0.83 for protocol A and 0.48 for protocol B ($p < 0.001$). There was no significant difference between individual trials for protocol A. Trial one of protocol B was significantly different ($p < 0.001$) than trials 2-4 for protocol B. Trial one of protocol B was not significantly different than any trial in protocol A. The results of this study suggest that the method in which a clinician performs repeated measure testing has a significant effect on the outcome measures when using the Cutometer. Removing the probe between trials appears to result in measures with higher reliability.

N. Akhtar, N.S. Malik, B.A. Khan, Gulfishan, H.M.S. Khan, Lactic Acid Cream: A novel approach to study the effects on skin aging of healthy human volunteers, SOFW-Journal 140, 3-2014

Introduction: Human skin has good frictional characteristics, supporting locomotion and management by its texture. Skin has elasticity and thus can be stretched and compressed (1). As aging takes place, our skin gets more wrinkles, becomes drier and less elastic. Assessment of the skin elasticity is particularly more significant, because it is not as noticeable as other signs of aging such as wrinkles (2). Noninvasive skin elasticity measurements are appropriate for an objective and quantitative

evaluation of the complex effect of different dermatological and cosmetic products on epidermal mechanics and water content (3).

S. Rao, F. Muia, S. Bennett, J. V. Gruber, Improving barrier function to address premature ageing, Personal Care February 2014

Skin barrier function, principally the stratum corneum, is the primary line of defence against extrinsic stress such as UV-induced photo-damage, insults from microbial infections and physical deterioration resulting from ageing and environmental exposure. Scientific evidence suggests that both intrinsic and environmental factors contribute to „compromised“ skin barrier function.

R. Burgo, Y. He, L. Lampe, E. Mustafa, Natural polymer for modern colour applications, Personal Care February 2014

Colour cosmetic formulations continue to seek new, novel ingredients that can allow brands to create differentiated products that meet the requirements of that latest trends in the marketplace. Inolex has created and introduces LipFeel Natural, a new, patented polymer suitable for many colour cosmetic applications, particularly lip products. LipFeel Natural is completely derived from renewable and sustainable plant sources, and is produced using green chemistry principles. In this article, Inolex shows the results of various testing to demonstrate how LipFeel Natural can confer many of the benefits sought in modern colour cosmetic applications.

S. Luebberding, N. Krueger, M. Kerscher, Mechanical properties of human skin in vivo: a comparative evaluation in 300 men and women, Skin Research and Technology 2014; 20: p. 127-135

Background: Previous studies have shown that the clinical genesis and onset of facial wrinkles as well as the morphology of the extracellular matrix differ between the sexes. The aim of this present clinical study was to do the first systematic assessment of gender-related differences in skin elasticity, with special focus on age-related changes. Material and Methods: 300 healthy male and female subjects (20–74 years) were selected following strict criteria including age, sun behavior or smoking habits. Skin mechanical properties were assessed at the cheek, neck, volar forearm and dorsum of the hand using a non-invasive suction device.

M.S. Woo, K.J. Moon, H.Y. Jung, S.R. Park, T.K. Moon, N.S. Kim, B.C. Lee, Comparison of skin elasticity test results from the Ballistometer and Cutometer, Skin Research and Technology 2014; 20: p. 422-428

Background: Long-term exposure to sunlight changes skin features like amount of facial wrinkling and skin elasticity, which is useful in estimating skin health and age-related changes. Skin elasticity is evaluated by quantitative methods such as the noninvasive suction device Cutometer, which is widely used to evaluate regional body-elasticity differences and correlate these findings with the results of other instrumental data. Few field studies have been done with the Ballistometer device, another noninvasive method for measuring skin elasticity.

S. Kirkham, S. Lam, C. Nester, F. Hashmi, The effect of hydration on the risk of friction blister formation on the heel of the foot, Skin Research and Technology 2014; 20: p. 246-253

Background: Friction blister research has focused on prevention and treatment approaches rather than exploring the pathophysiology of the friction blister. Increased skin hydration has been purported to be a key risk factor in friction blister development. This study aimed to test the effect of increased skin surface hydration on the risk of friction blister creation. Methods: The skin on one foot was hydrated by soaking the foot in water. Intermittent loading was carried out until an observable change of 3°C was evident using infrared thermography. The contra lateral foot acted as a control. Skin hydration and elasticity was measured using electrical capacitance and negative pressure respectively.

F. Hacard, L. Machet, A. Caille, V. Tauveron, G. Georgescu, I. Rapeneau, M. Samimi, F. Patat, L. Vaillant, Measurement of skin thickness and skin elasticity to evaluate the effectiveness of intensive decongestive treatment in patients with lymphoedema: a prospective study, Skin Research and Technology 2014; 20: p. 274-281

Background: Complex decongestive physiotherapy (CDP) is used to treat patients with severe lymphoedema. The efficacy of CDP is usually quantified by calculating limb volume from repeated measurements of circumference at least 10 points before and after treatment of an affected limb. Measurement is time-consuming and operator-dependent. Objectives: To determine whether decreased dermal thickness is correlated with decreased volume after intensive CDP. Methods: A consecutive series of patients admitted for intensive CDP were studied over a 6-month period. Before and after CDP,

we measured circumference, dermal thickness elasticity and finally improvement in quality of life using a visual analogue scale (VAS).

Y. Gabe, O. Osanai, Y. Takema, The relationship between skin aging and steady state ultraweak photon emission as an indicator of skin oxidative stress in vivo, *Skin Research and Technology* 2014; 20: p. 315-321

Background/purpose: Ultraweak photon emission (UPE) is one potential method to evaluate the oxidative status of the skin in vivo. However, little known about how the daily oxidative stress of the skin is related to skin aging-related alterations in vivo. We characterized the steady state UPE and performed a skin survey. Methods: We evaluated the skin oxidative status by UPE, skin elasticity, epidermal thickness and skin color on the inner upper arm, the outer forearm, and the buttock of 70 Japanese volunteers.

E.J. Kim, J.Y. Han, H.K. Lee, Q.Q. He, J.C. Cho, L. Wei, X. Wang, L. Li, L. Wei, H. Liang, X. Gao, B.J. Kim, G.W. Nam, Effect of the regional environment on the skin properties and the early wrinkles in young Chinese women, *Skin Research and Technology* 2014; 20: p. 498-502

Background: There are ethnic differences in the skin characteristics, also the skin is susceptible to be influenced by the external environment such as UV radiation and the climates. It can be shown that the skin in same race or twins varies by the environment. Objectives: This study was designed to investigate the skin characteristics and the early wrinkles of young Chinese women from four different regions, and to identify the correlation among the wrinkles, the other skin characteristics, and environmental conditions. Methods: A total of 441 healthy Chinese women aged between 20 and 35 years participated in the study: 110 from Beijing, 110 from Shanghai, 111 from Wuhan, and 110 from Guangzhou. The skin hydration, sebum contents, TEWL, pH, elasticity, and wrinkles were measured on the cow's feet area.

E. Proksch, D. Segger, J. Degwert, M. Schunck, V. Zague, S. Oesser, Oral supplementation of specific collagen peptides has beneficial effects on human skin physiology: a double-blind, placebo-controlled study, *Skin Pharmacol. Physiol.* 2014; 27; p. 47-55

Various dietary supplements are claimed to have cutaneous anti-aging properties; however, there are a limited number of research studies supporting these claims. The objective of this research was to study the effectiveness of collagen hydrolysate (CH) composed of specific collagen peptides on skin biophysical parameters related to cutaneous aging. In this double-blind, placebo-controlled trial, 69 women aged 35-55 years were randomized to receive 2.5 g or 5.0 g of CH or placebo once daily for 8 weeks, with 23 subjects being allocated to each treatment group. Skin elasticity, skin moisture, transepidermal water loss and skin roughness were objectively measured before the first oral product application (t0) and after 4 (t1) and 8 weeks (t2) of regular intake. Skin elasticity (primary interest) was also assessed at follow-up 4 weeks after the last intake of CH (t3, 4-week regression phase). At the end of the study, skin elasticity in both CH dosage groups showed a statistically significant improvement in comparison to placebo. After 4 weeks of follow-up treatment, a statistically significantly higher skin elasticity level was determined in elderly women. With regard to skin moisture and skin evaporation, a positive influence of CH treatment could be observed in a subgroup analysis, but data failed to reach a level of statistical significance. No side effects were noted throughout the study.

J.H. Min, I.S. Yun, D.H. Lew, T.S. Roh, W.J. Lee, The Use of Matriderm and Autologous Skin Graft in the Treatment of Full Thickness Skin Defects, *Arch Plast Surg* 2014;41: p. 330-336

Background: For patients with full thickness skin defects, autologous Split-thickness skin grafts (STSG) are generally regarded as the mainstay of treatment. However, skin grafts have some limitations, including undesirable outcomes resulting from scars, poor elasticity, and limitations in joint movement due to contractures. In this study, we present outcomes of Matriderm grafts used for various skin tissue defects whether it improves on these drawbacks. Methods: From January 2010 to March 2012, a retrospective review of patients who had undergone autologous STSG with Matriderm was performed. We assessed graft survival to evaluate the effectiveness of Matriderm. We also evaluated skin quality using a Cutometer, Corneometer, Tewameter, or Mexameter, approximately 12 months after surgery. Results: A total of 31 patients underwent STSG with Matriderm during the study period. The success rate of skin grafting was 96.7%. The elasticity value of the portion on which Matriderm was applied was 0.765 (range, 0.635–0.800), the value of the trans-epidermal water loss (TEWL) was 10.0 (range, 8.15–11.00) g/hr/m², and the humidification value was 24.0 (range, 15.5–30.0). The levels of erythema and melanin were 352.0 arbitrary unit (AU) (range, 299.25–402.75 AU) and 211.0 AU (range, 158.25–297.00 AU), respectively. When comparing the values of elasticity and TEWL of the skin treated with Matriderm to the values of the surrounding skin, there was no statistically significant difference

between the groups. Conclusions: The results of this study demonstrate that a dermal substitute (Matriderm) with STSG was adopted stably and with minimal complications. Furthermore, comparing Matriderm grafted skin to normal skin using Cutometer, Matriderm proved valuable in restoring skin elasticity and the skin barrier.

H.-S. Yoon, S.-R. Lee, J. H. Chung, Long-term Topical Oestrogen Treatment of Sun-exposed Facial Skin in Post-menopausal Women Does Not Improve Facial Wrinkles or Skin Elasticity, But Induces Matrix Metalloproteinase-1 Expression, Acta Derm Venereol 2014; 94: p. 4–8

It is controversial whether treatment with oestrogen stimulates collagen production or accumulation in sunexposed skin. The aim of this study was to determine the effect of long-term treatment with topical oestrogen on photoaged facial skin, with regard to wrinkle severity, and expression of procollagen and matrix metalloproteinase-1 enzyme. Two groups of 40 post-menopausal women applied either 1 g of 1% oestrone or vehicle cream once daily to the face for 24 weeks. Visiometer R1–R5 values (skin wrinkles) and Cutometer values (skin elasticity) were not significantly improved in the oestrone group after 24 weeks of treatment. Type I procollagen immunostaining did not increase in the oestrone group compared with the control group. However, levels of matrix metalloproteinase-1 mRNA increased robustly (10.3 times) in oestrone-treated skin compared with vehicle-treated skin. Thus, treatment with topical oestrogen may be deleterious in ultraviolet-induced skin ageing, at least in part, through induction of matrix metalloproteinase-1 (MMP-1) expression in human skin.

J.Y. Park, T.G. Lee, J.Y. Kim, M.C. Lee, Y.K. Chung, W.J. Lee, Acellular Dermal Matrix to Treat Full Thickness Skin Defects: Follow-Up Subjective and Objective Skin Quality Assessments, Arch Craniofac Surg Vol.15 No.1, 2014, p. 14-21

Background: There are several options for replacement of the dermal layer in fullthickness skin defects. In this study, we present the surgical outcomes of reconstruction using acellular dermal substitutes by means of objective and subjective scar assessment tools. Methods: We retrospectively reviewed the medical records of 78 patients who had undergone autologous split-thickness skin graft with or without concomitant acellular dermal matrix (CGDerm or AlloDerm) graft. We examined graft survival rate and evaluated postoperative functional skin values. Individual comparisons were performed between the area of skin graft and the surrounding normal skin. Nine months after surgery, we compared the skin qualities of CGDerm graft group (n=25), AlloDerm graft group (n=8) with skin graft only group (n=23) each other using the objective and subjective measurements. Results: The average of graft survival rate was 93% for CGDerm group, 92% for AlloDerm group and 86% for skin graft only group. Comparing CGDerm grafted skin to the surrounding normal skin, mean elasticity, hydration, and skin barrier values were 87%, 86%, and 82%, respectively. AlloDerm grafted skin values were 84%, 85%, and 84%, respectively. There were no statistical differences between the CGDerm and AlloDerm groups with regard to graft survival rate and skin functional analysis values. However, both groups showed more improvement of skin quality than skin graft only group. Conclusion: The new dermal substitute (CGDerm) demonstrated comparable results with regard to elasticity, humidification, and skin barrier effect when compared with conventional dermal substitute (AlloDerm).

J.-Y. Choi, S.-H. Kim, G.-J. Oh, S.-G. Roh, N.-H. Lee, K.-M. Yang, Management of Defects on Lower Extremities with the Use of Matriderm and Skin Graft, Arch Plast Surg 2014; 41: p. 337-343

Background: The reconstruction of large skin and soft tissue defects on the lower extremities is challenging. The skin graft is a simple and frequently used method for covering a skin defect. However, poor skin quality and architecture are well-known problems that lead to scar contracture. The collagen–elastin matrix, Matriderm, has been used to improve the quality of skin grafts; however, no statistical and objective review of the results has been reported. Methods: Thirty-four patients (23 male and 11 female) who previously received a skin graft and simultaneous application of Matriderm between January 2010 and June 2012 were included in this study. The quality of the skin graft was evaluated using Cutometer, occasionally accompanied by pathologic findings. Results: All 34 patients showed good skin quality compared to a traditional skin graft and were satisfied with their results. The statistical data for the measurement of the mechanical properties of the skin were similar to those for normal skin. In addition, there was no change in the engraftment rate. Conclusions: The biggest problem of a traditional skin graft is scar contracture. However, the dermal matrix presents an improvement in skin quality with elastin and collagen. Therefore, a skin graft along with a simultaneous application of Matriderm is safe and effective and leads to a significantly better outcome from the perspective of skin elasticity.

M.A. Adatto, R.M. Adatto-Neilson, G. Morren, **Reduction in adipose tissue volume using a new high-power radiofrequency technology combined with infrared light and mechanical manipulation for body contouring**, *Lasers Med Sci* (2014) 29: p. 1627–1631

A growing patient demand for a youthful skin appearance with a favorable body shape has led to the recent development of new noninvasive body contouring techniques. We have previously demonstrated that the combination of bipolar radiofrequency (RF) and optical energies with tissue manipulation is an efficient reshaping modality. Here, we investigated the efficacy and safety of a new high-power version of this combined technology, in terms of adipose tissue reduction and skin tightening. Thirty-five patients received one treatment per week over 6 weeks to their abdomen/ flank, buttock, or thigh areas and were followed up to 3 months post completion of the treatment protocol. This new device has an increased power in the bipolar RF, as this parameter appears to be the most important energy modality for volume reduction. Patient circumferences were measured and comparisons of baseline and post treatment outcomes were made. Diagnostic ultrasound (US) measurements were performed in 12 patients to evaluate the reduction in adipose tissue volume, and a cutometer device was used to assess improvements in skin tightening. We observed a gradual decline in patient circumferences from baseline to post six treatments. The overall body shaping effect was accompanied with improvement in skin tightening and was clearly noticeable in the comparison of the before and after treatment clinical photographs. These findings correlated with measurements of adipose tissue volume and skin firmness/elasticity using diagnostic US and cutometer, respectively. The thickness of the fat layer showed on average a 29 % reduction between baseline and the 1-month follow up. The average reduction in the circumference of the abdomen/flanks, buttocks, and thighs from baseline to the 3-month follow-up was 1.4, 0.5, and 1.2 cm, respectively, and 93 % of study participants demonstrated a 1–60 % change in fat layer thickness. Patients subjectively described comfort and satisfaction from treatment, and 97 % of them were satisfied with the results at the followup visit. The application of high-power RF energy combined with infrared (IR), mechanical massage, and vacuum appears to be an effective modality for the reduction in circumferences of the abdomen/flank, buttock and thigh regions, and the improvement of skin appearance. The present study performed with a new device suggests that the underlying mechanism of action is reduction in the subcutaneous adipose tissue volume and intensification of dermal matrix density.

H.-S. Yoon, S.-R. Lee, J.H. Chung, **Long-term Topical Oestrogen Treatment of Sun-exposed Facial Skin in Post-menopausal Women Does Not Improve Facial Wrinkles or Skin Elasticity, But Induces Matrix Metalloproteinase-1 Expression**, *Acta Derm Venereol* 2014; 94: p. 4–8

It is controversial whether treatment with oestrogen stimulates collagen production or accumulation in sunexposed skin. The aim of this study was to determine the effect of long-term treatment with topical oestrogen on photoaged facial skin, with regard to wrinkle severity, and expression of procollagen and matrix metalloproteinase-1 enzyme. Two groups of 40 post-menopausal women applied either 1 g of 1% oestrone or vehicle cream once daily to the face for 24 weeks. Visiometer R1–R5 values (skin wrinkles) and Cutometer values (skin elasticity) were not significantly improved in the oestrone group after 24 weeks of treatment. Type I procollagen immunostaining did not increase in the oestrone group compared with the control group. However, levels of matrix metalloproteinase-1 mRNA increased robustly (10.3 times) in oestrone-treated skin compared with vehicle-treated skin. Thus, treatment with topical oestrogen may be deleterious in ultraviolet-induced skin ageing, at least in part, through induction of matrix metalloproteinase-1 (MMP-1) expression in human skin.

Y. Piriou, A. Sirvent, A. Natalizio, F. Girard-ory, **Skin-lightening and anti-ageing effect of a food supplement containing *Pinus pinaster* extract**, *Nutrafoods* (2014)

Oligomeric proanthocyanidins extracted from the bark of the French maritime pine *Pinus pinaster* (FMPBE) have been studied for a long time and demonstrated various phytopharmaceutical applications. The objectives of this study were to assess the cutaneous lightening and anti-ageing effects of FMPBE after 56 days of consumption, in healthy Asian women. The cosmetic efficacy of the product was assessed through various biometrological evaluations. This randomised, double-blind, placebocontrolled and cross-over study evidenced the safety and efficacy of the 100 mg FMPBE supplementation from 28 days of intake: in comparison to placebo, the skin on pigmentary spots became significantly lighter and less red, skin on the face was more firm and its surface was less wrinkled. After 56 days of consumption, the skin was additionally significantly more elastic and the yellow constituent of the skin decreased on the normal skin. Taken together, these results proved that FMPBE supplementation can be considered as an innovative approach to skin whitening and anti-ageing treatments. It represents an interesting alternative to topical products and supports the skin from the inside out.

F. Hashmi, **The effect of non-enzymatic glycation of keratins on the physical properties of plantar epidermis in type II diabetic and non-diabetic individuals**, Thesis University College London 2014

As keratin is the principle structure of the plantar stratum corneum, it has been postulated that changes in this protein, associated with non-enzymatic glycation, may contribute to abnormalities in the development of plantar callus in diabetes consequently leading to ulceration of plantar skin. The clinical appearance of the skin in the diabetic state has been described as being thicker and less flexible than non-diabetic skin, particularly in the hands.

J. Chung, J.P. Bonaparte, M. Odell, M. Corsten, **The effect of topically applied tissue expanders on radial forearm skin pliability: a prospective self-controlled study**, Journal of Otolaryngology - Head and Neck Surgery 2014, 43:8

Background: The use of pre-operatively applied topical tissue expansion tapes have previously demonstrated increased rates of primary closure of radial forearm free flap donor sites. This is associated with a reduced cost of care as well as improved cosmetic appearance of the donor site. Unfortunately, little is known about the biomechanical changes these tapes cause in the forearm skin. This study tested the hypothesis that the use of topically applied tissue expansion tapes will result in an increase in forearm skin pliability in patients undergoing radial forearm free flap surgery. Methods: Twenty-four patients scheduled for head and neck surgery requiring a radial forearm free flap were enrolled in this prospective self-controlled observational study. DynaClose tissue expansion tapes (registered Canica Design Inc, Almonte, Canada) were applied across the forearm one week pre-operatively. Immediately prior to surgery, the skin pliability of the dorsal and volar forearm sites were measured with the Cutometer MPA 580 (registered Courage-Khazaka Electronic GmbH, Cologne, Germany) on both the treatment and contralateral (control) arms. Paired t-tests were used to compare treatment to control at both sites, with $p < 0.025$ defined as statistically significant. Results: There was a statistically significant increase in pliability by a mean of 0.05 mm (SD = 0.09 mm) between treatment and control arms on the dorsal site (95% CI [0.01, 0.08], $p = 0.018$). This corresponded to an 8% increase in pliability. In contrast, the volar site did not show a statistically significant difference between treatment and control (mean difference = 0.04 mm, SD = 0.20 mm, 95% CI [-0.04, 0.12], $p = 0.30$). Conclusions: This result provides evidence that the pre-operative application of topical tissue expansion tapes produces measurable changes in skin biomechanical properties. The location of this change on the dorsal forearm is consistent with the method of tape application. While this increase in skin pliability may account for the improved rate of primary donor site closure reported using this technique, the results did not reach our definition of clinical significance

E. Kim, G. Cho, N.G. Won, J. Cho, **Age-related changes in skin bio-mechanical properties: the neck skin compared with the cheek and forearm skin in Korean females**, Skin Research and Technology 2013; 19; 236-241

Background: There are many reports on regional variations in skin bio-mechanical properties, but few studies have been performed on the neck. The neck is sun-exposed and continues to move so the neck skin can be more apt to aging. Methods: The skin properties of the neck, cheek, and ventral forearm of 58 Korean female volunteers in good health (25-64 years old, 42.3 ± 11.7) were assessed non-invasively with skin measuring devices, and the correlation with age and wrinkles was analyzed. Results: Neck skin was more extensible, elastic and viscoelastic than the cheek. The dermal layer of the neck skin was thinner and more intense than the cheek, but the results were opposite when compared with the skin of the forearm. We could observe that the subcutaneous layer was divided by the fascia with regard to the neck skin, and this thickness increased BMI-dependently.

Y. Hara, Y. Masuda, T. Hirao, N. Yoshikawa, **The relationship between the Young's modulus of the stratum corneum and age: a pilot study**, Skin Research and Technology 2013; 19; 339-345

Background/purpose: The mechanical properties of the stratum corneum play an important role in protecting the body from external physical stimuli and excessive sensitivity. However, it is difficult to analyze these mechanical properties in vivo. To resolve this problem, we carried out a numerical analysis to calculate the Young's modulus of the stratum corneum. We then investigated the relationship between the Young's modulus of the stratum corneum and age. Methods: We used a Cutometer and a Dermal Torque Meter for measuring skin mechanical parameters, and optical coherence tomography and an ultrasonic imaging system for measuring skin thickness. Based on these non-invasive results, linear elastic analysis was performed by the finite element method, and the Young's moduli of the stratum corneum and the dermis were calculated by solving an inverse problem. Using these techniques, we analyzed the correlation between the Young's modulus of the stratum corneum for the cheeks of seventy-eight Japanese aged from 20 to 68 years.

G.E. Piérard, S. Piérard, P. Delvenne, C. Piérard-Franchimont, In vivo evaluation of the skin tensile strength by the suction method: pilot study coping with hysteresis and creep extension, ISRN Dermatology Volume 2013; Article ID 841217, 7 pages

Measurements of a number of physical parameters characterizing human skin have been attempted over the recent decades. A diversity of devices assessing skin viscoelasticity were used both in vitro and in vivo [1,2]. They proved to be useful tools for scientists and medical practitioners [3,4]. Over a large part of the body, the overall viscoelastic behaviour of the skin primarily depends on the skin connective tissue (SCT) structures present in both the dermis and the subcutis, with minimal contribution from the epidermis [5-7]. The suction method is one of the most widely used approach for determining some of the biomechanical characteristics of human skin in health and disease [8-17]. The progressive suction mode with a stress-versus-strain graphic recording is a convenient way in this endeavour [9-11]. In this procedure, a progressive increase in stress suction for a defined period of time is followed by a symmetrical rate of suction release. During the whole process, skin deformation defined as the strain is recorded. Typically, viscoelastic materials exhibit nonlinear stress-versus-strain properties [1,2,9,17]. The hysteresis loop represents the area delimited by the two curves representing the loading and relaxation phases, respectively.

A. Mitarotonda, F. Johnson, L. Koch, Clinically proven benefits of organic certified products, Personal Care November 2013

Abstract: There is a general belief that natural and organic cosmetic products cannot deliver strong benefits and only basic claims can be achieved. This is due to the limited number of ingredients available to those who are formulating certified products. When transposed to skin care claims, it usually means hydration and moisturisation derived benefits. When it comes to makeup, the absence of truly performing colour cosmetics can lead „green consumers“ to look at more standard brands in order to get their favourite look. With this article the authors would like to demonstrate that it is possible to develop organic certified products that are clinically proven to be effective.

O. Hevia, An Investigation into the Anti-aging Efficacy of a Serum Containing a Red Mangrove Extract, SOFW-Journal, 139, 10-2013

Introduction: *Rhizophora mangle*, more commonly known as the red mangrove, is a woody, salt water-tolerant plant that grows in tropical and subtropical coastal areas throughout the world, especially in the Atlantic basin of the Americas and Caribbean. Extracts from the bark of the red mangrove (*Rhizophora Mangle*) plant have been used in folk medicine for centuries, and numerous studies have demonstrated that the extract possesses antimicrobial, anti-inflammatory, and potent antioxidant activity. 1-6 Based in these findings, a proprietary extract from the seedlings of the red mangrove was developed and incorporated into a cosmetic formulation and applied topically to determine if it could exhibit any anti-aging efficacy.

D.G. Mercurio, T.A.L. Wagemaker, P.M.B.G Maia Campos, Effects of sun exposure habits on skin aging: a multivariate analysis, ISBS, Milan 15-16.10.2013

Summary: Skin exposure to ultraviolet (UV) radiation is related with molecular, morphological, structural and clinical changes on the skin, which characterizes photoaging. However, there are few studies that correlate sun exposure habits and objective measurements using biophysical and skin image techniques. Thus, the aim of this study was to evaluate the influence of the sun exposure habits on the biophysical and morphological characteristics of aged skin using multivariate analysis. For this, 40 healthy female volunteers (aged between 18- 30 or 40-65 years) filled a questionnaire concerning their sun exposure and protection habits during different periods of their lives. The characterization of the skin of dorsal and volar forearms was performed using objective measurements by biophysical and skin image techniques in terms of transepidermal water loss, direct measurement of the skin topography, viscoelasticity, dermis thickness and echogenicity, and structure and morphology of the epidermis by in vivo Reflectance Confocal Microscopy. Principal Component Analysis (PCA) of the values of each parameter was used to visualize the relationship between variables and groups. According to the PCA analysis, the sun exposure habits are directly related to increased dermis thickness, reduced echogenicity and elasticity.

J.C. Pittet, O. Freis, M.D. Vazquez-Duchêne, G. Périé, G. Pauly, Evaluation of Elastin/Collagen Content in Human Dermis in-vivo by Multiphoton. Tomography – Variation with the depth and correlation with aging, ISBS, Milan 15-16.10.2013

Summary: **Problem:** Several studies have reported that autofluorescence (AF) and second harmonic generation (SHG) signals generated in the superficial dermis are related with skin photoaging. In this study we have focused on the measurement of AF and SHG at two different depths of dermis

and performed the comparison with two other techniques. Method: Multiphoton Confocal Microscopy (MCM) was used to quantify elastin and collagen with SHG-to-AF Aging Index of Dermis (SAAID). A 50MHz ultrasound scanner was used for the calculation of the Sub Epidermal Non Echogenic Band (SENEB). The measurements of the skin mechanical properties were performed with a cutometer. All measurements were performed on 2 groups of 30 healthy female volunteers of different ages ("Young": 28±9 years; "Aged": 54±11 years).

*H. Ohno, N. Nishimura, K. Yamada, Y. Shimizu, S. Iwase, J. Sugeno, M. Sato, **Effects of water nanodroplets on skin moisture and viscoelasticity during air-conditioning**, Skin Research and Technology 2013;19;375-383*

Background/purpose: In air-conditioned rooms, dry air exacerbates some skin diseases, for example, senile xerosis, atopic dermatitis, and surface roughness. Humidifiers are used to improve air dryness, which often induces excess humidity and thermal discomfort. To address this issue, we investigated the effects of water nanodroplets (mist) on skin hydration, which may increase skin hydration by penetrating into the interstitial spaces between corneocytes of the stratum corneum (SC) without increasing air humidity. Methods: We examined biophysical parameters, including skin conductance and transepidermal water loss (TEWL), and biomechanical parameters of skin distension/retraction before and after suction at the forehead, lateral canthus, and cheek, with or without mist, in a testing environment (24°C, 35% relative humidity) for 120 min.

*C. Galzote, R. Estanislao, M.O. Suero, A. Khaiat, M.I. Mangubat, R. Moideen, H. Tagami, X. Wang, **Characterization of facial skin of various Asian populations through visual and non-invasive instrumental evaluations: influence of age and skincare habits**, Skin Research and Technology 2013;19; 454-465*

Background/purpose: We aimed to evaluate the impact of age and skincare habits on facial skin of different Asian ethnicities by comparing skin properties and skincare habits among various Asian populations of varying age groups. Methods: We evaluated approximately 100 female subjects each from a total of eight Asian cities in China, India, South Korea, Japan and the Philippines grouped according to age ranging from 14 to 75 years during a summer season. Facial skin was characterized using dermatological examinations of the cheek. Information regarding personal skincare habits was collected using a questionnaire.

*P. Neto, M. Ferreira, F. Bahia, P. Costa, **Improvement of the methods for skin mechanical properties evaluation through correlation between different techniques and factor analysis**, Skin Research and Technology 2013;19;405-416*

Background: In the past decades, many instruments have been developed to measure skin elasticity and firmness. The offer is extensive and is constantly increasing, becoming difficult to decide which equipment and mechanical property measurement are better to portrait the desired characteristics. The aim of this study was to compare and correlate parameters assessed with different probes, based on different methodologies, to understand which probe characterizes each skin elasticity property. Methods: Measurements were performed in the abdomen region of 34 female volunteers, with three different probes: Cutometer SEM575, Reviscometer RVM600 and Frictionmeter FR700. Statistical data analysis was performed by Factor Analysis on IBM SPSS Statistics 17.0.

*H. Dobrev, **Novel Ideas: The Increased Skin Viscoelasticity - A Possible New Fifth Sign for the Very Early Diagnosis of Systemic Sclerosis**, Current Rheumatology Reviews, 2013, 9*

Abstract: Introduction: Diagnosis of systemic sclerosis (SSc) at very early stage could allow starting an appropriate therapy and improving the patient outcome. Skin involvement is often the first non-Raynaud's phenomenon (RP) symptom. Its uncovering may play an important role for the initial diagnosis. Objective: To introduce a simplified method for non-invasive evaluation of skin mechanical properties in patients with clinically evident or suspected SSc. Material and Methods: A total of 94 patients and 162 healthy subjects were studied. According to clinical and nailfold videocapillaroscopy findings the patients were divided into four groups: 20 with edematous phase of SSc (group 1), 28 with indurative phase of SSc (group 2), 26 with suspected secondary RP (group 3), and 20 with primary RP (group 4). Mechanical properties of the volar forearm skin were evaluated using a non-invasive suction device (Cutometer) equipped with 2-mm diameter probe. The skin mechanical parameters analyzed were distensibility (Uf), elasticity (Ua/Uf) and viscoelasticity (Uv/Ue). Results: Skin distensibility was reduced and skin viscoelasticity increased in group 1-3 compared to age matched healthy controls. There were no significant changes in skin elasticity. Mechanical parameters in group 4 were normal. Comparison of individual patient's values with population 95% confidence intervals of the mean showed increased skin viscoelasticity in group 1 (100%), group 2 (93%), and group 3 (81%), whereas the

incidence in group 4 was 10%. Conclusions: Noninvasive method applied is appropriate for objective and quantitative evaluation of sclerodermatous skin. In combination with nailfold videocapillaroscopy it could be predictive in pre-scleroderma patients. The increased skin viscoelasticity parameter could be proposed as the possible new fifth sign for the very early diagnosis of SSc.

J.S. Everett, M.S. Sommers, Skin Viscoelasticity: Physiologic Mechanisms, Measurement Issues, and Application to Nursing Science, Biol Res Nurs. 2013 July; 15(3): p. 338–346

Skin is the primary interface between health care providers and patients and is assessed clinically to predict physiological stability or instability. The biomechanical properties of human skin, most notably elasticity and viscoelasticity, are critical to its protective function. In this article, the authors describe the physiological basis for skin elasticity and viscoelasticity. The authors discuss the role of viscoelasticity in nursing science and consider avenues for scientific exploration of the skin's biomechanical properties, including applications in pressure ulcer research, injury, and healing. They also discuss the Cutometer® as one option for measurement of viscoelasticity in clinical and bench research protocols.

K.C. Holley, H. Knaggs, Why don't I look younger?, Euro Cosmetics, 6-2013

The number of individuals over the age of 65 will outnumber those younger than five for the first time in 2020. With this the anti-aging market continues to grow causing more and more individuals to wonder – Can I look younger? This question plagues the anti-aging population and brings skin scientists to ponder:

- Can we quantify someone who looks old or young for his/her age?
- Do Asians, who are known for ageing gracefully, show the same age patterns?
- Can aging appearance or looking old for one's age be changed or improved?

Aging is multi-factorial and cannot be attributed to one cause. The structure of the skin changes in many ways. Transepidermal water loss (TEWL) increases resulting in less skin moisture. Dry skin appears dull and fine lines are more apparent. Cell turnover also decreases. The outer most layer of keratinocytes cling to the surface for longer, adding to dullness of the skin's appearance. It also contributes to rough skin that reflects light less uniformly causing a loss of radiance.

J.P. Bonaparte, D. Ellis, J. Chung, The effect of probe to skin contact force on Cutometer MPA 580 measurements, J Med Eng Technol, 2013; 37(3): p. 208–212

The purpose of this study is to test the hypothesis that increasing the force applied on the skin by the Cutometer MP580 probe will result in a decrease in the skin elasticity measures. Specifically, this study assessed the probe intrinsic weight plus the addition of a light mass (10 g and 20 g), a moderate mass (50 g and 100 g) and a high mass (200 g and 500 g) on skin elasticity measures. Primary outcome measures U_v , U_r , U_f , U_e and U_a , along with calculated measures U_v/U_f , U_a/U_f and U_r/U_f were assessed under each loading condition. A general linear model ANOVA with repeated measures was used to assess for differences in each outcome measure between each loading condition. Thirty-two patients were enrolled and all completed the testing. For all primary variables except U_v ($p=0.001$), there was no statistically significant effect of adding a light mass to the probe. There was a significant effect of the addition of a moderate and heavy mass for all variables ($p=0.005$) except U_e/U_f . These results suggest that the addition of a low mass results in no significant effect on outcome measures. However, if moderate-to-heavy additional force is applied to the probe, the outcome measures are significantly altered. Of all the variables, U_e/U_f appears to be influenced the least by alterations in force. Users should ensure light contact is made between the skin and probe during testing to avoid a false alteration in outcome measures of skin elasticity.

Controlled usage study to evaluate efficacy of an anti-aging product, Lifeline Skin Care Information 2013

The purpose of this study is to evaluate the performance of an anti-aging eye cream product intended to increase skin firmness and reduce the appearance of fine lines, wrinkles and crow's feet in the peri-orbital area when tested over a 28 and 56 day period. Wrinkle assessment was conducted instrumentally using a Visioscan image analysis system. Elasticity and viscoelastic properties of the skin were measured as a function of flexibility and firmness employing a Cutometer. In addition product effectiveness was subjectively evaluated using panelist self-assessment via questionnaire responses.

M. Baspeyras, C. Rouvrais, L. Liégard, A. Delalleau, S. Letellier, I. Bacle, L. Courrech, P. Murat, V. Mengeaud, A.-M. Schmitt, Clinical and biometrological efficacy of a hyaluronic acid-based mesotherapy product: a randomised controlled study, Arch Dermatol Res (2013) 305: p. 673–682

Data demonstrating the efficacy of hyaluronic acid (HA)-based mesotherapy for skin rejuvenation are scarce. The aim of the study is to assess the efficacy of nonreticulated HA-based mesotherapy on skin elasticity and complexion radiance. 55 women with cutaneous ageing signs included in the Full Analysis Set (FAS) population blindly received intradermal micro-injections (50 9 0.02 mL) of non-cross-linked HA filler with mannitol (Glytone 1, HA concentration: 14 mg/g) in one cheek and saline physiological solution in the other according to hemifacial randomisation in 3 monthly sessions. Elasticity (E1 and E2 stiffness parameters) and dermis thickness were measured by cutometry and 20 MHz echography, before (D0) treatment and 1 (1M) and 3 months (3M) after the last injection. A trained panel blindly scored skin complexion radiance from standardised and calibrated photographs, using 100 mm analogue scales. In the FAS population, only HA filler significantly decreased E1 at 1M (-10.9 %, $p = 0.026$) and 3M (-10.5 %, $p = 0.035$) compared with D0; its effect versus the control tended to be more persistent, with a difference between treatments at 3M close to significance ($p = 0.063$). E2 also decreased at 1M (-8.2 %, $p = 0.027$ in the per protocol population, $n = 53$) and 3M after HA-treatment only. Dermis thickness significantly increased after HA-treatment at 1M (?3.4 %, $p = 0.028$) and 3M (?4 %, $p = 0.008$), and after control-treatment at 1M only (?2.5 %, $p = 0.015$). The HA filler significantly improved complexion radiance at 3M compared with the control ($p = 0.012$) and for 51 % of subjects, their skin status. Non-reticulated HA-based mesotherapy significantly and sustainably improves skin elasticity and complexion radiance.

H. Aksamitova, S. Holcova, M. Hladicova, Anti-Aging Effekt und Hautverträglichkeit einer multivalenten Wirkstoffkombination in einer W/O Emulsion, Kosmetische Medizin 4.13

In zwei klinischen Modellen wurde der Effekt der zweimal täglichen Anwendung einer Hautcreme mit antioxidativen und biologisch hautaktiven kosmetischen Inhaltsstoffen dokumentiert. In beiden Teilstudien betrug die Anwendungsdauer 25-35 Tage, mit einer Zwischenauswertung nach 12-16 Tagen. Im ersten Teil der Studie wurden die Effekte der Creme auf Hauttrockenheit und Hautrötung an 50 Patienten (88% weiblich) mit allergischer Diathese klinisch dokumentiert. Beide Parameter verbesserten sich hochsignifikant, bei gleichzeitig ausgezeichneter Verträglichkeit und dem Fehlen unerwünschter Effekte. Im zweiten Teil Studie wurde an 20 Probandinnen mittels physikalischer Messverfahren der Effekt auf die Hauthydratation und Hautelastizität objektiviert. Beide Parameter verbesserten sich hochsignifikant und bestätigten damit eindrucksvoll die ärztliche Beobachtung.

M. Pflaumbaum, M. Farwick, M. Mentel, T. Köhler, J. Schild, Red algae delays chronological ageing, Personal Care April 2013 and January 2014

During the chronological ageing process epidermal skin stem cells become less effective, meaning that the renewing and repairing activity of the epidermis is reduced. Moreover, fewer elastic fibres are synthesised, thereby inducing a progressive loss of skin elasticity. The standardised, COSMOS certified Cyanidium caldarium red algae extract, unique in its capability to produce gamma aminobutyric acid (GABA) with proven combined activity on epidermal stem cells and elastic fibres, clearly retains youthful skin appearance and reduces the signs of chronological ageing.

A.F.P.M. Vloemans, Aspects of burn wound care in children, Dissertation at the Vrije Universiteit Amsterdam, van de Faculteit der Geneeskunde, 2013

This thesis focuses on burns in children, in particular on the epidemiology of children admitted to the Dutch Burn Centres, general therapeutic options to promote wound healing and on specific aspects of the conservative and surgical wound treatment. Since its foundation in 1974, research is performed in the Beverwijk Burns Centre on clinical and preclinical aspects of burn wound care. Initially this mainly concerned surgical wound care issues such as wound excision and skin grafting techniques in the context of burn survival¹. Later on, attention shifted to functional and cosmetic outcome of burn treatment, more specifically the treatment of partial thickness burns in children. Part of this thesis builds on this previous research. In the course of time research further expanded to other areas of burn care, such as the impact of burn disasters and selective bowel decontamination to diminish the risk of burn wound sepsis. Nowadays many studies are initiated, supported and co-ordinated by the Association of Dutch Burn Centres (ADBC).

I. Anderson, A. Hedvall, Relationships Between Skin Properties and Body Water Level, Master Thesis, Center for Technology in Medicine and Health, CTMH, Stockholm, Sweden, 2013

A need for a quantitative method to determine body water level has been identified by a team of Clinical Innovation Fellows at the Centre for Technology in Medicine and Health (CTMH). A reliable way to determine body water level would bring great benefits to the healthcare sector, where no optimal method is available at the time of writing. A possible solution is a sensor that would measure alterations in skin properties due to changes in total body water. CTMH has had an idea of such a sensor, which is

evaluated in this work. At an early stage of this evaluation process, it became clear that the research regarding correlations between skin properties and body hydration level was not sufficient to warrant the initiation of a sensor development process. Therefore, the main objective of this thesis became to investigate such correlations. An extensive literature review is presented, from which an experiment was developed. The experiment was performed on four human test subjects and involved measurements of skin thickness and elasticity parameters, before and after a weight loss of 3.2-3.7 % due to dehydration. The results showed clear decreases in skin thickness and indications of alterations in skin distensibility as well as in the skin's immediate elastic response to applied negative pressure. It could also be seen that skin at different body sites does not respond in the same way - calves showed more distinct results than thighs and volar forearm. The material provided in this thesis encourages further studies of the correlation between the mentioned properties and total body water. If a predictable correlation can be found, a sensor development process could start. A reliable way to determine body water level would bring great benefits to the healthcare sector, where no optimal method is available at the time of writing.

F. Ibrahim, N. Arifin, Z.H.A. Rahim, Effect of Orofacial Myofunctional Exercise Using an Oral Rehabilitation Tool on Labial Closure Strength, Tongue Elevation Strength and Skin Elasticity, J. Phys. Ther. Sci. 25: p. 11–14, 2013

Purpose: This paper reports the effects of orofacial myofunctional exercise using an oral cavity rehabilitation device on physiological parameters that include labial closure strength, tongue elevation strength, and the right and left facial skin elasticity. **Subjects:** Seventeen females aged forty years old and above were initially recruited for this study. Thirteen performed the exercise for 14 weeks, and only 11 subjects continued the exercise for another 10 weeks. **[Methods]** Subjects were instructed to perform an orofacial myofunctional exercise using an oral rehabilitative device for three minutes, for four times a day. The non-parametric Wilcoxon test was conducted to examine the significance of physiological parameters induced by the orofacial myofunctional exercise. The measurements of the physiological parameters were carried out weekly for 14 weeks and 24 weeks after the intervention for 13 and 11 subjects, respectively. **[Results]** The findings showed that there were significant improvements in the median values of all parameters before and after performing the orofacial myofunctional exercise for 14 weeks or more. **[Conclusion]** These results suggest that the orofacial myofunctional exercise can be regarded as a potential non-invasive therapy for improvements of the labial closure strength and tongue elevation strength, which indirectly provide support for the facial tissue, and enhances facial skin elasticity.

C. Uhl, D. Khazaka, Techniques for globally approved skin testing, Personal Care April 2013

In efficacy testing and claim support for cosmetic products, objective measurement systems became indispensable long ago, especially since subjective clinical assessments are often prone to bias and inter-observer variation. Without suitable instrumentation it is close to impossible to determine what a product is really doing for the skin. Those objective measurement methods and subjective evaluations are mutually dependent. No measurement can be performed without the subjective evaluation of the results by the user of such instrumentation. However, a pure subjective evaluation of the skin without appropriate measurement techniques is not able to achieve accurate results either. This relationship becomes clearer when looking for example at skin colour measurements. Subjectively, the human brain cannot process slight changes in colour, especially when the colours are not viewed side by side, but at different points in time. Instrumental measurement however will clearly detect such slight changes. The achieved result must then be interpreted in context with the expected outcome or the hypothesis. For this, you will always need a knowledgeable and experienced person because 'a fool with a tool is still a fool', as the late Albert Kligman used to say. This relationship between objective measurement and subjective evaluation is not only true for the determination of differences in skin colour, but also for all other skin measurement parameters important for the cosmetic industry.

P. Larmo, V.-P.D. Tech, A. Bonfigli, Lingonberry boosts hydration with anti-ageing benefits, Personal Care April 2013

Lingonberry (*Vaccinium vitis-idaea*) is a nutritious berry that is widely abundant and harvested in wild form in the Nordic countries. In recent years, it has gained a reputation as a health-promoting superfruit. Lingonberries are used in several ways in Scandinavian cuisine: as a side dish, garnish or components of desserts. Lingonberries are rich in vitamin C and E in polyphenols including anthocyanins, proanthocyanidins and flavonols. Seeds containing ≈30% oil by dry weight, represent about 1.5% of lingonberries' fresh weight.

L. Rigano, G. Baratto, A. Portolan, A. Semenzato, M. Meloni, A. Bonfigli, M. Sironi, S. Pieraccini, N. Lionetti, Development of a Powerful Tool for Investigation of the Structure and Functionality of

the Aqueous Phase of Cosmetics, IFSCC Magazine 3, 2013

Introduction: Among other problems, skin aging is associated with a loss of the capability of skin cells to answer and react to internal and environmental changes. Osmotic pressure and its equilibrium, involving the extracellular matrix and the cell inside, are key factors in maintenance of the homeostasis of living cells. Moreover, osmotic pressure differences between cells and their environment lead to the production/release of molecules (osmoprotectants) aimed at keeping the functional equilibrium of cells. Indeed, nature uses mainly such molecular structures for protecting cells, both vegetal and animal, from uncontrolled development of pressure differences between the inside and outside of cell membranes [1, 2]. This economy in the creativity of nature is due to the fact that such protection is exerted on the hydrophilic peptide bonds while different substituents which are lipophilic are not easily exposed to the hydrolytic action of water.

L. Marini, G. Crisman, V. Trashlieva, A. Krunic, P. Polizos, A. de Faveri, Using photobiomodulation to treat premature ageing, Prime March 2013

Abstract: Background and objective: Facial skin shows signs of ageing earlier than other anatomical areas. Predominantly non-thermal infrared A (IR-A) light emitting diode (LED) photobiomodulation has proven effective in triggering intracellular photobiochemical reactions leading to new collagen synthesis and reduction of matrix metalloproteinase-1- (MMP-1). The objective of this study was to assess the effectiveness, safety, and tolerability of a sequentially combined, continuous (CW) 835 ± 5 nm and pulsed emission (PW) 875 ± 5 nm LED facial mask array in the treatment of facial premature ageing.

B.Y. Kim, J.W. Choi, K.C. Park, S.W. Youn, Sebum, acne, skin elasticity, and gender difference - which is the major influencing factor for facial pores?, Skin Res Technol. 2013 Feb;19(1): e45-53

Background: Enlarged facial pores have been esthetic problems and have become a matter of cosmetic concern. Several factors are supposed to be related to the enlargement of facial pores, although scientific evaluations were not performed yet. Objective: To assess the correlation between facial pores and possible relating factors such as age, gender, sebum secretion, skin elasticity, and the presence of acne, using objective bioengineering instruments. Methods: Sixty volunteers, 30 males and 30 females, participated in this study. Various parameters of facial pores were assessed using the Robo Skin Analyzer. The facial sebum secretion and skin elasticity were measured using the Sebumeter and the Cutometer, respectively. These data were compared and correlated to examine the possible relationship between facial pores and age, sebum secretion and skin elasticity, according to gender and the presence of acne. Male gender and the existence of acne were correlated with higher number of facial pores. Sebum secretion levels showed positive correlation with facial pores. Results: The R7 parameter of skin elasticity was negatively correlated with facial pores, suggesting increased facial pores with decreased skin elasticity. However, the age and the severity of acne did not show a definite relationship with facial pores. Male, increased sebum and decreased skin elasticity were mostly correlated with facial pore development. Conclusion: Further studies on population with various demographic profiles and more severe acne may be helpful to elucidate the potential effect of aging and acne severity on facial pores.

H. Ohshima, S. Kinoshita, M. Oyobikawa, M. Futagawa, H. Takiwaki, A. Ishiko, H. Kanto, Use of Cutometer area parameters in evaluating age-related changes in the skin elasticity of the cheek, Skin Research & Technology, 2013 Feb;19(1): e238-42

Background/Aim: The decrease of skin elasticity on the cheek is a major concern to woman. The Cutometer has been widely used to evaluate skin elasticity and its change with aging. Cutometer parameters derived from one suction have been traditionally used to evaluate skin elasticity, and few reports describe the use of multiple suctions to obtain parameters to assess the skin elasticity of the cheek. To find the most suitable Cutometer parameter that reflects age-related changes in the elasticity of cheek skin using multiple suctions. Methods: The cheeks of 32 healthy Japanese women (mean age, 42.3 years) were assessed using the Cutometer MPA580 by measuring the skin mechanical parameters R0-R9, F2 and F3. Parameters F2 and F3 were obtained by the multiple suction method. The relationship between age and these parameters were then examined. Result: Significant negative correlations were found between the age of subjects and R2, R3, R7, R8 and F3. Of these, the correlation coefficient was best between age and F3 ($r = -0.641$), followed R8 ($r = -0.603$). Conclusion: Although R parameters have been used to evaluate skin elasticity, our study showed that F3 parameters derived from multiple suctions appear to be suitable for evaluating the elasticity of cheek skin, since this parameter is less influenced by environmental factors compared with R parameters.

G. Neudahl, Rating of butters on TEWL, moisturisation and elasticity, Personal Care February 2013

Butyrospermum Parkii (Shea) Butter (shea butter) is widely used in personal care and cosmetics as a moisturiser and emollient. While shea butter has grown in importance within the industry, there is little in the way of clinical studies showing its efficacy in skin care. Much of the information is based upon its composition or anecdotal in nature. Nonetheless, most cosmetic chemists are convinced that shea butter works, and works very well, as a moisturiser, improving the lipid barrier function. We believe that many other naturally occurring butters, such as Garcinia Indica Seed Butter (kokum butter), Mangifera Indica (Mango) Seed Butter (mango butter) and Theobroma Cacao (Cocoa) Seed Butter (cocoa butter), may be equal to, or better than, shea butter for reduction in transepidermal water loss (TEWL). A study was therefore undertaken to explore the effects of these butters for cosmetic use on transepidermal water loss, skin moisturisation and skin elasticity. The primary objective of the study was to determine the efficacy of these butters in skin care applications when incorporated in a standard formulation.

J.W. Choi, S.H. Kwon, C.H. Huh, K.C. Park, S.W. Youn, The influences of skin visco-elasticity, hydration level and aging on the formation of wrinkles: a comprehensive and objective approach, Skin Research & Technologie, 2013 Feb;19(1): p. 349-55

Background: Various skin parameters including skin visco-elasticity and hydration level affect the formation of wrinkles. Objective: The aim of this study was to investigate the comprehensive and objective relationship between age, skin visco-elasticity, hydration level, and the occurrence of wrinkles using bioengineering equipments for the first time. Methods: A total number of 97 healthy women were included in this study. Age, Fitzpatrick skin type, skin mechanical parameters obtained with Cutometer(R0~R9), hydration level measured with Corneometer, as well as wrinkle parameters (SEsm, SEr, SEsc, and SEw) assessed with Visioscan, were analyzed with the Pearson's correlation test. Results: The skin fluidity (R6) increased while the elastic recovery ratio (R7) decreased with the age. The wrinkle parameter (SEw) also increased with the age. The higher skin hysteresis values (R4 and R9) coincided with the higher SEw values. Skin hydration significantly lowered the hysteresis (R9), the wrinkles (SEw), and the depth of wrinkle furrows (R3mr). Conclusion: The elderly have less elastic skin and more wrinkles. Skin hysteresis most closely related with the degree of wrinkles. Drier skin showed more wrinkles and deeper furrows, with wider intervals. On the basis of these objective findings, we propose several skin parameters associated with wrinkles, and hypothesize the mechanism of wrinkle generation.

H. Klosová, J. Štětinský, I. Bryjová, S. Hledíkc, L. Klein, The objective evaluation of the effect of autologous platelet concentrate on post-surgery scarring in deep burns, Burns, January 2013

Introduction: The healing of grafted areas after surgical treatment of deep burns frequently generates mutilating scars and rises the risk of subsequent scar hypertrophy. Scar assessment based on clinical evaluation is inherently subjective, which stimulates search for objective means of evaluation. Objective: The aim of this study was to objectively evaluate the effect of using autologous platelet concentrate (APC) in combination with split thickness skin grafting (STSG) on scarring processes following surgery of deep burns as compared with application of sole STSG. Method: Selected viscoelastic properties of 38 scars on 23 patients in total were examined using the Cutometer MPA 580 under controlled conditions for long-term outcomes 1, 3, 6 and 12 months after the surgery following deep burns. Results: The findings of this study suggest that the STSG+APC combination reduces the time of scar viscoelastic properties recovery as compared with application of the sole STSG. This was statistically significant for viscoelastic parameters R2 and Q1. Conclusion: APC has been advocated to enhance scarring after surgery of deep dermal and full thickness burns. We objectively demonstrated that the viscoelastic properties of scars treated with STSG+APC combination return more rapidly to the plateau state than areas treated with STSG only.

M. Riedel, Einfluss des Silikongels DERMATIX™ auf standarddiessierte, operative Narbenbildung am Thorax, Disseration der Klinik für Hals-, Nasen- und Ohrenheilkunde und Plastische Operationen der Universität zu Lübeck, Januar 2013

Jeder invasive Eingriff, bei dem ein Hautschnitt durchgeführt wird, ist mit einer anschließenden Wundheilung und Narbenbildung verbunden. Nach wie vor stellt die minimalste Ausbildung und Ausprägung von Narben nach Eingriffen in der plastischrekonstruktiven Chirurgie eines der entscheidenden Erfolgskriterien, sowohl für den Patienten, als auch für den behandelnden Arzt dar. In diesem Teilbereich der Chirurgie steht für Patienten in vielen Fällen eine kosmetische Korrektur der als störend empfundenen Narbe im Vordergrund. Die Prävention und Therapie hypertropher, keloider oder kosmetisch unbefriedigender Narben ist eine aufwendige, langwierige und nicht selten unbefriedigende Prozedur.

C. Schrammek-Drusio, Haut- und Gesichtsdiaagnosen – eine Kernkompetenz jeder Kosmetikerin, dermatologie, S. 32-33

Neben dem Dermatologen ist eine kompetente Kosmetikerin die Expertin in Sachen Hautpflege. Doch wodurch zeichnet sie sich aus? Selbstverständlich ist ein umfassendes theoretisches und praktisches Fachwissen erforderlich, komplettiert durch stetige Weiterbildung. Doch wenn Kunden ins Institut kommen, möchten sie auch schnelle Analyseergebnisse und Behandlungspläne erfahren. Grundlage hierfür ist die professionelle Hautdiagnose. Denn alle sich anschließenden Fragen, etwa welche Produkte und Behandlungen in der Kabine angewendet werden, wie das individuelle Pflegekonzept aussehen soll und welche Präparate sich für die Heimpflege empfehlen, hängen von dem Ergebnis der Hautanalyse ab. Für die kosmetische Praxis bedeutet dies das Erkennen und Einordnen des Hautgrundbildes, des Hautzustandes und der Anomalien bzw. unerwünschten Hautveränderungen.

P. Moortgat, C. Laifaire, L. de Cyper, M. Antonissen, J. Meirte, K. Maertens, The effects of radial shock wave therapy on water vapor permeability rate and elasticity of burn scars: a case series report, ISBI congress in Edinburgh

Nowadays, non-invasive or minimally-invasive treatments are preferred for the most burn patients. Burn surgery often leaves important functional and aesthetic sequelae, which can reduce the patients quality of life (1). Research on biomechanics and biophysics in general is introducing new non-invasive therapies.

H.-B. Pyun, M. Kim, J. Park, Y. Sakai, N. Numata, J.-Y. Shin, H.-J. Shin, D.-U. Kim, J.-K. Hwang, Effects of Collagen Tripeptide Supplement on Photoaging and Epidermal Skin Barrier in UVB-exposed Hairless Mice, Prev Nutr Food Sci, Vol 17, p. 245-253 (2012)

Collagen tripeptide (CTP) is a functional food material with several biological effects such as improving dry skin and wound and bone fracture healing. This study focused on the anti-photoaging effects of CTP on a hairless mouse model. To evaluate the effects of CTP on UVB-induced skin wrinkle formation *in vivo*, the hairless mice were exposed to UVB radiation with oral administration of CTP for 14 weeks. Compared with the untreated UVB control group, mice treated with CTP showed significantly reduced wrinkle formation, skin thickening, and transepidermal water loss (TEWL). Skin hydration and hydroxyproline were increased in the CTP-treated group. Moreover, oral administration of CTP prevented UVB-induced MMP-3 and -13 activities as well as MMP-2 and -9 expressions. Oral administration of CTP increased skin elasticity and decreased abnormal elastic fiber formation. Erythema was also decreased in the CTP-treated group. Taken together, these results strongly suggest that CTP has potential as an anti-photoaging agent.

J. Lozza, D. Schmid, E. Belser, F. Züllig, Crocus bulb extract prompts epidermis/dermis crosstalk, Personal Care November 2012

Interactions between growth factors, skin cells and the extra-cellular matrix (ECM) are essential for tissue regeneration in wound healing as well as intrinsic ageing of the skin. Wound healing is a complex process comprising different phases such as inflammation, proliferation and remodelling, all of which require growth factors to regulate the fine balance between the synthesis of extracellular matrix and its degradation by proteases. Intrinsic skin ageing is accompanied by an accumulation of reactive oxygen species (ROS) due to an impaired mitochondrial oxidative metabolism.

G.E. Piérard, T. Hermanns-Lê, C. Piérard-Franchimont, Scleroderma: skin stiffness assessment using the stress-strain relationship under progressive suction, 2012 Informa Healthcare UK

In recent decades, various instrumentations were used for assessing the *in vivo* viscoelasticity of skin. The methods relied on various approaches including the uniaxial and biaxial stretching, torsion, elevation, indentation, ballistometry, and suction procedures. The time-honored suction method aims at measuring the skin deformation caused by and loss of pressure exerted over a defined skin area. Skin deformation occurs as a function of the suction force, its time of application, and the surface area of the stressed skin. It is regarded as the *in vivo* expression of the overall skin viscoelasticity.

I. Matejková, J. Cheel-Horna, M. Moravcová, T. Muthný, New coffee phytocomplex improves skin elasticity, November 2012 Personal Care

Skin, as an outer shell, protects the body from harmful external influences and from water and heat loss. Premature ageing is not only a health issue but also a social problem because of the development of visible changes such as wrinkles, dryness and loss of elasticity. These and other changes in the quality of the skin are partly the result of chronological ageing (i.e. they are intrinsic). Yet external influences (premature/extrinsic ageing) can also have a major impact on skin ageing. These external factors include smoking, pollution, toxic chemicals, and lifestyle (physical activity, diet, etc.) But

the most significant factor (at a rate of 80%-90%) of all that contributes to the development of changes typical for premature ageing is UV rays.

N. Waranuch, S. Maphanta, W. Wisuitiprot, Effect of microparticles containing green tea extract on facial skin improvement, ISBS Copenhagen 2012

To clinically evaluate an effectiveness of skin cream containing green tea extract loaded chitosan microparticles for facial wrinkle treatment. Method: Twenty-nine volunteers were randomly assigned to apply skin cream containing 1% green tea extract loaded chitosan microparticles (GT-Cs) and a placebo cream on each of their half faces for 8 weeks. Skin elasticity was evaluated by using Cutometer and the photographs of each half faces were also compared. Skin moisture and skin irritation were determined by Corneometer and transepidermal water loss (TEWL) respectively.

A. Osmola-Mankowska, A. Danczak-Pazdrowska, K. Olek-Hrab, W. Silny, A. Polanska, A. Sadowska-Przytacka, Hf-usb and cutometer in monitoring of sclerodermoid cgvhd patients with joint contractures, ISBS Copenhagen 2012

The purpose of this study was to illustrate the skin sclerotic lesions of two chronic sclerodermoid GvHD patients using two noninvasive methods. Two adult patients (23 year-old female and 52 year-old male) suffering from chronic sclerodermoid GvHD (cGvHD) were involved in the study. Typical sclerotic skin lesions affected their upper and lower extremities leading to dermatogenic contractures and difficulty in walking. Patients were treated with the medium dose regimens of UVA1 up to total dose 1000J/cm² and 1380J/cm² respectively, delivered by GP-24H (Cosmedico, Medical Systems, Germany).

L. Palma, L. Tavares, C. Monteiro, M.J. Bujan, L.M. Rodrigues, Diet water seems to influence skin hydration and biomechanics, ISBS Copenhagen 2012

The feeding habits of a given population were studied, specially regarding its daily regular water intake (diet and beverages) and tried to relate with those skin biometrical variables. This transversal study involved forty healthy volunteers, female, (mean 26,45 ± 7,95 y.o.), after informed written consent. All procedures respected Helsinki principles and respective amendments. A Feeding Frequency Questionnaire (FFQ) previously validated for the Portuguese population was applied. Transepidermal water loss (TEWL, Tewameter TM300), epidermal hydration (Corneometer CM825) and skin's biomechanics (Cutometer SEM575) were the cutaneous variables chosen.

G. Spongiatto, C. Mello-Sampayo, M.M. Pereira, H. Silva, M.F. Otuki, B.S. Lima, L.M. Rodrigues, Studying the impact of age in the rat's skin physiology, ISBS Copenhagen 2012

Animal models have been useful to study specific mechanisms affecting human skin. It is the case of ageing and the micromechanical changes determining wrinkle in UV irradiated mice. These models allowed to perceive that ageing involved many peculiar mechanical responses that cannot be explained by homogeneous deformation of the skin. Nevertheless, the different life span of these species also affects the processes and this is a major aspect to consider. This project aimed to compare the skin properties of two Wistar rats groups with different ages – young-adult rats (n=7, 20-24 week-old, weight 379 ± 30g) and old-adult rats (n=5, 48-72 week-old, weight 520±60g).

L. Tavares, L. Palma, O. Santos, M.A. Almeida, M.J. Bujan, L.M. Rodrigues, Looking for a global indicator of obese skin function, ISBS Copenhagen 2012

The impairment of water balance and biomechanical behaviour of the skin seems to be consistently present in obesity, and probably related with most frequent signs and symptoms. The present work aimed to search for a global body mass index (BMI) related indicator for this functions. 51 female patients, aged between 20 and 46 (mean 29 ± 7) years old, with no relevant pathologies except the overweight or obesity were involved. All procedures respected Helsinki principles and respective amendments. The Quetelet index (BMI) was calculated for each volunteer. Measurements took place under controlled conditions, in different anatomical areas (face; breast; and abdomen) and included skin hydration (Corneometer CM825), barrier function (Tewameter TM300) and biomechanical descriptors (Cutometer MPA580 and Reviscometer).

V. Zorin, A. Zorina, V. Cherkasov, R. Deev, A. Isaev, A. Nerobeev, E. Krechina, A. Alikova, S. Donetskaya, Application of autologous dermal fibroblasts for correction of age-related changes of skin; the year of clinical observations, ISBS Copenhagen 2012

Basic molecular mechanisms, associated with the main cell population of the dermis – fibroblasts, are the basis of skin aging. The number of functionally active fibroblasts in the skin and their bio-synthetic activity decreases with age thus augmentation of their population with the synthetically-active cells is accepted as a one of most effective methods. In the common practice of aesthetic

medicine only two dermal autofibroblasts-based technologies are allowed: SPRS-therapy (Human Stem Cells Institute, Russian Federation ; since July 2010) and LAVIVTM (Fibrocell Science, Inc ; USA ; since July 2011).

*S. Pérez Damonte, M. Baptista, M.A. Moyano, M. Nunez, A. Segall, **The effect of a lipoic acid on the skin: biomechanical properties**, IFSCC 2012, 15-18 Oct. 2012, Sandton, South Africa*

α -lipoic acid or the reduced form dihydrolipoate are potent scavengers of hydroxyl radicals, superoxide radicals, peroxy radicals, singlet oxygen and nitric oxide with anti-inflammatory properties. Previously, we have demonstrated in vivo the effect of α -lipoic acid (0.5%) and ascorbic palmitate (0.2%) in the improvement of the skin barrier and diminished the redness in sensitive skin. The aims of this study were to analyze the clinical efficacy of formulations containing α -lipoic at 2.5% and 5.0% by measuring in vivo the biochemical parameters of transepidermal water loss TEWL and the color of the skin initially and after the application.

*M. Farwick, J. Schild, M. Mentel, U. Maczkiewitz, T. Köhler, **Cyanidium caldarium algae extract: a multifunctional anti-aging cosmetic ingredient with profound in vitro activity on epidermal stem cells and dermal fibroblasts**, IFSCC 2012, 15-18 Oct. 2012, Sandton, South Africa*

The presented studies show unique and multifunctional anti-aging activity of an aqueous *Cyanidium caldarium* algae extract enriched in 4-aminobutyric acid (GABA). Activities were demonstrated in different in vitro cell culture models, and further substantiated in an in vivo cosmetic study. In order to elucidate the molecular mechanism of the *Cyanidium caldarium* extract, several in vitro assays were conducted on different skin cell culture models. The extract proved to be highly effective on all in vitro models employed, including stem cell-like epidermal keratinocyte progenitor cells, human dermal fibroblasts and reconstituted epidermis models. Results from in vitro gene expression experiments suggest that *Cyanidium caldarium* extract exerts several beneficial nutritional and protective effects on the molecular level, thereby promoting (i) maintenance of the skin's stem cell potential, (ii) overall strengthening of the dermal extracellular matrix architecture, and (iii) protection from UV-induced stress.

*J. Hosoi, M. Ooba, H. Miyake, T. Hiroi, E. Hara, C. Matsumoto, S. Amano, **New approach to anti-aging skincare by mechanism-based improvement of facial sagging: role of subcutaneous tissues**, IFSCC 2012, 15-18 Oct. 2012, Sandton, South Africa*

Many skincare treatments have been developed to improve superficial aging-related changes of facial skin, such as fine wrinkles and pigmentation, but such treatments have had little impact on more substantial changes of facial morphology, such as sagging, the formation of deep grooves around the mouth (nasolabial folds), loss of sharpness of facial outline, decrease of eye fissure size, fixed deep wrinkles and so on.

*O. Freis, G. Perie, A. Rathjens, **Skin mechanical and optical properties in function of aging**, IFSCC 2012, 15-18 Oct. 2012, Sandton, South Africa*

The evolution of skin biomechanical and optical properties in function of aging and/or photo-aging is one of the main targets of cosmetic and dermatological research. Many different non-invasive devices using alternative measuring approaches such as stretching, torsion, indentation, and suction have been developed for biomechanical properties evaluation. The measurements of skin deformation after suction of torsion are the most widely used techniques in cosmetic research.

*D. Tamburic, I. Macijauskaite, R. Parton, S. Williams, **Assessing the efficacy of high-flavanol cocoa extract: does higher concentration work better?**, IFSCC 2012, 15-18 Oct. 2012, Sandton, South Africa*

It is well documented that antioxidants have a range of positive effects on human skin. However, there is a problem with their delivery to the site of action, an issue shared with most topical actives. Due to their chemical nature, antioxidants are also inherently unstable ingredients.

*W. Voss, I. Bunge, **Dermatological Reports on Cosmetics: Intentions and Possibilities**, IFSCC 2012, 15-18 Oct. 2012, Sandton, South Africa*

Dermatological reports and claims in accordance with scientific criteria are of decisive value for the safety and efficacy of cosmetics. Whether a cosmetic product is well tolerated or causes irritations or allergic reactions must be proven by dermatological tests. The value of dermatological reports directly depends on the respectability of the commissioned dermatologists. Pitfalls occur, whenever non-qualified scientific results are generously used for advertising campaigns like "dermatologically tested", "allergy tested", "hypo-allergen" etc. Additionally a lot of reports are scientifically insufficient.

Dermatological reports on cosmetics therefore must be valid in methodology and practical execution. With Dermatest you benefit from more than 30 years of testing experience and dermatological expertise.

C.J. Chin, J.H. Franklin, B. Turner, R.V. Moukarbel, S. Chandarana, K. Fung, J. Yoo, P.C. Doyle, A novel tool for the objective measurement of neck fibrosis: validation in clinical practice, J Otolaryngol Head Neck Surg. 2012 Oct;41(5): p. 320-6

Background: Radiotherapy is commonly used to treat neoplasms of the head and neck, and fibrosis is a known side effect. The Cutometer is a device that quantifies properties of the skin. The goal of the study was to validate the Cutometer in normal neck tissues and then quantify fibrosis in radiated necks. Methods: We performed a prospective study of 251 patients. The elasticity and stiffness parameters were recorded. Control patients were compared to determine the correlation between their left and right sides. Next, the treatment groups were compared using a nonparametric test (Kruskal-Wallis). Results: We found a significant correlation between the left and right sides of the control patients' necks, supporting the view that the Cutometer provides reproducible measurements in the normal neck. Furthermore, the Cutometer demonstrated reduced elasticity in necks treated with radiation, surgery/radiation, and chemoradiation. No significant difference in stiffness was seen. Conclusion: The Cutometer may serve as a valuable and valid tool for the measurement of neck skin elasticity. Radiated patients have a quantifiable decrease in their skin elasticity.

N.M. Atlan, E. Perrodeau, G. Georgesco, R. Khallouf, L. Martin, L. Machet, Skin tightening induced by fractional CO(2) laser treatment: quantified assessment of variations in mechanical properties of the skin, J Cosmet Dermatol. 2012 Sep; 11 (3): 201-6

Background: Certain authors have reported the efficacy of fractional resurfacing laser treatment in patients with photodamaged skin resulting in skin tightening of treated area. Objective: To assess skin tightening after CO(2) fractional resurfacing laser treatment by measuring variations in mechanical properties in treated areas. Dermal elasticity was measured using suction applied with an in vivo skin elasticity meter (Cutometer®). METHODS: A prospective observational study was undertaken from January 2007 to August 2009. Laser treatment was performed with the SmartXide Dot® (Deka®, Firenze, Italy) CO (2) fractional resurfacing device. Patients were offered quantified analysis using the Cutometer® before and after treatment.

M. Rull, C. Davi, E. Canadas, J. Cebrián, Reversing signs of ageing in mature skin, Personal Care September 2012

Due to the effect of several internal and external factors across the years, mature skin is physiologically different from its own young predecessor. It is clear that skin continuously suffers aggressions like photoageing, environmental factors, chronological ageing and hormonal deficiency, which end up in skin deep alterations including a loss of elasticity and firmness, an increase of flaccidity and sagging, and a thicker and atrophic skin.

D. Whitby, J. Allen, Facing up to ageing: what makes us appear old, Personal Care, June 2012

Over many hundreds of years one of the key areas for the application of personal care products has been the face. The human face is exposed to the elements for most of the year, whether it be bright sunshine in the summer or cold, dry winds in the harshest of winters. It also bears the brunt of other environmental exposure from, for example, traffic fumes, cigarette smoke, etc., so suffers from the effects of both intrinsic and extrinsic ageing. Facial skin can also, through its colour and expressions, reflect many emotions and feelings. Blushing for example, resulting from dilation of blood vessels in the skin, can show embarrassment. So the face signals many different things in the way it appears to the casual observer.

P. Moussou, L. Danoux, F. Henry, Inflammaging: the new theory in skin ageing, Personal Care June 2012

Several research studies on aged people carried out by different research teams have highlighted the existence of a new theory in skin ageing named "inflammaging". Skin inflammaging results from a combination of several deleterious pathways inducing a vicious cycle of micro-inflammation. A cascade of inflammatory responses results in chronic low level inflammation and leads to accumulation of molecular and cellular damages, well-known sources of skin ageing which can affect the appearance of the skin. Laboratoires Sérobiologiques (LS) – now with Beauty Creations – developed the first cosmetic active - a bark extract from *Eperua falcate* – which targets inflammaging in a comprehensive way, by addressing the consequences of its deleterious effects on the skin in a particularly efficient manner.

J. Yoo, S. Chandarana, K. Fung, J.H. Franklin, A.C. Nichols, P.C. Doyle, The use of autologous platelet and plasma products in salvage neck dissections: a prospective clinical study evaluating early and late wound healing, J Biol Regul Homeost Agents, Apr-Jun 2012;26(2 Suppl 1): p. 63S-69S

Objectives: To evaluate the effect of autologous platelet and plasma adhesives (APA) on postoperative drainage and soft-tissue fibrosis following neck dissections. Design: This was a blinded comparative prospective cohort study done as two parts: part one evaluated early post-surgical outcomes and part two evaluated late tissue fibrosis. Method: Salvage neck dissections were stratified into two groups based on severity of prior treatment. High risk patients were defined as those who had previously undergone chemoradiation therapy and autologous platelet adhesives were administered to the surgical wound intraoperatively. The low risk group consisted of patients undergoing salvage neck dissections following radiation only and acted as controls. Part one evaluated postsurgical wound drainage as the primary outcome as well as length of hospital stay and complications. Part two evaluated late postoperative tissue fibrosis by comparing neck skin using the Cutometer. R2 and F0 were the specific Cutometer parameters for quantifying the viscoelastic properties of the skin. Results: Postoperative wound drainage was significantly less (253.7 vs. 345.8) in the autologous platelet adhesive group as compared to the control group (p less than 0.03). Length of stay in the APA group versus the control group was 3.13 and 3.86 days respectively (p less than 0.004). Both R2 and F0 measurements showed improved viscoelastic properties of the skin in the APA group (R2 p less than 0.05, F0 p less than 0.05).

J. Bhat on behalf of S. Lanigan, C. Whitehurst, J. Birch, A Single -Blinded Randomised Controlled Study to Determine the Efficacy of Omnilux Revive Facial Treatment in Skin Rejuvenation, Lasercare clinics, Birmingham, UK

The use of light technology in dermatology has grown rapidly in the last decade. There have been many developments in the use of light for the treatment of a wide variety of skin conditions from nonmelanoma skin cancers^{1, 2,3,4} to facial resurfacing for crows feet and photo damaged skin.^{5, 6,7} Historically the use of CO₂ lasers has been the mainstay for facial resurfacing and skin rejuvenation since the mid 1990s. It is accepted that photoageing and the subsequent visible effects is in part due to the breakdown of collagen by metalloproteinases and oxidative damage induced by exposure to UV light.⁸ Subsequent treatment with CO₂ lasers improves these visible signs through tissue remodelling after cutaneous injury. However the effectiveness of this technique is limited by prolonged healing times, discomfort during the procedure (requiring local anaesthesia) and the risk of complications such as pigmentary disorders.⁸ The popularity of laser resurfacing has therefore decreased, while the demand for new procedures that provide optimum results with minimal side effects has continued regardless. Light Emitting Diode (LED) technology has been at the forefront of new light source development in recent years. LED technology offers a new vehicle for the delivery of non-coherent light in arrays of varying shape, suitable for the treatment of large surface areas. Whelan H et al have repeatedly proven the effectiveness of LED technology in delivering an optimum light dose consistently demonstrating the efficacy of LED therapy in tissue regeneration.^{9, 10.}

M. Keck, H.F. Selig, D.B. Lumenta, L.P. Kamolz, M. Mittlböck, M. Frey, The use of Suprathel(®) in deep dermal burns: first results of a prospective study, Burns, 2012 May;38(3): p. 388-95

Introduction: While autologous skin grafting has been the standard for coverage of full-thickness areas, several options for deep-partial-thickness defects exist. With regard to economising donor sites, we compared a copolymer based on DL-lactid acid (Suprathel(®)) as temporary wound dressing with autologous skin, and analysed time to healing and scar quality in matched areas of deep-partial-thickness burn. Methods: We recruited 18 patients with a median age of 45 years (range: 25-83 years), for this prospective, non-blinded controlled non-inferiority study, suffering from deep-partial-thickness burns from November 2009 to July 2010. After early tangential excision, matched deep-partial-thickness areas were covered with 1:1.5 meshed autologous skin grafts and the copolymer for direct intra-individual comparison. Scars were evaluated by means of the Vancouver Scar Scale (VSS), the Patient and Observer Scar Assessment Scale (POSAS) and suction cutometry (MPA 580, Courage and Khazaka Electronic GmbH, Cologne, Germany) on days 30 and 90, postoperatively. Results: Fifteen days after surgery, complete wound closure was present in 44.4% (8/18) of all areas covered with copolymer and 88.9% (16/18) in the split-thickness skin graft (STSG) area (p=0.008). Evaluation of the total VSS, POSAS and cutometry satisfied the criterion of non-inferiority for Suprathel(®) on day 30. Ninety days after surgery, only the Observer Scar Scale showed that Suprathel is non-inferior to STSG, albeit the mean total VSS and Patient Scar Scale were better in Suprathel(®) areas. Conclusion: Suprathel(®) represents a solid, reliable epidermal skin substitute with longer healing times in comparison to skin grafts but comparable results concerning early scar formation. Suprathel(®) can serve as a tool in treatment portfolio for adult patients suffering from deep dermal burns. Especially in

patients with extensive burns, Suprathel® can be used to cover the deep dermal burn wounds to save STSGs and its donor sites for the coverage of full-thickness burned areas.

R.C. Spitale, M.Y. Cheng, K.A. Chun, E.S. Gorell, C.A. Munoz, D.G. Kern, S.M. Wood, H.E. Knaggs, J. Wulff, K.D. Beebe, A.L.S. Chang, Differential effects of dietary supplements on metabolomic profile of smokers versus non-smokers, Genome Medicine 2012, 4:14

Cigarette smoking is well-known to associate with accelerated skin aging as well as cardiovascular disease and lung cancer, in large part due to oxidative stress. Because metabolites are downstream of genetic variation, as well as transcriptional changes and post-translational modifications of proteins, they are the most proximal reporters of disease states or reversal of disease states. Methods: In this study, we explore the potential effects of commonly available oral supplements (containing antioxidants, vitamins and omega-3 fatty acids) on the metabolomes of smokers (n = 11) compared to nonsmokers (n = 17). At baseline and after 12 weeks of supplementation, metabolomic analysis was performed on serum by liquid and gas chromatography with mass spectroscopy (LC-MS and GC-MS). Furthermore, clinical parameters of skin aging, including cutometry as assessed by three dermatologist raters blinded to subjects' age and smoking status, were measured. Results: Long-chain fatty acids, including palmitate and oleate, decreased in smokers by 0.76-fold (P = 0.0045) and 0.72-fold (P = 0.0112), respectively. These changes were not observed in non-smokers. Furthermore, age and smoking status showed increased glow (P = 0.004) and a decrease in fine wrinkling (P = 0.038). Cutometry showed an increase in skin elasticity in smokers (P = 0.049) but not in non-smokers. Complexion analysis software (VISIA) revealed decreases in the number of ultraviolet spots (P = 0.031), and cutometry showed increased elasticity (P = 0.05) in smokers but not non-smokers. Conclusions: Additional future work may shed light on the specific mechanisms by which long-chain fatty acids can lead to increased glow, improved elasticity measures and decreased fine wrinkling in smokers' skin. Our study provides a novel, medicine-focused application of available metabolomic technology to identify changes in sera of human subjects with oxidative stress, and suggests that oral supplementation (in particular, commonly available antioxidants, vitamins and omega-3 fatty acids) affects these individuals in a way that is unique (compared to nonsmokers) on a broad level.

Marine ingredients focus: a look at marine products, Personal Care, April 2012

The sea holds a huge amount of power and influence in the minds of humans. At once mysterious, alluring and terrifying, Earth's oceans also represent the birthplace of all life, both plant and animal, and are increasingly becoming a rich source of medical and personal care ingredients. In personal care, the popularity of marine-derived cosmetic ingredients is not only due to their efficacy, but also the connotations they come with. Consumers associate the sea with purity and freshness, two extremely important characteristics for personal care products, and skin care in particular. This is a deeply-ingrained association that has lead people to use sea flora as a skin care ingredient for many centuries as well as in soap, cleansers, and more recently shaving foams and shampoos.

M. Mateu, C. Davi, E. Canadas, A. Soley, R. Delgado, Effective ingredients from marine biotechnology, Personal Care, April 2012, p. 53-57

Cosmetic scientists are developing new ways to identify new natural sources, which enable innovative compounds with excellent cosmetic properties such as firming, restructuring, moisturising or anti-wrinkles. Biotechnology encompasses the use of microorganisms to come up with novel active ingredients that fulfil two of the demands that are leading trends in the cosmetic industry: natural and sustainable. Besides, complex molecules can be obtained, which otherwise would be impossible due to technical or economic limitations. Our approach is to take advantage of biotechnology to develop cosmetic ingredients which are naturally occurring in non-genetically modified organisms, through sustainable production while preserving the environment, since there is no harvesting nor extracting from nature.

E. Loing, T. Suere, E. Lamarque, Trifluoroacetyl-Tripeptide-2 to Target Senescence for Anti-Aging Benefits, Cosmetics & Toiletries, Vol. 127; No.4/April 2012

Skin aging is characterized by progressive changes in the regulation of cellular processes and miscommunication between cells and their immediate environment, the extracellular matrix (ECM). These malfunctions, which may result from physiological and/or environmental events, are most notably characterized by the increased activities of metalloproteinases (MMPs) and the reduced synthesis of their endogenous inhibitors, i.e. tissue MMP inhibitors (TIMPs), as well as the reduced biosynthesis of major ECM protein. As a result, the extracellular matrix is no longer renewed and the skin shows the effect of aging.

SARISE BIO – Eine 100% natürliche Anti-Aging-Innovation, impag Produkt Information, COSSMA 4/2012

SARISE BIO ist ein innovativer, 100% natürlicher Anti-Aging-Wirkstoff, ECOCERT-zertifiziert und frei von Konservierungsmitteln. Der Phytokomplex wird aus den Stielen der Sauerkirsche und den Blättern des Sommerbohnenkrautes gewonnen. Reduzierter Zellmetabolismus und oxidativer Stress sind die beiden Hauptursachen der Zellalterung. SARISE BIO ist in der Lage, gegen diese beiden Auslöser anzukämpfen. Die Wirkung wurde in klinischen Studien bestätigt. Durch eine spezielle Produktionsmethode enthält SARISE BIO einen hohen Gehalt an aktiven Molekülen wie Triterpenoide (Ursolsäure), Rosmarinsäure und Flavonoide (Quercetin). SARISE BIO neutralisiert direkt reaktive Sauerstoffspezies (ROS). Durch die Stimulation der mitochondrialen Aktivität und die dadurch bedingte Reduktion von intrazellulärem oxidativem Stress, besitzt der Wirkstoff einen zusätzlichen positiven Effekt.

A. Firooz, B. Sadr, S. Babakoohi, M. Sarraf-Yazdy, F. Fanian, A. Kazerouni-Timsar, M. Nassiri-Kashani, M.M. Naghizadeh, Y. Dowlati, Variation of Biophysical Parameters of the Skin with Age, Gender, and Body Region, The Scientific World Journal, Volume 2012

Background: Understanding the physiological, chemical, and biophysical characteristics of the skin helps us to arrange a proper approach to the management of skin diseases. Objective: The aim of this study was to measure 6 biophysical characteristics of normal skin (sebum content, hydration, transepidermal water loss (TEWL), erythema index, melanin index, and elasticity) in a normal population and assess the effect of sex, age, and body location on them. Methods: Fifty healthy volunteers in 5 age groups (5 males and females in each) were enrolled in this study. A multifunctional skin physiology monitor (Courage & Khazaka electronic GmbH, Germany) was used to measure skin sebum content, hydration, TEWL, erythema index, melanin index, and elasticity in 8 different locations of the body. Results: There were significant differences between the hydration, melanin index, and elasticity of different age groups. Regarding the locations, forehead had the highest melanin index, where as palm had the lowest value. The mean values of erythema index and melanin index and TEWL were significantly higher in males and anatomic location was a significant independent factor for all of 6 measured parameters. Conclusion: Several biophysical properties of the skin vary among different gender, age groups, and body locations.

P. Moussou, L. Danoux, F. Henry, Micro-Inflammatory Vicious Cycle: A new target to delay skin aging; IFSCC Magazine, No. 3, 2012

The age-related chronic low grade upregulation of the inflammatory response is a major factor underlying the cutaneous aging process. To fight against micro-inflammation and its visible consequence on skin aging, we developed a cosmetic ingredient able to modulate three key pathways: NF- κ B, neuropeptides and plasmin activity. *Eperua falcate* extract was shown in vitro to 1) decrease the activation of NF- κ B and the release of pro-inflammatory cytokine IL-8 in stimulated human keratinocytes, 2) decrease the neuropeptide CGRP release by sensory neurons, and 3) inhibit plasmin protease activity. In addition, it inhibited the release of superoxide anions, the UVA-induced oxidation of fibroblast membrane lipids and cytokine induction in UVB-irradiated keratinocytes, showing its capacity to protect epidermal cells against the environmental and oxidative stresses that aggravate the micro-inflammatory vicious cycle.

K. Selbmann, Querschnittsstudie zur Ermittlung von biomechanischen Hauteigenschaften mittels Cutometer® und Reviscometer® zur Ableitung von Richtwerten für gesunde Haut, Dissertation an der Ernst-Moritz-Arndt-Universität Greifswald, 2012

Die Haut, als flächenmäßig größtes, ist auch funktionell eines der vielseitigsten Organe des menschlichen Körpers. Gesunde Haut stellt wesentliche Funktionen des menschlichen Organismus sicher. Neben den Kontakt- bzw. Sinnesfunktionen sind vor allem die Schutz- und Regulierungsfunktionen von Bedeutung für den gesunden Organismus [1]. Über diese wichtigen organischen Funktionen hinaus, bestimmt die Haut das Aussehen jedes Einzelnen und damit einen wesentlichen Teil seiner Repräsentation in der Gesellschaft. Aus diesem Grund steht die Haut nicht nur im Fokus der kosmetischen, sondern auch der medizinischen Forschung. Besonders die Eigenschaft der Hautelastizität und ihre Veränderungen im Alter sind dabei von Interesse. Es gibt neben diesen physiologischen Veränderungen der Haut krankhafte Hauterscheinungen, die mit einer Änderung der biomechanischen Eigenschaften der Haut einhergehen. Die Bestimmung von Richtwerten hat deshalb große Bedeutung für die Diagnostik.

Y. Matsunaga, S. Fujiwara, Y. Mori, A. Miyake, H. Yamanishi, M. Kage, Y. Tokudome, F. Hashimoto, T. Hariya, Development of Self-dissolving Microneedles Consisting of Hyaluronic Acid as an Anti-

Wrinkle Treatment, IFSCC Magazine 2, 2012

Microneedle technology has recently attracted considerable attention in the medical field as a means of facilitating effective transdermal delivery of vaccines and other pharmaceutical compounds with minimal invasiveness, little pain and a high degree of safety. Generally, microneedles typically consist of multiple micro-projections made of silicon, metal or polymeric materials through which a drug can diffuse in to the skin. Delivery using solid or hollow microneedles can be accomplished by piercing the skin and then applying active agents to the permeabilized skin, coating or encapsulating agents on microneedles for rapid dissolution and release in the skin.

N. Kindler, Extrinsische und intrinsische Formen der Hautalterung - Vergleich klassischer Untersuchungsverfahren mit der Multiphotonen-Lasertomographie, Dissertation der Medizinischen Fakultät der Friedrich-Schiller-Universität Jena, 2012

Unsere Haut und ihr Erscheinungsbild haben in der modernen Gesellschaft zunehmend an Bedeutung gewonnen. Wesentliche Gründe dafür sind einerseits das gestiegene Körperbewusstsein, im Vordergrund steht jedoch die demographische Entwicklung in den Industrienationen. Bei einer stetig steigenden Lebenserwartung mit einer oft guten körperlichen Konstitution auch im hohen Lebensalter, wird dem Thema eines jugendlichen Hautbildes immer mehr Aufmerksamkeit gewidmet. Die menschliche Haut unterliegt jedoch im Verlaufe des Lebens einer Vielzahl von unterschiedlichsten Einflüssen, die eine Veränderung des Hauterscheinungsbildes und somit eine vorzeitige Hautalterung verursachen. In der Forschung werden mittlerweile zwei Formen der Hautalterung unterschieden. Zum einen die durch äußere Einflüsse hervorgerufene extrinsische Hautalterung, deren Ursachen v.a. die UV-Strahlung und der Nikotinabusus darstellen. Zum anderen gibt es die natürliche, genetisch determinierte intrinsische Hautalterung. Bei ihr spielen der natürliche Hormonhaushalt, Veränderungen im Immunsystem und einige andere intrinsische Prozesse eine entscheidende Rolle, die noch nicht vollständig verstanden sind.

A. Manosroi, R. Chutoprapat, M. Abe, W. Manosroi, J. Manosroi, Anti-aging efficacy of topical formulations containing niosomes entrapped with rice bran bioactive compounds, Pharm Biol. 2012 Feb;50(2): p. 208-224

Context: Rice [*Oryza sativa* L. (Gramineae)] bran is a rich source of phytochemicals. Its oil also contains several bioactive components that exhibit antioxidative properties such as ferulic acid (F), γ -oryzanol (O), and phytic acid (P) which can be a new source of cosmetic raw materials. Objective: To evaluate the anti-aging effects of the gel and cream containing niosomes entrapped with the rice bran bioactive compounds. Materials and Methods: The semi-purified rice bran extracts containing F, O, and P which indicated the growth stimulation of human fibroblasts and the inhibition of MMP-2 by sulforhodamine B and gelatin zymography, respectively, were entrapped in niosomes by supercritical carbon dioxide fluid (scCO₂) and incorporated in gel and cream formulations. The skin hydration, elasticity, thickness and roughness, and pigmentation in human volunteers after treated with these gel and creams were investigated by corneometer, cutometer, visiometer, and mexameter, respectively. Results: Gel and cream containing the semi-purified rice bran extracts entrapped in niosomes gave no sign of erythema and edema detected within 72 h on the shaved rabbit skin by the closed patch test investigated by mexameter and visual observation, respectively. These formulations also demonstrated higher hydration enhancement and improvement of skin lightening, thickness, roughness, and elasticity on the skin of 30 human volunteers within the 28-day treatment not more than 9, 27, 7, 3, and 3 times, respectively. Discussion and Conclusions: The formulations containing niosomes entrapped with the rice bran bioactive compounds gave superior clinical anti-aging activity which can be applied as a novel skin product.

D.Q. Nguyen, T.S. Potokar, P. Price, A long term evaluation of Integra® and split thickness skin grafts in acute burns and reconstructive surgery, Journal of Wound Technology, January 2012, No 14, p. 83-84

The field of wound healing and tissue repair has advanced rapidly in the last decade, with this there is an increasing emphasis on the importance of the functional and cosmetic outcomes following injury. Integra artificial skin is the most widely used synthetic skin substitute and is reported to have better outcomes in relation to the appearance and elasticity when compared to split thickness skin grafting (SSG). A review of the literature reveals very few trials that are based on an objective evaluation of Integra treated scars as compared to SSGs. This research aimed to provide further data on the long term outcome of Integra. All adult patients from the Welsh Burns Centre who had been successfully treated with Integra were invited to attend a clinic for a follow up provided they had been healed for greater Observer scale (POS) were used to evaluate whether Integra was subjectively superior to SSG.

A.-E. Craciun, M. Moldovan, A. Rusu, C. Nita, C. Craciun, A. Tataru, **Predictors of changes in physical properties of skin in patients with diabetes mellitus**, Rom J Diabetes Nutr Metab Dis. 19(1):33-40; 2012

Introduction: The skin, the largest human organ, is often affected by diabetes mellitus (DM). We know that DM affects the hydration of stratum corneum (SC), the sebum content of the skin and to some extent, the barrier function of the epidermis and elasticity, but we do not know the factors leading to these changes. Objectives: The objectives of this study were to determine the factors associated with changes in physical properties of the skin (skin hydration degree, sebumetry, transepidermal water loss and skin elasticity) in patients with diabetes. Materials and methods: The physical properties of the skin were assessed using the Multi Probe Adapter Systems MPA (Courage-Khazaka, Germany) in 57 patients with diabetes and 46 non-diabetic.

D. Schmid, R. Sacher, E.r Belser, F. Züllig, **Stimulation of growth factor communication between epidermis and dermis by Crocus chrysanthus bulb extract**, Household and Personal Care Today n 1/2012, p. 33-36

Growth factors and cytokines are messenger compounds, in most cases proteins, that allow the communication between cells in our tissues. After binding to specific receptors on cell surfaces, growth factors activate cellular proliferation or differentiation. In the skin, growth factors orchestrate the wound-healing process and also the continuous regeneration and repair. The repair of skin damaged by a wound or after UV exposure takes place in two phases. Firstly there is an inflammatory reaction. Activation on the NF- κ B pathway in the cells of the epidermis leads to the formation of inflammatory cytokines.

H. Ohshima, A. Tada, A. Kanamaru, H. Akamatsu, Y. Sakai, M. Itoh, H. Kanto, **Relevance of the directionality of skin elasticity to aging and sagging of the face**, Skin Research and Technology 2011; 17: 101-107

Forces acting in facial skin have been suggested to show directionality. Non-invasive methods of measuring this directionality may thus provide information related to aging processes. The Reviscometer RVM 600 device is capable of measuring directionality of forces on the skin. This device has not been used previously in a published study to evaluate changes in directionality of forces on facial skin with aging. The first objective of this pilot study was to investigate relationships between mechanical directionality using the Reviscometer RVM 600, the Cutometer MPA 580, and aging of the facial skin in a supine position. In addition, the study investigated relationships between mechanical directionality and "skin sagging", which may be caused by gravity.

P. Quatresooz, F. Henry, P. Paquet, G. E. Piérard, **Photoaging under recreational sunbeds**, Skin Research and Technology 2011, 17; p. 309-313

Photoaging refers to light-induced changes in the skin that are superimposed to the alterations of intrinsic chronologic aging. Photoaging is induced by non-ionizing electromagnetic radiations, and is recognized by the combination of mottled skin melanoderma (MSM), coarse wrinkles, loss of skin firmness and solar elastosis. These changes are primarily due to chronic solar radiations. In addition, the importance of exposures to artificial sources of restricted light wavelengths is steadily increasing for lifestyle purposes in affluent cultural societies. The tanning bed procedure poses problems particularly in conditions of unsupervised and non-medical use.

N. Akthar, S. Uz Zaman, B.A. Khan, M.N. Amir, M.A. Ebrahimzadeh, **Calendula extract: effects on mechanical parameters of human skin**, Acta Poloniae Pharmaceutica – Drug Research, Vol. 68 No 5, p. 693-701, 2011

Abstract: The aim of this study was to evaluate the effects of newly formulated topical cream of Calendula officinalis extract on the mechanical parameters of the skin by using the cutometer. The Cutometer 580 MPA is a device that is designed to measure the mechanical properties of the skin in response to the application of negative pressure. This non-invasive method can be useful for objective and quantitative investigation of age related changes in skin, skin elasticity, skin fatigue, skin hydration, and evaluation of the effects of cosmetic and antiaging topical products. Two creams (base and formulation) were prepared for the study. Both the creams were applied to the cheeks of 21 healthy human volunteers for a period of eight weeks. Every individual was asked to come on week 1, 2, 3, 4, 5, 6, 7, and 8 and measurements were taken by using Cutometer MPA 580 every week. Different mechanical parameters of the skin measured by the cutometer were; R0, R1, R2, R5, R6, R7, and R8. These were then evaluated statistically to measure the effects produced by these creams. Using ANOVA, and t-test it was found that R0, and R6 were significant ($p < 0.05$) whereas R1, R2, R5, R7, R8

were insignificant ($p > 0.05$). The instrumental measurements produced by formulation reflected significant improvements in hydration and firmness of skin.

*L.J. Cruz, C. Gutierrez, C. Caniego, I.M. Ramos, **Peptides build a 3D regenerative matrix***, Personal Care November 2011, p. 67-70

Skin aging is caused by intrinsic biological factors combined with external effects (environmental impacts like UV or pollutants). Most of the skin ageing macroscopic signs (such as wrinkles, skin thinning or loss of firmness) are related to a reduction either of the quantity or quality of the extracellular matrix (ECM). Hence, the improvement of the structure of ECM is a key goal to minimise the effects of ageing and also for regeneration processes. Wound repair is an essential physiological process that plays a key role for tissue homeostasis. Any regeneration of injured or damaged skin, including damage by environmental factors, requires restoration of ECM.

*G. Maramaldi, **A highly moisturising active from tamarind seed***, Personal Care November 2011, p. 101-103

Tamarind is considered as one of the most beautiful trees growing in the South-East of Asia, and is also an edible plant; its young pods are used both for nutrition and to manufacture spices. Traditionally used in the Ayurvedic medicine even today, its use as a laxative dates back to the 1500s even in Western Countries. The seed of tamarind has a high content of polysaccharides among which the most abundant is a branched polysaccharide of a cellulose-type backbone carrying xylose and galactoxylose substituents. This polysaccharide has been extremely well characterised (the polydispersion index being very limited, i.e. the number of molecules largely differing from the fixed molecular weight), and its use in cosmetic formulations has been assessed in terms of skin hydration, elasticity, roughness and density on healthy volunteers.

*A. Mehling, U. Griesbach, V. Pian, **Sensible solutions for sensitive faces***, September 2011, Personal Care, p. 41-45

The term “sensitive skin” is commonly used to describe a number of unpleasant sensations of varying intensity and which are transient in nature. People have different sensitive skin types but typically complain about skin tightness, burning, prickling or itchy sensations. These complaints can be accompanied by transient redness or skin dryness. Although these symptoms usually do not involve visible or predictable signs of irritation or immunological reactions, they can cause significant discomfort. Due to the wide variety of possible causes and the subjective nature of the responses associated with sensitive skin, it is extremely difficult to quantify.

*F. McCall-Perez, T.J. Stephens, J.H. Herndon Jr., **Efficacy and Tolerability of a Facial Serum for Fine Lines, Wrinkles, and Photodamaged Skin***, Journal of Clinical Aesthetics, July 2011, Volume 4, No. 7, p. 50-54

Background: Dermatology visits for the prevention and treatment of aging skin are rapidly increasing. The clinical sequelae including wrinkling, pigmentary changes, roughness, laxity, and telangiectasia can all result in the appearance of aging skin, impacting quality of life. A facial serum was developed with ingredients associated with an improvement in the appearance of fine lines and wrinkles and increase in stratum corneum barrier function. Patients were instructed to use a gentle wash before applying the formulation and a moisturizer afterwards. Objective: To assess the efficacy and tolerability of a facial serum in improving the appearance of fine lines, wrinkles, and signs of photodamage. Methods: Thirty-four female subjects (Fitzpatrick classification I–IV) with early to advanced photodamaged skin in a 12-week, single-arm, open-label clinical trial. Visits were scheduled at Baseline and Weeks 4, 8, and 12. Efficacy was assessed using visual grading of facial and periocular skin (modified 10-point scales); changes in viscoelasticity properties were assessed by cutometry. Cutaneous tolerability was evaluated both clinically and subjectively using a 4-point scale and monitoring adverse events. Digital photography documented treatment-related changes in skin appearance. Subjects completed self-assessments at Baseline and Weeks 4, 8, and 12. Results: Significant improvements in all parameters and skin condition were seen as early as Week 4 ($p \leq 0.05$). There was an 18-percent improvement in overall appearance by Week 12 ($p \leq 0.05$). Fine lines and coarse wrinkles improved by 27 and 15 percent, respectively (both $p \leq 0.05$). Significant improvements were also seen in uneven pigmentation, firmness/elasticity, toned/resiliency, skin radiance, tone, and tactile roughness/smoothness (10%, 11%, 18%, 21%, 16%, and 47%, respectively; all $p \leq 0.05$). By Week 12 subjects reported a 43-percent improvement in overall facial skin appearance and 24-percent reduction in mean scores for facial lines and wrinkles (both $p \leq 0.05$). Improvements were also reported in overall skin tone, firmness, dryness, appearance of pores, appearance of brown spots/facial discoloration, skin radiance, and texture (37%, 35%, 35%, 28%, 24%, 39%, 38%, respectively; all $p \leq 0.05$). There was a

71-percent reduction in erythema and 94-percent reduction in skin dryness by Week 12 (both $p \leq 0.05$). Conclusion: The facial serum, in combination with the wash and moisturizer, may be effective and well-tolerated when treating photodamaged skin and may improve the appearance of fine lines and wrinkles. Significant improvements were seen with all grading parameters as early as four weeks of usage. A controlled study is warranted to further validate these findings.

T. Ezure, E. Yagi, N. Kunizawa, T. Hirao, S. Amano, Comparison of sagging at the cheek and lower eyelid between male and female faces. Skin Research and Technology 2011; 17; p. 510-515

Facial Sagging is a well-known feature of aging. Age-related changes of female faces have been examined thoroughly as regards characteristics and formation mechanism, but relatively little is known about age-related male facial changes. Sagging is thought to be associated with decreased dermal elasticity in female faces, but the dermis is thicker in males and dermal blood flow is more abundant in males than females of the same age. Therefore, the relationship of dermal condition with facial sagging may be different in males and females. However, there is little information about gender differences of dermal elasticity. Therefore, the relationship of dermal condition with sagging in male faces is unclear.

G.G. Barbarino, M. Jabareen, E. Mazza, Experimental and numerical study on the mechanical behaviour of the superficial layers of the face, Skin Research and Technology 2011; 17; p. 434-444

Modeling the mechanical behaviour of facial soft tissues has gained importance in recent years due to the development of 3D face models for the computational simulation of surgical intervention. The need for improved simulation accuracy and envisaged applications of these models (e.g. outcome of face lift surgeries) require a distinction between the different soft tissue layers and an accurate representation of their mechanical behaviour. Soft tissues have been investigated in vivo in different studies. Specifically for the mechanical characterization of the skin, different non-invasive testing methods were used: suction, indentation, torsion and in situ tensioning devices.

W. Raab, Narben und Keloide, Kosmetische Medizin 5.11

Narben bilden sich nach einer traumatischen Schädigung der Haut; die entstandenen Substanzverluste im Hautbindegewebe werden nur unvollkommen ersetzt.

R. Darlenski, T. Callaghan, J.W. Fluhr, Antiaging and Antiwrinkle Products, J.W. Fluhr (ed.), Practical Aspects of Cosmetic Testing; Springer-Verlag Berlin Heidelberg 2011

The chronological (intrinsic) and extrinsic aging demonstrate typical macroscopic, histological and functional characteristics. The relative improvement in different parameters characterizing aging skin can be used in efficacy proof of antiaging and antiwrinkle cosmetic products. Different approaches to investigate the efficacy of antiaging products exist such as clinical evaluation and objective assessment with non-invasive methods and invasive procedures. A multiparametric approach is useful in the assessment of antiaging products efficacy. There is no uniform consensus on the protocol and the design of studies aiming efficacy proof of antiaging cosmetics.

J.W. Shin, D.H. Lee, S.Y. Choi, J.I. Na, K.C. Park, S.W. Youn, C.H. Huh, Objective and non-invasive evaluation of photorejuvenation effect with intense pulsed light treatment in Asian skin, J Eur Acad Dermatol Venereol. 2011 May; 25(5): p. 516-22

Background: Intense pulsed light (IPL) has been widely used for photorejuvenation. Although previous literature has shown clinical effectiveness of IPL treatments on cutaneous photoaging, the associated changes in the biophysical properties of the skin following IPL treatments have not been fully elucidated. Objective: The aim of this study was to evaluate changes in skin biophysical properties in patients with photoaging after IPL treatments, using non-invasive, objective skin measuring devices. Patients and Methods: A total of 26 Korean women with facial dyschromias underwent three sessions of IPL treatment at 4-week intervals. Outcome assessments included standardized photography, global evaluation by blinded investigators, patients' self-assessment and objective measurements of colour (Mexameter MX18, Chromatometer), elasticity (Cutometer), roughness (Visiometer), sebum (Sebumeter) and skin hydration (Corneometer). Results Intense pulsed light treatments produced a 15% decrease in the size of representative pigmented lesions ($P < 0.05$). Conclusions: Patients' self-assessment revealed that 84% and 58% of subjects considered their pigmented lesions and wrinkles were improved respectively. Objective colorimetric measurement demonstrated significant improvements following IPL treatments that were most remarkable after one session of IPL. Moreover, skin elasticity showed significant improvements at the end of the study. Skin wrinkles as measured using Visiometer showed a mild improvement without statistical significance. Sebum secretion and water content of skin remained unchanged. Intense pulsed light provided significant improvement in the

appearance of facial pigmented lesions in Korean patients. These effects appeared to be more remarkable in improving pigmentation, skin tone and elasticity.

G. Pauly, C. Jeanmaire, L. Danoux, V. Bardey, O. Freis, A. Rathjens, New Approaches for Collagen and Elastic Tissue to Improve Skin Firmness and Elasticity, IFSCC Magazine 4/2011

Skin firmness and elasticity are major targets for anti-aging claims in cosmetics. The alteration of these essential functions during skin aging are mainly due to degradation of collagen and elastic tissue at different levels of the extracellular matrix of the dermis and of the dermo-epidermal junction in the skin. A global and multi-level approach to reverse this process is on the one hand to repair the damages by stimulating the synthesis of different collagens and elastic tissue components and on the other hand to preserve these macro-molecules from glycation and excessive proteolysis. Several in vitro experiments showed the capacity of two active ingredients to increase synthesis by fibroblasts of the collagen types I, IV, V, XII, XVI, XVI-II.

N. Hirt-Burri, C. Scaletta, W. Raffoul, L.A. Applegate, A. de Buys Roessingh, Ten year follow-up of Pediatric Burn Patients Treated With Biological Bandages, Hospital of Lausanne;

This study presents the skin quality results ten years after treatment of eight children with intermediate to profound 2nd degree burns. They were treated with biological bandages produced from a clinical bank of human fetal skin cells (one organ donation, 1m² fetal skin). Children (age mean = 6 yr) were treated with one to seven bandage changes (mean of 4.1 +/- 2) following the surgeon's evaluation. No auto-graft was necessary. Overall skin quality was evaluated following the Vancouver Scar Scale model and compared with semi-quantitative biomedical devices such as the Cutometer and the Dermatospectrometer.

A. Thibodeau, Anti-aging Skin Care Benefits of Saccharina longicuris Extract, Cosmetics & Toiletries, Vol. 126, No. 3/March 2011

Skin appearance and functionality are affected by a complex combination of factors including both genetic, i.e. intrinsic, and actinic, i.e. extrinsic or environmental. Indeed, genetic and actinic factors act together to modulate the expression of key genes involved in skin homeostasis. Intrinsic aging is genetically regulated and follows a chronological clock inside of cells, while environmental factors such as UV exposure, humidity and air pollutants are responsible for actinic aging. Together, genetic and actinic aging target important metabolic pathways in skin cells that trigger the signs of aging such as skin roughness and wrinkling. At a molecular level, it has been demonstrated that collagen synthesis is reduced in aged skin cells and in cells damaged by UV radiation.

A. Thibodeau, P. Jacobs, S. Amari, Olive oil fatty acids: positive effects for the skin, Personal Care, March 2011, p. 51-57

From the activity of B&T over the last 20 years we have collected vast knowledge of the effects of olive oil fatty acids on the skin showing positive benefits by reinforcing the effectiveness of the hydrolipidic film supporting the skin barrier function. In this paper we take three olive oil derivatives (Olivem 1000, Sensolene and Olivem 900) having different formulation functions and show how the olive oil fatty acids can provide positive effects on the skin in cosmetic applications.

A. Thibodeau, P. Jacobs, S. Amari, Biomimetic ingredient offers formulation benefits, Personal Care, March 2011, p. 115-118

The hydrolipidic film covers the surface of the skin and actively contributes to the skin surface smoothness and the skin barrier function. We have developed a biomimetic ingredient of the hydrolipidic film as per its fatty acid profile. Ethylhexyl olivate (INCI nomenclature) brings clinical benefits for numerous parameters and rheology advantages to the formulation. One single application of a formulation containing 3% ethylhexyl olivate was shown to significantly increase skin hydration (+12.2%, p<0.05), barrier function (+16.7%, p<0.05), visco-elastic properties (+6.7%, p<0.05) and skin surface profilometry (+11.2%, p<0.05) for up to eight hours. In another experiment, ethylhexyl olivate was compared to 10 different oil/emollients and ranked third for the viscosity enhancement and second for spreadability index on skin. Thanks to its molecular composition, ethylhexyl olivate creates a subtle veil naturally integrating itself within the hydrolipidic film and significantly improving skin sensorial properties. Ethylhexyl olivate stands as a key tool for formulation chemists while positively acting on skin physiological features as well as on sensorial properties.

M. Bloemen, M. van der Wal, P. Baar, P. van Zuijlen, E. Middelkoop, Clinical Effectiveness of Dermal Substitution in Burns by Topical Negative Pressure: A Multicenter Randomized Controlled Trial

Previous research has demonstrated clinical effectiveness of dermal substitution, however, in burn wounds only limited effect has been shown. A problem in burn wounds is the reduced take of the autograft, when the substitute and graft are applied in a one-step procedure. In other studies, application of topical negative pressure (TNP) was able to improve the take rate of an autograft. Aim of this study was to investigate if application of a dermal substitute in combination with TNP improves scar quality after burns. In a four-armed multicenter randomized controlled trial (RCT), a split-skin graft with or without dermal substitute Matriderm, and with or without TNP were compared in adult patients with deep dermal or full-thickness burns which required skin transplantation.

*P. Maia Campos, D.G. Mercurio, M.D. Gianeti, A.T. Nobrega, **In vitro antioxidant activity and clinical efficacy of cosmetic formulation containing chamomile extract**, FAPESP*

Botanical extracts have attracted great interest in the cosmetic area due to its rich composition and medicinal properties. Among these extracts, it can be mentioned the *Matricaria chamomilla* L. extract, which has been commonly used in cosmetics. Chamomile extract has been well studied once it presents therapeutic properties in terms of pharmacological applications. Various studies showed that chamomile has soothing, antiallergic, antioxidant and antiinflammatory effects. All of these properties are given by chamomile's richest composition of organic components. It is added to the cosmetic formulations to provide skin moisturizing and smoothness.

*L.J. Cruz, C. Gutierrez, C. Caniego, I.M. Ramos, **Intelligent targeting devices; Target delivery of cosmetic actives to specific skin cells**, Household and Personal Care TODAY n3/2011; p. 14-17*

Since the first Liposomes were introduced in the cosmetic market products in the 80's, Cosmetic Delivery Systems have been used during the last decades to enhance the properties of Cosmetic Actives. Encapsulation Technologies are a family of Delivery Systems that include a wide range of techniques, that allow isolating the substance of interest from the environment, surrounding it with a shell, or into a matrix made up of the encapsulating material. Just by encapsulating a substance in the right way, we can increase stability, reduce toxicity, increase the bioavailability, mask taste or odour... or just change the physical appearance. But the most elegant applications of encapsulation involve any kind of modification of the delivery of the encapsulated active material.

*L. Rigano, C. Andolfatto, L. Stucchi, M. Bosco, **Hyaluronic Acid Butyric Esters for the Improvement of Skin Functionality**, Cosmetic & Toiletries Vol. 126, No. 2/February 2011, p. 104-111*

The word hyaluronic is derived from the Greek *hyalos* meaning "glass" or "transparent" and refers to the vitreous humor, the ocular tissue from which it was first isolated by Karl Meyer and colleagues in 1934. It was later located in many other animal tissues, i.e. synovial fluid, cartilage and the umbilical cord, where it has the same structure and biological activities, described in this article. Hyaluronic acid (HA) is a linear polysaccharide of high molecular weight that belongs to the family of mucopolysaccharides or glycosaminoglycans (GAGs), the physiological constituents of the dermal connective tissue in the extracellular matrix. In adult humans, the total amount of HA is equal to approximately 15g, half of which is found in the skin.

*P. Sin, I. Stupka, P. Brychta, **Evaluation and comparison of composite and split-thickness skin grafts using Cutometer MPA580**, Annals of Burns and Fire Disasters, Vol. XXIII, No.4, December 2010*

In our preliminary experiments we found that composite skin grafts consisting of allogeneic acellular dermis and thin epidermal autologous grafts applied to the excised burn wound in one stage led to better results in terms of viscoelastic properties than autologous split-thickness skin grafts. In ten burn patients we applied composite skin grafts consisting of allogeneic acellular dermis and thin epidermal autologous grafts and followed the quality of the reconstructed skin cover with a special device, Cutometer MPA580, over a period of four years. The cutometric curves demonstrated better viscoelastic properties in composite skin grafts than in conventional split-thickness skin grafts after four years.

*H. Maier, A. Schmalwieser, H. Rohn, L.L. Kellner., A. Wanka, A. El Modeir, S. Felke, K. Schmid-Kubista, J. Schmidt, A. Cabaj, H. Stadlmann, J. Spiess, S. Binder, W. Fischer, H. Hönigsmann, **UV-Belastung bei der bäuerlichen Arbeit. Eine Studie im Auftrag der Sozialversicherungsanstalt der Bauern**, Medizinische Universitätsklinik Wien*

Landwirte haben ein erhöhtes Risiko, an UV-induzierten Haut- und Augenschäden zu erkranken. Aufgrund der unzureichenden Datenlage werden UV-induzierte Hauttumore derzeit noch

immer nicht als echte Berufskrankheiten (BK) anerkannt. Unsere Studie umfasst zwei Teile. In der epidemiologischen Untersuchung wurde bei einer repräsentativen Gruppe von Landwirten und einer Kontrollgruppe aus reinen Innenarbeitern das Wissen zu den Themen „Sonnenschaden und Sonnenschutz“ mittels eines detaillierten Fragebogens abgefragt und die Häufigkeit von UV-induzierten Haut- und Augenproblemen durch eine vollständige dermatologische und ophthalmologische Untersuchung ermittelt.

K. Yoshida, H. Yamazaki, T. Takenaka, E. Tanaka, T. Kotsuma, Y. Fujita, N. Masuda, K. Kuriyama, M. Yoshida, T. Nishimura, Objective Assessment of Dermatitis Following Post-Operative Radiotherapy in Patients with Breast Cancer Treated with Breast-conserving Treatment, Stahlenther Onkol 2010 No. 11

Breast cancer is one of the most frequent cancers among women in several western countries, and most of these patients are treated post-operatively with radiotherapy. The sensitive target is normal skin with its inherent radiosensitivity and is sometimes severely affected by irradiation. Some studies have suggested that most patients treated with post-operative external radiotherapy for breast cancer will experience some type of skin reaction, such as skin dermatitis. However, there is currently no objective universal skin reaction rating scale, and there is always a risk of subjective factors interfering with the rating. In most previous studies, the extent of erythema was determined with subjective means, such as visual inspection.

B. Martinez Für alle Fälle; COSSMA 11/2010

Will man das Fettgewebevolumen und die damit verbundene Cellulite lokal reduzieren, muss man auf die verschiedenen Prozesse (s. Kasten) einwirken, die die Fettakkumulation verursachen. Provislim ist die synergistische Kombination zweier Wirkstoffe, Fisetin und Frambinon, die genau das tun. Fisetin, ein Sirtuinaktivator, ist ein natürliches Lebensmittelflavonoid, das aus dem Buchsbaum *Buxus sinica* Cheng gewonnen wird, aber auch in Obst und Gemüse, besonders in Erdbeeren, vorkommt. Das Phenol Frambinon ist die Hauptgeruchskomponente in Himbeeren und wird aus der Anispflanze *Pimpinella anisum* gewonnen. Aufgrund seines Wirkmechanismus ist Provislim täglich 24 Stunden im Einsatz, um lokales Fett und Cellulite abzubauen, egal ob der Verwender sich ausruht, trainiert, arbeitet, isst oder fernsieht.

Oestro Cream – Firmer and Beautiful Breast Cream, www.Oestrocream.com, 2010

Oestro cream is a natural breast enhancement cream scientifically engineered with Transdermal Technology to naturally enhance the size, shape and firmness of women's breasts.

T. Ezure, S. Amano, Influence of subcutaneous adipose tissue mass on dermal elasticity and sagging severity in lower cheek, Skin Research and Technology 2010; 16: p. 332-338

Obesity is a significant risk factor for various cardiometabolic diseases, for example hypertension, atherosclerosis and type 2 diabetes. Subcutaneous adipose tissue lies just beneath the dermal layer, and is composed of lipid-filled cells termed adipocytes. Until recently, adipocytes were considered only as an inert fat-storing tissue, but recent studies have demonstrated that adipocytes play dynamic roles in the highly regulated processes of secreting various bioactive compounds, including steroids, hormone precursors and cytokines, collectively named adipokines.

S.S. Fong, L.K. Hung, J.C. Cheng, The cutometer and ultrasonography in the assessment of postburn hypertrophic scar--a preliminary study, U.S. National Library of Medicine, National Institutes of Health

Sixteen patients with various degrees of postburn hypertrophic scars were evaluated by ultrasonography and elastometry. An Aloka Echo Camera (SSD-500) with a 7.5 MHz probe and a Cutometer SEM 575 skin elastometer were used. Serial monthly examinations were performed using both pieces of equipment. In some patients, more than one scar was assessed. The assessments were correlated with clinical grading of the progress of the scars. It was noted that ultrasonography was very sensitive in the localization of scar tissues, distinguishing them from normal skin, assessment of thickness and also delineation of the extent of scar tissues. The subcutaneous part of the scar could be assessed. Cutometer SEM 575 is a new machine that applies a gentle suction to the skin to measure its viscoelasticity. It is sensitive, the inter-observer variation is low, and it could be used for the grading of a scar. These two assessment techniques compliment other methods of scar assessment and will prove useful when assessment of response to treatment is required.

Seba med Flüssig Wasch – Emulsion, **Erfahrungsbericht**, www.ciao.de

welche eine sanfte ph - hautneutrale Reinigung verspricht und für problematische und

empfindliche Haut geeignet sein soll. Zudem soll eine biologische Desodorierung garantiert sein. Gekauft habe ich das Produkt im örtlichen DM - Drogeriemarkt zu einem Preis von 4,95. Man bekommt einen Beutel mit 400 ml Inhalt. Sebamed Produkte gibt es meines Wissens auch nur bei DM und in der Apotheke. Aussehen der Verpackung . Die Emulsion befindet sich in einem knapp 18 cm hohen Beutel an dem links oben ein Drehverschluss angebracht ist. Der Hintergrund ist in einem schlichten weiss gehalten. Ganz oben rechts befinden sich Informationen zu der Verpackung, welche die Umwelt wohl nicht belastet und darunter befindet sich der Aufdruck über den pH - Wert und noch weiter unten das Logo des Herstellers. Mittig findet man die Produktbezeichnung und darunter kann man nachlesen für welche Haut es geeignet ist. Ganz unten stehen noch etwas uninteressante Dinge und auf der Rückseite die Verpachen des Herstellers, die Inhaltsstoffe, der Inhalt, Anwendungsempfehlung und die Haltbarkeit sowie Kontakt - und Herstellerdaten. Das Design ist relativ unspektakulär und wirkt medizinisch. Hässlich finde ich es aber keinesfalls! Ein neuartiger Reinigungskomplex mit besonders milden Waschaktivsubstanzen reinigt die empfindliche Haut ohne Reizung und Austrocknung. Ein wertvoller Pflegekomplex mit Pentavitin®, Vitaminen, Aminosäuren, Glycerin und Panthenol spendet Feuchtigkeit und pflegt die Haut. Dadurch wird die Haut schon beim Waschen spürbar glatt und geschmeidig. Der pH Wert 5,5 stärkt den natürlichen Säureschutzmantel der Haut und schützt vor Austrocknung, schädlichen Umwelteinflüssen und Krankheitserregern. Hervorragende Eignung für empfindliche und problematische Haut dermatologisch-klinisch getestet. Bei Hauterkrankungen und Seifenverbot nach Rücksprache mit dem Arzt.

S. Mac-Mary, J.-M. Sainthillier, A. Jeudy, C. Sladen, C. Williams, M. Bell, P. Humbert, Study of Asymmetrical Facial Damage due to Cumulative UVA Exposure, ISBS 2010 Buenos Aires, Argentina

Published studies assessing whether asymmetrical facial UV exposure leads to any underlying differences in skin physiology and morphology are only observational. These studies demonstrate that visible signs of photot ageing are more evident on the window exposed side of the face suggesting a role for UVA in photo ageing. Aim: To assess the physiological skin changes associated with visible asymmetrical photo ageing. Methods: 10 subjects were enrolled in the study (age 64 ± 6 , 8 women and 2 men), presenting with asymmetrical signs of photoageing due to overexposure of one side of their face to the sun through a window over a long period of time. Split-face biometrological assessments were performed (clinical scoring, hydration with corneometer®, mechanical properties with cutometer®, transepidermal water loss with Aquaflux®, skin relief with fringe projection, photography). Results: significant differences ($P < 0.05$) were observed on clinical scores of wrinkles which were greater on the window exposed side, skin roughness assessed with fringe projection on the cheek and skin heterogeneity assessed with spectrocolumetry on the cheekbone (the skin was less heterogeneous) and differences which tend to be significant ($p < 0.1$) were observed on skin hydration (skin was dryer) as well as skin laxity (skin was laxer).

P.M.B.G. Maia Campos, M.D. Gianeti, D.G. Mercurio, L.R. Gaspar, Assessment of Protective Effects of Cosmetics with UV-Filters, Vitamins, Ginkgo Biloba and Red Alga Extracts using Biophysical and Skin Image Techniques, ISBS 2010 Buenos Aires, Argentina

The combination of UV filters with antioxidant substances and natural extracts with biological activity in terms of photoprotection can provide unique benefits to the skin, by increasing its protection against UV radiation and also by improving skin conditions. Thus, the aim of this study was the assessment of protective effects of cosmetic formulations containing UV-filters, vitamins, *Ginkgo biloba* and red alga *Porphyra umbilicalis* extracts by biophysical and skin image techniques. For this purpose, an emulsion was supplemented or not (F) with *Ginkgo biloba* extract (FG), or red alga *Porphyra umbilicalis* extract (FA), or the combination of these extracts and vitamins A, E and C (FGAV). These formulations were submitted to preliminary studies for the evaluation of Sun Protection Factor (SPF), which were carried out on a group of human volunteers according to the COLIPA methodology After that, the formulations were applied on 10 human volunteers' forearm skin, followed by the analysis of their effects using biophysical and skin image techniques. This evaluation was done in terms of transepidermal water loss (TEWL) (Tewameter® TM 210), water content of the stratum corneum (Corneometer® CM 825), viscoelastic properties (Cutometer® SEM575), skin microrelief (Visioscan® VC 98) and the dermal thickness (Dermascan C®). The measurements were done before and after a 30 day-period of daily applications.

J. Descoubes, C. Fauchaux, A. Bernois, C. Heusèle, J.C. Pittet, S. Schnebert, Evaluation of in vivo Keratinocyte size with confocal Laser Scanning Microscopy at 830 and 445 nm, ISBS 2010 Buenos Aires, Argentina

Confocal Laser Scanning Microscopy (CLSM) allows visualization of the keratinocytes of the different layers of the epidermis rapidly and non invasively. The aim of this study was to quantify in vivo the size of the keratinocytes of the granular and spinous layers with the new VivaScope® 1500 Multilaser to investigate the age effect on the forehead and the ventral forearm. A panel of 98 healthy Caucasian women aged 18 - 70 was recruited for the study. Photoageing was scored according to the Larnier scale. Biomechanical properties of the skin were measured with Cutometer SEM 575 (Courage & Khazaka) with a 2 mm probe and a 500 mBar suction on the cheek and the ventral forearm. Image acquisitions were taken with the VivaScope® 1500 Multilaser (Lucid - Mavig GmbH) on the forehead and the ventral forearm with 2 wavelengths: 445 nm and 830 nm. Three stacks, separated by 5 mm, with a 2 µm step were performed from the skin surface to 150 µm depth. Mosaics of images (3 x 3 mm) were acquired at the center of this region of interest at granular layer and spinous layer levels. Images were analyzed with ConfoScan V 02 (Orion Concept).

A. Elkhyat, Y. Afifi, B. Hassam, P. Humbert; Human skin wettability cartography; Skin Research Technology 2010, 16: p. 481

For decades the surface hydrophobicity has been reported to play an important role in many biological processes, such as cellular adhesion, contact inhibition, elasticity, functionality of tissue membranes, functioning of intracellular structures, and adhesion of infectious microorganisms. The skin affinity with water is estimated by measuring of its water contact angle. To establish a cartography of skin's wettability by Ow measuring at nine sites. The hydration and lipidic index (HI, LI) and the skin pH are measured. Volunteers: Ten females volunteers took part in this study.

M.J. Koehler, M. Kaatz, Intrinsic, solar and sunbed-induced skin aging measured in vivo by multiphoton laser tomography, Skin Research and Technology 2010; 16, p. 501

Skin aging is accelerated by extrinsic factors, particularly actinic damage. Over the last decades, both clinical and pathological differences between intrinsic and actinic aging have been characterized. In one work, we aimed at quanti-fying skin aging by non-invasive in vivo methods. Young healthy volun teers using indoor tanning facilities and aged people were compared with appropriate conrols by measurements of skin elasticity with the Cutometer and the Reviscometer and by semi-quantitative evaluation of the dermal matrix composition by the multiphoton laser tomograph dermalnspect. We found differences between the sun-protected volar forearm and the dorsal side as well as between youn g and old test persons with all three methods.

A. Castro, J. Cordero, M. Josmelith, Use of Tetradecyl Aminobutyrolylvalylaminobutyric Urea Trifluoroacetate as Firming in Cosmetic Products and Measurement of its Effectiveness in the Enhancement of Skin Firming, IFSCC 2010 Buenos Aires, Argentina

The skin aging is due, among other causes moisture loss and reduced strength of the collagen fibers. In this study 60 volunteers were taken with visible signs of sagging skin on face (chin) and chests, between 55 and 70 years old; 30 of them were told daily applied twice a day at the site indicated a formulation with 2.5 % of tetradecyl aminobutyrolylvalylaminobutyric urea trifluoroacetate (labeled Firming "A") for a period of 90 days, and 30 other placebo (labeled Firming "B"). We measured the elasticity and hydration of the skin before and after study, using a Multi Dermascope MDS 800. Elasticity measures showed a maximum increase of elasticity in the chest at 18% and this value for the younger person. And the neck (chin) was observed a maximum increase of elasticity with the active (Firming A) in a 28.89%, yielding an average increase of 25%. There was not a significant increase of % elasticity with the placebo (Firming B). For hydration, It was observed in the neck (chin) a maximum increase of moisturizing with the active (Firming A) in a 42,31%, yielding an average increase of 39%.

E. Kim, G. Cho, S. Yu, H. Rho, D. Min, D. Kim, H. Kim, The elasticity, depth of wrinkles, and skin color on the neck determine your neck age and shape, IFSCC 2010 Buenos Aires, Argentina

There are many reports on regional variations in skin properties, but few physiological studies have been performed on the neck. The neck is sun-exposed and we stretch or shrink our neck constantly, so the neck skin can be more apt to be aged. The purpose of this study was to find out the biomechanical and physiological parameter on the neck to change age-dependently and make the photographic scale for the neck age or neck shape. The skin properties on the neck of 56 Korean female volunteers in good health (25-64 years old, 43.1±10.5yr) were assessed non-invasively with the skin measuring devices. And we analyzed the correlation of skin physiological parameters with age. The neck skin was changed age-dependently. The elasticity, skin lightness was reduced. The depth of wrinkles and TEWL were increased. Based on the correlation parameter to age, we chose the skin color, winkles and elasticity for the key parameters to determine the neck age or neck shape. As the elasticity was reduced, the sagging of the neck skin increased. The neck wrinkles increased age-dependently

and changed to “U” shape because the neck skin was sagged.

S.M. Bertucci, L.S. Freitas, L.R. Gaspar, D.G. Mercurio, M.D. Gianeti, P.M. Maia Campos, Efficacy of Cosmetic Formulations Containing Green Tea and Ginkgo Biloba Extracts-Pre-Clinical and Clinical Studies, IFSCC 2010 Buenos Aires, Argentina

This research aims to evaluate the effects of cosmetic formulations containing green tea (*Camellia sinensis*) and/or *Ginkgo biloba* glycolic extracts by histopathological and histometric studies and also to evaluate the immediate and long-term effects on human skin using biophysical techniques and skin image analyses. The pre-clinical efficacy evaluation was performed by the application of the formulations on the dorsum of hairless mice once a day for 5 days. For the clinical studies, formulations under study were applied to the forearm skin of 48 volunteers, which was evaluated by biophysical techniques and skin image analyses according to the following parameters: stratum corneum water content, transepidermal water loss (TEWL), skin elasticity and viscoelastic-to-elastic ratio and skin micro-relief, before (basal values) and after 3 hours (immediate effects), 15 and 30 days (long term effects). The histological analysis showed the formulations containing green tea extract, alone or in combination with the *Ginkgo biloba* extract, provoked significant enhancement in viable epidermis thickness and in the number of cell layers, suggesting a moisturizing effect and an induction of cell renewal. The clinical efficacy studies showed that the extracts under study had a moisturizing effect and also acted synergistically on skin viscoelastic-to-elastic ratio, related to hydration of deeper epidermal layers.

D.Q.A. Nguyen, T.S. Potokar, P. Price, An objective long-term evaluation of Integra (a dermal skin substitute) and split thickness skin grafts, in acute burns and reconstructive surgery, Burns 36/2010; p. 23-28

The field of wound healing and tissue repair has advanced rapidly in the last decade, with this there is an increasing emphasis on the importance of the functional and cosmetic outcomes following injury. Integra artificial skin is the most widely used synthetic skin substitute and is reported to have better outcomes in relation to the appearance and elasticity when compared to split thickness skin grafting (SSG). A review of the literature reveals very few trials that are based on an objective evaluation of Integra treated scars as compared to SSGs. This research aimed to provide objective data on the long-term outcome of Integra.

S. Buchwald-Werner, Abgrenzung kosmetische und pharmazeutische kosmetische und pharmazeutische Zubereitungen, Presentation at Interpharm, Frankfurt, October 2010

J.H. Fitton, V.-A. Gardiner, Bioactive ingredients from marine macroalgae, Personal Care September 2010, p. 77-79

Maintaining an organ with direct exposure to the environment is a remarkable achievement. Skin provides a renewable, self-repairing and defensive barrier to external influences. It is in a continual state of rejuvenation as the new skin cells make their way to the epidermis and also provides immune monitoring and pathogen defence via specialised cells. Seaweed derived products can provide both cosmetic and therapeutic assistance to this constantly rehabilitated tissue. Brown seaweed contains a remarkable fucose-rich sulphated polysaccharide called “fucoidan” which has marked biological activities. These include a blocking effect on receptors for viruses in addition to an anti-inflammatory effect.

R. Armengol, B. Martinez-Teipel, E. Rubio, Combined forces work to restore skin firmness, Personal Care September 2010, p. 52-55

Due to ageing and external factors, the skin loses its thickness, it produces a reduced amount of structural components and, in general, its biomechanical properties deteriorate. At a facial level, skin expresses these changes with the appearance of wrinkles and flaccidity. This fact is aggravated by the action of gravity, which exerts a constant downward force, altering the shape of the facial oval. To counter these adverse effects, it is essential to recover and maintain the good condition of the skin structural elements; dermal-epidermal junction, epidermal cohesion and dermal extracellular matrix. Union provides strength and firmness. The skin is structured in several tightly bound layers: epidermis, dermis and hypodermis. The epidermis maintains cell cohesion through structures such as desmosomes, which keep adjacent cells firmly together.

C. Jeanmaire, V. Bardey, F. Henry, L. Danoux, L. Bailly, M. Sabadotto, O. Freis, G. Pauly, A. Rathjens, Mushroom extract recovers youthful skin properties, Personal Care, September 2010

The organism is daily aggressed by different types of stress. The best known is oxidative stress defined as the toxic effect of chemically reactive oxygen species (ROS) or reactive nitrogen species. Reactive oxygen species can damage cellular components, leading to impaired physiological functions and thus inducing ageing. To counteract ROS, cells have many anti-oxidant enzyme systems. Among these, peroxiredoxins, are key enzymes having a role in cellular detoxification due to their reduction potential.

Feasibility and correlation of in vivo measurement of vaginal biomechanical properties using a purpose designed vaginal probe, Joint Annual Meeting of the International Continence Society and the International Urogynecological Association, 23rd – 27th August 2010, Toronto, Canada

In the field of dermatology, non invasive aspiration devices that can measure the biomechanical properties of skin are clinically used. They are presumed to measure properties of the dermal component of the skin, consisting of collagen and elastin fibers. It seems logical that these devices could be applied for similar measurements at the level of the vaginal wall. One such device (DermaLab skin probe, Cortex Technology, Hadsund, Denmark) has already been used for that purpose. The aspiration device, has a diameter of 2cm and a height of 1.5cm. The probe suctions at a preset vacuum pressure the vaginal wall into an opening of 10 mm diameter (=aperture). During this process it measures the actual pressure (stress) and vaginal wall displacement (strain).

T. Reuther, J. Bayrhammer, M. Kerscher, Effects of a three-session skin rejuvenation treatment using stabilized hyaluronic acid-based gel of non-animal origin on skin elasticity: a pilot study, Arch. Dermatol Res (2010) 302: 37-45

The purpose of this study was to evaluate in vivo the effects of micropuncture injections of stabilized hyaluronic acid-based gel of non-animal origin (NASHA, Restylane Vital) on skin elasticity, a major aspect of skin ageing. Patients (n=19) underwent a series of three treatment sessions, spaced 4 weeks apart, with NASHA injected into the lower facial cheeks. Using the suction principle, 12 parameters describing the viscoelastic properties of the skin were assessed, before each treatment session and at follow-up visits 4 and 16 weeks after the last treatment. Treatment with NASHA significantly increased skin firmness and improved its viscoelastic recovery capacities. The most significant differences from baseline were noted at the end of the study. The changes observed in this study may underlie some of the cosmetic improvements noted after treatment with NASHA.

N. Akhtar, M. Waqas, M. Ahmed, T. Saeed, G. Murtaza, A. Rasool, M.N. Aamir, S.A. Khan, N.S. Bhatti, A. Ali, Effect of Cream Formulation of Fenugreek Seed Extract on Some Mechanical Parameters of Human Skin, Tropical Journal of Pharmaceutical Research August 2010, 9 (4): 329-337

Skin has good frictional properties, assisting locomotion and manipulation due to its texture. It is elastic and can be stretched and compressed within limits. Elastic fibres within the skin form a fibrous network that is interwoven between the collagen bundles throughout the dermis. As aging occurs, human skin gets more wrinkled, becomes drier and loses its elasticity. Evaluation of skin elasticity is especially important, because it is not as visible as other signs of aging such as wrinkles. Skin mechanical parameters are most sensitive to epidermal hydration. Epidermal hydrating produced by moisturizers influences the mechanical properties of skin. Accumulation of water in the dermis diminishes friction between fibres and facilitates movement of the interstitial fluid. At the upper level, they are attributed to the softening of the outer layers of the epidermis (mainly stratum corneum).

G. Buchbauer, Die österreichische Kosmetika- und Parfüm-Industrie, EURO COSMETICS 7/8-2010 Pressemitteilung von DermaTronnier

Aus Anlass des 20jährigen Bestehens des Instituts für experimentelle Dermatologie an der Universität Witten/Herdecke – DERMATRONNIER – fanden am 21.4 und 22.4.2010 die VII. Dermadays in Witten statt. Mit der Veranstaltung Dermadays berichtet das Institut seinen Freunden und Partnern über die Arbeit der letzten Jahre und bedankt sich bei den eingeladenen Gästen gleichzeitig für die Mit- und Zusammenarbeit. Das umfangreiche wissenschaftliche Programm der diesjährigen Dermadays, vorwiegend von Partnern des Instituts gestaltet, zeigt wiederum die breite Themenvielfalt. Sie reichte von der Histologie der Haut über die Neurophysiologie des Juckreizes, die Penetrationsprobleme von Wirkstoffen, Fragen und aktuelle Situation zum in vitro Sonnenschutz, die Logistik für hautphysiologische Messungen der Schwerelosigkeit bis zu Wirkungen und den Nachweis von Stoffen in Nahrungsergänzungsmitteln und zu den Anwendungsmöglichkeiten der Photoakustik in der photodermatologischen Forschung.

M. Choi, J.-W. Choi, S.-Y. Lee, S.-Y. Choi, H.-J. Park, Low-dose 1064-nm Q-switched Nd: YAG laser for the treatment of melisma, Volume 21 (4) Informa Healthcare, Jul. 1, 2010

Abstract Background: Melasma is a common acquired pigmentary disorder which is sometimes hard to treat with conventional methods. Various kinds of modalities have been applied for the treatment of melasma but none shows constantly good results. **Objectives:** In this study, we would like to know the effect of low-dose 1064 -nm Q-switched Nd: YAG laser (QSNYL) on melasma and want to evaluate the changes of skin after laser treatment. **Methods:** Twenty melasma patients were enrolled. Two regions were evaluated from each patient; a total of 40 sites. The 1064-nm QSNYL at fluences of 2.0–3.5 J/cm² was used to treat the whole face, including the melasma lesions. The fluence was adjusted individually and increased until erythema was developed on the laser-treated area. The treatment was performed five times with a 1-week interval. Non-invasive measuring methods, including a chromatometer, mexameter, cutometer, visioscan and a corneometer, were used before and after treatment.

*M. Mateu, E. Canadas, J. Cebrian, N. Alminana, **Novel elasticity and tightness enhancing peptide**, Personal Care, June 2010*

Wrinkles, lack of firmness or sagginess are the most visible signs of skin ageing. A variety of environmental, hormonal, and genetic factors result in skin elasticity loss. Mature skin becomes less elastic and less able to resist any deformation, leading to many of the visible manifestations of ageing. The synergistic effects of chronological ageing, photoageing environmental factors, and hormonal deficiency, cause skin quality deterioration with age. Hormonal ageing of skin due to oestrogen loss during the menopause is thought to include atrophy, elasticity loss and decreased sebaceous secretions, and collagen and water content. Intrinsically, aged skin shows characteristic fine wrinkling and appears smooth. Especially from the age of 40 years, synthesis and turnover of new components by fibroblasts slow, and enzyme action on fibres increases, implying skin elasticity loss and a less supple and more hardened collagen.

*S. Mac-Mary, J.M. Sainthillier, A. Jeudy, C. Sladen, C. Williams, M. Bell, P. Humbert, **Assessment of cumulative exposure to UVA through the study of asymmetrical facial skin aging**, Clinical Interventions in aging; Volume 5, 2010 open access*

Background: Published studies assessing whether asymmetrical facial ultraviolet light exposure leads to underlying differences in skin physiology and morphology report only clinical observations. The aim of this study was to assess the visual impact of the skin of repeated ultraviolet-A (UVA) exposure through a window. **Methods:** Eight women and two men presenting with asymmetrical signs of photoaging due to overexposure of one side of their face to the sun through a window over a long period of time were enrolled in the study. Split-face biometric assessments were performed (clinical scoring, hydration with Corneometer, mechanical properties with Cutometer, transepidermal water loss with AquaFlux, skin relief with fringe projection, photography, stripping, and then lipid peroxidation analysis).

*A. Sadanori, A. Kozo, I. Toshifumi, H. Akiyoshi, **Basic fibroblast growth factor accelerates and improves second-degree burn wound healing**, Wound Repair and Regeneration; Volume 16, Number 5*

Second-degree burns are sometimes a concern for shortening patient suffering time as well as the therapeutic choice. Thus, adult second-degree burn patients, mainly with deep dermal burns, were included. Patients receiving topical basic fibroblast growth factor (bFGF) or no bFGF were compared for clinical scar extent, passive scar hardness and elasticity using a Cutometer, direct scar hardness using a durometer, and moisture analysis of the stratum corneum at 1 year after complete wound healing.

*L.-C. Gerhardt, V. Strässle, A. Lenz, N.D. Spencer, S. Derler, **Influence of epidermal hydration on the friction of human skin against textiles**, J. R. Soc. Interface (2008) 5, p. 1317–1328*

Friction and shear forces, as well as moisture between the human skin and textiles are critical factors in the formation of skin injuries such as blisters, abrasions and decubitus. This study investigated how epidermal hydration affects the friction between skin and textiles. The friction between the inner forearm and a hospital fabric was measured in the natural skin condition and in different hydration states using a force plate. Eleven males and eleven females rubbed their forearm against the textile on the force plate using defined normal loads and friction movements. Skin hydration and viscoelasticity were assessed by corneometry and the suction chamber method, respectively. In each individual, a highly positive linear correlation was found between skin moisture and friction coefficient (COF). No correlation was observed between moisture and elasticity, as well as between elasticity and friction. Skin viscoelasticity was comparable for women and men. The friction of female skin showed significantly higher moisture sensitivity. COFs increased typically by 43% (women) and 26% (men) when skin

hydration varied between very dry and normally moist skin. The COFs between skin and completely wet fabric were more than twofold higher than the values for natural skin rubbed on a dry textile surface. Increasing skin hydration seems to cause gender-specific changes in the mechanical properties and/or surface topography of human skin, leading to skin softening and increased real contact area and adhesion.

X. Liang, S.A. Boppart, Biomechanical Properties of In Vivo Human Skin From Dynamic Optical Coherence Elastography, IEEE Transactions on Biomedical Engineering, Vol. 57, No. 4, April 2010

Dynamic optical coherence elastography is used to determine *in vivo* skin biomechanical properties based on mechanical surface wave propagation. Quantitative Young's moduli are measured on human skin from different sites, orientations, and frequencies. Skin thicknesses, including measurements from different layers, are also measured simultaneously. Experimental results show significant differences among measurements from different skin sites, between directions parallel and orthogonal to Langer's lines, and under different skin hydration states. Results also suggest surface waves with different driving frequencies represent skin biomechanical properties from different layers in depth. With features such as micrometer-scale resolution, noninvasive imaging, and real-time processing from the optical coherence tomography technology, this optical measurement technique has great potential for measuring skin biomechanical properties in dermatology

T. Ezure, S. Amano, The severity of wrinkling at the forehead is related to the degree of ptosis of the upper eyelid, Skin Research and Technology 2010, 16: p. 202-209

Wrinkling and sagging of the face are well-known features of aging. The mechanism of wrinkle formation has been studied extensively in relation to the deterioration of the dermal condition caused by sun exposure and aging, which enhance the fixation of transiently formed wrinkles. However, little is known about transient wrinkles induced by change of facial expression as putative initiators of fixed wrinkles. The forehead represents a major part of the face, and wrinkles appear there, as well as at the corners of the eyes, around the eyes and around the mouth.

H. Yim, Y.-S. Cho, C.-H. Seo, B.-C. Lee, J.-H. Ko, D. Kim, J. Hur, W. Chun, J.- H. Kim, The use of AlloDerm on major burn patients: AlloDerm prevents post-burn joint contracture, BURNS, Vol. 36, Issue 3, p. 322-328

A total of 64 patients received AlloDerm graft selectively on joint areas during the study period from March, 2005 to July, 2007. From January to March, 2008, a total of 31 patients returned to our burn center to examine the functional results by measuring range of motion of joints. Additionally, the quality of grafted skin condition criteria of skin elasticity, scar thickness, trans-epidermal water loss, melanin and erythema level was measured in a total of 11 patients among them. By analyzing the limitation level of 55 joints excluding hand areas, we found that 24 joints (43.6%) showed no limitations, 12 joints (21.8%) showed limitations below 10%, 16 joints (29.1%) showed limitations between 10 and 19% and 3 joints (5.5%) showed limitations over 20%. The scar thickness of non-AlloDerm applied areas was 2.5 ± 0.9 mm and AlloDerm applied areas was 1.8 ± 0.7 mm ($p = 0.396$). Trans-epidermal water loss for non-AlloDerm applied areas was 20.9 ± 7.7 g/h/m² and AlloDerm applied areas was 10.8 ± 3.4 g/h/m² ($p < 0.001$). Erythema value for non-AlloDerm applied areas was 436.1 ± 65.8 , whereas AlloDerm applied area was 394.4 ± 61.2 ($p < 0.001$). Acellular dermal matrix is a good option for treating major burns to prevent scar formation after burn and loss of joint function.

J.-M. Sainthillier, S. Mac-Mary, D. Monnier, P. Mermet, C.T. Zarrit, M. Mudry, C. Mudry, P. Humbert, Exploratory study of the typology of mature skin at different stages, and Skin Research and Technology 2010; 16

Post-menopausal skin aging has intrinsic and extrinsic origins that induce considerable appearance and feeling disparition within a class of age. The aim of this study was to try and identify different stages of maturity of skin of the face of menopausal women.

K.A. Tadini, Acetyl hexapeptide-3 in a cosmetic formulation acts on skin anisotropy – clinical study, ISBS Besancon, 2009 and Skin Research and Technology 2010; 16

Acetyl hexapeptide-3 has been used in anti-aging topical formulations since it has demonstrated effects in improving the skin appearance. However, there are few scientific studies about its effects on epidermis and dermis when vehiculated in topical formulations, mainly using objective measurements, which are an important tool in clinical efficacy studies. Thus the aim of this study was to determine the clinical efficacy of the acetyl hexapeptide-3 using biophysical techniques. Formulations with and without acetyl hexapeptide-3 were applied to the ventral forearm and the face area of human volunteers. Skin conditions were evaluated after 2 and 4-week period daily applications, by analyzing

the stratum corneum water content (Corneometer SEM 575) and the skin mechanical properties, using two instruments, the cutometer SEM 575 and Reviscometer RV 600 to identify skin changes after the use of the formulations under study.

S. Hibino, U. Hamada, H. Takahashi, M. Watanabe, N. Nozato, Y. Yonei, Effects of Dried Brewer's Yeast on Skin and QOL: A Single-Blind Placebo-Controlled Clinical Study of 8-Week Treatment, Anti-Aging Medicine 2010

Objective: Brewer's yeast contains vitamins, minerals, amino acids and other nutrients, and has been reported to control intestinal function as well as to exert anti-ulceration, anti-tumor and anti-allergy effects. The present study evaluated the effects of oral treatment with dried brewer's yeast tablets (study product) on skin in a single-blind placebo-controlled design in humans. Methods: Thirty-two healthy volunteer women (37.0 ± 4.8 years) were allocated as follows: Group E-30 ($n=11$) were treated with 30 tablets/day of the study product (containing 7,125mg/day of dried brewer's yeast), Group E-9 ($n=10$) were given 9 tablets/day of the study product, and the control group ($n=11$) were given 30 placebo tablets/day. The treatment period was 8 weeks. Two patients prematurely discontinued the study (discontinuation rate: 5.9%) and were excluded from the analyses. The study product (Ebios Tablet®) was provided by Asahi Food & Healthcare Co., Ltd. Before and at 4 and 8 weeks after the study, subjective symptoms were evaluated using the Anti-Aging QOL Common Questionnaire (AAQol) and checking skin symptoms, skin images were analyzed with SK Info (SKI, Integral Co.) and Aphrodite-III (PSI), and skin color (CM-700d, Konica Minolta Sensing, Inc.) and elasticity (Cutometer MPA580, Courage & Khazaka electronic GmbH) were measured. Results: In Group E-30, the AAQol physical symptom "cold skin" score was significantly improved at 8 weeks ($p<0.05$). The skin symptoms "make-up runs easily" and "desiccated and gritty skin," as well as the physical symptom "menstruation-related troubles" were improved in a significant and dose-dependent way from the control group ($p<0.01$). On skin analysis, SKI demonstrated an increase in moisture content (15.4%, $p=0.010$), decrease in erythema (-18.3% , $p<0.001$) and increase in elasticity (13.3%, $p=0.003$), while PSI revealed an increase in hydration (Total: 14.5%, T zone: 13.7%, U zone: 18.2%, $p<0.01$) and decrease in pores (-32.7% , $p=0.022$). Cutometer analysis showed a dose-dependent increase in skin elasticity, while analysis of skin color showed a decrease in hemoglobin (-9.5% , $p=0.016$), improved lightness (-0.7% , $p=0.045$) and decrease in redness (-8.3% , $p=0.013$). During the study period, no serious adverse events were noted. Conclusion: These results suggest that treatment with dried brewer's yeast is useful in improving skin condition, e.g. moisture content and elasticity, and also QOL.

A.O. Barel, R. Clysen, P. Clarys, Evaluation of the elastic properties of the skin using the suction method (Cutometer®). Which parameters to use for claims in anti-aging treatments? ISBS Besancon, 2009 and Skin Research and Technology 2010; 16; p. 471

In cosmetic claims concerning the efficacy of anti-aging products and treatments, general terms such as elasticity, firmness, tonus etc. are used. Based on the suction method, the Cutometer (Courage-Khazaka, Germany) evaluates quantitatively the elastic and viscoelastic properties of the skin. In the Strain versus Time mode (which is mostly used) the vertical deformation of the skin due to vacuum, is measured in function of time and various linear skin deformation parameters are recorded.

T. Brennan Steele, A Double blind comparative study to determine the efficacy of a 25% urea cream vs. a 10% urea cream, in treating anhydrosis, Thesis of the Glasgow Caledonian University

The terms anhydrosis and xerosis are used interchangeably to describe a skin condition which presents as dry, rough and scaly with possible presence of reddening, cracking or itching (Flynn et al, 2001). For the purpose of this project, the term anhydrosis will be applied. Anhydrosis can affect all age groups and features regularly within the podiatrist's clinical environment. The skin may also present as less flexible than normal, contributing to the irregular feel which is usually rough and uneven to touch (Flynn et al 2001, M.Loden, 2003).

A.-L. Rodrigues, O. Freis, L. Danoux, C. Jeanmaire, P. Moussou, M. Sabadotto, A. Rathjens, Functional moisturiser raises skin barrier function, Personal Care, January 2010, p. 40-43

One of the skin's primary functions is to protect our body from external aggressions such as allergens, dirt, irritants, chemicals, as well as from water loss from the inside. Stressful environmental conditions, including weather (cold, wind, sun) and pollution in addition to daily-used products, such as soap and surfactants, may alter the skin's natural water balance and affect its protective functions. If the skin's protective barrier is compromised, skin becomes dry and flaky and more sensitive to external stress factors, such as pollution, air-conditioning and frequent cleansing.

R. Armengol, A. Benaiges, J. Bosch, Cellular senescence inhibition halts skin ageing, Personal Care, January 2010, p. 29-33

Over time, cells show a decrease in their replicative and metabolic capacity, resulting in a reduction in their number of duplications achieving a state of proliferation arrest. This phenomenon of loss of replicative capacity is known as cellular senescence. The existence of a molecular clock is suggested, marking the moment when the capacity of cell replication stops and senescence starts. This marker is placed on the DNA molecules located at the ends of chromosomes, called telomeres, a term which comes from the Greek word "telos" (end) and "meros" (part). Each time, a cell divides, its telomeres are shortened, thus reducing their subsequent cellular replicative capacity.

K. Kajiya, E. Kawai, J. Kshimoto, M. Detmar, A Novel Mechanism of Cutaneous Photo-Aging Mediated by the Impairment of Lymphatic Function and the Protective Role of a Lymphatic-promoting Compound, IFSCC Magazine, Vol. 12, No. 4 / 2009; p. 417

The lymphatic system plays an important role in the maintenance of tissue fluid homeostasis and the afferent phase of immune response. However, the role of the lymphatic system in mediation of aging and its molecular mechanism have been totally unknown. Here we have identified, for the first time, the importance of the cutaneous lymphatic system in the process of ultraviolet (UV) B-induced skin-damage. UVB induced the prominent enlargement of lymphatic vessels which were leaky and hyperpermeable, suggesting that the function of enlarged lymphatic vessels induced by UVB was impaired.

G. Boyer, L. Laquière, A. Le Bot, S. Laquière, H. Zahouani, Dynamic indentation on human skin in vivo: ageing effects, Skin Research and Technology 2009; 15, p. 55-67

Knowledge of the mechanical properties of the human skin is very important for cosmetic and clinical research. Objective and quantitative measurements are essential to compare studies performed by different experimenters in different centres. The aim of this paper is to present a method to measure the viscoelastic properties of human skin in vivo dynamic indentation. A complete device to assess the stiffness and damping of skin has been developed.

K. Miyamoto, O. Kuwanzuru, N. Yoshikawa, Sudden skin appearance change in skin aging, skin elasticity tipping model as a key indicator of the skin aging progression, Journal of Investigative Dermatology (2009), Volume 129

Understanding bio-elasticity of human tissues is important to maintain human health and wellness including skin substrates against aging. It has been considered signs of skin aging are appeared gradually, while we discovered sudden skin condition change occurred in the aging process. A new skin elastic model was proposed as a new skin aging progression, by characterizing multilayered skin physical properties.

M.J. Koehler, A. Preller, N. Kindler, P. Elsner, K. König, R. Bückle, M. Kaatz, Intrinsic, solar and sunbed-induced skin aging measured in vivo by multiphoton laser tomography and biophysical methods, Skin Research and Technology 2009; 15; p. 357-363

In aging skin, the decreasing dermal collagen content due to diminished collagen synthesis is responsible for some of the clinically most evident signs of intrinsic aging skin such as thinning, loss of elasticity and fine wrinkling. Extrinsic skin aging is mainly a consequence of cumulative ultraviolet (UV) exposure of the skin, but can be accelerated by nicotine abuse and environmental hazardous compounds.

G. Sliwinski, A. Schneider, M. Schulz, M. Wolf, A. Fiolka, M. Meyer, H. Feussner, Z. Sliwinski, R. Poll, C. Thiele, Physical Organ Phantoms for Training in Minimal Invasive Surgery (MIS), IFMBE Proceedings 25/VI, WC 2009, p. 120-123, 2009;

In surgical training realistic phantoms of organs are necessary. Today's system only meet the requirements of a simulation of a medical intervention very limited. As of now it is only possible to learn the basis skills on such systems. Complicated and complex procedures have to be practised in experiments on animals or under supervision on the patient. As of now the physical organ phantoms do not display the requested features.

N. Krueger, S. Luebberding, M. Oltmer, M. Streker, M. Kerscher, Age Related Changes in Skin Mechanical Properties – Quantitative Evaluation Of 120 Female Subjects In A Trial With A Strict Design, University of Hamburg, Department of Chemistry, Division of Cosmetic Science

One of the most important functions of the skin is the protection against mechanical exposure. The mechanical properties of the skin depend on the thickness and qualitative characteristics of the

epidermis, dermis and subcutis. During the aging process the three layered skin system changes strongly accompanied by changes in its mechanical properties, resulting in higher vulnerability and other skin diseases.

N. Waranuch, M. Sirada, K. Ingkaninan, W. Wisuitiprot, The correlation between Cutometer's parameters of skin elasticity and ages of Thai female volunteers, ISBS Besancon, 2009

Skin elasticity is one of aging signs that can be measured using several equipments. Cutometer is one among those used to quantify skin elasticity. Skin property can be demonstrated in term of Cutometer's parameters; U_a/U_f : gross elasticity, U_r/U_e : net elasticity, U_v/U_e : ration of viscoelastic to elastic distension and U_r/U_f : relative elastic parameters. However, the correlations of its parameters with skin properties reported in many publications are often in disagreement. Besides, a report on Asian population is limited.

W. Pratchyapruit, Grading of improvement and relapse in melasma of Thai females after 8 weeks-treatment with a combined cream of hydroquinone, steroid and tretinoin, ISBS Besancon, 2009

Melasma is a common skin problem in any races including Asians. It commonly occurs in Thai females, age 30-40 years and females outnumber males about 13:1. In addition to multiple etiologic factors, the environmental factor of Thailand as a tropical and sunny climate country constitutes a definite factor responsible for improvement and relapse of pigmentation after any treatments. At present, the topical treatment consisting of hydroquinone (HQ), steroid and tretinoin together with sunlight protection is a standard treatment for melasma.

N. Krueger, S. Luebberding, M. Oltmer, M. Streker, M. Kerscher, Age-related changes in skin mechanical properties. Quantitative evaluation of 120 female subjects in a trial with a strict design, ISBS Besancon, 2009

The most commonly used method to determine the mechanical ability of skin is the creep test using suction chamber devices. Until now there is no scientific consensus upon which skin deformation parameters are particularly suitable to describe age related changes in human skin mechanics. The aim of this study was to examine common mechanical skin parameters to find those best representing the influence of aging.

M. Lanctin, A. Nkengne, G. Stamtas, F. Le Goff, A. Papillon, C. Bertin, Changes on body skin as a function of age, ISBS Besancon, 2009

Facial skin aging has been a great concern in cosmetodermatology and many publications have documented the age-related transformations of skin. However to our knowledge, few studies have been conducted to systematically investigate the changes of skin attributes in different body sites. This study was designed to assess the link between age and skin body attributes such as hydration, firmness, color, stretch marks and cellulite. The study involved 150 healthy women Caucasian volunteers aged between 18 and 70 years of age and with a Body Mass Index (BMI) between 20 and 26 kg/m².

J.W. Wiechers, S. Mac-Mary, S. Vacheron, J.M. Sainthillier, E. Garcia, G. Khazaka, P. Humbert, B. Gabard; How to measure exactly the same location on the face as a function of time with digital photography; ISBS Besancon, 2009

The fight against skin aging is truly international, although the symptoms may differ throughout the world. Whereas Caucasians notice wrinkles as one of the first signs of their passing years, Asians observe skin discolourations. All of us want to have a skin with a perfect colour (a uniform complexion without any discolouration) and a perfect smooth surface (without any wrinkles or other signs of roughness). Hence, there must be products to achieve these effects as well as ways to measure whether these products are successful.

K.P. Wilhelm, G. Springmann, S. Bielfeldt, Functional food, food supplements and the skin, ISBS Besancon, 2009

Functional food and food supplements are foods or dietary products that should provide a health benefit beyond basic nutrition. The worldwide market for these products is estimated to be in excess of \$ 100 billion. Such products are regulated in Europe under the food (supplement) legislation. However there is a potential distinction and separation between food supplements and drugs. While initially functional food and food supplements were mainly provided as a "soft alternative" to pharmaceutical drugs to improve health parameters that could be early linked to nutrition i.e. lower cholesterol levels, prevent osteoporosis, induce natural sleep etc.

S.E. Dal Belo, L.R. Gaspar, P.M. Maia Campos, J.P. Marty, Skin Penetration of Epigallocatechin-3-

Callate and Quercetin from Green Tea and Ginkgo biloba Extracts Vehiculated in Cosmetic Formulation, NCBI 2009

Green tea (*Camellia sinensis*) and Ginkgo biloba extracts in cosmetic formulations have been suggested to protect the skin against UV-induced damage and skin ageing. Thus, it is very important to assess the human skin penetration of their major flavonoids to verify if they penetrate and remain in the skin to exert their proposed effects. The aim of this study was to evaluate the human skin penetration of epigallocatechin-3-gallate (EGCG) and quercetin from green tea and *G. biloba* extracts vehiculated in cosmetic formulations. This study was conducted with fresh dermatomed human Caucasian skin from abdominal surgery mounted on static Franz diffusion cells.

L.R. Gaspar, F.B. Camargo Jr., M.D. Gianeti, P.M. Maia Campos, Evaluation of dermatological effects of cosmetic formulations containing Saccharomyces cerevisiae extract and vitamins, NCBI 2009

Saccharomyces cerevisiae extract (SCE) is used in cosmetics since it can act in oxidative stress and improve skin conditions. This study investigated dermatological effects of cosmetic formulations containing SCE and/or vitamins A, C and E. The formulation studied was supplemented or not (F1: vehicle) with vitamins A, C and E esters (F2) or with SCE (F3) or with the combination of vitamins and SCE (F4). Formulations were patch tested on back skin of volunteers. For efficacy studies, formulations were applied on volunteers and transepidermal water loss (TEWL), skin moisture (SM), skin microrelief (SMR) and free radicals protection were analysed after 3h, 15 and 30 days of application.

C. Schrammek-Drusio, Fachfrau in Sachen Haut – die Kosmetikerin als Hautpflegetherapeutin, natur & kosmetik, service, p. 39

Die Kosmetikerin von heute muss sich in Theorie und Praxis rund um das Thema Haut auskennen. Dafür spielt die fundierte und theorie- sowie fachorientierte Ausbildung und eine stetige Weiterbildung die größte Rolle. Ohne berufliche Fortbildung ist es auf Dauer unmöglich, zeitgerecht und marktorientiert zu arbeiten. Um die Haut der Kundinnen und Kunden für die kosmetische Kabinenbehandlung spezifisch zu bestimmen, liegt ein Schwerpunkt im richtigen Erkennen der Hautgrundbilder und Hautzustände – die so genannte Profi-Hautanalyse. Noch immer werden Hauttypen und Hautgrundbilder häufig verwechselt.

P. Wendling, Skin Changes Help Identify Scleroderma Mimics, www.skinandallergynews.com, July 2009

Few physicians would be fooled nowadays by gadolinium-induced nephrogenic systemic fibrosis, but there are other diseases that can masquerade as scleroderma. The precise diagnosis of scleroderma-like illnesses is important because even though many of them are called scleroderma, they are different from systemic sclerosis in their treatments and outcomes, Dr. Virginia Steen said at a symposium sponsored by the American College of Rheumatology. The diagnosis is most often based on the distribution and clinical characteristics of skin findings, as biopsies don't always differentiate types of scleroderma. She recommended watching for the following conditions: Lipodermatosclerosis is one condition that physicians often fail to think of as a scleroderma mimic. Also known as hypodermatitis sclerodermaformis, it refers to localized chronic inflammation and fibrosis of the skin and subcutaneous tissues of the lower leg. In the acute stage, the leg is inflamed and warm, the skin is very tight, and cellulitis may be present. The ankle and toes are not involved.

K. Bazela, A. Dzwigalska, E. Kazmierczak, R. Debowska, K. Rogiewicz, I. Eris, Corrective make-up cosmetics – the study of efficacy and camouflage effect, 18th EADV Congress, Berlin, 2009

Corrective make-up can be applied to hide the skin imperfections accompanying numerous skin diseases. The aim of this study was to evaluate the efficacy and camouflage effect of corrective make-up in patients with pigmentary disorders, acne and pre-rosacea. Corrective fluid foundation efficacy was tested on 20 subjects and applied once a day for 4 weeks. The skin moisturization, oil content and elasticity were measured using Multiprobe Adapter System MPA 5 probes.

C. Catala-Pétavy, L. Machet, G. Georgesco, F. Pétavy, A. Maruani, L. Vaillant, Contribution of skin biometrology to the diagnosis of the Ehlers-Danlos syndrome in a prospective series of 41 patients, Skin Research and Technology 2009; 15, p. 412-417

The diagnosis of the Ehlers-Danlos syndrome (EDS) is primarily clinical. Clinical signs result from modifications of the rheological properties of the skin: thickness, extensibility and hydration. Our main objective was to demonstrate what skin biometry can contribute to the diagnosis and evaluation of the different types of EDS. Forty-one patients clinically diagnosed with EDS were paired by age and sex to 41 healthy subjects with no known dermatologic disease, in particular connective tissue diseases.

*T. Ezure, J. Hosoi, S. Amano, T. Tsuchiya, **Sagging of the cheek is related to skin elasticity, fat mass and mimetic muscle function***, Skin Research and Technology 2009, 15: p.299-305

Facial sagging is associated with aging, although the mechanism remains unclear. The aim of this study was to investigate the mechanism of facial sagging by examining the relationship of sagging severity to changes of skin elasticity, fat mass and facial muscle function at the cheek. Faces of 108 healthy Japanese female volunteers, aged 20-60 years were photographed at an angle of 45°. Standard scores of sagging severity were established by analyzing the photographs. We examined the correlations of scored sagging levels with skin elasticity measured with a Cutometer MPA 580, fat content estimated by bioelectrical impedance analysis and facial muscle function (lip sealing force and occlusal force) in middle-aged female volunteers (30-40 years) with a wide range of sagging scores.

*H. Dobrev, **How do cosmetic products improve the skin mechanical properties?***, Congress of EADV, 2009, Berlin

Objective: to study the mechanisms for improving skin mechanical properties after short-term and long-term application of cosmetic products containing different active ingredients. Skin mechanical properties were determined using a non-invasive suction device (Cutometer). A total of 52 healthy female volunteers (aged 18-64 years) divided into 3 groups were studied. The first group was measured before and 120 min after single application on volar forearm of two emulsions containing urea and complex of alpha hydroxyacids, respectively.

*D. Boudier, C. Lenaers, C. Sabbadini, D. Creel, B. Closs, **Certified Organic Actives For Cosmetic Formulations***, HAPPI, May 2009, p. 70-77

With more consumers interested in following a healthy and eco-conscious lifestyle, demand for natural and organic beauty care products has grown tremendously in the past couple of years. Indeed, it is more than a trend, consumers today expect their cosmetics to be natural. Silab has more than 20 years of experience in the field of natural active ingredients. Most recently, we have developed a range of certified organic active ingredients that respond to the main cosmetic claims: anti-aging, anti-free radicals, moisturizing and soothing.

*G. Oberto, K. Cucumel, Y. Guerif, R. Chabert, A. Berghi, C. Dal Farra, N. Domloge, **Catch them young***, SPC April 2009

The epidermal basement membrane is an essential and highly specialised zone of the skin that links the dermis to the epidermis. Aside from its structural role, the basement membrane participates in the selective flow of communication between the epidermis and the dermis, which is essential for skin homeostasis. The basement membrane contains specialised structures, called the anchoring complex, which ensures the quality and stability of the connection and communication between the dermis and the epidermis.

*L.-C. Gerhardt, A. Lenz, N.D. Spencer, T. Münzer, S. Derler, **Skin-textile friction and skin elasticity in young and aged persons***, Skin Research and Technology 2009; 15, p. 288-298

The mechanical properties of human skin are known to change with ageing, rendering skin less resistant to friction and shear forces, as well as more vulnerable to wounds. Until now, only few and contradictory results on the age-dependent friction properties of skin have been reported. This study has investigated in detail the influence of age on the friction of human skin against textiles. In vivo skin-friction measurements on a force plate were combined with skin analyses concerning elasticity, hydration, pH value and sebum content.

*C. Oresajo, M. Yatskayer, R. Rizer, S. Raab, Z. Draelos, **A multicenter, controlled clinical study to evaluate the efficacy and tolerance of an antioxidant composition containing vitamin C, ferulic acid, and phloretin on photodamaged skin***, JAAD, March 2009, San Francisco

The purpose of this study was to evaluate the effectiveness of an antioxidant composition containing vitamin C, ferulic acid, and phloretin in improving the visible signs of photodamaged skin. A 24-week, multicenter, clinical study of 55 females 35 to 65 years of age with self-perceived sensitive skin, mild to moderate periorcular fine and coarse wrinkles, and mild to moderate hyperpigmentation on the face and back of the hands were enrolled.

*R. Wanitphakdeedecha, S. Eimpunth, W. Manuskiatti, **The effects of tetrahydrocurcumin in curmin cream on the hydration, elasticity, and color of human skin***, JAAD, March 2009, San Francisco

An antioxidant used in cosmetic applications should have the capability to efficiently quench free radicals on the surface of the skin. Tetrahydrocurcumin (THC) plays an important role in the

antioxidant mechanism resulting in the significant neutralization of free radicals in a dose-dependent manner. Recent studies revealed the superior free radical scavenging ability of THC.

N. Trookman, E. Ho, R. Ford, V. Gotz, Clinical efficacy and tolerance of a novel treatment serum for photodamaged facial skin, JAAD, March 2009, San Francisco

Oxidative damage induced by environmental factors, such as chronic ultraviolet exposure, contributes to the process of photoaging and results in the formation of biochemical events which leads to increased collagen degradation and the suppression of collagen synthesis. Clinical manifestations of photodamage include a loss of skin elasticity and firmness, fine lines and wrinkles, and uneven skin tone

M. Murakami, O. Tanno, H. Kurokawa, Evaluation of skin mechanical properties by determining of resonant frequency and loss resistance with tactile sensor, Skin Research and Technology, No. 1, Feb. 2009, p. 125-126

To clarify the characteristics of resonance frequency change and loss resistance by determining the mechanical properties of skin with a tactile sensor (Venustron Axiom Incl, Japan), which is a device used to elucidate the mechanical characteristics of skin based on implementation of a resonance circuit and piezoelectric oscillator. Two different experiments were performed with 30 healthy Japanese males as subjects.

D. Khazaka, C. Uhl, More than 2 decades of bioengineering for efficacy testing and product recommendation, Household and Personal Care TODAY, No. 1/2009

Due to high competition in the cosmetic and growing customer expectations, in the past two decades there has been a continuous development of new cosmetic products with more efficient ingredients covering new effects on the skin. Simultaneously to this, there was an increasing demand for new measuring techniques to substantiate the new product claims. The field of skin bioengineering has consequently been immensely enriched in the last years by inventing new physical and optical measurement methods for all kind of skin parameters.

H. Tronnier, M. Wiebusch, U. Heinrich, Skin-Physiological Test in Weightlessness in the ISS Space Station, IFSCC Magazine Vol. 11, No. 3/2008

A prolonged stay in weightlessness includes several medical alterations of the human body and also results in impairment of the skin. The stratum corneum, epidermal barrier as well as other skin compartments are affected in terms of their susceptibility to dryness, desquamation and pruritus. This can lead, for example, to wound healing disorders. Skin physiological tests were performed on the skin of an astronaut during and after the the ASTROLAB-Mission within the Skin Care program initiated by the ESA.

L. Rigano, M. Pleardo, E. Pini, R. Stradi, M. Meloni, A. Bertelli, A. Benedusi, G. Guiliani, Novel Retinol-like Actives from Parrot Feathers, IFSCC magazine, Vol. 11, No. 4 / 2008

Several classes of pigments are responsible for coloration in birds. Melanin pigments most commonly appear in bird feathers and bare parts. They impart black, brown and chestnut hues. Carotenoids are a second group of coloring biochemicals in birds. These two types of pigment-based coloration are found in nearly every order of extant birds. In contrast, parrots harbor bright-colored pigments in their feathers, which have different structures.

T. Krieg, M. Worm, J. Wenzel, T. Gambichler, A. Kuhn, E. Aberer, K. Scharffetter-Kochanek, Diagnostik und Therapie der zirkumskripten Sklerodermie, AWMF online; AWMF-Leitlinien-Register Nr. 013/066; 11/2008

Bei der zirkumskripten Sklerodermie handelt es sich um ein Spektrum von sklerotischen Erkrankungen der Haut mit je nach Subtyp und Lokalisation möglicher Beteiligung von hautnahen Strukturen wie Fettgewebe, Muskulatur, Gelenke und Knochen. Ein Befall innerer Organe wie z.B. Herz, Lunge, Niere oder Gastrointestinaltrakt tritt bei der zirkumskripten Sklerodermie ebenso wenig wie Übergänge in eine systemische Sklerodermie auf. Die Inzidenz der zirkumskripten Sklerodermie wird mit ca. 27 pro 1 Mio. Einwohner (Silman et al. 1988; Peterson et al. 1997) angegeben. Die zirkumskripte Sklerodermie tritt mit einer Häufigkeit von 2,6 - 6 zu 1 häufiger bei Frauen als bei Männern auf (Silman et al. 1988). Das breite klinische Spektrum der zirkumskripten Sklerodermie führte zur Entwicklung einer Reihe verschiedener Klassifikationen (Jablonska 1975b; Peterson et al., 1995). Für diese Leitlinie wird eine Klassifikation vorgeschlagen, die das Ausmaß, die Ausbreitung und die Tiefe des fibrotischen Prozesses berücksichtigt. Hieraus resultiert eine Einteilung in die vier Hauptformen "limitiert,

generalisiert, linear und tief" (Abbildung 1). Vorteil dieser einfachen Klassifikation ist der eindeutige Bezug zu

den therapeutischen Empfehlungen dieser Leitlinie. Diese Einteilung reflektiert teilweise auch den unterschiedlichen klinischen Verlauf der einzelnen Untergruppen. So wird für die limitierte Variante eine Rückbildung bei ca. 50 % der Patienten nach ca. 2,5 Jahren beschrieben (Christianson et al. 1956, Peterson et al. 1997). Hingegen wird für die generalisierte, lineare und tiefe Form eine längere durchschnittliche Erkrankungsdauer mit ca. 5,5 Jahren beschrieben. Hierbei handelt es sich allerdings nur um Durchschnittswerte. Sekundäre Veränderungen wie Hyper-, Depigmentierung, Kontrakturen und atrophische Veränderungen zeigen in der Regel nur eine sehr geringe und langsame Rückbildungstendenz. Die Häufigkeitsmuster für die verschiedenen Subtypen sind altersabhängig. So tritt die lineare Form im Kindesalter deutlich häufiger auf (Zulian et al, 2006). Vorwiegend im Kindesalter wird im Verlauf oder sogar gleichzeitig ein Auftreten mehrerer Formen beobachtet, z.B. einer linearen Form in Kombination mit einer limitierten Form. Dies sollte entsprechend bei Beschreibung der Diagnose angegeben werden.

G. Pauly, J.-L. Contet-Andonneau, P. Moussou, L. Danoux, V. Bardey, O. Freis, M. Sabadotto, Y. Wegrowski, F.-X. Marquart, A. Ratjens, **Small Proteoglycans in the skin: New Targets in the fight against skin aging**, IFSCC Magazine, 11 (2008) (1) 21–29

Proteoglycans take an important part in tissue homeostasis. In the skin, Proteoglycans are present in the extracellular matrix of dermis, particularly with lumican which plays an important role in dermal homeostasis. In the epidermis, several small proteoglycans such as the syndecans are synthesised and play an important role in keratinocyte activation.

C. Oresajo, M. Yatskayer, A. Galdi, N.S. Trookman, R.L. Rizer, Z. Draelos, I. Hansenne, **Multi-Center, Clinical Evaluation of a Broad Spectrum Sunscreen Moisturizer Containing a new Photostable UVA/UVB Complex for Treatment of Photodamaged Facial Skin**, www.lorealusa.com; Poster

Photoaging is the result of chronic cumulative exposure to UV radiation. UVB radiation changes throughout the year and according to location, whereas UVA radiation is less variable. UVA rays are lower in energy than UVB, however they are twenty times more abundant. Efficient and stable broad spectrum protection is therefore needed year round for adequate protection against photoaging.

J. Staton, **Tools for anti-ageing claim support**; Personal Care, Nov. 2008; S.19-22

Anti-ageing covers a substantially broad area of claims associated with both the prevention and the treatment of chronological and environmental effects on the condition of human skin. A large number of instrumentally based clinical methods are available for the substantiation of claims related to anti-ageing. This article describes the most common of these and considers only those which are essentially non-invasive.

R.M. Debowska, A. Dzwigalska, M. Szubert, K. Rogiewicz, I. Eris, B. Pander, **Efficacy evaluation of re-modelling face care product**, Abstract, EADV Paris 09/2008

Background: Skin ageing is an important and interesting topic of study. It results from the combination of intrinsic ageing and photoageing, which is due to the environmental influence. The cosmetic industry creates and develops for the ageing population constantly improving products. Objectives: The aim of this study was to evaluate the in vivo efficacy and beneficial effects of application of the re-modelling face cream containing an anti-wrinkle peptide, vitamin E, proteins from sweet almonds and peach oil.

R.M. Debowska, B. Tyszczyk, J. Zielinska, K. Rogiewicz, I. Eris, B. Pander, **The effect of an anti-ageing body care product containing anti-wrinkle peptide, repairing enzymes and plant waxes**, Abstract, EADV Paris 09/2008

Background: Aging is an inevitable process which concerns every organ of our body, including the skin. Every day our skin is exposed to external factors. They influence the skin's condition and its appearance. Many women concern themselves mainly with the skin on the face and neck. However, they forget about the rest of their body skin, which undergoes aging as well and thus also needs suitable care. Objectives: The aim of this study was to evaluate the in vivo efficacy and beneficial effects of application of the body cream containing an anti-wrinkle peptide, repair enzymes, and olive, bee, cocoa and mango wax.

J. Vokurkova, H. Buckova, P. Sin, **Treatment of giant congenital melanocytic nevi and cutometric measurement of the skin elasticity after repeated expansions and surgery**, Abstract; EADV Paris 09/2008

Introduction: All types of surgical procedures _ neonatal dermabrasion, partial excisions, expansion and reexpansion of skin flaps etc. are used in children with diagnosis a Giant Congenital Melanocytic Nevi. Scar maturation after a surgery and especially after a transfer of expanded flap has its biological rules. However, it differs in individual patients in as much as one year. For objective examination of scar maturity and evaluation of its elasticity, it is possible to apply measurement with the Cutometer device. According to the measurement results, an algorithm may be evaluated for individual surgical procedures and especially for the best timing of re-expansion or if to continue in dermabrasion method.

*C. Huh, M. Choi, S. Lee, S. Kim, Y. Park, B. Kim, H. Park, S. Choi, S. Youn, K. Park, **Low dose 1064nm Q-switched Nd:YAG laser for the treatment of melisma**, Abstract; EADV Paris 09/2008*

Background: Melasma is a common acquired pigmentary disorder that is known for its recalcitrance to the conventional treatment. Although Q-switched Nd: YAG laser (QSNYL) is widely used for the treatment of melasma, little has been published regarding its effect. Objectives: In this study, we would like to know the effect of low dose 1064nm QSNYL (MedLite C6, HOYA Conbio, CA) on the treatment of melasma objectively.

*H. Tronnier, M. Wiebusch, U. Heinrich, **Skin physiological parameters in space – results of the European long-term mission in the ISS (ASTROLAB)**, Abstract, EADV Paris 09/2008*

Background: Since in weightlessness many astronauts report skin problems like dryness, itching, tendency to get injured, impaired wound healing etc., a “Skin Care” program was initiated for the ASTROLAB Mission of ESA (European Space Agency). It was carried out by a consortium with different tasks.

*A. Fourtanier, B. Ladan, C. Camus, N. Dami, V. Delvigne, R. Bazin, M. Hughes, A. Green, **Comparison of facial skin parameters in Caucasian Australian and European women**, Abstract, EADV Paris 09/2008*

The aim of this study was to compare two Caucasian female populations aged 40 to 69 years with very different lifestyles and cosmetic habits: one (n= 67) living in a temperate climate in Europe (Paris 55° N); the other (n= 80), living in subtropical Australia (Nambour, 26° S). Using a patented proprietary skin evaluation tool (Diagnô Expert®) in each location, we compared the skin properties of women classified into three age groups: 40 to 49, 50 to 59, 60 to 69. This tool combines several techniques including a capacitance method (Corneometer®) for hydration and a suction method (Cutometer®) for assessment of mechanical properties. The greatest wrinkle-depth, the intensity of the darkest pigmented spot (selected clinically) and sebaceous activity were measured on images acquired by camera with an adapted magnification (x10 and x60) and analyzed by a specific software.

*C. Camus, M. Isono, G. Yang, M. Daveno, D. Amar, B. Lavaud, C. Hoang Van Chu, V. Delvigne, R. Bazin, **Comparison of skin properties in various populations using a new multi-criteria measuring device**, Abstract, EADV Paris 09/2008*

Purpose of the study: To assess a new testing battery device for evaluating skin condition in relation to age and skin ethnicity and skin type. Methods: Facial skin data have been recorded in female volunteers by the same operator in 5 different countries from December 2003 to April 2004. Study volunteers included various ethnic skin types i.e. Caucasian (Paris, France), Hispanic (Mexico City, Mexico), Asian (Tokyo, Japan and Hong-Kong, China) and African American (Chicago, USA). At least one hundred women per city were involved and split into 4 natures of skin (normal, dry, oily and combined) and 5 age groups (20- 29 years, 30 - 39 years, 40 -49 years, 50 -59 years and over 60 years).

*U. Heinrich, B. Garbe, H. Tronnier, W. Stahl, C. Moore, M.J. Arnaud, **Supplementation with green tea extract improves skin physiological parameters**, Abstract, EADV Paris 09/2008*

Background: The objective of the study was to determine changes in skin parameters during the intake of a beverage rich in green tea extract. The detection of hydration properties, transepidermal water loss (TEWL), changes of skin surface (SELS), skin elasticity, skin thickness and density as well as serum analyses were determined during the study. Methods: Hydration measurements were carried out with the Corneometer CM 825 prior to and during the study. Transepidermal water loss (barrier function of the skin) was measured with the Tewameter, skin surface (SELS) with the Visioscan and skin elasticity with the Cutometer (Courage & Khazaka Electronics, Cologne, Germany).

Lys'lastine, the face designer, Advertisement of BASF Beauty Care Solutions, Cosmetics & Toiletries 9/2008, Vol. 123, No. 9

Major discoveries about elastin. Elastin naturally brings to mind the skin's youthful appearance and level of elasticity, both of which are symbolic values that make this molecule a choice ingredient in anti-age strategies. Nevertheless, the real scientific aspects of elastin are surprisingly not very well known including information about its structure, its function, and aging process.

C. Orlandi, R. Loubies, S. Baeza, C. Reyes, X. Worstman, Clinical Experience of the Treatment with Pro-Xylane TM, Isobioline TM and Phytocomplex TM on Chilean Women with Hormonal Aging, 21st World Congress of Dermatology, Buenos Aires, Argentina, 2008

An open and prospective study was performed in order to evaluate the action of a formulation with pro-xylane, isobioline and phyto-Complex in 59 patients with hormonal aging during a period of twelve weeks. An open and prospective study was performed in 59 patients, between 50 and 65 years of age (average 55 years old), with hormonal aging in order to evaluate the action of a formulation with -xylane, isobioline and phyto-complex.

P. Msika, S. Bredif, S. Garnier, J. Legrand, Oligosaccharidic and Peptidic Extract from Maca Root: A new Cell Energizer With Clinical Anti-Aging Properties, 21st World Congress of Dermatology, Buenos Aires, Argentina, 2008

Purpose of the study: Maca (*Lepidium meyenii*) was an integral part of the diet and commerce of residents of Andes region. The Incas found maca root so potent that they restricted Maca use to their Royalty. Now days, maca powder is used worldwide as nutraceutical ingredient. We have developed and patented an oligosaccharidic and peptidic extract obtained by a biotechnological process from maca flour.

C. Oresajo, M. Yatskayer, H. Fares, T. Stephens, I. Hansenne, A Twelve-Week, Clinical Evaluation of the Skin Firming Benefits of a Topical Product Containing Hyaluronic Acid and Oligo Peptides on the Face, Neck, Upper Chest and Hands, 21st World Congress of Dermatology, Buenos Aires, Argentina, 2008

Purpose of the study: The objective of this study was to assess the efficacy and safety of a test product on subjects with mild to moderate photodamage on the face, neck, upper chest and hands. Methods: 69 female volunteers between the ages 35 to 65 years with mild to moderate photodamage on the face and hands (scores 3-8 on a 10cm scale) were enrolled in 12-week single-center study.

H.S. Ryu, Y.H. Joo, S.O. Kim, K.C. Park, S.W. Youn, Influence of age and regional differences on skin elasticity as measured by the Cutometer®, Skin Research and Technology, Vol. 14 / 2008

The medical properties of the skin are due to the thickness and quantitative properties of the epidermis, dermis and subcutis. During aging, quantitative and qualitative changes occur in the skin. Loss of elasticity, reduction in the epidermal thickness and collagen content, increased wrinkling and pigment lesions

S. Ahn, S. Kim, H. Lee, S. Moon, I. Chang, Correlation between a Cutometer and quantitative evaluation using Moire topography in age-related skin elasticity, Skin Res Technol., 2007 Aug;13(3): p. 280-4

Background/Purpose: As aging occurs, our skin gets more wrinkles, becomes drier and loses its elasticity. Validating the evaluation of skin elasticity is especially important, because it is not as visible as other signs of aging such as wrinkles. So it is needed that the method for measuring skin elasticity is able to reflect perception about the change of the skin state. Methods: Here, the correlation between age and the parameters given by a Cutometer is identified and the main parameters that reflect the decreases in skin elasticity in terms of ages are presented. Also, Moire's system, an evaluation method to quantify the sensory value of viewing, is developed. A five-grade standard of Moire topographic photo scale on the face is used to evaluate the state of skin elasticity and lifting 20- to 61-year-old women. Based on this photo standard, scoring is performed using a five-grade system by three specialists to obtain the consensus score. The score is compared with the result of a Cutometer. Results: Significant negative correlations between age and results of a Cutometer ($r=-0.687-0.725$), Moire's topography scores ($r=-0.938$), were found. Some Cutometer parameters and the decreases in skin elasticity in terms of ages were highly correlated ($r=-0.687-0.725$). The results from Moire system and flexibility as sensory evaluation also had a very high correlation with age ($r=-0.765-0.932$). Finally, we have shown the significance of the correlation between the result of a Cutometer and the score of Moire topography ($r=0.711$). Conclusions: It is considered that Cutometer parameters R7 and R2 are used as main parameters to assess skin elasticity and aging. And our studies using Moire topography on the face have confirmed that instrumental measurements reflect the decrease in skin elasticity, which is perceived visually.

Was können Kosmetika leisten?, Beautyforum 05 / 2008

Messung der Hautelastizität; Ein wichtiges Kapitel sind Problemhäute, die aus Barriere- und Verhornungsstörungen resultieren. In diesen Fällen bietet hinsichtlich der Wirkstoffe und Transportsysteme die Korneotherapie von Prof. A Klingman gute Ansatzpunkte (s. auch Ästhetische Dermatologie 2007 (3), 8-16)

*C. Barba, S. Mendez, A. Roddick-Lanzilotta, R. Kelly, J.L. Parra, L. Coderch, **Cosmetic effectiveness of topically applied hydrolysed keratin peptides and lipids derived from wool**, Skin and Research Technology Vol. 14, No. 2, May 2008*

Wool is primarily (ca. 85%-95%) composed of keratin proteins that combine to give it desirable properties such as strength, insolubility and moisture regain. Different classes of keratin proteins are represented in the complex macromolecular structure, each of which has specific functions and characteristics. Protein hydrolysates from various sources have long been used in skin and hair personal care products and are known to confer improved compatibility, feel moisturisation and help maintain the natural structure...

*D. Qu, J. Leverett, O. Freis, M. Sabadotto, G.P. Seehra, J. Scimeca, B. Luke, G. Pauly, A. Rathjens, **Correlating Age and Quantifying Product Efficacy on Human Skin Using Noval Viscoelastic Parameters***

Biological age and anti-aging product efficacy were evaluated in human skin in vivo using noval viscoelastic parameters. The Cutometer SEM 575 (CK Electronics) was employed to collect the mechanical responses of the skin. Measurements were conducted on the inner forearm skin of sixty-nine healthy female volunteers age 18 to 60 years. Cutometer data were then analyzed using an automated technique of inflection point and area analysis to obtain novel viscoelastic parameters termed total viscoelastic recovery (R/R), elastic recovery (R/R), and "viscous" recovery (R/R). Our results showed strong correlation of age with two skin viscoelastic parameters – viscoelastic and elastic recovery. Age did not seem to affect the viscous component although a slight declining trend was observed. Standard curves were constructed based on those parameters to provide linear age – elasticity functions for quantification of product efficacy. A 6 week anti-aging product efficacy trial was then conducted on 30 volunteers to evaluate the biomechanical properties of skin. At the end of the trial, significant improvement in viscoelastic and elastic parameters were observed when compared to baseline. Average elastic improvement at 6 weeks corresponded to approximately a 15-year shift using our previously characterized standard curves relating skin viscoelasticity and age.

*A. Delalleau, G. Josse, J.-M. Lagarde, H. Zahouani, J.-M. Bergheau, **A nonlinear elastic behavior to identify the mechanical Parameters of Human skin in vivo**, Skin Research and Technology 2008, 14*

Background/purpose: Various analyses have been performed to identify the mechanical properties of the human skin tissue *in vivo*. They generally use different approaches and hypotheses (behavior laws as well as mechanical tests) and the obtained results are consequently difficult to analyze and compare.

In this paper, an inverse method that can be adapted to any kind of mechanical tests and behavior laws is presented.

*D.B.L. Terci, D. Terci, D. Terci, A. Pinheiro, **Use of Cutometer to Assess Skin Water Content**, IFSCC Barcelona 2008*

Assessing the skin water content (skin hydration) is one of the first and most important measurements to test the efficacy of cosmetics on the skin surface. The quantity of literature worldwide dealing with this subject indicates the significance of this measurement.

*T.H. Jeong, K.Y. Jeong, S.K. Han, S.J. Lee, S.H. Kang, S.G. Oh, **Development of Thermotropic Gel Patch Technology improving skin moisture and resilience physiochemically: An innovative skin shielding and drug-delivering challenger**, IFSCC Barcelona 2008*

Sol-Gel transition has been vigorously investigated in various chemical syntheses to manufacture powders, polymers, and encapsulating materials. Starting from pharmaceutical industries, Sol-Gel transition and its applications have been focused to enhance the time-releasing patterns of drugs such as insulin and to maintain their effective periods much longer than conventional methods. Therefore, many researchers in pharmaceutical fields have paid their attention to develop biocompatible polymers which show Sol-Gel transitions to be transformed nearby human's body temperature, as well as bio-degradable ones.

S.-J. Kim, T.-H. Jeong, E.-A. Ko, S.-H. Kang, K.-Y. Jeong, S.-K. Han, S.-J. Lee, S.-G. Oh, Development of a noble solid lipid emulsion technology using silicone-based waxes and its cosmetic applications improving instant skin resilience and skin protection, IFSCC Barcelona 2008

Recently, women make more effort for their beauty. Because the entry of women in public affairs have been extended. And their appearances can affect to their social images. Moreover, many of skin problems are caused by the stress of social activities and the environmental problems. Especially, the problems with skin aging are appeared a lot by the increase in UV exposure. In these situations, many cosmetics for anti-aging are gaining popularity. The wax formulations of cosmetic are effective on skin protection and moisturization.

U. Heinrich, B. Garbe, H. Tronnier, In Vivo Assessment Of Ectoin: A Randomized, Placebo-Controlled Clinical Trial, IFSCC Barcelona 2008

The objective of this study was to determine the anti-aging properties of Ectoin with special regard to its compatibility and efficacy. For this purpose 104 voluntary female participants were included in a monocentric, randomized, double-blind application test. Moisturizing properties, skin surface structure and skin elasticity were tested, comparing Ectoin (2 %: Treatment B) to a reference emulsion (Treatment A) versus an untreated control. None of all treated participants showed side effects during the study. The gained results of this study display that the natural cell protection concept of Ectoin is transferable to skin care.

A. Tada, A. Kanamaru, M. Oyobikawa, T. Maeda, H. Oshima, Advanced Glycation End Products Crosslinks Breaker: A New Approach for Improvement of Aged Skin, IFSCC Barcelona 2008

The reaction between proteins and glucose was first reported by Maillard [1], who observed, while cooking food, glucose and other reducing sugars reacting with protein amino acids to form adducts that after dehydration and rearrangement became stable brown pigments. This reaction between reducing sugar and proteins has been named non-enzymatic glycation. These glycation products undergo further complex reactions to become irreversibly cross-linked, forming a broad range of heterogeneous fluorescent and yellow-brown products called advanced glycation end products (AGEs).

L. Couturier, F. Yvergneux, Biotechnological Process For The Synthesis Of Omega 9 Compound For Enhancement Of Anti-elastase Activity With Firmness And Restructuring Efficacy, IFSCC Barcelona 2008

Inhibition of human neutrophil elastase is an important target due to the enzyme's involvement in tissue destruction of a number of skin disease states [1]. Elastase itself cleaves collagens, as well as elastin and other proteins with important biological functions. A variety of different types of inhibitors and inhibitor formulations have been devised for treatment of these targets [2,3]. Oleic acid is a highly selective non-toxic inhibitor of elastase. To enhance the vectorization of Omega 9 into the skin, especially in the dermis where elastase acts, Omega 9 type compound has been synthesised through a biotechnological process, miming a structural lipid analogue of the skin.

S.H. Pérez Damonte, C.L. Selem, C. Groisman, Bi-Functional Study of Ion Calcium in the Skin, IFSCC Barcelona 2008

The Calcium ion has an important function in the skin. Its gradient plays a role in regulating epidermal growth and differentiation *in-vivo*. In the intact epidermis, the extra cellular calcium content is low in both, malpighi and spinosum strata, but increases from the inner to the outer layer of the stratum granulosum [1]. Also, the calcium ion participates in the formation of the epidermal desmosomes, fibroblasts and keratinocytes, which provide the integrity and firmness of the skin [2]. All of these factors are important for the correct function of the epidermal barrier.

A. del Pozo, M. Solans, C. Fernandez, M. Dolz, F. Corrias, M. Herráez, O. Díez-Sales, Efficacy evaluation and characterization of chitosan nanoemulsions with Spirulina hydro-glycolic extract, IFSCC Barcelona 2008 (Poster)

Nanoemulsions represent an interesting prospect for use as vehicles in the development of formulations to deliver active ingredients to the human body. Particularly, nanoemulsion formulations have been shown to be superior for transdermal and dermal delivery of hydrophilic and lipophilic compounds, compared to conventional vehicles, such as hydrogels and emulsions [1]. Lecithins (phosphatidylcholines) have been used in several studies as surfactants for topical nanoemulsion vehicles. These surfactants are able to form nanoemulsions without co-surfactants.

B. Nedelec, J.A. Correa, G. Rachelska, A. Armour, L. LaSalle, Quantitative Measurement of Hypertrophic Scar: Intrarater Reliability, Sensitivity, and Specificity, Journal of Burn Care & Research May/June 2008

The comparison of scar evaluation over time requires measurement tools with acceptable intrarater reliability and the ability to discriminate skin characteristics of interest. The objective of this study was to evaluate the intrarater reliability and sensitivity and specificity of the Cutometer, the Mexameter and the DermaScan C relative to the modified Vancouver Scar Scale (mVSS) in patient-matched normal skin, normal scar (donor sites), and hypertrophic scar.

B. Nedelec, J.A. Correa, G. Rachelska, A. Armour, L. LaSalle, Quantitative Measurement of Hypertrophic Scar: Intrarater Reliability and Concurrent Validity, Journal of Burn Care & Research May/June 2008

Research into the pathophysiology and treatment of hypertrophic scar (HSc) remains limited by the heterogeneity of scar and the imprecision with which its severity is measured. The objective of this study was to test the interrater reliability and concurrent validity of the Cutometer measurement of elasticity, the Mexameter measurement of erythema and pigmentation, and total thickness measure of the DermaScan C relative to the modified Vancouver Scar Scale (mVSS) in patient-matched normal skin, normal scar, and HSc.

H. Tronnier, M. Wiebusch, U. Heinrich, Change in Skin Physiological Parameters in Space - Report on and Results of the First Study on Man, Skin Pharmacol Physiol 2008;21: p. 283-292

Astronauts often show skin reactions in space. Systematic tests, e.g. with noninvasive skin physiological test methods, have not yet been done. In an interdisciplinary cooperation, a test series with skin physiological measurements was carried out before, during and after a long-term mission in the International Space Station. The hydration of the stratum corneum (Corneometer), transepidermal water loss (Tewameter), and the surface structure of the skin (SkinVisiometer) were measured. In order to record cutaneous states, the suction elasticity was measured (Cutometer), and an ultrasound measurement with 20 MHz (DermaScan) was also made. In addition, one measuring field of the two inner forearms was treated with a skin care emulsion. There were indications of a delayed epidermal proliferation of the cells, which would correspond to the clinical symptoms. Hydration and TEWL values are improved by respective skin care. On the cutaneous level, the elasticity measurements and the ultrasound picture showed results which correspond to a significant loss of elasticity of the skin. Further examinations are necessary to validate these preliminary results.

B. Sommer, Regenerationsergebnisse nach Nervenverletzungen an der oberen Extremität – Einflussfaktoren und die Optimierung klinischer Untersuchungsmethoden, Dissertation aus der Klinik für Plastische Chirurgie der Universität zu Lübeck, Lübeck 2008

Klinik der Nervenverletzungen: In der Handchirurgie nimmt die Verletzung peripherer Nerven der oberen Extremität mit 10% aller zu versorgenden Fälle einen wesentlichen Stellenwert ein. Durch motorische und sensible Ausfälle im entsprechenden Versorgungsgebiet des Nerven kommt es zum Verlust von sensomotorischen Fertigkeiten, die zu Bewältigung von Situationen im Berufsleben als auch im häuslichen Lebensumfeld von zentraler Bedeutung sind. Der hohe Anteil der postoperativen Arbeitslosigkeit [51] hat in den letzten Jahren den wirtschaftlichen Einfluss auf das Gesundheitssystem nach Verletzungen der oberen Extremität immer mehr in den Fokus neuer Studien gerückt [34,94]. Insbesondere Nervenverletzungen haben einen nachhaltigen Einfluss auf den sozioökologischen Status des Patienten und können zu erhöhten Behandlungskosten vor allem im Bereich Rehabilitation und sekundärer Rekonstruktion führen [34]. Trotz der hohen klinischen Relevanz können Nervenverletzungen im Rahmen vermeintlicher Bagatelverletzungen leicht übersehen werden (Abb. 1).

D. Qu, Chris J. Masotti, G.P. Seehra, Novel Cutometer Analysis for Evaluation of Skin Viscoelastic Properties/ Nouveaux Paramètres pour l'Evaluation des Propriétés Viscoélastiques de la Peau, SFIC 2008 Monaco (Poster, English + French)

Quantitative evaluation of biomechanical properties of human skin *in vivo* is the subject of continuous investigation. The Cutometer (*Courage & Khazaka*) has been frequently used to measure the mechanical properties of skin. Conventionally with this instrument, skin viscoelastic properties are defined by many linear parameters (U_f , U_e , U_v , U_r , and U_a) from a typical mode 1 measurement of the Cutometer. The ratios of those U values, particularly U_e/U_f (overall elasticity), U_r/U_f (pure elasticity), and U_r/U_e (elastic-viscous ratio), are frequently reported. In our extensive studies using the Cutometer we have noticed significant variability of those U parameters leading to inconsistent results.

Efficacy evaluation of a skin treatment product, Report Essex Testing Clinic 2008

The objective of the study was to determine if the use of a skin treatment product: reduces the appearance of fine lines and wrinkles at the crow's feet area; improves skin texture; improves skin firmness/elasticity; improves the moisture content of the skin; and diminishes the appearance under-eye puffiness in a panel of 30 subjects, aged 35-69 years, 2 minutes after application and after 4 weeks of product use.

Viele Blender – Gesichtscremes mit UV-Schutz, test 1/2008, S. 28 - 31

Auf den Lichtschutz in Gesichtscremes kann man sich oft nicht verlassen. Sieben Produkte sind deshalb „mangelhaft“ und nur drei insgesamt „gut“. Eine gute Gesichtsschmierung soll die Haut in erster Linie mit zusätzlicher Feuchtigkeit versorgen, damit sie frisch, glatt und gesund bleibt. Der Trend geht allerdings dahin, diese Cremes mit Lichtschutzfiltern anzureichern, um die Haut vor vorzeitiger Alterung und Fältchenbildung zu schützen. Ein Ansatz, den viele Hautärzte unterstützen.

A. Rougier, S. Seite, **Clinical efficacy of topically applied vitamin C associated with madecassoside on skin aging**, AB28 J. Am. Acad. Dermatol.

Cutaneous aging is a complex biological process that affects the different compartments of the skin. In sun-exposed areas, skin aging is caused by two distinct processes: chronological aging and sun-induced actinic damage, called photoaging. We have previously demonstrated in vivo, the beneficial effect of topically applied vitamin C in the treatment of skin aging.

J. Crowther, P. Matts, J. Jarvis, **Quantification of body skin aging requires measuring multiple parameters**, AB29 J. Am. Acad. Dermatol.

Background: Changes in skin with increasing age result in alteration of its physical and chemical characteristics. In areas of the body where skin is subjected to mechanical stress from repeated bending (knees, elbows) or to environmental stressors, such as repeated exposure to UV radiation (hands, décolletage), these differences may become more obviously expressed.

T. Reuther, A. Atwan, M. Kerscher, **Evaluation of skin elasticity using an approach with repeated deformation of the skin**, AB15 J. Am. Acad. Dermatol.

One prominent feature of aged skin is the decreased capability of relaxation in particular after repeated deformation. Measuring of this phenomenon appears to be an interesting approach for assessing skin aging. However, comparatively little data dealing with this topic is available. Therefore the aim of the present study is to evaluate skin elasticity after repeated deformation as a measure of skin aging with respect to age and skin thickness.

R. Wanitphakdeedecha, W. Manuskiatti, S. Eimpunth, S. Hunnangkul, **The effects of single application of mucopolysaccharide polysulphate (MPS)**, AB96 J. Am. Acad. Dermatol.

To study the efficacy on the skin hydration of mucopolysaccharide polysulphate (MPS) 0,1% after single application. Twenty female volunteers aged 30 to 45 years with dry skin, defined by the corneometer, were recruited to the study. All subjects were asked to apply 2 g of MPS cream on a selected forearm.

R. Wanitphakdeedecha, W. Manuskiatti, S. Eimpunth, S. Hunnangkul, **The effects of mucopolysaccharide polysulphate (MPS) on the hydration and elasticity of human skin**, AB95 J. Am. Acad. Dermatol.

To study the efficacy of mucopolysaccharide polysulphate (MPS) in hydration and elasticity of human skin. Methods: Sixty female volunteers aged 30 to 45 years with dry skin, defined by the corneometer, were recruited to the study. The volunteers were randomly treated with MPS and placebo.

T. Miller, S. Batra, J. Ramirez, **Evaluation of the effect of a Novel Bi-Mineral Complex on photoexposed periorbital skin**, AB32 J. Am. Acad. Dermatol.

The elasticity of the skin is attributable to elastic fibers that can stretch and then recoil. The elastic fibers contain elastin – a large protein synthesized by dermal fibroblasts that forms spiral filaments comparable to springs. The spiral filaments are crosslinked together and, when the skin is stretched, this crosslinking enables the spiral filaments to spring back to their original positions.

T. Reuther, J. Bayrhammer, M. Kerscher, **Einsatz biophysikalischer Messverfahren zur Untersuchung der hautphysiologischen Wirkung injizierbarer Hyaluronsäure**, Hautarzt 2007, 58: 1046-1050

Hyaluronsäure (Glukuronsäure- β -1-3-N-Acetyl-Glycosamin; HS) ist ein wichtiger physiologischer Bestandteil der extrazellulären Matrix gesunder Haut. Bis zu 50% des

Gesamtkörpergehalt humaner HS befinden sich in der Haut. Es handelt sich um ein großes anionisches Glukosaminoglykan (GAG), das aus Doppelzuckergrundbausteinen (D-Glukuronsäure + N-Acetylglucosamin) aufgebaut ist und ein lineares Polymer mit bis zu > 10.000 Monomeren bildet. HS hat verschiedene wichtige Funktionen in der Haut. So kann das Molekül große Mengen Wasser binden und ist essenziell für die kutane Hydratationshomöostase. Außerdem ist HS wichtig für die Zelldifferenzierung, den Zellgerüstaufbau, die Zellmigration und –mobilität, für die selektive Diffusion verschiedener Stoffe im Gewebe (z.B. Elektrolyte und diverse Nähr- und Abfallstoffe), die Mediation von Immunprozessen sowie den Aufbau der extrazellulären Matrix.

K. Tsukahara, M. Hotta, T. Fujimura, K. Haketa, T. Kitahara, Effect of room humidity on the formation of fine wrinkles in the facial skin of Japanese, Skin Research and Technology 2007, 13, p. 184 – 188

Changes in humidity are commonly known to influence the condition of the skin. Previous studies of the skin dealt with variations in relative humidity (RH) either through statistical analysis or by maintaining room humidity at a constant level; however, the range of humidity and the length of acclimation varied in each study.

L. Ambroisine, K. Ezzedine, A. Elfakir, S. Gardinier, J. Latreille, E. Mauger, M. Tenenhaus, C. Guinot, Relationships between visual and tactile features and biophysical parameters in human facial skin, Skin Research and Technology 2007; 13: p. 176 – 183

Skin properties, such as colour, hydration and texture, can be studied on a qualitative basis by a clinical assessment or on a quantitative basis using techniques that measure biophysical properties of the skin. The aim of this study was to explore the links between facial skin features and a range of skin biophysical parameters using multivariate methods.

I. Wontroba, Der Einfluss von linear polarisiertem Licht auf Hauttemperatur, Hautwasserabgabe und sudomotorische Aktivität, Digitale Dissertation FU Berlin, p. 1-37

Zur Untersuchung, welche Auswirkungen inkohärentes polarisiertes Licht (VIP = visible incoherent polarized light) auf die menschliche Haut zeigt, sind in unterschiedlichen Messreihen an insgesamt 48 Probanden Veränderungen von Evaporation und Temperatur über der Haut des Unterschenkels in einem Messzylinder (Tewameter) untersucht worden. Verwendet wurde eine im Rahmen der VIP-Lichttherapie eingesetzte Lichtquelle der Firma Bioptron.

F. Hashmi, J. Malone-Lee, Measurement of skin elasticity on the foot, Skin Research and Technology 2007; 13, p. 252-258

The Cutometer 580 MPA is a device that is designed to measure the viscoelastic properties of skin in response to the application of negative pressure. The aim of this study was to test the Cutometer 580 MPA for the repeatable, quantitative measurement of the specific indices of elasticity of pedal skin.

S. Cho, D.H. Lee, C.H. Won, S. Lee, M.J. Lee, J.H. Chung, A Randomized, Double-Blind Clinical Trial on the Clinical Efficacy of Oral Supplementation with Chlorophyll Extracts on Skin Aging, 21st World Congress of Dermatology, Buenos Aires, Argentina, 2007

Chlorophyll, a polyene photoreceptor of plants, is known to have anti-inflammatory effects. Though its beneficial roles on aged skin were reported, there have been few systematic studies. The aim of this study is to evaluate the efficacy and tolerability of dietary chlorophyll extract supplementation on aging skin. Thirty healthy females (aged more than 45) were randomised to take low-dose or high-dose dietary supplementation containing chlorophyll extracts for 12 weeks.

U. Eich, Thermische Verletzungen im Kindes- und Jugendalter, Dissertation Universität zu Lübeck 06.06.2007

Einführung: Jedes Jahr verunglücken circa 7100 Kinder im Alter von 0 bis 20 Jahren durch thermische Unfälle, sodass sie stationär in einem der 44 Betten für Kinder in einem Schwerbrandverletzentzentrum in Deutschland behandelt werden müssen. Thermische Verletzungen entstehen im Kleinkind- und Vorschulalter vorwiegend (etwa 85%) in Form von Verbrühungen, d.h. bei Kontakt mit heißen Flüssigkeiten. Der Inhalt einer Tasse mit heißem Wasser genügt, um bis zu 30% der Körperoberfläche eines Säuglings- oder Kleinkindes zu verbrühen. Verbrennungen treten hingegen häufiger bei Schulkindern auf und werden vornehmlich durch Hausbrände, Grillunfälle und Experimentieren mit dem Feuer hervorgerufen. Bei circa 3000 Kindern verbleiben nach der Therapie einschränkende Narben. Diese sind häufig hypertroph, verursachen Schmerzen und Juckreiz und können zu funktionellen Einschränkungen führen. Gut sichtbare Narben, insbesondere an Gesicht und Händen, können zudem auch psychosoziale Probleme im Leben der Kinder nach dem Unfall

hervorrufen.

H. Dobrev, In vivo study of skin mechanical properties in Raynaud's phenomenon, Skin Research and Technology 2007, p. 91-94 and Vol. 9, Nr. 2, May 2003, Abstract No. P76 and 14th International Congress for Bioengineering and the Skin, May 21-24, 2003

Mechanical properties of the skin in patients with suspected secondary Raynaud's phenomenon significantly differ from these in patients with primary Raynaud's phenomenon and resemble those in patients with edematous phase of scleroderma. Our findings suggest that the non-invasive measurements of skin elasticity could be helpful in identifying patients with Raynaud's phenomenon at risk of developing systemic sclerosis. Raynaud's phenomenon (RP) is usually the first symptom in patients with systemic sclerosis (SS) and may precede skin changes by several months or years. Non-invasive measurements of skin elasticity are very sensitive and appropriate for objective and quantitative evaluation of sclerodermatous skin. Diagnosis of systemic sclerosis (SSc) at very early stage could allow starting an appropriate therapy and improving the patient outcome. Skin involvement is often the first non-Raynaud's phenomenon (RP) symptom. Its uncovering may play an important role for the initial diagnosis. Objective: To introduce a simplified method for non-invasive evaluation of skin mechanical properties in patients with clinically evident or suspected SSc. Material and Methods: A total of 94 patients and 162 healthy subjects were studied. According to clinical and nailfold videocapillaroscopy findings the patients were divided into four groups: 20 with edematous phase of SSc (group 1), 28 with indurative phase of SSc (group 2), 26 with suspected secondary RP (group 3), and 20 with primary RP (group 4).

A. Puig, J.M. García Antón, M. Manges, A new Decorin-like Tetrapeptide for Optimal Organization of Collagen Fibers, IFSCC Magazine, Vol. 10, No. 4/2007

Decorin interacts with collagen via its protein core and influences collagen fibrillogenesis, thus regulating excessive bundle-like aggregation of collagen. As skin ages, there is a lack of functional decorin which results in disrupted collagen fibers and a reduction in the tensile strength of the skin. Therefore, a substitute for decorin would make up for the non-functional decorin that is present as we age.

G. Betz, In Vivo Comparison of Various Liposomal Formulations for Cosmetic Application, IcoS, June 2007, Istanbul Türkiye, p. 14-16

Liposomal formulations have been used for skin moisturization, due to the occlusive effect of a phospholipid film deposited on the skin surface. Furthermore, interactions between liposomal lipids and Stratum corneum lipids may affect positively the structure of the Stratum corneum. Phospholipids themselves are hygroscopic and bind water.

K. Shimada, K. Awai, H. Irie, Ceramide Polymer improves skin texture, Personal Care, May 2007, p. 47-50

Anti-ageing cosmetics are increasingly demanded today. Many consumers, especially women, care about keeping their skin young by controlling wrinkles and freckles and keeping their skin soft, firm, smooth and beautifully white. Ingredients for controlling the ageing of the skin are demanded and are actively studied.

H. Frank, E. Schubert, H. Konrad, A. Eggert, Biokybernetik - ein sanfter Weg zur Gewebestraffung und Körperformung, Ästhetische Dermatologie 2/2007, p. 44 – 47

Dysformen, Alterungsprozesse, Schönheit und ewige Jugend. Die Angst des Menschen vor dem Altern ist sicherlich der wichtigste Beweggrund, „forever young“ zu sein. Daran hat sich über die Jahrhunderte nichts geändert. Das heute vorherrschende gesteigerte Körperbewußtsein in Verbindung mit einer erfreulich gesteigerten Lebenserwartung und einer bis ins hohe Alter erhaltenen körperlichen und geistigen Fitness lassen diesen Wunsch jedoch immer mächtiger werden.

R. Muggli, Systemic Evening Primrose Oil for Irritated Skin Care, Cosmetics & Toiletries magazine, Vol. 122, No. 2/February 2007

Dry skin is a common complaint from men and women alike and its incidence and severity increase with age. This condition is the result of an impaired barrier function, increased transepidermal water loss (TEWL) and a significantly lower level of ceramides in the horny layer that causes the skin to lose an excessive amount of water.

M. Paye, S. Mac-Mary, A. Elkhyat, C. Tarrit, P. Mermet, P.H. Humbert, Use of the Reviscometer for measuring cosmetics-induced skin surface effects, Skin Research and Technology 2007; 13; p. 343-349

The Reviscometer® RVM 600 that measures resonance running time (RRT) has been shown to be inversely related to the skin stiffness. However, very few publications describe the use of this instrument for testing the effect of cosmetic products. Slight xerotic skin condition was induced by using an alkaline soap for 1 week. Skin has then been rehydrated with a lotion or further dehydrated and dried with sodium lauryl sulfate.

L. K. Smalls, R. R. Wickett, M. O. Visscher, Effect of dermal thickness, tissue composition, and body site on skin biomechanical properties, Skin Research & Technology 2006, 12, p. 43-49

The epidermis, the fibrous collagen and elastin network of the dermis, and the hypodermis give rise to the biomechanical properties of the skin. Measurements of these properties have been used extensively to evaluate treatments for the repair of facial actinic damage and the effects of aging and to assess the effectiveness of facial resurfacing treatments (1-3).

F. Khatyr, C. Imberdis, D. Varchon, J.-M. Lagarde, G. Josse, Measurement of the mechanical properties of the skin using the suction test, Skin Research & Technology 2006, 12, p. 24-31

The mechanical behaviour of skin in vivo is both viscoelastic (1,2) and anisotropic (3-5). Currently, the suction test is the only real test that is in use in both research laboratories and dermatology departments. This is mainly because of the availability on the market of perfectly operational apparatuses such as the Dermaflex A (Cortex Technology, Hadsund, Denmark) (6) and in particular the Cutometer SEM575 (Courage Khazaka, Köln, Germany) (7).

Beurteilung von frühkindlichen Verbrennungen – Objektivität optimiert Therapie; aesthetic Tribune, Ausgabe 8, Dezember 2006

Die Beurteilung von Narben erfolgt im Allgemeinen visuell und palpatorisch durch den Arzt. Darin liegt allerdings auch ein grosses Fehlerpotential begraben, da jeder Untersucher die Narbe subjektiv beurteilt. Was leistet die objektive Einschätzung mittels Apparaten? Zur Beurteilung von Narben hat sich die Vancouver Scar Scale (VSS) etabliert. Mit ihr werden Hautrötung, Pigmentierung, Erhabenheit und Elastizität beurteilt. Allerdings spielen hier zahlreiche subjektive Einflussfaktoren durch den Untersucher mit, sodass diese Methode insbesondere den wissenschaftlichen Ansprüchen nicht genügt. Dr. Jörn Lohmeyer von der Plastischen, Hand- und Wiederherstellungschirurgie und Intensivstation für Schwerbrandverletzte in Lübeck stellte Methoden vor, Narben nach frühkindlichen Verbrennungsunfällen mit objektiven Kriterien zu beurteilen.

Y.J. Kim, M.Y. Kim, P.K. Lee, H.O. Kim, Y.M. Park, Evaluation of natural change of skin function in split-thickness skin grafts by noninvasive bioengineering methods, Dermatol Surg. 2006 Nov;32(11):1358-63

Background: Autologous split-thickness skin grafts (STSGs) are considered the mainstay for the treatment of large full-thickness wounds. There have been few studies reporting the natural change of the skin function in STSGs after procedure, however. Objective: The objective was to evaluate the natural change of the skin function in STSG using noninvasive bioengineering methods. Methods: Eighteen patients were eligible for the study. The skin functions of the graft and the control site were evaluated by an evaporimeter, corneometer, mexameter, and cutometer at Postoperation Days 0.5, 1, 2, 3, 6, 9, and 12 months. Results: Transepidermal water loss (TEWL) of the graft was maintained around that of the normal skin. The values of the skin hydration testing generally decreased during the follow-up period. Erythema was highly maintained for the whole period. For the pigmentation, the ratio tended to increase after 6 months. The skin pliability of the graft was abruptly decreased at 0.5 month, and it recovered from 3 to 12 months. The value did not reach that of the normal skin, however. Conclusion: Our results showed that the STSGs had changed within the frame of the skin function, including the TEWL, epidermal hydration, color, and pliability, throughout 1 year after surgery. The authors have indicated no significant interest with commercial supporters.

C. Lenaers, D. Boudier, C. Chauprade, D. Rondeau, B. Closs, Wrinkle Reduction by Stimulation of the Skin's Mechanical Resistance, Cosmetics & Toiletries, Vol. 121, No. 11/Nov. 2006, p. 47-56

Wrinkles are a symptom of structural failure in the dermis. They indicate that the skin is losing its ability to support its own weight, and that fibroblasts in the dermis are losing their capacity to attach to collagen fibers and transmit mechanical information.

*L. Rigano, C. Andolfatto, F. Rastrelli, **Antiaging Effects of a Skin Repair Active Principle***, Cosmetics & Toiletries, Vol. 121, No. 11/Nov. 2006, p. 57-64

Sodium DNA is an ingredient with activity at the cellular level. This fact has led to its incorporation in numerous high-end antiaging skin care products. An explanation of that activity and results of several tests of one sodium DNA material are presented in this article.

*C. Lenaers, M. Dana, M. Pinel, B. Closs, **Immediate and long-lasting skin tightening***, Personal Care, Sept. 2006, p. 65-67

The use of tensor active ingredients in anti-age care products is well-known to provide the users with immediate and visible effects. Nevertheless, these tensor active ingredients provide only mechanical effects on the skin surface that are also short-term effects.

*F. Distante, V. Pagani, A. Bonifigli, L. Rigano, J. Fluhr, **Objective evaluation of the placebo effect in cosmetic treatments. A randomized controlled study***, Presentation on the IFSCC in Florence 2005 and IFSCC Magazine, Vol. 9, No. 3/2006

A product's packaging and claimed efficacy may stimulate pleasant emotions during the use of cosmetics, thus enhancing their perceived benefits. The aim of this study was to evaluate if smart packaging and strongly claimed efficacy attributes can influence the objectively measured efficacy, allowing a true placebo effect to be associated with a given cosmetic treatment.

*D. Khazaka, **Objective Measurement at all Stages of the treatment***, 5th Asia Pacific Conference on Antiaging Medicine, Bali, September 2006

The days are over when a dermatologist only looked at the skin to make a diagnosis and to decide about the following treatments and to recommend skin care products to use. For almost 20 years now there is scientific equipment available to measure different parameters on the skin, such as hydration and sebum level, pH, elasticity, pigmentation skin texture and wrinkles and many more.

*D. Schmid, C. Schürch, F. Züllig, **Mycosporine-like Amino Acids from Red Algae Protect against Premature Skin-Aging***, Euro Cosmetics 9-2006, p. 18-22

Normal skin aging is accompanied by slow and continuous structural, functional, and metabolic changes in the skin. Such changes are greatly accelerated when the skin is exposed to solar UV radiation. The solar UV spectrum which reaches the earth's surface has been divided into UVB (290 – 320 nm) and UVA (320 – 400nm).

*U. Heinrich, K. Neukam, H. Sies, W. Stahl, **Long-Term Ingestion of High Flavanol Cocoa Provides Photoprotection against UV-Induced Erythema and Improves Skin Condition in Women***, Journal of Nutrition 136: p. 1565–1569, July 2006

Dietary antioxidants contribute to endogenous photoprotection and are important for the maintenance of skin health. In the present study, 2 groups of women consumed either a high flavanol (326 mg/d) or low flavanol (27 mg/d) cocoa powder dissolved in 100 mL water for 12 wk. Epicatechin (61 mg/d) and catechin (20 mg/d) were the major flavanol monomers in the high flavanol drink, whereas the low flavanol drink contained 6.6 mg epicatechin and 1.6 mg catechin as the daily dose. Photoprotection and indicators of skin condition were assayed before and during the intervention. Following exposure of selected skin areas to 1.25 3 minimal erythema dose (MED) of radiation from a solar simulator, UV-induced erythema was significantly decreased in the high flavanol group, by 15 and 25%, after 6 and 12 wk of treatment, respectively, whereas no change occurred in the low flavanol group. The ingestion of high flavanol cocoa led to increases in blood flow of cutaneous and subcutaneous tissues, and to increases in skin density and skin hydration. Skin thickness was elevated from 1.11 6 0.11 mm at wk 0 to 1.24 6 0.13 mm at wk 12; transepidermal water loss was diminished from 8.7 6 3.7 to 6.3 6 2.2 g/(h m²) within the same time frame. Neither of these variables was affected in the low flavanol cocoa group. Evaluation of the skin surface showed a significant decrease of skin roughness and scaling in the high flavanol cocoa group compared with those at wk 12. Dietary flavanols from cocoa contribute to endogenous photoprotection, improve dermal blood circulation, and affect cosmetically relevant skin surface and hydration variables.

*H.O. Rennekampff, J. Rabbels, V. Reinhard, S.T. Becker, H.E. Schaller, **Comparing the Vancouver Scar Scale with the cutometer in the assessment of donor site wounds treated with various dressings in a randomized trial***, J. Burn Care Res. May 2006

Cutaneous scarring observed in wounds is, to a significant degree, dependent upon the time it takes for the wounds to heal. Various topical dressings are proposed to influence healing time in donor sites. In this prospective randomized study, we examined the effect of Vaseline gauze (VD; Branolind,

Paul Hartmann AG, Germany), Biobrane (BD; Bertek Pharmaceuticals, Inc., Morgantown, WV), an occlusive film dressing Barrier Flex (OD; Moelnlycke Health Care GmbH, Germany), and an equine collagen foil, Tissu Foil E (CD; Baxter, Heidelberg, Germany), on re-epithelialization and scarring in standardized donor site wounds. At 6 months after surgery, donor site scars and normal uninjured mirror sided skin were evaluated in 33 patients using both the Vancouver Scar Scale (VSS) and the cutometer SEM 575 (Courage and Khazaka). The median healing time for OD was 14 days, BD 16 days, CD 19 days, and VD 19 days. The single parameter pliability of the VSS was not significantly different from uninjured skin when all donor site scars were pooled. No difference was found between the four groups. Viscoelastic analysis of all pooled patient data showed a significant difference for Uf (total deformation), Ua (total recovery), Ur (immediate retraction), Ue (immediate distension), Ur/Ue, and Ur/Uf, indicating that donor sites significantly differed from normal uninjured skin.

F. Guillaumie, B. M. Malle, K. Schwach-Abdellaoui, T. C. Beck, A New Sodium Hyaluronate for Skin Moisturization and Antiaging, Cosmetics & Toiletries Vol. 121, No. 4, April 2006, p. 51-58

In response to growing concerns about animal-derived sources for hyaluronic acid, some researchers have turned to biotech methods to produce this skin moisturizing agent.

S. Tamburic, Effects of Polymer Entrapment of Prunus Spinosa Fruit extract on its cosmetic efficacy, Journal of Applied Cosmetology, vol. 24, number 2, April/June 2006, p. 1-14.

The aim of this paper was to find out whether the entrapment of herbal extract into polymeric "reservoir" systems affects its skin efficacy.

E. Berardesca, N. Cameli, G. Primavera, M. Carrera, Clinical and Instrumental Evaluation of Skin Improvement after Treatment with a New 50% Pyruvic Acid Peel, Dermatol Surg 2006

Pyruvic acid is an α -keto acid that presents keratolytic, antimicrobial, and sebostatic properties as well as the ability to stimulate new collagen production and elastic fibers formation. Because of its low pK_a and its small dimension, it penetrates rapidly and deeply through the skin, so far as to be considered a potent chemical peel agent. It has proven its efficacy for the treatment of many dermatological conditions such as acne, superficial scarring, photodamage, and pigmentary disorders. Pyruvic acid application usually induces intense burning, and the postpeeling period is characterized by erythema, desquamation, and, sometimes, crusting.

G. Varju, G. Garay, Surface Evaluation of Living Skin (SELS) during Microdermabrasion Treatment Course, Poster Presentation, Dr. Derm Laser Center of Dermatology, Budapest Hungary, 2005

Microdermabrasion has become a popular method of skin rejuvenation for treating photodamage, fine rhytides, age spots, dyschromia, enlarged pores and mild acne. This procedure is one of the newest skin rejuvenating techniques employed to help improve the texture and appearance of the skin.

M. Szubert, C. Vincent, K. Rogiewicz, I. Eris, Z. Jakolska, M. Stroinski, M. Wieczorowski, J. Chajda, Efficacy of Dr. Irena Eris Anti-Cellulite Body Cream, Poster Presentation, Centre for Science and Research Dr. Irena Eris, 2005

Cellulite is a skin problem which characterizes non-inflammatory lesions of subcutaneous tissue (lipodystrophy), leading to changes in smoothness of skin surface. Epidemiological data indicates that cellulite is problem for 80-95% of women population. The pathogenesis of cellulite covers complex of different factors: genetics, hormonal and life style.

Dermokosmetik, Beratung in der Apotheke, PTA Nr. 11, Oktober 2005

Eine gute Unterstützung bei Promotionaktionen zum Thema „Hautpflege“ sind Hautanalysegeräte. Sie erleichtern den Einstieg in die Beratung, individuell auf den Hauttyp und Hautzustand der Kundin oder des Kunden abgestimmt.

D. Schmid, F. Suter, F. Züllig, Soothing Factor from Opuntia Cactus for Sensitive Skin, SÖFW-Journal 131/11-2005, p. 2-5

Sensitive skin tends to be more susceptible to some environmental factors. People with sensitive skin report exaggerated reactions such as redness, itching or rashes when their skin is in contact with certain cosmetics, plants or fabrics, hot or cold, or insect bites. Normally, people with sensitive skin show quicker an erythematous reaction against ultraviolet irradiation. Skin that is sensitive to sun, typically shows allergic reactions, induced by ultraviolet radiation alone or in combination with chemical ingredients in skin care products.

A. O. Barel, K. Henau, P. Clarys, **In vitro calibration and validation of the reviscometer using silicone polymers as simple skin model systems**, Presentation on the ISBS Meeting 2005 in Philadelphia and Skin Research and Technology 2005, 11 (abstracts)

In vitro determination of the mechanical properties and isotropy of various polymers used as skin model systems can be determined using the shear wave propagation method. The Reviscometer (Courage-Khazaka, Cologne, Germany) measures the resonance running time (RTT) between 2 sensors which are placed with constant pressure on the surface of the material. The RTT times are expressed in arbitrary units related to time.

P. Clarys, K. Henau, A.O. Barel, **Investigation of intrinsic and photoaging of human skin using the reviscometer and the cutometer**, Presentation on the ISBS Meeting 2005 in Philadelphia and Skin Research and Technology 2005, 11 (abstracts)

In vivo and mechanical isotropy/ anisotropy properties of the skin can be determined using the shear wave propagation method (Reviscometer, Courage-Khazaka). The wave travelling time from transmitter to receiver (Resonance Running Time, RTT), expressed in arbitrary time units, is inversely proportional to the stiffness of the skin.

M. Jouandeaud, C. Lenaers, S. Mazalrey, J. Dorotyn, B. Closs, **Synthesis capacities of human fibroblasts compared to those of fibroblasts from striae**, Presentation on the ISBS Meeting 2005 in Philadelphia and Skin Research and Technology 2005, 11 (abstracts)

The deterioration of the fibril network of the skin is due mainly to aging and other types of modifications such as hormonal modifications. One of the problems often encountered as a result of a modification of the skin fibrous network is striation.

D. Kowatzki, C. Machold, K. Krull, P. Elsner, J.W. Fluhr, **Regeneration kinetic of sweating, Stratum Corneum hydration, Surface pH, Sebum production and mechanical properties is not altered by regular sauna bathing**, Presentation on the ISBS Meeting 2005 in Philadelphia and Skin Research and Technology 2005, 11 (abstracts)

Wellness and especially sauna bathing are of growing interest in modern health care. The positive effect of sauna for general health is well documented. However, to our knowledge no controlled studies have been published on the effect of sauna on skin physiology.

K. Lintner, C. Mas Chamberlin, P. Mondon, O. Peschard, **IgG fragments regulate IL6 production in keratinocytes: potential use in anti-age treatments**, Sederma S.A.S., Le Perray, 78612 France, Presentation at the IFSCC in Florence 2005

Cytokines play a fundamental role in inter-cellular communication. Their secretion rate and cellular concentrations are well regulated and in an equilibrium state ("homeostasis") in healthy, young skin. Ageing leads to changes in these equilibriums. DHEA clearly controls IL6: the age-related decrease in DHEA (by a factor of >2 after age 50) is accompanied by increased IL6 levels. Cytokine IL6 is also known to be strongly induced in skin by UV rays.

P.M.B.G. Maia Campos, M.D. Gianeti, G.M.S. Gonçalves, L.R. Gaspar, **Assessment of *in vitro* antioxidant and *in vivo* anti-ageing effects of cosmetic products containing vitamin C and its derivatives on human skin**, Presentation at the IFSCC in Florence 2005

The objective of this study was to determine the *in vitro* antioxidant activity of vitamin C (AA) and its derivatives, magnesium ascorbyl phosphate (MAP), ascorbyl tetra-isopalmitate (ATIP) as well as their *in vivo* anti-ageing effects by using Cutaneous Bioengineering Techniques on human skin. The study of antioxidant activity *in vitro* was made with an aqueous and a lipid system, the luminol-chemiluminescence, and malondialdehyde assay, respectively.

S. Ahn, S. Kim, H. Lee, S. Moon, I. Chang, O. Lee, **Correlation between a Cutometer® and quantitative evaluation using Moire topography in age-related skin elasticity**, Presentation at the IFSCC in Florence 2005

As aging occurs, our skin gets more wrinkles, becomes drier and loses its elasticity. Validating the evaluation of skin elasticity is especially important, because it is not as visible as other signs of aging such as wrinkles. Here, we identified the correlation between age and the parameters given by Cutometer®, and we present the parameters of that reflect the decreases in skin elasticity in terms of ages. (U_r/U_p , U_a/U_p , U_r/U_e , U_a , $r = -0.687 \sim -0.725$). Also we developed an evaluation method to quantify

the sensory value of viewing. A five-grade standard of Moire topographic photo scale on face was prepared using sensory evaluation of 20 to 61 year-old women.

P. Granata, R. Maffei Facino, A. Ghirardini, E. Berardesca, G. Primavera, M. Carrera, Tyrosyl-Histidine Dipeptide: A New Approach Against Premature Aging, Presentation at the IFSCC in Florence 2005

Oxidative fragmentation of polyunsaturated fatty acids in the skin generates cytotoxic aldehydes, mainly 4-hydroxy-*trans*-2-nonenal (HNE), involved in premature skin aging and photo-aging, due to the formation of collagen and elastin cross-links, skin enzymes inactivation, accumulation of lipid peroxidation products. Since histidine-containing dipeptides have been recently shown to possess carbonyl quenching activity, we developed a series of different dipeptides with the aid of combinatorial chemistry and each of them was subjected to antioxidant and anti-carbonyl assays, in a cell-free model using the ORAC assay (Oxygen Reactive Antioxidant Capacity) for anti-lipoperoxidant activity, HPLC analysis for the evaluation of the HNE quenching ability and LC-MS/MS for the characterization of the site and of the mechanism of adduction.

K. Yagi, K. Ogawa, T. Kanemaru, K. Joichi, N. Kunizawa, R. Takano, Optical Rejuvenation MakeUp Using an Innovative Shapecontrolled Hybrid Powder, Presentation on the IFSCC in Florence 2005

For women, the sagging on the face skin that is noticed with aging is one of the important problems that should be solved. Although conventional cosmetics that can prevent sagging are only skin-care products, no makeup cosmetics that can correct the appearance of sagging have been developed. The vital factors of an optical rejuvenating makeup were found to recover the skin tension and to lighten up the face shadow appeared on the sagging skin. Therefore, the hybrid powder consisting platy barium sulfate on the surface of titanium dioxide coated mica having red interference light was developed. The panel test resulted that almost all panels could realize the rejuvenating effect of the foundation containing the powder. The image analysis showed that the finishing of the foundation was 12-years-younger than no makeup face.

*J.-H. Kim, G.-S. Sim, J.-H. Kim, D.-H. Lee, Y.-H. Cho, B.-C. Lee, H.-B. Pyo, Effects of *Draconis sanguis* on antioxidant and MMP-1 expression in human dermal fibroblast*, Presentation on the IFSCC in Florence 2005

UV irradiation stimulates the production of free radicals and reactive oxygen species (ROS) and overexpression of matrix metalloproteinases (MMPs) in the human skin. These cause various types of cell damages and destruction of connective proteins such as collagen in the skin. In order to develop new anti-photoaging agents, we examined the antioxidant activity and the inhibitory effect of MMP-1 (collagenase) with the extracts of oriental herbs.

H. Dobrev, Evaluation of the efficacy of a Rooibos Extract containing anti-wrinkle cream, EADV, May 2005, Sofia, Bulgaria (abstract and poster)

Background: Rooibos plant possesses scientifically proven anti-oxidative, anti-allergic, anti-microbial and anti-inflammatory features. Aim: To evaluate the efficacy of a Rooibos extract containing cream on aged facial skin using in vivo skin bioengineering techniques.

H. Dobrev, The Effects of topically applied Matrixyl, natural grape seed and avocado oils on skin surface, hydration and elasticity, EADV, May 2005, Sofia, Bulgaria (abstract/poster)

Background: Matrixyl is a lipophilic pentapeptide that stimulates the collagen synthesis by fibroblasts in the skin. The grape seed extract is rich in flavonoids which are powerful antioxidants. Avocado oil consists predominantly of unsaturated fatty acid glycerides, vitamins and minerals, and has good emollient properties.

H. Dobrev, Application of Cutometer area parameters for the study of human skin fatigue, Skin Research and Technology 2005-11, May, p. 120-122

The hallmark of age-related changes of skin mechanical properties is the decrease in its elastic properties. This results in larger fatigue of adult skin than young skin after applying multiple stress at one and the same anatomic region.

R. Debowska, K. Rogiewicz, T. Iwanenko, M. Kruszewski, I. Eris, Folic Acid (Folacin) – New Application of a Cosmetic Ingredient, Kosmetische Medizin 3/2005, p. 16-22

Many years of trials and research tests proved that a lot of well-known vitamins could be successfully used in cosmetology. The available data indicate that one of them – folic acid plays an important role in life process of mitotically active tissues and its deficiency increases background level of DNA damage.

P. Humbert, P. Creidi, A. Richard, A. Rougier, Efficacy of a 5% ascorbic acid cream on skin aging induced by UVA, JAAD Case Reports, 2005

The aim of this study was to assess the tolerance and the effect of a cream combining ascorbic acid and sunscreen on women with facial heliodermatitis, after receiving UVA and repeated application of the cream for 3 months. A 3-month, open study (daily application of the active on the face) was conducted in 20 women with heliodermatitis (age range, 50-65 years). At each visit (day 0, day 30, day 61, day 94), volunteers had a clinical examination on several items, and biometric measurements were performed: corneometry (CM825; Courage et Khazaka), cutometry (SM810; Courage et Khazaka), and wrinkles evaluation analyzed with fringe projection (prototype). These volunteers were irradiated with UVA 3 times per week over 3 months, with increasing doses (10 J/cm² the first week, 15 J/cm² the second week, 20 J/cm² until the end of the study). Clinical scoring showed a significant increase in hydration, slackness, softness, bright complexion and a significant decrease in roughness and wrinkles. Skin hydration (SH) as determined by corneometry as well as skin elasticity (Ur/Ue) of the face were significantly increased by the cream (SH = 54.3 ± 9.3 at day 0 and SH = 63.5 ± 7.9 at day 94; Ur/Ue = 0.454 ± 0.113 at day 0 and Ur/Ue = 0.549 ± 0.084 at day 94). The wrinkles were significantly decreased as shown by the volume (V) assessed by fringe projection *in vivo* { *P* = .0361) and the depth of the wrinkles (*P* = .0024). One of the main causes of skin aging induced by the environment is UV radiation from the sun. Previous studies have shown that UV radiation decreases basal ascorbic acid levels. This study has shown the benefit of using a cream combining ascorbic acid and sunscreen in terms of protection and efficacy against photoaging, by improving wrinkles, skin elasticity, and skin hydration, even after 3 months of repeated UVA irradiation.

M. Marcenaro, S. Sacco, S. Pentimalli, L. Berretta, V. Andretta, R. Grasso, R.C. Parodi, M. Guarrera, D. Scarpati, Measures of late effects in conservative treatment of breast cancer with standard or hypofractionated radiotherapy, Tumori, Nov-Dec 2004;90(6):586-91

Aims and background: To confirm the equivalence in terms of late effects between two fractionation schedules of radiotherapy in conservative treatment of breast cancer. Methods: Fifty-eight patients treated at our institution from 1999 to 2002, with a median follow-up of 15 months (range, 7-46 months), were evaluated retrospectively. Twenty-nine patients (group A) were treated with standard fractionation: 5000 cGy/25fx/5 weeks, and 29 patients (group B) were treated with a hypofractionated schedule: 4500 cGy/15fx/5 weeks, three fractions per week. Late effects were evaluated using the LENT-SOMA scoring scale. The cosmetic results were assessed on a five-point scale. Skin elasticity was measured using a dedicated device (Cutometer SEM 575). Results: There were no differences in breast volume, age at diagnosis and follow-up between groups. The LENT-SOMA toxicity observed in groups A and B, respectively, was as follows: grade 2-3 pain in five patients in each group; grade 2 breast edema in two and three patients; grade 2-3 and grade 2 fibrosis in six and eight patients; grade 2 and grade 2-3 telangiectasia in two and three patients; grade > or = 2 and 2 arm edema in two and one patients; no ulceration or atrophy were observed. Two patients in group A and one patient in group B needed treatment for breast and arm edema and arm edema, respectively. Very good, good-acceptable, and poor cosmetic results were observed in seven and two, fifteen and nineteen, and six and eight patients, respectively. Median skin elasticity loss due to treatment was -4.19% in group A and -6.29% in group B. These results are not statistically different. Conclusions: LENT-SOMA toxicities were minimal and no differences were observed between groups. Few patients in the hypofractionated group had very good cosmetic results, but it is debatable if radiotherapy was the only cause. Skin elasticity was not different between groups. Our results seem to suggest that it is possible to treat patients with both schedules, with similar late toxicity

H. Tagami, Development of Skin Measurement Instruments, JMAJ 47(11): p. 495-500, 2004

The observation of skin changes has long been conducted with an emphasis on the visually identifiable and palpable lesions. However, because of the limitation of sensory evaluation, efforts have been made during the last 30 years toward the introduction of various types of instrumental measurement. Skin conditions that have conventionally been categorized as normal can now be classified into various types on the basis of numerical values. Achievements from such studies are widely utilized not only for the treatment of diseases, but also in the field of cosmetics. Of particular importance is the measurement of the barrier function of the stratum corneum in the outermost layer of the skin, as well as its water content. Such measurement enables us to perform numerical assessment of skin irritation and abnormal cornification. It also facilitates the quantitative evaluation of the action of topical drugs in softening and smoothing the skin surface. Skin color, surface topography, and stiffness can also be evaluated numerically. The magnified observation of the skin assists the differential diagnosis of malignant tumors. Recent developments are enabling us to perform in-situ non-invasive

observation of the internal structures of the skin, eliminating the need for invasive biopsy and histopathological studies to some extent.

H. Dobrev, Impact of Three Different Emulsions on Skin Hydration And Elasticity, Department of Dermatology and Venereology, Med. Uni. Plovdiv, Bulgaria

The well-hydrated skin is smooth, soft and elastic. Therefore, the restoration and maintenance of skin water content is the main goal of skin care products. Currently, two kind of moisturizers are used [1, 2]: Emollients (lipids), which reduce the loss of water from the skin by simple occlusion of its surface and by improvement of water-holding capacity of stratum corneum in result of restoration of the lipid layers around the corneocytes. Humectants (urea, glycerin, lactic acid, pyrrolidone carboxylic acid, hyaluronic acid), which bind or attract water in or to the corneal layer.

H. Dobrev, Comparative Study Of The Mechanical Properties In Erysipelas Of The Lower Legs Using Suction Method And Share Wave Propagation Method, EADV Plovdiv Bulgaria, 13th Congress "The Renaissance Of Dermatology", Florence 2004.

Inflammatory dermal edema in erysipelas alters skin mechanics. The aim of this study was to compare the informativeness of two different methods for evaluation of skin mechanical properties.

H. Dobrev, Application Of Cutometer Area Parameters For Study Human Skin Fatigue, Department of Dermatology and Venereology, Med. Uni. Plovdiv, Bulgaria.

The hallmark of age-related changes of skin mechanical properties is the decrease in its elastic properties [1-2]. This results in bigger fatigue of adult skin than young skin after applying multiple stress at one and the same anatomic region. Skin fatigue can successfully be evaluated with a suction skin elasticity meter (Cutometer) using measurements with several repetitions of the measuring cycle [3].

F. M. Hendriks, D. Brokken, C.W. J. Oomens, F. P. T. Baaijens, Influence of hydration and experimental length scale on the mechanical response of human skin in vivo, using optical coherence tomography, Skin Research and Technology 10, p. 231-241, 2004

Human skin is a complex tissue consisting of different layers. To gain better insight into the mechanical response was studied with experiments of various length scales. Also, the influence of (superficial) hydration on the mechanical response is studied.

M. Fröschle, R. Plüss, A. Peter, F. Etzweiler, Phytosteroids for skin care, Personal Care, Vol. Sept. 2004

Healthy skin is a largely self-regulating system. In order to keep metabolic processes functioning efficiently, the relevant biological precursors and activators must be available to the skin cells for metabolism. If, due to age-related changes, the body no longer provides a sufficient amount of certain substances, an additional external supplement can proactively support the biological processes and thus counteract the advance of the ageing process.

J. Rabbels, Klinische und Experimentelle Untersuchungen zur Abheilung von Spalthautentnahmestellen, Dissertation der Berufsgenossenschaftlichen Unfallklinik Tübingen 2004

Einleitung: Die Wunde: Man versteht unter einer Wunde eine Unterbrechung des Zusammenhangs von Körpergewebe mit oder ohne Substanzverlust. Ursache können unterschiedliche physikalische oder chemische, aber auch entzündliche oder ischämische Einwirkungen sein. Dabei kommt es zur Eröffnung von Blut- und Lymphgefäßen sowie zur Zellschädigung. Unter einer kutanen Wunde wird eine mehr oder minder klaffende Durchtrennung der Haut verstanden. Die oberflächlichste Form einer Hautwunde ist die Hautabschürfung oder Exkoration. Sie betrifft immer nur die gefäßlose Epidermis. Da die Epidermis zur Regeneration befähigt ist, heilen diese oberflächlichen Wunden narbenlos ab (9). Tiefere Wunden liegen vor, wenn die Verletzungstiefe in der Dermis liegt, wie z.B. bei Spalthautentnahmestellen. Die tiefste Form der Hautwunde ist der Vollhautdefekt, bei dem alle Hautschichten verlustig sind.

G. Guglielmini, M. Cucchiara, Cosmetic treatment for heavy legs, Poster Presentation, IFSCC Orlando, 2004

Heavy legs is a really widespread problem. It hits the 50% of the adults of more than 50 years old, with a prevalence for female sex, interested 4 times more than the male one. Subjects perceive some symptoms associated to a sense of tiredness and to a sensation of pain for lower limbs...

M. Kumar, Biotechnology for Personal Care: A Case Study of Silk-Elastin Protein Polymer, Biochemistry Department, USA, Poster Presentation, IFSCC Orlando, 2004

Designer Proteins are in need as active ingredients to perform a variety of functions and to impart desired characteristics to personal care product formulations. Advances in genetic engineering offer a unique opportunity to design specific, targeted properties, and production of consistent fermentation based protein polymers with desired properties that are important to provide specific benefits.

J. C. Leverett, J. Gour, J. Mayne, Immunofluorescent Imaging Of Dermal Proteins Using Laser Scanning Confocal Microscopy, IFSCC Orlando 2004, Podium Proceedings

More powerful tools are needed in order to develop the next generation of functional cosmetics. Today's highly evolving field demands a greater understanding of the root causes of actinic and age related damage that until recently were seen as merely surface phenomenon. By understanding these causes, better solutions can be discovered which will produce a more profound effect for the consumer.

H.H. Chan, D.S.Y. Wong, W.S. Ho, L.K. Lam, W. Wei, The Use of Pulsed Dye Laser for the Prevention and Treatment of Hypertrophic Scars in Chinese Persons, Dermatologic Surgery, Volume 30, issue 7, July 2004, p. 987-994

Background. Pulse dye laser has been used with variable degrees of success in the treatment of hypertrophic scars, and although earlier reports suggested a significant degree of improvement, more recent studies have raised concern about its effectiveness. Furthermore, most previous studies examined its use in patients with light skin types, and the use of pulse dye laser in dark-skinned patients for the treatment of hypertrophic scars is not well established.

L.J. Draaijers, Y.A.M Botman, F.R.H. Tempelman, R.W. Kreis, E. Middelkoop, P.P.M. van Zuijlen, Skin elasticity meter or subjective evaluation in scars: a reliability assessment, Journal of the International Society for Burns Injuries, Vol. 30, Issue 2, March 2004, p. 109-114

Various methods are available for evaluating the elasticity of scars. However, the reliability and validity of these methods have been sparsely examined.

H. Tronnier, U. Heinrich, Beautytek-Studie: Gutachten über einen Wirksamkeitsnachweis einer kosmetischen Behandlung, Dermatronnier, Institut für experimentelle Dermatologie i. A. für medilab GmbH & Co., Würzburg, Mai 2004

Unter Bezugnahme auf unseren Forschungsauftrag 19/2/04 vom 20.02.2004 sowie unter Bezugnahme auf Ihr Schreiben vom 29.09.2003 erstatten wir Ihnen nachfolgend ein Gutachten über einen Wirksamkeitsnachweis einer kosmetischen Behandlung. *

C. Brandi, C.D. Aniello, L. Grimaldi, E. Caiazzo, E. Stanghellini, Carbon Dioxide Therapy: Effects on Skin Irregularity and Its Use as a Complement to Liposuction, Aesthetic Plastic Surgery 2004

For a successful conventional or superficial liposuction, it is necessary to consider the competence of the surgeon who is to administer the procedure necessary for this type of surgery as well as the physical and psychological evaluation of the determined patient. A poor result often is related to the persistence of adipose tissue irregularity in the form of fatty tissue accumulation. This complication, common to this type of surgery, has called for research to determine methods for its treatment. Carbon dioxide (CO₂) therapy refers to the transcutaneous and subcutaneous administration of CO₂ for therapeutic purposes. This treatment originated at the Royal Spas of France in 1932 with the treatment of patients affected by obliteration of arteriopathies. Recent studies have demonstrated the effect of subcutaneous CO₂ therapy performed to improve local parameters of circulation (performed by Doppler, laser-Doppler, and trans-cutaneous partial pressure of oxygen determination), and to reduce localized adiposities (verified reporting variations in maximum circumference and performing histologic studies). With these results, the absence of toxicity, and the relevant side effects related to this treatment taken into consideration, the Plastic Surgery Unit of Siena has been committed to researching the role that CO₂ therapy can play in the treatment of skin irregularity and as a complement to liposuction. The authors report their experience using CDT therapy apparatus and 30GA1/2 0,3X13 microlance needles for the treatment of patients with adipose tissue accumulations located on the thighs and knees. In their study, 42 patients were divided into three groups: A, B, and C. In Group A, only liposuction was performed. In group B 3 weeks after liposuction CO₂ therapy was administered in two weekly subcutaneous applications of CO₂ for 10 consecutive weeks. In group C, CO₂ therapy alone was administered with the same contingencies used for group B (two weekly subcutaneous applications of CO₂ for 10 consecutive weeks). The objective was to assess the effectiveness of CO₂ therapy for skin irregularity and as a complement to liposuction for adipose tissue accumulation by reporting variations in circumference and skin elasticity monitored by the Cutometer SEM 474 in all treated areas. The data

obtained were analyzed statistically. Values of p less than 0.05 were considered significant. The authors report their experience and the results achieved from the study.

E. Hernandez, **Bioengineering in Dermatology and Cosmetology: Methods, Studies and Prospects**, SÖFW-Journal, 129. Jahrgang, 11-2003

One of the trends in modern dermatology and its perspectives for the near future are skin bioengineering and imaging. The 1st joint meeting of two scientific societies focusing on measurements and visualisation of skin function, structure and physiology – the International Society for Skin Imaging (ISSI) – took place in Hamburg, May 21-24, 2003. Before that, the meetings and conferences organised by these societies had been held separately.

P-A. Wendling, G. Dell'Acqua, **Skin biophysical properties of a population living in Valais, Switzerland**, Skin Research and Technology 2003, 9, 306-311

On average we observed low values of skin capacitance that identify subjects with dry skin. Measures of skin visco-elasticity ratios were also particularly low, while skin pH and sebum content were in the normal range. Age was correlated with a decrease of skin elasticity and sebum content, but there was no correlation with hydration or pH.

L.P.L. van de Vijver, E. Boelsma, R.A. Bausch-Goldbohm, L. Roza, **Subjective skin condition and its association with objective skin measurements**, Cosmetics & Toiletries, Vol. 118, No. 7, July 2003

From a group of 302 volunteers, the authors obtained both selfreported subjective evaluations of skin condition and objective measurements of skin conditions, and then looked for correlations between the subjective and objective skin measures.

M. Jouandeaud, M. Dana, B. Closs, **A new generation of tensor actives**, Household and Personal Products Industry, June 2003

After age 50, or thereabouts, women experience a slackening of the skin and a loss of elasticity and tone. Cutaneous aging results primarily in the appearance of more or less marked wrinkles, which are accentuated on the photo-exposed body areas such as the face, the neck or hands. In order to "erase" the effects of age, consumers are eager to test an entire range of anti-wrinkle substances, or take more drastic measures such as undergoing plastic surgery.

H.K. Lee, S.Y. Bae, S.J. Moon, I.S. Chang, **Comparisons of skin characteristics between men and women using non-invasive methods in young healthy Asians**, Skin Research and Technology, Vol. 9, No. 2, May 2003

Skin has different properties depending on intrinsic effects such as inherent factors, race, gender and so on. Besides, it has been known that skin may change because of the environmental stress such as UV, climate and life style. We would like to know the differences of skin characteristics between male and female. The results of this study might be applicable to the department of dermatology and cosmetology.

D. Brokken, L.J.M. Schlangen, P.M. van Kemenade, **A mechanical model for the skin suction experiment**, Skin Research and Technology, Vol. 9, No. 2, May 2003, Abstract No. P72

The skin suction experiment is one of the most widely used methods in dermatology and cosmetology to evaluate the mechanical properties of the skin. Usually, the skin is sucked into an aperture repeatedly by applying an intermittent partial vacuum (P).

I. Sadiq, T. Stoudemayer, A. Kligman, **Blue light visualizes the degree of solar elastosis in photodamaged human facial skin**, Skin Research and Technology, Vol. 9, No. 2, May 2003, Abstract No. P74

We have utilized the short wavelength visible light (blue light) to visualize the fluorophores and chromophores of photo-aged facial skin. Topographic details of the surface can also be seen with great clarity.

L.J.M. Schlangen, D. Brokken, P.M. van Kemenade, **Correlation between small aperture skin suction parameters: statistical analysis and mechanical model**, Skin Research and Technology, Vol. 9, No. 2, May 2003

Skin suction experiments are widely used in order to evaluate the effects of skin treatments, both for cosmetic and for dermatological purposes. Classically, the elevation of the skin is measured at different discrete time instances after the pressure has been changed. Relations between the classical

parameters-Uv, Ur, Ue and Uf-have been investigated and used in order to develop a new model for interpreting the mechanical properties of the skin.

M. I. Nogueira de Camargo Harris, **Propriedades biomecânicas da pele**, Pele: estrutura, propriedades e envelhecimento, Editora Senac, Sao Paulo, 2003

A biometrologia cutânea, ramo da ciência que avalia quantitativamente as propriedades biomecânicas da pele, tem encontrado na cosmetologia um importante aliado, pois o apelo mercadológico dos produtos destinados aos cuidados com a pele e com os cabelos tem-se baseado cada vez mais em evidências científicas e técnicas sensíveis, precisas e validadas, ao invés de serem fundamentadas em especulações.

P.M. van Zuijlen, **Perspectives On Burn Scar Evaluation and Artificial Skin**, Dissertation 2002

H. Zahouani, J. Asserin, P. Humbert, **Mechanical Properties of the Skin During Friction Assessment**, CRC Press 2002, p. 49-58

Previous studies on the tribology of human skin have attempted to demonstrate a correlation between certain tactile sensations and the friction between the skin surface and variety of probes. In addition, friction measurements have been used to provide in vivo information about the effects of age, hydration, dermatitis, and cosmetic products on both the interfacial and bulk properties of skin.

H.S. Yoon, S.H. Baik, C.H. Oh, **Quantitative measurement of desquamation and skin elasticity in diabetic patients**, Skin Research and Technology, Vol. 8, No. 4, Nov. 2002

Diabetes mellitus is responsible for many cutaneous alterations. Xerosis and sclerotic change of the skin are the most common findings. Recently non-invasive computerized devices have been developed and used for determining the desquamation rate and measuring the mechanical properties of the skin. Using these devices, the necessity to characterize the conditions of the skin in the healthy as well as the diseased state is increasing.

P. Humbert, P. Creidi, B. Chadoutaud, J.C. Choulot, P. Msika, **Photoageing: clinical and biometrological results of a double-blind randomized trial evaluating a new cosmetic product containing avocadofurane plus pentapeptides and retinol (abstract)**, 11th Congress of the European Academy of Dermatology and Venereology, Prag 2002

The role of metallo matrix proteinases (MMPs) in cutaneous ageing is now well established. Moreover the decrease of TGF-beta has been more recently discovered. Two new molecules have been developed in this field: pentapeptides which inhibit the production of MMP1, -3, -9 by UV exposure on fibroblast cultures and pure heptadecadienylfurane (Avocadofurane) which increases the collagen synthesis via a specific stimulation of TGF beta.

J-H. Park, S-W. Son, Y-M. Yoon, M-H. Lee, Y-S. Lee, H-C. Kim, H-S. Oh, C-H. Oh, **Objective evaluation for xerosis by morphological study in atopic dermatitis**, Symposium of the International Society for Bioengineering and the Skin, Baltimore Oct. 24-26, 2002

It is essential to be able to measure and record the severity of atopic dermatitis for routine clinical practice and research. Many clinical severity scales have been proposed, but not yet objective. Of severity scoring systems currently available for atopic dermatitis, the SCORAD index has been the most extensively tested.

H. Dobrev, **Study of Human Skin Fatigue**, Medicine and Stomatology Session, 18 October, 2002 House of Scientists, Plodiv, Bulgaria

The aim of this study was to determine age-related changes in human fatigue.

L.M. Rodrigues, P.C. Pinto, P. Lamarao, **After-sun claims substantiation: experimental criteria to assess the in vivo effects of sun care products under controlled-using conditions**, Cosmetics & Toiletries, Vol. 117, No. 10, October 2002

The authors describe a practical method of substantiating claims of "after-sun" products. Ten healthy women 35-65 years old were irradiated on both legs (antero-lateral) in a laboratory for six sequential days using an indoor solarium-type UV source. Efficacy assessment endpoints were defined from the product's typical claims.

A. Oba, T. Gomi, Y. Nishimori, C. Graves, A. Pearse, C. Edwards, **A Non-invasive Method for Measuring Invisible Subcutaneous UV Damage**, 22nd IFSCC Congress, Edinburgh, 25.09.2002

Repeated exposure to UV radiation can induce subcutaneous damage leading to permanent structural degradation and formation of visible wrinkles. In the early stages when damage is slight, the body is capable of repairing itself, and intervention with certain drugs or treatment products may slow or even reverse the process of photoaging. This is not possible, however, when damage is severe and extensive.

H. Zahouani, C. Pailler-Mattei, R. Vargiolu, M.A. Abellan, Assessment of the elasticity and tactile properties of the human skin surface by tribological tests, 22nd IFSCC Congress, Edinburgh, 25.09.2002

The current paper describes the assessment of the visco-elasticity and tactile properties during a static and frictional contact of a spherical indenter on an inner human forearm. The current techniques that simultaneously measure the normal load F_z between the contacting surfaces and the friction force F_x , can be used to determine the normal and lateral stiffness, the Young modulus, static and dynamic friction forces F_z , F_d and respective friction coefficients: μ_s , μ_d .

P. Msika, F. Perin, P. Beau, et. al., AvocadoFurane, Pentapeptides and Soy Isoflavones: A Clinical Study against Hormonal Aging, Bioengineering and The Skin, International Congress 27-28th June 2002, Paris

A patented association containing a new inducer of collagen synthesis via TGF-beta (Avocadofurane), an MMP's inhibitor (Pentapeptides) and soy isoflavones was evaluated in postmenopausal skin aging. 30 women were engaged in two clinical studies (age < 50, no hormonal replacement therapy) and have applied twice daily the product for 1 year.

H. Dobrev, Mechanical Properties in Other Dermatological Diseases, In P. Elsner, et al. (Edts): Bioengineering of the Skin, CRC Press, 2002, Chapter 19

Human Skin, as a complex multi-layered organ, has three major mechanical properties: Stiffness, i.e., resistance to change of shape; elasticity, i.e., ability to recover the initial shape after deformation; Viscoelasticity, i.e., time-dependent deformation with a "creep" phenomenon and nonlinear stress-strain properties with "hysteresis". These properties are altered in dermatological diseases, which are accompanied with pathological induration or softening of the skin. Noninvasive bioengineering measurements allow quantifying the alterations of skin mechanics *in vivo*.

R.R. Wickett, Standardization of Skin Biomechanical Measurements, In P. Elsner, et al. (Edts): Bioengineering of the Skin, CRC Press, 2002, Chapter 15

Standardization of measurement methods has been a goal of many researchers working on noninvasive measurement of skin function. For example, Pierard stated, "optimization of noninvasive biophysical measurements should benefit from strict standardization of measurements and frequent calibration of devices." While no absolute standards for skin measurements have been published, helpful guidelines have been published for measurement of transepidermal water loss (TEWL) and the electrical properties of skin for assessment of skin hydration.

U. Berndt, P. Elsner, Hardware and Measuring Principle: The Cutometer®, In P. Elsner, et al. (Edts): Bioengineering of the Skin, CRC Press, 2002, Chapter 7

The biomechanical properties of human skin are a complex combination of elastic and viscous components. Elasticity correlates with the function of elastin fibers; viscosity is controlled by the collagen fibers and the surrounding intercellular ground substance, which consists primarily of water and proteoglycans. The cutometer allows the measurement of the viscoelastic properties of the skin *in vivo*, which provides valuable information on physiological and pathological changes of human dermis as well as on the efficacy of topical treatments. It is recognized as a standard tool in dermatological and cosmetic research.

A. O. Barel, Product Testing: Moisturizers, In P. Elsner, et al. (Edts): Bioengineering of the Skin, CRC Press, 2002, Chapter 21

The presence of an adequate amount of water in the stratum corneum is important for maintaining the following properties of the skin: general appearance of a soft, smooth, flexible, and healthy-looking skin; and an intact barrier function allowing a slow rate of transepidermal water loss (TEWL) under dry external conditions, which are frequently encountered

L.A. Young, J.C. Dodge, K.J. Guest, J.L. Cline, W.W. Kerr, Age, Breed, Sex and Period Effects on Skin Biophysical Parameters for Dogs Fed Canned Dog Food, American Society for Nutritional Sciences, J. Nutr. 132: 1695S–1697S, 2002

Noninvasive skin biophysical methods have been used in clinical and experimental dermatology for humans (1). The application of some of these methods has also been investigated for companion animals (2–9). Skin biophysical measurements have been reported to be affected by age, breed, sex, site of measurement, animal excitement, evaluation (time) period or season, gonadal status and even coat color (9). The objective of this study was to look at the effect of age, breed, sex and time period on skin biophysical parameters for dogs fed a nutritionally complete and balanced canned food for adult dogs.

T. Gambichler, P. Altmeyer, S. Rotterdam, M. Herde, M. Stücker, K. Hoffmann, Bioengineering der Haut, Kosmetische Medizin, 4/2002, 23. Jahrgang

Nicht-invasive Untersuchungstechniken (Bioengineering) am Hautorgan werden in der Dermatologie und Kosmetologie zunehmend eingesetzt. Gegenüber der bloßen klinischen Untersuchung bietet der Einsatz von Bioengineering-Methoden viele Vorteile. Es lassen sich morphologische und funktionelle Parameter der Haut objektiv darstellen und standardisiert messen, die der bloßen klinischen Untersuchung bzw. sensorischen Wahrnehmung oft unzugänglich sind.

G. Maramldi, M.A. Esposito, Potassium Azeloyl Diglycinate: A Multifunctional Skin Lightener, Cosmetics & Toiletries, March 2002, Vol. 117, Nr. 3

Skin lightening and sebum normalization are among the useful cosmetic functions of potassium azeloyl diglycinate, a soluble derivative of azelaic acid.

H. Dobrev, A Study of Human Skin Mechanical Properties by Means of Cutometer, Folia Medica, XLIV 3/2002

Cutometer is a commercially available non-invasive suction skin elasticity meter. The present study discusses some aspects of the biological informativeness and interpretation of the results obtained in studying skin mechanical properties with cutometer. We analyze the results of previously published studies on the mechanical properties of healthy and diseased skins and their changes after external influences. Studying human skin using cutometer gives objective and biologically meaningful information about the mechanical properties of healthy and diseased human skin.

M. Egawa, M. Oguri, T. Hirao, M. Takahashi, M. Miyakawa, The evaluation of skin friction using a frictional feel analyzer, Skin Research & Technology, 2002 Feb;8(1): p. 41-51

Background/Aims: Sensory evaluation is an important factor for cosmetic products. Several devices for the measurement of sensory properties have been developed in recent years. The objective here is to measure skin surface friction using these devices and examine the correlation with other physiological parameters in order to evaluate the potential of physical measurement of tactile sensation. Methods: A KES-SE Frictional Analyzer, a commercial device for measurement of surface frictional characteristics, was used in this study. An arm holder was added to this device for measurement on the human forearm. The frictional coefficient (MIU) and its mean deviation (MMD) were used as the parameter to indicate surface friction. The moisture content in the stratum corneum was measured with a Corneometer CM825, the transepidermal water loss with a Tewameter TM210, the viscoelastic properties of the skin with a Cutometer SEM575 and the skin surface pattern by observing the negative replica using silicon rubber. Results: The MIU was not influenced by load; however, it was increased due to water application on the skin. The relationship between MIU and the moisture content in the stratum corneum, between MMD and skin surface pattern and between MMD and viscosity of both normal human forearm skin and SDS (sodium dodecyl sulfate)-induced dry skin were confirmed by statistical analysis in a test on human subjects. There was also a correlation between either MIU or MMD and sensory evaluation in the morning after the application of moisturizing products. Human skin surface friction was measured by using a KES-SE Frictional Analyzer. Conclusion: Judging from the correlation between either MIU or MMD and sensory evaluation, we considered this instrumental analysis to be useful for evaluating the tactile impression of human skin.

M. Aalberts, Functional changes in the bovine cervix during pregnancy, Thesis 2001-2002, Utrecht University, Faculty of Veterinary Medicine

K. Schuster, Untersuchungen zur Wirksamkeit der Behandlung von Keloiden bzw. hypertrophen Narben in vivo mit intraläsionalem Triamcinolonacetonid bzw. Silikon-Gel Folie - Eine klinische Studie an 25 Keloiden, Dissertation an der Klinik und Poliklinik für Dermatologie und Allergologie am Biederstein, TU München, November 2011

Seit jeher stellen Narben ein physisch und psychisch beeinträchtigendes und kosmetisches Problem dar. Ästhetisch sind schlecht verheilte Narben häufig sehr störend und können eine funktionelle Behinderung sowie eine Einschränkung der Beweglichkeit an Gelenken hervorrufen.

M. Egawa, T. Hirao, M. Takahashi, The measurement of skin friction using a frictional feel analyser, Congress Stratum Corneum III, Basel, September 2001

Sensory evaluation is an important factor for cosmetic products. Several devices for the measurement of sensory properties have been developed in the recent years.

H. Lambers, H. Pronk, Biophysical Methods for Stratum Corneum Characterization, in T. Förster (Editor): *Cosmetic Lipids and the Skin Barrier*, 2001 by Marcel Dekker

There is no doubt that the application of cosmetic lipids has many positive effects on the structure and function of the skin. These effects are pleiotropic, caused either by direct interaction with the epidermis, particularly the stratum corneum, or indirectly, by influencing the physiologic, homeostatic condition of the skin.

H.M. Ribeiro, J. Morais, L. Rodrigues, Long-term Influence of Polymers on the Biological Properties of the In Vivo Normal Human Skin, IFSCC Conference, Stockholm/Sweden, May 7-9, 2001

Cosmetic formulations are actually included into the normal skin care daily habits and often aim to contribute to the normal skin physiology.

H. Song, The Effects of Inositol Extracted from Rice on the Skin. Personal Care Ingredients Asia, March 2001

A.O. Barel, R. Lambrecht, P. Clarys, Mechanical Function of the Skin: State of the Art, Skin Bioengineering. Vol. 26, March 2001

The in vivo mechanical properties of the human skin have been studied extensively. The skin is a complex five-layered structure organ, which as many other biological materials presents the typical properties of elastic solids and various liquids in a combined way known as viscoelastic properties. Typical mechanical properties of viscoelastic material are nonlinear stress-strain properties with hysteresis (the stress-strain curve obtained during loading will not be superposed by the curve obtained during unloading).

D. Iliev, U. Hinnen, P. Elsner, Skin Bioengineering Methods in Occupational Dermatology, Skin Bioengineering Vol. 26, March 2001

Measuring biophysical properties of the skin is not only useful to study cutaneous physiology and pathology but may also be of value for the prediction of eczema risk, for the detection of subclinical eczema and for therapy control in occupational dermatology.

R.R. Wickett, Stretching the Skin Surface: Skin Elasticity, Cosmetics & Toiletries, March 2001

This contribution to the series "From Test to Claim" deals with the instrumental measurement of skin elasticity, discussing measuring conditions, relevant parameters to record, data analysis and the type of conclusions that could be drawn from such measurements. In particular, this paper will review the use of the Dermal Torque Meter (DTM) and the Cutometer to measure the elasticity of the stratum corneum.

D. Khazaka, News in the Field of Elasticity Measurement, Cosmetic Science Conference 2001

Dermatology and cosmetic industry have been investigating skin parameters for decades to defeat skin diseases and to test the efficacy of cosmetics and pharmaceuticals on the skin.

H. Dobrev, Evaluation of the inhibitory activity of topical indomethacin, betamethasone valerate and emollients on UVL-induced inflammation of means of non-invasive measurements of the skin elasticity, Photodermatology, Photoimmunology & Photomedicine, January 2001

Topical indomethacin has been reported to inhibit ultraviolet light-induced erythema. The objective of this study was to verify this assertion and to compare indomethacin 10% ointment to betamethasone valerate 0.1% ointment, water-in-oil emulsion and oil-in-water emulsion by means of non-invasive skin elasticity measurements.

K. Tsukahara, Y. Takema, S. Moriwaki, T. Fujimura, S. Mayama, G. Imokawa, Carbon dioxide laser treatment promotes repair of the three-dimensional network of elastic fibres in rat skin, British Journal of Dermatology, Vol. 143, 2001

We have previously reported that ultraviolet (UV) B irradiation induces a loss of linearity in the three-dimensional structure of dermal elastic fibres, which results in the reduction of elastic properties of the skin and leads to wrinkle formation. We further reported that repair of wrinkles by all-trans retinoic acid is accompanied by recovery of the linearity of elastic fibres. Carbon dioxide lasers are widely used for treating wrinkles in cosmetic surgery.

*S. Sustmann, **Body care for dry skin**, Scientific Study Eubos Med, 2001*

Dry skin is a widespread phenomenon of our time and is characterized by a deficiency of fat and moisture.

*S. Sustmann, **Face care for sensitive and particularly dry skin**, Scientific Study Eubos Med, 2001*

Daily influences, such as stress and the effects of weather, attack our skin and cause damage that is initially slow and scarcely detectable.

*H. Dobrev, **In vivo Study of Skin Mechanical Properties in Psoriasis Vulgaris**, Acta Derm. Venerol., 2000; 80, p. 1-5*

The aim of this study was to investigate the mechanical properties of the skin in psoriatic plaques before and after treatment with dithranol in clinically uninvolved psoriatic skin in comparison with skin of healthy controls.

*P.P.M. van Zuijlen, A.J.M van Tier, J.F.P.M. Vloemans, F. Groenevelt, R.W. Kreis, E. Middlekoop, **Graft Survival and Effectiveness of Dermal Substitution in Burns and Reconstructive Surgery in a One-Stage Grafting Model**, Plastic and Reconstructive Surgery, September 2000, p. 615-623*

Survival of autograft and subjective parameters for scar elasticity were evaluated after dermal substitution for acute burns and reconstructive surgery.

*L.F. Gouveia, J. Tavares, L. Rodrigues, **Mathematical Modelation of Cutometer Acquired Signals**, 13th ISBS Jerusalem, March 2000 and Skin Research and Technology, Vol. 6, No. 3, August 2000*

The biomechanical 'descriptors' obtained from systems such as the Cutometer™, a well known device used to assess the biomechanical properties of the in vivo skin using forces perpendicular to skin's surface, have been extremely useful to address such a complex characteristic of human skin.

*S. Diridollou, A. Pavy-Le Traon, A. Maillet, F. Bellossi, D. Black, F. Patat, J.M. Lagarde, M. Beron, Y. Gall, **Characterisation of Gravity-Induced Facial Skin Oedema Using Biophysical Measurement Techniques**, Skin Research and Technology, Vol. 6, No. 3, August 2000*

In humans, the microgravity environment can be expected to induce swelling of facial tissues and shrinking of the tissues in the lower limbs, together with a loss in body weight. To evaluate fluid shifts in skin, the head-down bed-rest model was used. The aim of the present study was to evaluate the appearance of facial oedema in subjects undergoing antiorthostatic bed-rest at an angle of -10°.

*S. Sakai, S. Sasai, Y. Endo, K. Matue, H. Tagami, S. Inoue, **Characterization of the Physical Properties of the Stratum Corneum by a New Tactile Sensor**, Skin Research and Technology, Vol. 6, No. 3, August 2000*

The physical properties of the stratum corneum (SC) change with its water content which is regulated by the presence of water solutes (natural moisturizing factors) and lipids in the SC, and are considered to be responsible for the induction of desquamation, skin surface roughness and fine wrinkles.

*A. Morita, K. Kobayashi, I. Isomura, T. Tsuji, J. Krutmann, **Ultraviolet A1 (340-400nm) Phototherapy for Scleroderma in Systemic Sclerosis**, AAD 2000*

The presence of an inflammatory infiltrate consisting of helper T cells and a dysregulated matrix metabolism leading to excessive deposition of collagen are two pathogenetic factors responsible for the developments of fibrosis and sclerosis in patients with systemic sclerosis. In previous studies, ultraviolet A1 (UVA1) radiation phototherapy was shown to deplete skin-infiltrating T cells through the induction of T-cell apoptosis and to up-regulate the expression of matrixmetalloproteinase-1 (collagenase-1) in dermal fibroblasts.

*D. Schmid, A. Lang, T. Allgäuer, C. Bayerl, E.G. Jung, **Beurteilung der Veränderung der Hautbeschaffenheit durch die Heilpflanzensäfte Brennnessel und Löwenzahn**, Akt. Dermatol. 2000*

Wir führten eine Anwendungsbeobachtung über die Beeinflussung von objektiven und subjektiven Parametern der Hautbeschaffenheit durch die Kombination der Heilpflanzensäfte Brennnessel und Löwenzahn bei gesunden Probandinnen durch. Zehn Probandinnen (Versuchsgruppe) nahmen über 6 Wochen die Kombination der Heilpflanzensäfte oral ein, gleichzeitig erhielten sie eine standardisierte Körperpflege mit Basiscreme DAC, weitere 10 Probandinnen (Kontrollgruppe) benutzten lediglich die standardisierte Körperpflege mit Basiscreme DAC.

J. Grudeva-Popova, H. Dobrev, Biomechanical measurement of skin distensibility in scleredema of Buschke associated with multiple myeloma, Clinical and Experimental Dermatology, 25, 2000, p. 247-249

We report a case of scleredema of Buschke associated with IgG kappa monoclonal hypergammaglobulinaemia.

H. Dobrev, Evaluation of the photoprotective activity of topical indomethacin, betamethasone valerate and emollients by means of non-invasive measurements of the skin elasticity, Department of Dermatology, Plodiv, Bulgaria

Topical indomethacin has been reported to inhibit ultraviolet light-induced erythema.

H. Dobrev, Photoaging and Skin Elasticity, National Session of Young Scientists, May 2000

The aim of the present study was to determine the effect of chronic sun exposure on the skin mechanical properties.

H. Dobrev, Changes in Skin Elasticity after an Application of Emulsions containing urea and alphahydroxy acids, 7th National Congress of Dermatology and Venereology, May 2000

The aim of the present study was to compare the effect of 3 different emulsions on skin mechanical properties-

H. Dobrev, Influence of telegammatherapy on the skin physiology, 7th National Congress of Dermatology and Venereology, May 2000

We investigated a female patient who after left mastectomy was treated by means of telegammatherapy with a total dose of 50 Gy (two cycles of 13 and 12 days, pause of 10 days, daily dose of 2 Gy).

H. Dobrev, Treatment of psoriasis vulgaris with hydrocolloid occlusive dressings in combination with betamethasone dipropionate 0.05% cream, 7th National Congress of Dermatology and Venereology, May 2000

In the present preliminary study we report comparative results regarding a new method, used for the first time in Bulgaria.

H. Dobrev, Photoaging and Skin Elasticity, Research Reports of the Union of scientists in Bulgaria, 19. May 2000

The aim of the present study was to determine the effect of chronic sun exposure on the skin mechanical properties.

H. Fadhli, C. Edwards, S. Gaskell, R. Marks, Differences between normal skin and Unaffected Psoriatic Skin are Demonstrated by Cutometer and Uniaxial Extensometry, and Confirmed by Measurement of Elastic Fibre Content, 13th ISBS Jerusalem, March 2000

Unaffected skin in psoriasis looks normal, but past work in our group hinted at subtle differences between skin from a normal individual and normal looking skin from an individual with psoriasis.

F. Henry, O. Martalo, G.E. Piérard, Liminar Perception Threshold of Cutaneous Distension, 13th ISBS Jerusalem, March 2000

Cutaneous sensorial perception is complex and proves to be difficult to quantify.

H.E. Packham, C.L. Packham, Skin Bioengineering as a Contribution to Product Performance and Safety, Cosmetics & Toiletries 03/2000

With today's increasing consumers sophistication and the demand both for products that work and are safe for the user, there is a need for greater objectivity and accuracy in both formulations and claims made by the manufacturer.

H. Dobrev, Use of Cutometer to assess epidermal hydration. Skin Reserach and Technology 2000, 6, P. 239-244

The Cutometer equipped with a 2 mm diameter suction probe is a device suitable for the assessment of epodermal mechanics.

L. Vaillant, L. Declerq, D. Malvy, J.C. Béani, J Bazex, D. Maes, S. Hercberg, Topical Antioxidant treatment provides long term prectective benefits against skin aging, Poster Arbois 1999

Most photoniological effects (from sunburn to immunosuppressin, photoaging and photocarcinogenesis) are attributed to ultraviolet raditation and are believed to be essentially mediated by reactive oxigene species.

R. Jermann, R. Voegeli, J. Meier, Wirkstoffe und Marktsystem der Pflegekosmetik – Rückblick, Veränderungen und zukünftige Trends, SÖFW-Journal-Jubiläumsausgabe 1999

Die Pflegekosmetik weist eine eher junge Geschichte auf, die weniger als 100 Jahre zurück geht. Pentapharm ist seit über 20 Jahren Hersteller von Pflegewirkstoffen für die Kosmetikindustrie. Vor allem in dieser Zeit hat sich sowohl bei den Produkten der Pflegekosmetik wie auch bei den Wirkstoffen viel verändert. dieser Artikel zeigt im ersten Teil die Entwicklungen des ganzen Marktsystems der Pflegekosmetik mit all den Einflüssen von außen.

U. Heinrich, B. Meick, H. Tronnier, Neue Wege bei Behandlung von Cellulite. Pharmazeutische Zeitung Sonderdruck 45/94, 139. Jahrgang, 1999

Das Körperbewußtsein der Verbraucher ist in den vergangenen Jahren deutlich gestiegen. Dabei werden neben reinigenden und pflegenden Anwendungen auch zunehmend Maßnahmen ergriffen, um die Körpersilhouette zu verbessern. Die Cellulite – ein weit verbreitetes Phänomen – nimmt dabei eine zentrale Stellung ein. Das sichtbare Bild der Cellulite beruht auf einer Zunahme von Fettpolstern in der Subcutis (Unterhautfettgewebe), einer Bindegewebesschwäche sowie einer Minderung der Durchströmungsverhältnisse in en Blut- und Lymphbahnen. Die Ursache ist somit eine zum Teil anlagebedingte Schwächung des Bindegewebes mit gleichzeitigen Auftreten von vergrößerten Fettzellkammern infolge von Übergewicht, unausgewogener Ernährung, Bewegungsmangel, etc.

L.M. Harnisch, M.K. Raheja, L.K. Lockhart, A. Pagnoni, A. Lopez, A. Gabbianelli, Substantiating Antiaging Product Claims, Cosmetics & Toiletries, Vol. 114, No. 10, October 1999

Areas of the body most battered by the damaging effects of UV raditation, such as face and hands, are also the most visible in our social life.

R.J. Koch, E.T. Cheng, Quantification of Skin Elasticity Changes Associated With Pulsed Carbon Dioxide Laser Skin Resurfacing, Arch Facial Plasr Surg/Vol 1, Oct.-Dec. 1999

While Skin resurfacing using pulsed carbon dioxide lasers appears to have a skin-tightening effect clinically, the debate continues over its actual effects on dermal collagen. There have been multiple histological evaluations of its effects, but it is unclear how this translates into substantive changes in skin elasticity. Objective measures of results obtained from facial plastic surgery procedures are desirable. Uniform photographic documentation has improved, but there are still inconsistencies in patient position and lighting, which may lead to skepticism over viewing the presented results. Also, physician-based grading systems have inherent elements of subjectivity no matter how good the intentions. Quantification of results in a purely objective manner would be of great benefit for all facial plastic procedures. This need has been recognized with the use of cephalometric radiographs to monitor orthognathic procedures and grid systems to assess browlift results.

L.M. Rodirigues, EEMCO Guidance to the in vivo assessment of tensile functional properties of the skin, EEMCO Group, Part 2: Instruments and Test Modes

Tensile functions of the skin and subcutaneous tissues contribute to the appearance of the aged and photodamaged skin and to the effects of various other pathophysiological processes.

H. Dobrev, Non-invasive Monitoring of the Mechanical Properties of Keloids during Cryosurgery, Acta Derm. Venereol., 1999; 79, p. 1

Non-invasive bioengineering techniques are successful in monitoring the progres and response to treatment of various skin diseases.

M. Förschle, I. Frei, Elastisch und geschmeidig – Tests zur Messung der Hautstraffung, Kosmetik International 6/99

Der Hauptnutzen vieler Produkte ist es, die Haut der jüngeren Konsumentin elastisch und geschmeidig zu erhalten, bzw. die der älteren Verwenderin wieder straffer aussehen zu lassen.

W. Voss, G. Schlippe, M. Breuer, Tests on Cosmetics Scientific Standards, SÖFW-Journal 4/99

In general, body care articles and cosmetics have only a low allergy potential. The probability that toxic-irritative reactions will arise after proper use is even lower. But especially with patients with sensitive skin, unclear skin reactions, which can frequently be confused with allergies, can arise. The cosmetics manufacturers, however, would like to produce safer products and naturally want to avoid that type of problem from the start.

M. Puschmann, A. Melzer, H.P. Nissen, Hautglättende, hautelastische und hautschützende Wirkung einer Urea-Ceramid-Kombination, Kosmetische Medizin Nr. 4, 1999-11-22

Sebastase ist ein häufiges dermatologisches Krankheitsbild. Sie wird durch exogene Faktoren, (Klima, Waschgewohnheiten) und/oder konstitutionelle Faktoren wie Alter und atopische Hautdiathese hervorgerufen. Eine auffällige Häufung derartiger Symptome findet sich in der kalten Jahreszeit. Hier ist das Klima (Temperatur, Luftfeuchtigkeit) sowohl im Freien als auch in den Gebäuden als wichtiger Kofaktor anzusehen. Zur Therapie trockener Haut werden traditionell Salben/Fettsalben, Ölbäder sowie harnstoffhaltige Zubereitungen eingesetzt.

C. Greif, W. Wigger-Alberti, M. Arens-Corell, P. Elsner, Beurteilung einer Körperlotion für trockene und empfindliche Haut, Poster – 5. Tagung der ABD, Aachen 03/99 und Allergologie 3, 03/1999

Durch häufige Reinigungsmaßnahmen kann es zu einer starken Entfettung des Stratum corneum und zu Störungen der epidermalen Permeabilitätsbarriere kommen.

S. Gütt, Rheologische in vivo-Untersuchung an der menschlichen Haut mit nicht-invasiven Verfahren, Dissertation aus dem Institut für Gewerblich Technische Wissenschaften - Fachrichtung Körperpflege - der Universität Hamburg, 1998 (German language)

Changes in the regulatory guidelines for cosmetics as well as consumer interest have led to increased efforts in assessment of product efficacy and claim substantiation. Within the framework of the development of modern emulsion systems with improved percutaneous absorption, it is important to be able to detect even slight alterations in skin conditions. This requires a selection of suitable measurement procedures with high reproducibility. This dissertation focuses on the evaluation of methods for the noninvasive measurement of biomechanical skin parameters, particularly in conjunction with application of cosmetic skin care products.

J.S. Koh, K.S. Chae, H.O. Kim, Skin Characteristics of Normal Korean Subjects According to Sex and Site using Non-Invasive Bioengineering Methods, Korean J Dermatol., 1998 Oct; 36(5): p. 855-864

Background: During the last few years, the in vivo study of the physiological parameters of the skin by non-invasive methods has been considerably developed. So far, there have been some reports on the skin characteristics only in parts, but there has not been any criteria to classify those of normal subjects. Objective: The aim of the present study was to investigate the skin characteristics of healthy Korean subjects according to sex and sites using non-invasive methods. Methods: To determine normal levels of sebum, skin hydration, transepidermal water loss (TEWL), skin elasticity and skin color according to sex, 163 subjects (male; 124, female; 39) were used to investigate 5 different anatomical sites. 6 different instruments were used: The Sebummeter SM 410, Corneometer CM 820, Evaporimeter EP1, Cutometer SEM 474, Chromameter CR-121, and Mexameter MX 16, for evaluating sebum excretion rate, capacitance, TEWL, mechanical property and skin color respectively. Results: Differences were noticed depending on the anatomical sites and sex. Most of the measuring parameters were significantly different according to sites and sex. The values of sebum levels, capacitance and TEWL were higher in the males on the cheek, forehead and crows foot, whereas in the females, higher values were observed on the dorsum of the hand. The skin elasticity varied considerably among the nine-parameters but, for the elastic ratio (R2, R5), the females showed significantly higher values than the males in all sites except the forehead. Skin lightness (L* value) was higher in the females, whereas the males showed higher values in the category of redness (a* value) and yellowness (b* value). The values of the erythema index (EI) and melanin index (MI) were also higher in the males on all sites. Correlations between the skin parameters mentioned above were calculated. A negative correlation between capacitance and TEWL was observed only on the cheek (male/female, $r = -0.2 / r = -0.4$, $p < 0.05$). The L* value correlated negatively with MI. Moreover the values between a* and EI also showed significant correlations in the male (cheek and dorsum of hand, $r = 0.2$, forehead and crows foot, $r = 0.3$, $p < 0.05$). There were considerably significant correlations between the visual pigmentation score and

instrumental skin parameters in the males (visual pigmentation score vs. L^* value measured by Chromameter ; cheek/crows foot, $r = -0.3/y = -0.4$, visual pigmentation score vs. MI by Mexameter ; cheek/crows foot, $r = 0.2/ r = 0.4$, visual wrinkle score vs. sebum excretion rate measured by Sebumeter ; cheek, $r = 0.2$, visual wrinkle score vs. elasticity parameters measured by Cutometer ; cheek, $R2/R5/R7$, $r = -0.3/ r = -0.2/ r = -0.3$, $p < 0.05$). Conclusion: Skin physiological parameters can be evaluated by non-invasive skin bioengineering methods which show quantitative modifications in physiological conditions in relation to sites and sex.

Y. Yazan, M. Seiller, S. Avcier, M. Demirel, Comparison of Glycolic, Lactic and Glycolic + Lactic Acids in Multiple Emulsion Systems, 20th IFSCC Congress Cannes, 09/1998

Y. Nishimori, H. Tsuruoka, K. Matsumoto, M. Kawai, A. Pearce, C. Edwards, R. Marks, A new Approach for the Improvement of Photoaged Skin Through Collagen Fiber Bundle Reconstruction Mechanism, 20th IFSCC Congress Cannes, 09/1998

Many anti-wrinkle and anti-photoaging cosmetics contain retinoic acid (RA) or RA-derived chemicals to induce the production of connective tissue components. However, this approach does not always produce longlasting or satisfactory results. Investigations of injured skin reveal that the ultrastructural condition of dermal connective tissue, especially dermal collagen fiber bundles, is an extremely important factor affecting both the mechanical properties and surface profiles. Photoaging is skin injury caused by solar radiation. Our research indicates that restoration of the ultrastructural changes of dermal collagen fiber bundles is more important than simple promotion of the production of connective tissue components.

D. Black, A. Del Pozo, S. Diridollou, J.M. Lagarde, Y. Gall, Assessment of Emollient Effects on the Stratum Corneum of Winter Dry Skin Using A Multiple Measurement Approach, Stratum Corneum II Symposium, Cardiff, 09/98

A randomised single-blind study was carried out on 13 female volunteer subjects aged 21-43, (mean 35 yrs), with the aim of assessing the effects of a glycerine/vaseline based emollient cream on the stratum corneum of winter dry skin.

A. Benaiges, P. Marcet, R. Armengol, C. Betes, E. Gironés, Study of the refirming effect of a plant complex, Int J Cosmet Sci, 1998 Aug;20(4): p. 223-33

Loss of skin elasticity is one of the main problems of ageing. This is a mechanical property influenced by elastin, a protein in the dermis which, together with collagen and glycosaminoglycans, makes up the connective tissue. This tissue is affected by a large number of events (such as cutaneous ageing, pregnancy, slimming processes and cellulitis) which eventually cause it to change. At the same time, the metabolism of the proteins of the connective tissue decreases and there is an ever greater presence of enzymes, principally elastases and collagenases, which are responsible for breaking down the elastin and the collagen. One way to prevent such a loss of elasticity is to use active ingredients that are able to inhibit elastase enzymes. A plant complex was prepared using the following plants: lady's thistle (*Silybum marianum* GAERTN), alchemilla or yarrow (*Alchemilla vulgaris* L.), horsetail (*Equisetum arvense* L.) as well as germinated seeds (*Glycine soja* Siebold and Zucc., *Triticum vulgare* Vilars, *Medicago sativa* L., *Raphanus sativus* L.). The complex was standardized to give the corresponding active principles, silybin, tannins, silicon and peptides, respectively, and in vitro enzymatic tests were carried out to establish its ability to inhibit elastase. The study of enzymatic inhibition was carried out using two enzymes: (1) porcine pancreatic elastase (PPE), and (2) human leukocyte elastase (HLE). The results showed that the plant complex presents non-competitive inhibition in the order of 41.0% against PPE and 50.0% against HLE. An in vivo test was made alongside the in vitro test using an SEM 474 Cutometer (Courage & Khazaka) to study the elasticity of the skin, and positive effects were obtained when applying a cosmetic formulation containing 5% of the plant complex. Image analysis of duplicates of the cutaneous surface, before and after treatment began with a product containing 5% of plant complex and showed that wrinkles were decreased by 36.7%.

W. John Kitzmiller, L. Singer, D. Page, M. Visscher, R.R. Wickett, Use of Noninvasive Biophysical Techniques to Compare Effects of Laser Resurfacing and Dermabrasion on Perioral Skin, 12th ISBS, Boston, 06/98

Direct comparison of two common techniques, dermabrasion and CO₂ laser resurfacing used for restoring facial skin condition from the effects of solar damage and acne scarring are absent from literature.

R. Lambrecht, P. Clarys, B. Gabard, A.O. Barel, Relation Between Capacitance Measurements and Biomechanical Skin Properties Under Different Hydration Conditions, 12th ISBS, Boston, 06/98

The biomechanical characteristics of the stratum corneum are influenced by the water content of this layer.

P. Humbert, H. Zahouani, N. Bizouard, J. Asserin, J. Arnaud-Battandier, Evaluation of Efficacy of an Anti-Aging Cream Containing Anti-Glycation Agents and Vitamins Using a Non-Invasive Method, 12th ISBS, Boston, 06/98

The aim of the study was to evaluate the efficacy of an anti-aging cream containing antiglycation agents and vitamins.

P.Y. Rizvi, St. Kaplan, B.M. Morrison, Seasonal Skin Changes as Measured by Biophysical Instruments, 12th ISBS, Boston, 06/98

The work presented here examines the changes in the biophysical properties of the skin as a function of seasonality.

C. Greif, W. Wigger-Alberti, M. Arens-Corell, P. Elsner, Beurteilung einer Körperlotion für trockene und empfindliche Haut, Kosmetische Medizin Nr. 5, 1998

In einer offenen kontrollierten Anwendungstudie über 3 Wochen wurde an 30 Probanden eine Body Milk auf Hautverträglichkeit und Wirksamkeit getestet. Dazu wurden folgende hautphysiologische Parameter erfaßt: Hautfeuchtigkeit, transepidermaler Wasserverlust, Hautelastizität, pH-Wert sowie Hauttemperatur.

T. Fischer, C. Greif, W. Wigger-Alberti, P. Elsner, Instrumentelle Methoden zur Bewertung der Sicherheit und Wirksamkeit von Kosmetika, Kursprogramm Sicherheitsaspekte in der Kosmetik, Basel, Mai 1998

Durch die Erfordernisse eines Wirksamkeits- und Sicherheitsnachweises für Kosmetika gewinnen nichtinvasive biophysikalische Meßmethoden zunehmend an Bedeutung. Neben der Bestimmung des transepidermalen Wasserverlustes und der Messung der Hautfeuchtigkeit, des Oberflächenfettes, des pH-Werts, und der Elastizität kommen der Bestimmung des Oberflächenreliefs, der Farbe und der Hautdurchblutung große Bedeutung zu. Mit diesen Methoden können u.a. die hautfeuchtigkeitsfördernden, glättenden und straffenden Wirkungen von Topika sowie der Grad der Irritation durch Externa valuiert werden. Zur Messung der Vergleichbarkeit dieser unterschiedlichen Funktionsparameter sind standardisierte Meßbedingungen erforderlich.

S.A. Barkovic, Y. Appa, G. Payonk, A Clinical Evaluation of a Glycolic Acid Hand Treatment with Retinyl Palmitate and an SPF 15 on Photoaged Hands, AAD, Orlando, March 1998

Treatments for improving the appearance of photo-damaged skin have primarily focussed on facial tissue, despite the necessity of similar treatment for the hands.

J. Hart, C. Polla, Oat Fractions. Cosmetics & Toiletries March 1998

Clinical and in vitro studies demonstrate the ability of specific topically applied oat fractions (oat β -glucan, hydrolyzed oat protein and oat extract) to provide targeted benefits in the skin care and hair care.

H. Tronnier, Neuere Wirkstoffe in der Kosmetik – Teil 2, Kosmetische Medizin Nr. 2, 1998

Eine Reihe neu oder wieder entdeckter Wirkstoffe für die Kosmetik wird vorgestellt und kritisch beleuchtet. Manches ist an Wirkungen an der Haut nachgewiesen, anderes bisher nur in Modellen und dann einfach auf die Haut übertragen worden. Für den Wirkungsnachweis bedeutet das aber speziell in der Kosmetik, daß dieser zur Bewertung prophylaktischer Maßnahmen, die ja erst nach Jahrzehnten zum Tragen kommen, natürlich kaum geführt werden kann, und hier ein Rückgriff auf eine Beeinflussung von Mechanismen, die zu einer Alterung, vor allem einer vorzeitigen führen, erfolgen muß.

H. Dobrev, Value of the Non-Invasive Skin Bioengineering Investigations of the Skin Mechanical Properties In Vivo, 5th National Congress of Rheumatology, November 1997

During recent years several modern non-invasive bioengineering methods and devices for evaluation of the skin mechanical properties have been introduced.

H. Dobrev, In Vivo Study of Skin Mechanical Properties in Patients with Systemic Sclerosis, 5th Nat. Congress of Rheumatology in Sofia, November 1997

Background: Measurements of skin elasticity are more sensitive than the skin severity score and very appropriate for an evaluation of sclerodermatous skin.

M. Kläsger-Radez, Putting Claims to the Test, SPC Oktober 1997

The pressure is on to substantiate your product claims or drop them altogether. Michael Kläsger-Radez of Courage + Khazaka explains how high-tech equipment is making this possible in skin care.

H. Dobrev, In Vivo Study of Skin Mechanical Properties in Scleredema of Buschke. Derma 1029. October 1997

A non-invasive, in vivo suction device was used to investigate the mechanical properties of the skin in a patient with scleredema of Buschke. Clinical scoring of skin induration and measurements of skin elasticity were performed over 9 anatomic regions on admission and after 3 (on discharge), 17 and 28 months. Immediate distension, final distension and immediate retraction were significantly decreased, while the viscoelastic to elastic ratio was significantly increased in the patient as compared to the healthy controls. Delayed distension and biological elasticity were preserved. Low value of skin distensibility correlated with a severe skin induration ($p < 0.001$). The changes were more expressive with the 8 mm-diameter measuring probe than the 2 mm-diameter probe. The method applied can be used for objective and quantitative assessment of skin involvement in scleredema of Buschke.

H. Dobrev, Changes of Skin Mechanical Properties after Single Application of Different Moisturizers, 1st Balkan Congress of Medicine, October 1997

In this study we investigated the influence of single application of different moisturizers on skin mechanics and the relationship between the mechanical parameters and capacitance of the skin.

H. Dobrev, Use of Cutometer to Assess Dermal Oedema in Erysipelas of the Lower Legs, 1st Balkan Congress of Medicine, October 1997

Inflammatory dermal oedema in erysipelas alters skin mechanics.

H. Dobrev, In Vivo Study of Skin Mechanical Properties in Erysipelas of the Lower Legs, 1st Balkan Congress of Medicine, October 1997

Using a non-invasive, in vivo suction skin elasticity meter (Cutometer®), we studied the mechanical properties of the skin in 17 patients with erysipelas of the lower leg.

B.K. Sun, H.K. Lee, J.C. Cho, J.I. Kim, Clinical Improvement of Skin Aging by Retinol Containing Products: With Non-Invasive Methods, IFSCC Conference Mexico 25-27 September 1997

Retinol as well as RA (retinoic acid) is well known to have many beneficial effects on (photo)aged skin. But the skin irritation potential and unstable condition of the products containing them have been some problems in their cosmetic uses. So, retinol containing gel product (MDC gel) was developed for less skin irritancy and more stability in cosmetic products. To examine the clinical effects of retinol containing product, we used clinical non-invasive assessment techniques on 40 volunteers for 6 months maintaining double-blind test conditions. According to our results, the use of retinol containing product improved skin color and hydration level slightly. But there was no statistical difference. There was no erythema reaction compared to the use of RA. Especially, the skin elasticity increased above 20% and skin wrinkles of crows' feet region decreased more than 10%. Besides the instrumental analysis, a large majority of volunteers felt that their skin was improved in the case of wrinkles, elasticity, hydration and color.

H.Blitz, M.Schidelko, H.P.Nissen, H.Driller, Skin mechanics measured in vivo: A new and accurate model more sensitive to age and moisturising treatment, Australian Journal of Dermatology: Abstracts 19th World Congress of Dermatology, Sydney, June 1997

Measurements of skin mechanics are required to better understand the condition of human skin and loss of elasticity in the epidermis. The study presents a new method which shows that cosmetic products are capable to induce significant changes in the mechanical properties of human skin after an application twice a day for one week.

B.C. Murray, R.R. Wicket, Correlations between Dermal Torque Meter®, Cutometer®, and Dermal Phase Meter® measurements of human skin, Skin Research and Technology 1997-3

The Dermal Torque Meter® (DTM) and the Cutometer® are instruments that measure mechanical properties of skin. The NOVATMDermal Phase Meter® (DPM) measures the stratum corneum (SC) hydration level. The objectives of this study were to determine which parameters of the

DTM data curves were most sensitive to changes in SC hydration level, which of the two instruments (Cutometer or DTM) was most sensitive, and what correlations existed between the Cutometer and DTM data.

K.P. Wilhelm, Client-Server based On-Line Data Acquisition for Skin Bioinstrumentation Devices; proDERM institut for applied Dermatological Research GmbH. Schenfeld, Germany

During dermatological safety and efficacy studies, huge amounts of data- both instrumental data as well as evaluator scores may accumulate. We have developed an integrational data with on-line data acquisition capability. The program runs in a Macintosh network. A graphical interface facilitates data entry. A multilevel password system secures unauthorised use. In order to comply with GCP/GLP requirements all data entries and any possible changes relating to experimental studies- both scores and instrumental values -are secured in a log file together with date, time, and initials of the person entering the data. The program can at present acquire data from: Chromameter(Minolta), Tewameter, Corneometer, pH-Meter, Sebumeter, Mexameter, (all Courage and Khazaka). However, the open architecture would easily allow to incorporate more instruments with a serial interface. Data can be exported in DOS, windows or Macintosh format for easy import into any spreadsheet or statistics programs. The program has been completely validated and successfully used in a contract research organisation for over 12 months. Automatic data acquisition has proven to be very useful tool to facilitate and speed up data analysis and to enhance the quality and reliability of test results.

F. Henry, G.E. Pierard, Biomechanical Properties of Striae Distensaie of Pregnancy, Skin Research and Technology, Vol.2 No. 4 Nov.1996

Background and Objective: Striae Distensae of pregnancy is a common finding. There is currently a lack of information about the rheological properties of such lesions. The purpose of this study was to compare the mechanical properties of striae distensae before and after delivery. Patients and methods: A total of 79 primigravid entered the study. Rheological properties of the skin were evaluated in vivo using a CUTOMETER equipped with a 2-mm probe. Results: Mechanical properties of striae distensae developing during pregnancy resembled those of the surrounding skin. By contrast, significant differences were yielded during post-partum. Extensibility of striae distensae was increased although parameters of elasticity remained normal. Conclusion: Rheological properties of striae distansae of pregnancy vary in time. This might reflect the changes in hormones and in the mechanical stresses normally setting the skin under tension.

A.O. Barel, Mechanical Function of the Skin: State of the Art, Skin Research and Technology, Vol. 2 , No. 4, Nov 1996.

In vivo assessment of the mechanical properties of the skin is considered a valuable non-invasive tool for the investigation of normal and diseased skin as well as for evaluating the efficiency of various cosmetic treatments.

A. Teglia, A. Mondelli, Influence of cosmetic treatments on the intercorrelations of skin elasticity, hydration and microrelief, 19th IFSCC Congress Sydney, October 1996 and Experimental Dermatology Vol 6 No 5, ISICD and ISBS Meeting Rome 2-4 October 1997

Skin Hydration, elasticity and surface microtopography are important cutaneous parameters reflecting sensory/aesthetic qualities of the skin and have been largely adopted as indicators of the effectiveness of cosmetic treatments. Several studies have been made about the influence of environmental and biological factors on them, while little is known about their correlation. Aim of our study was to investigate their intercorrelation and possible influence of cosmetic applications on their relationship. 30 healthy volunteers were subject to the study over a period of one year. 7 skin sites for each longitudinal half of the body were taken as test areas: volar aspect of the forearm (3sites), upperarm, breast cheek, forehead. The subjects divided into two groups were properly instructed to apply twice a day a W/O emulsion (1st group) and an O/W emulsion (2nd group) on the test sites of a half of the body; contralateral untreated sites were used as controls. Biophysical measurements of skin hydration, mechanical properties and surface geometry were made at regular intervals over the test period for each volunteer. The data collected were submitted to statistical analyses for cross-correlation and differences of the means. The following variables were considered: electric capacitance EC as measure of the hydration of the horny layer; the viscoelastic to elastic ratio U_v/U_e and the biological elasticity U_r/U_f as mechanical properties of the skin; mean roughness depth R_z and coefficient of skin estensibility LD as parameters of the skin surface microtopography. Age of the subjects was considered as biological variable. On untreated skin were observed: significant correlation of topographycal and mechanical parameters with age; correlation of R_z with U_v/U_e (direct) and with U_r/U_f (inverse); correlation of LD with EC (inverse) and with U_r/U_f (direct). Correlation of mechanical properties with

hydration was not significant. Treatment with W/O emulsion increases significantly hydration, elasticity and skin smoothness; intercorrelation of biophysical variables does not show important variations. The baseline correlation of microrelief parameters with age was reduced. Treatment with O/W emulsion increases moderately hydration and smoothness but does not effect the elastic properties of the skin; correlation of Rz with biological elasticity and viscoelastic component loses significance. Exposure of the skin to different type of emulsions can effect selectively the cutaneous biophysical parameters and vary their intercorrelation.

H. Dobrev, Age-Related Changes in Skin Mechanical Properties, 5th National Conference of Gerontology and Geriatry, October 1996

J. Woodruff, Testing time, Cosmetics, June 1996

In his continuing series on impending EC cosmetics-legislation, John Woodruff looks at the requirements for proof of efficacy, and takes a trawl around available testing facilities.

J. Habig, E. Vocks, F. Kautzky, M. Dahm, S. Borelli, Influence of single UVA and UVB irradiation on surface structure and viscoelastic properties of the skin in vivo, Umweltdermatologie (ABD), Göttingen März 1996

The present study was designed to evaluate the effects of single irradiation either with UVA (dosage: 50J/cm²), or UVB (dosage IMED) on surface structure and viscoelastic properties of the skin. Biophysical measurements by means of profilometry and cutometry were carried out on normally sun-protected skin areas directly before and 24 hours after irradiation. UVA induced neither immeasurable changes in skin surface structure (expressed by the profilometrically calculated parameters of roughness Ra and Rx DIN and the parameter Wt reflecting depths of furrows) nor in its viscoelastic properties (expressed by the cutometrically calculated ratio Uv/Ue reflecting viscosity and the ratio Ur/Uf reflecting biological elasticity). However, a single dry-thermogenic dose of UVB radiation was followed by significant increase in the depths of furrows, increase in viscosity and decrease in biological elasticity. (Article in German)

J. Habig, E. Vocks, F. Kautzky, M. Dahm, S. Borelli, Einfluß einmaliger UVA- und UVB-Bestrahlung auf Oberflächenbeschaffenheit und viskoelastische Eigenschaften der Haut in vivo, Hautarzt 47, 1996

The present study was designed to evaluate the effects of single irradiation either with UVA (dosage: 50J/cm²) or UVB (dosage: 1 MED) on surface structure and viscoelastic properties of human skin. Biophysical measurements by means of profilometry and cutometry were carried out on normally sun protected skin areas directly before and 24 hours after irradiation. UVA induced neither measurable changes in skin surface structure (expressed by the profilometrically calculated parameters of roughness Ra and Rz DIN and the parameter Wt reflecting depths of furrows) nor in its viscoelastic properties (expressed by the cutometrically calculated ratio Uv/Ue reflecting viscosity and the ratio Ur/Uf reflecting biological elasticity). However, a dry thermogenic dose of UVB radiation was followed by significant increase in the depth of furrows, increase in viscosity and decrease in biological elasticity.

J. Habig, E. Vocks, F. Kautzky, J. Ring, Biophysikalische Charakteristika der Haut von Patienten mit Atopischem Ekzem und Beeinflussung durch einmalige UV-Applikation, Hautarzt 47, 1996

Zur quantitativen Erfassung biophysikalischer Eigenschaften klinisch befallener Haut von Patienten mit atopischem Ekzem gegenüber einem Kollektiv hautgesunder Patienten wurden die Methoden der Profilometrie (Hommeltester T 20000, Hommelwerke, Schwennigen) zur Messung der Oberflächenstruktur und der Cutometrie (Cutometer SEM 474, Courage und Khazakaa, Köln) zur Messung der viskoelastischen Hauteigenschaften angewandt.

J.R. Mekkes, D.N.H. Enomoto, R. Hoekzema, J.D. Bos, C.de Borgie P.M.M. Bossuyt, Quantification of cutaneous sclerosis in patients with generalized scleroderma with a skin elasticity meter, American Academy of Dermatology, 55th Annual Meeting March 1997 and J. Am. Acad. Dermatol. 1996;35: p. 381-387

A skin score, a subjective assessment of skin elasticity, is widely used in patients with systemic sclerosis. Although this scoring method is regarded as validated and accepted tool, the interobserver and intraobserver reproducibility are relatively poor. Aim of the study: To investigate whether the recently developed SEM 474 cutometer, which exerts a controlled vacuum force to the skin, can measure skin elasticity more objectively.

D.H.N Enomoto, J.R. Mekkes, P.M.M. Bossuyt, R. Hoekzema, J.D. Bos, Quantification of cutaneous sclerosis with a skin elasticity meter in patients with generalized scleroderma, J Am Acad Dermatol 1996; 35: p. 381-387

Background: The skin score, a subjective assessment of skin elasticity, is widely used in patients with systemic sclerosis. Although this scoring method is regarded as a validated and accepted tool, the interobserver and intra-observer reproducibility is relatively poor. Objective: Our purpose was to investigate whether the recently developed SEM 474 cutometer, which exerts a controlled vacuum force to the skin, can measure skin elasticity more objectively than the skin score.

H. Gerny, IV. Medizinische und Kosmetische Behandlungen, Kosmetik+Dermatologie, 1. Ausgabe 1996

Die Langzeitwirkung einer Pflege kann nur dann einigermaßen objektiv beurteilt werden, wenn ein klar definierter Ausgangspunkt bezüglich des aktuellen Hautzustandes und Hauttypes gegeben ist. Die Bestimmung des Hauttypes ist ein sehr komplexer Vorgang, da viele äußerliche Einflüsse auf unser Hautbild einwirken. Auch ist die Haut hormonell empfindlich und stellt ein Bild unseres Innenlebens dar.

G.E. Piérard, Relevance, Comparison, and Validation of Techniques, Handbook of Non-Invasive Methods and the Skin, J. Serup, G.B.E.Jemec, 1995

Measuring in an objective way is always in need of additional breakthrough. Dermometrology and bioengineering have been and remain closely associated in the search for improvements of quantitative noninvasive assessments. The pre-bioengineering times and the descriptive phase of dermometrology are behind us. Ingenious researches pioneered methods that may now look crude, time-consuming, and sometimes lacking in reproducibility.

A.O. Barel, W. Courage, P. Clarys, Suction Method for Measurement of Skin Mechanical Properties: The Cutometer®, Handbook of Non-Invasive Methods and the Skin, J. Serup G.B.E. Jemec, 1995

The mechanical properties of the human skin have been extensively studied in the past most in vitro and less in vivo. Skin is a complex organ which as many other biologicals, presents in a combined way the typical properties of elastic solids and viscous liquids. As a consequence the mechanical properties of the skin are called viscoelastic. Typical properties of viscoelastic materials are nonlinear stress-strain properties with hysteresis (the stress-strain curves obtained on loading will not be superposed on the curves obtained by unloading). Furthermore the deformation of the skin is time-dependent with a typical phenomenon of creep. The creep is characterized as an increasing deformation of the skin in function of time when a constant stress is applied on this material. The viscoelastic properties of the skin are due to the components of the skin: collagen fibers and elastin fibers impregnated in a ground substance of proteoglycans.

A.O. Barel, W. Courage, P. Clarys, Suction chamber method for measurement of skin mechanics: the new digital version of the Cutometer

The mechanical properties of the human skin have been extensively studied in the past most In Vitro and less In Vivo, (1). Skin is a complex organ which as many other biologicals, presents in a combined way the typical properties of elastic solids and viscous liquids, (2). As a consequence the mechanical properties of the skin are called viscoelastic. Typical properties of viscoelastic materials are non linear stress - strain properties with hysteresis (the stress - strain curves obtained on loading will not be superposed on the curves obtained by unloading), (2-5). Furthermore the deformation of the skin is time-dependent with a typical phenomenon of creep. The creep is characterised as an increasing deformation of the skin in function of time when a constant stress is applied on this material. The viscoelastic properties of the skin are due to the components of the skin: collagen fibers, elastin fibers and cells impregnated in a ground substance of various proteoglycans and glycoproteins, (6).

I. Diepenbrock, U. Heinrich, H. Tronnier, Der Einfluß von Nikotin auf die Haut, Parfümerie und Kosmetik 12/95

Die Beschaffenheit der Haut als größtes menschliches Organ ist wie keine zweite ein Gradmesser für das Alter des gesamten Organismus. Nicht selten lassen sich durch ihren Zustand Rückschlüsse auf vorhandene Erkrankungen schließen. Der Einfluß des Rauchens nun auf die Hautelastizität bestätigt um ein weiteres die oben genannte Feststellung. Aufgrund des Vergleichs von quantitativen Messungen der Hautelastizität bei Rauchern und Nichtrauchern über verschiedene Altersgruppen ließ sich eindeutig feststellen, daß die Elastin- und Kollagenfasern eine längere Zeit benötigen, um wieder in ihre ursprüngliche Ausgangslage zurückzukehren. Weiterführende Untersuchungen ergaben sogar einen verstärkten Abbau der elastischen Fasern. Auf jeden Fall läßt

sich feststellen, daß die Haut bei Rauchern um durchschnittlich 11 Jahre älter ist als bei Nichtrauchern vergleichbaren Alters.

*P. Elsner, **Skin Elasticity**, Bioengineering of the Skin: Methods and Instrumentation, CRC Press 1995*

Mechanical properties of human skin have interested dermatologists and bioengineers for a considerable time, as differences between biomechanical skin parameters at various skin sites and changes with age and disease are obvious. Objective functional assessment of skin mechanics was necessary in order to correlate mechanical properties with anatomical and biochemical findings.

*G.E. Piérard, N. Nikkels-Tassoudji, C. Piérard-Franchimont, **Influence of the Test Area on the Mechanical Properties of Skin**, Dermatology 1995, 191: p. 9-15*

New advances in bioengineering have provided commercially available devices for measuring the mechanical properties of skin in vivo. Reproducibility of data and methodological approaches have not yet been thoroughly studied. Objective: To study the reproducibility and the influence of the area of the test site on the values of biomechanical variable yielded in a normal population. Method: A 500-mbar suction was transmitted to the skin through Cutometer probes equipped with a 2- or 8-mm opening. Results: The best reproducibility was obtained for the maximum distension of skin and for the biological elasticity. The values of the standard biomechanical ratios were almost the same for both probes. Linear correlations were found between parameters of elasticity.

*N. Nikkels-Tassoudji, F. Henry, C. Letawe, C. Piérard-Franchimont, P. Lefèbre, G.E. Piérard, **Mechanical Properties of the Diabetic Waxy Skin**, S. Karger, Basel, 1995*

Background: In some diabetic patients, the skin of the hands has a waxy appearance. Objective: To study subclinical skin stiffening in diabetic patients using a noninvasive, in vivo suction device measuring skin extensibility and elasticity. Skin thickness was also measured by high-resolution ultrasonography. Methods: Evaluations were made on the dorsum of the hands and on the volar aspect of the forearms. Results: In type 1 diabetic patients, the extensibility of skin was decreased while values of thickness and elasticity were increased. These alterations were most prominent on the hands. Similar modifications, although less pronounced, were also found in type 2 diabetic subjects. Conclusion: The reported biomechanical changes indicate the presence of subclinical skin stiffening in many patients with diabetes mellitus. Such noninvasive biometrological evaluations could be used for monitoring, rating and correlating some diabetes-associated disorders.

*G.E. Piérard, R. Kort, C. Letawe, C. Olemans, C. Piérard-Franchimont, **Biomechanical Assessment of Photodamage**, Skin Research and Technology 1995*

Background/Aims: Intrinsic ageing and photoaging may present different biomechanical properties. Dorsal and volar forearm skin is differently exposed to UV-light. The object was to derive a cutaneous extrinsic ageing score (SEAS) representative of UV ageing, i.e. the global photoageing corrected for intrinsic ageing.

*G.E. Piérard, C. Letawe, A. Dowlati, C. Piérard-Franchimont, **Effect of Hormone Replacement Therapy for Menopause on the Mechanical Properties of Skin**, Jags 43:662-665, 1995.*

Objective: To evaluate the effect of hormone replacement therapy (HRT) for menopause on the mechanical properties of the skin in healthy women. Design: A group of 114 women, including 43 nonmenopausal controls, 46 menopausal women with HRT and 25 menopausal women without HRT, participated in the study. Mechanical properties of the skin were measured on the volar forearm using a computerized suction device.

*M. Viatour, G.E. Piérard, **A Computerized Analysis of Intrinsic Forces in the Skin**, BSL Clinical Experimental Dermatology Paper, 15/8/1995.*

The skin of the volar forearm is a site selected for many biometrological studies. We studied the influence of forearm position when evaluating the surface topography and mechanical properties of the skin in normal young adults. Optical profilometry of skin replicas and the suction biomechanical method (Cutometer, 2 and 8 mm probes) were used in combination with evaluation of the thickness and sliding mobility of the dermis and dermohypodermal tissues.

*H. Dobrev, **In Vivo Noninvasive Study of the Elastic and Viscoelastic Properties of Human Skin after a Short Term Application of Topical Corticosteroids**, 6th Congress of Dermatology and Venerology, Pleve, Bulgaria, May 11-13, 1995*

A noninvasive, in vivo suction device for measuring skin elasticity (Cutometer SEM 474, Courage + Khazaka electronic GmbH, Köln, Germany) was used to determine the alteration in the

mechanical properties of the skin after a short term application of 5 commercially available topical corticosteroids as ointments and creams. 25 volunteers (20 female and 5 male, aged 16-54 years) were investigated. The following relative parameters, independent of skin thickness, were calculated and compared: R2 (U_a/U_f) - gross, R5 (U_r/U_e) - net, R7 (U_r/U_f) - biologic elasticity and R6 (U_v/U_e) - viscoelastic/elastic ratio. Corticosteroid ointments increase the purely elastic parameters R2, R5 $/p<0.05/$, R7 as well as the parameter of viscoelasticity R6 $/<0.001/$. Corticosteroid creams alter the elastic parameters weakly while increase the viscoelastic parameter R6 significantly $/p<0.05/$. These effects of topical corticosteroid formulations are probably due to the hydration of the stratum corneum and softening of keratin, which improve the epidermal mechanical properties. On the other hand as a result of dermal oedema and some biochemical effect on the ground substance perhaps, the friction between the fibres is reduced and interstitial fluid movement is facilitated through the fibrous network. The applied noninvasive method can be useful for an evaluation and comparison of local effects of the different dermatologic topicals on the elastic and viscoelastic properties of human skin.

W.I. Worret, T. Krusche, Objektive Nachweismethoden zur Überprüfung von Narbentherapeutika, 38. Tagung der Deutschen Dermatologen Gesellschaft, Berlin, 29. April - 03. Mai 1995

Es gibt mehrere Methoden, um hypertrophe Narben und Keloide der Hautoberfläche anzugleichen. Intraläsionale Triamcinolon-Injektionen gelten dabei als Standardbehandlung.

T. Krusche, W.-I. Worret, Änderung der mechanischen Eigenschaften von Keloiden während Behandlung mit intraläsionalem Triamcinolonacetonid, 38. Tagung der Deutschen Dermatologischen Gesellschaft in Berlin, 29.04.-03.05.1995

K. Stephanek, J.J. Levy, A. Kesckés, The Local Reaction Followed Topical Application of Leukotriene B4 on Healthy Human Skin, Skin Pharmacology Society: 12th Annual Meeting 1995

The arachidonic acid-derived metabolite leukotriene B4 (LTB4) seems to play an important role in the pathogenesis of several skin diseases like psoriasis, leukocytoclastic vasculitis and atopic dermatitis.

K. Matsuzaki, N. Kumagai, S. Fukushi, O. Ohshima, M. Tanabe, H. Ishida, Cultured Epithelial Autografting on Meshed Skin Graft Scars: Evaluation of Skin Elasticity, Burn Science Publishers, Inc. 1995

Many patients with meshed skin graft scars complain of the scars unsightly appearance and hardness. Since 1989 we have shaved away meshed skin graft scars and then resurfaced the area with autologous cultured epithelium in nine patients. This method improved the disfigurement of meshed skin graft scars, with minimal sacrifice of normal donor skin. Furthermore, autologous cultured epithelium grafted areas had high skin elasticity compared with meshed skin graft scars, as measured with a noninvasive suction device.

T. Krusche, W. Worret, Mechanical properties of keloids in vivo during treatment with intralesional triamcinolone acetonide, Arch. Dermatol Res 287-293, 1995

The mechanical properties of 17 keloids in 9 patients before and during treatment with intralesional triamcinolone acetonide were studied using a recently developed noninvasive suction device for measuring skin elasticity in vivo. Each keloid was treated with intralesional injections of 10 mg/ml triamcinolone acetonide without local anaesthetic at intervals of 3 weeks. A total of four measurements per keloid were performed, before treatment and 3 weeks after the first, second and third treatments. The parameters used were: immediate distension (U_e), delayed distension (U_v), immediate retraction (U_r) and final distension (U_f). Relative parameters independent of skin thickness were calculated: U_v/U_e , the ratio between the viscous and the elastic deformation of the skin, and U_r/U_f , representing the ability of the skin to return to its initial position after deformation (biological elasticity). After three injections of triamcinolone acetonide a marked decrease in U_v/U_e and a less-pronounced increase in U_r/U_f compared with baseline values was observed. These findings indicate that the main effect of intralesional steroids on the connective tissue of keloids is a decrease in viscosity due to a loss of ground substance. This method provides a noninvasive quantitative assessment of the mechanical properties of scars and is well suited to comparative studies on the efficacy of various scar therapies.

T. Krusche, Keloidbehandlung - Neues Gerät objektiviert den Therapieerfolg, Medical Tribune Nr. 5, 03.02.1995

Dick, derb und manchmal hässlich verfärbt sind Keloide. Manchmal stören sie ihren Besitzer empfindlich.

G.E. Piérard, R. Kort, C. Letawe, C. Olemans, C. Piérard-Franchimont, Biomechanical assessment of photodamage, Skin Research and Technology 1:17-20, 1995

Background/Aims: Intrinsic aging and photoaging may present different biomechanical properties. Dorsal and volar forearm skin is differently exposed to UV-light. The object was to derive a cutaneous extrinsic aging score (SEAS) representative of UV aging, i.e. the global photoaging corrected for intrinsic aging.

V. Couturaud, J. Coutable, A. Khaiat, Skin biomechanical properties: in vivo evaluation of influence of age and body site by a non-invasive method, Skin Research and Technology 1:68-73, 1995

The stratum corneum is covered by a network of microdepressions which have been classified by Hashimoto (1). Escande (2) introduced the concept of microdepressionary network, mDN, representing Hashimoto's primary [I] and secondary [II] lines. The primary lines are visible, and represent the deepest furrows delimiting 3- to 4-sided polygons. Their anatomic base is at the level of the dermal-epidermal junction, the furrows surrounding a group of papilla (3). The secondary lines are inside these figures and cross all or parts of their surface. Their presence is noticeable only from the stratum granulosum.

J. Ennen, S. Jaspers, G. Sauermann, U. Hoppe, Measurement of Biomechanical Properties of Human Skin, Cosmetic and Toiletries Manufacture Worldwide, Jan. 95

The biomechanics of skin comprises a complex interrelationship and interaction of three layers - epidermis, dermis, and subcutaneous tissue. Assessment of the mechanical properties of the skin by noninvasive techniques has turned out to be a difficult task. The intimate interconnection of the different tissue compartments of the skin, the anisotropy, and time dependence of the mechanical properties, as well as the regional variations in skin make biomechanical measurements more difficult than other types of skin measurement. Measurement of those parameters of skin that describe the biomechanical properties of the skin are currently performed mainly by two different mechanical modes. Firstly, the test mode of torsion is represented by a rotating disc and guard ring torque measurement. Secondly, the mechanical test mode of elongation is represented by the instrumentation of a suction device. The mechanical parameters of extensibility and elastic recovery, both represented in a biological elastic modulus of skin, can be measured by both approaches. In this paper the characteristics, the similarities, and the differences of both bioengineering techniques of characterizing the biomechanical properties of skin are described.

C. Trullas, J. Coll, C. Pelejero, J. Vilaplana, S. Sirigu, C. Dederen, Cosmetological Activity of Glycolic Acid Incorporated in a New Topical Delivery System (W/O/W Emulsion), 18th International IFSCC-Congress, Venice, October 1994

The cosmetological potential of alpha hydroxyacids (AHA'S) is still evolving. The powerful research in physicochemistry has provided a promising new delivery system, the multiple emulsion W/O/W which could permit a controlled and sustained release of AHA'S, modifying their efficiency and safety. The cosmetological activity and safety of a W/O/W multiple emulsion containing 3% of glycolic acid has been assessed by bioengineering methods using several tests. A six-hour test and 30-days study for comparison of the effects of 3% glycolic acid in two delivery systems W/O/W multiple emulsion and O/W emulsion were conducted. The cutaneous biophysical variables evaluated were electrical capacitance of stratum corneum, skin surface lipids, transepidermal water loss, biomechanical properties, blood flow and skin surface topography. The safety of 3% glycolic acid in the two delivery systems was determined using patch testing and assessment of cutaneous responses by visual scoring and biophysical non-invasive methods (evaporimetry, laser doppler flowmetry, reflectance spectrophotometry).

P. Masson, P. Blin, R. Urbaniak, F. Mérot, Influence of Operative Procedures on Cutaneous Deformations following Measurement of Skin Elasticity by Vertical Stretching, 18th International IFSCC-Congress, Venice, October 1994

Numerous systems are available for experimenters in order to evaluate the biomechanical properties of the skin and especially its elasticity. The principle of the cycle vertical stretching-relaxing process under partial vacuum is operated by different equipment using probes of different sizes and especially 2.8 and 13 mm providing various (cutometer 0-500 millibars) or fixed tensile strengths. Each inventor praises the merits of his own equipment and its specificity without the support of any objective and comparative analysis able to provide the possibility of justification and evaluation of the comparative advantages.

B. Seybold, K. Seidel, K. Beck-Devalle, F. Hevert, K. Klein, T.L. Diepgen, Distribution and Variation of Basic Physiological Characteristics of Uninvolved Skin in the General Population - a Bioengineering Study, The 10th International Symposium on Bioengineering & the Skin, Cincinnati, Ohio, June 13-15, 1994

The aim of the study was to data about the distribution and variation of bioengineering parameters in the general population (GP).

O.A. Barel, P. Clarys, R. Lambrecht, In Vivo Study of the Mechanical Properties of the Human Skin with the Suction Method (Cutometer®), The 10th International Symposium on Bioengineering & the Skin, Cincinnati, Ohio, June 13-15, 1994

The Cutometer SEM 474® based on the suction method, measures the vertical deformation of the skin surface when the skin is pulled in the circular aperture of the measuring probe after application of a vacuum. With this instrument experimental deformation (strain)-time and stress-strain curves are obtained.

F. Panisset, D. Varchon, P. Agache, P.. Humbert, Assessment of Human Stratum Corneum Tangent Modulus in Vivo, The 10th International Symposium on Bioengineering & the Skin, Cincinnati, Ohio, June 13-15, 1994

The elastic modulus (E) is a major parameter of the skin mechanical behavior.

P. Elsner, H.I. Maibach, Biophysical Properties of Human Male Genital Skin, The 10th International Symposium on Bioengineering & the Skin, Cincinnati, Ohio, June 13-15, 1994

Since many skin diseases, especially sexually transmitted may be localized in genital skin, information about the physiological properties of this specilized skin is of importance for the dermatologist.

J. Asserin, P. Agache, P. Humbert, Checking the Mechanical Performance of a Skin Suction Meter: the Cutometer®, The 10th International Symposium on Bioengineering & the Skin, Cincinnati, Ohio, June 13-15, 1994

Presently skin mechanical testing has gained increasing acceptance in Dermatology, while it is currently used in Cosmetology. Accordingly checking the mechanical reliability of the devices is mandatory.

F. Deleixhe-Mauhin, C. Piérard-Franchiomont, G. Rorive, G.E. Piérard, Influence of Chronic Haemodialysis on the Mechanical Properties of Skin, Clinical and Experimental Dermatology 1994; 19: p. 130-133

Certain features of the skin of patients undergoing chronic haemodialysis suggest an ageing process. Seventy-two haemodialysed patients were studied by a non-invasive technique using the Cutometer SM 474 to determine biomechanical properties of the skin. Patients undergoing chronic haemodialysis showed some impairment of changes in viscous properties of skin similar

Y. Takema, Y. Yorimoto, M. Kawai and G. Imokawa, Age-related Changes in the Elastic Properties of Human Facial Skin, British Journal of Dermatology, 1994.

Using recently designed, commercially available, non-invasive instruments, we measured the thickness and elasticity of the skin of the face and ventral forearm in 170 women, and evaluated the effects of age and exposure to sunlight. Skin thickness decreased with age in ventral forearm skin, which has limited exposure to sunlight, but increased significantly in the skin of the forehead, corners of the eyes, and cheeks, which are markedly exposed to sunlight

A. O. Barel, P. Clarys, R. Lambrecht, L. Hemelaers, In Vivo Non-Invasive Study of the Elastic and Viscoelastic Properties of Human Skin: Determination of Various Skin Deformation Parameters and Modulus of Young, Poster at the Regional Meeting of the International Society for Bioengineering and the Skin, Liibeck, Germany, April 23-25, 1993

The Skin Elasticity Meter, Cutometer SEM 474 based on the suction method, allowed us to measure in vivo in a simple way the biomechanical properties of the human skin. The influence of various experimental conditions such as load (vacuum), aperture of the probe and pretension of the skin, on the elastic and viscoelastic properties of the skin was evaluated. Under well controlled experimental conditions, reproducible and accurate stress - strain and strain - time curves were obtained which gave quantitative data concerning the elastic properties (U_r/U_f , U_r/U_e j and E) and viscoelastic properties (U_v/U_e). The influence of physiological parameters such as anatomical skin sites, ageing and sex on the biomechanical properties of the skin was clearly established using the suction method.

K.P. Wilhelm, A.B. Cua, H.I. Maibach, In Vivo Study on Age-Related Elastic Properties of Human Skin, Noninvasive Methods for the Quantification of Skin Functions, 1993;190:203

The pertinent literature on the effect of aging on human skin elasticity is reviewed and various methods to investigate skin elasticity in vivo are described.

F. Mérot, J.P. Borthier, P. Denis, P. Masson, Incidence du diamètre de la sonde sur les mesures d'élasticité cutanée, Congres SFC-ISIPCA, Versailles (France), 16-18 Novembre 1992

Pour chaque catégorie de peau l'étirement maximal moyen augmente en fonction du diamètre de la sonde / selon la classification adoptée, l'étirement maximal moyen est significativement plus important pour la catégorie "peaux relâchées" / la répartition des résultats individuels obtenus avec les trois sondes suggère l'implantation de structures cutanées différentes.

M. Nishimura, T. Tsuji, Measurements of Skin Elasticity with a New Suction Device - Relation to Age, Sex, Anatomical Region, Sun-Exposure and Comparison with Diseased Skin, Jpn J Dermatol: 1111-1117, 1992

Using a recently developed in vivo suction device for measuring skin elasticity, we evaluated age, sex, and regional differences in the elastic properties. Skin elasticity decreased with aging at all anatomical regions. Differences between the anatomical regions in the same age groups were significant, but no significant differences were noted between the sexes. The measurements in patients with skin diseases (PSS and Ehlers-Danlos syndrome) showed interesting results. This procedure allows assessment of skin elasticity, and its application to diseased skin, particularly connective tissue disorders may be helpful for diagnosing, deciding progression and evaluating therapeutic effects. (Article in Japanese)

A. Barel, P. Clarys, In Vivo Evaluation of Skin Ageing: Relations between Viscoelastic Properties and Skin Surface Roughness Parameters, 9th ISBS Meeting, Japan, October 19 +20, 1992

Ageing of the skin is clearly characterized by changes in a variety of physical parameters related to the dermis. We have studied the influence of age on the mechanical properties of the skin and on skin roughness. Both physical properties are correlated with modifications in the structure of the papillary and reticular dermis.

P.G. Agache, D. Varchon, P. Humbert, A. Rochfort, Non-Invasive Assessment of Biaxial Young's Modulus of Man in Vivo, 9th ISBS Meeting, Japan, October 19 +20, 1992

The elastic modulus (E) is a major parameter of the skin mechanical behaviour. Unfortunately up to now only its variation could be currently estimated in vivo, and without access to absolute differences.

P. Busch, K. Schumann, H. Verbeek, Die Entwicklung der Hautkosmetik in den letzten 25 Jahren, Parfümerie + Kosmetik 02/92

Die gegenwärtige Wissensexplosion übersteigt bei weitem unsere Vorstellungskraft. Experten haben herausgefunden, daß sich das Menschheitswissen alle 5 Jahre etwa verdoppelt.

E.H. Braue, C.R. Bangledorf, R.C. Rieder, J.J. Guzman, Assessment of Skin Injury from Sulfur Mustard using Bioengineering Techniques, US Army Medical Research Institute of Chemical Defense, Aberdeen, MD, USA

In the past, noninvasive methods for evaluating the severity of sulfur mustard (HD) skin lesions have relied on subjective visual scoring by trained observers.

S.S. Curri, A. Gezzi, A.M.G. Longhi, M.N.G. Longhi, Una nuova tecnica strumentale per la determinazione della elasticità cutanea, Gruppo di studio per la Dermacosmetica Funzionale, Milano-Bologna

Lo scopo prefisso era quello di realizzare in dispositivo che permettesse di determinare un valore numerico in qualche modo legato all'elasticità cutanea dell'uomo.

P. Zuijlen, J. Vloemans, A. van Trier, M. Suijker, E. van Unen, F. Groenvald, R.W. Kreis, E. Middlekoop, Dermal Substitution in Acute Burns and Reconstructive Surgery: A Subjective and Objective Long-Term Follow-Up, Plastic and Reconstructive Surgery Vol. 108, No. 7, December 1991

Tissue engineering and dermal substitution are currently prominent subjects of wound-healing research.

V. Parison, Validation d'une nouvelle méthode de mesure de l'élasticité cutanée: le Cutometer.

Application à l'étude de l'effet de l'hydratation sur les propriétés biomécaniques de la peau,
Thèse pour le diplôme de docteur en Pharmacie, 29.11.1991

Check-up Cosmetologique et Biometrologie Cutanee, Actualités Pharmaceutiques, Jul. 1991, Special Dermo-cosmétologie, No. 289

La notion de "Check-Up" cutané a toujours exprimé un souci de rigueur pour définir des besoins cutanés et des réponses performantes. Une logique, aujourd'hui scientifique, qui s'appuie sur des connaissances précises de la physiologie cutanée pour interpréter les différents états de la peau et proposer de véritables méthodes de correction; c'est l'avènement d'une cosmétologie de soins, rigoureuse.

P. Elsner, H.I. Maibach, **AT-based Data Acquisition and Analysis System for the Skin Bioengineering Laboratory**, Dermatosen 39, Heft 4 1991

In recent years, bioengineering instruments have found wide application for the non-invasive evaluation of functional properties of human skin. These devices measure transepidermal water loss (evaporimetry), skin hydration (methods based on conduction, impedance, and capacitance), skin blood flow (laser Doppler velocimetry, photoplethysmography), friction (friction meter), and mechanical properties (e.g. twistometer, suction devices), and allow the investigator to generate considerable data which requires documentation and analysis. Although some instruments meanwhile offer interfaces for the transfer of data into personal computers, integrated data acquisition systems supporting the whole spectrum of instruments used in the laboratory are lacking. We have developed an inexpensive data acquisition and analysis system for our skin bioengineering laboratory which allows the acquisition of data from several instruments simultaneously or in sequence. The data are fed into a spreadsheet on a personal computer and conversions and basic statistics are computed automatically. The system consists of an AT-compatible PC with two serial interfaces and an analog-digital conversion board. The software is an industry-standard spreadsheet (Lotus 1-2-3) with an instrument set (Lotus Measure). Using this system, we considerably improved the precision of our measurements and the scientific productivity in our skin bioengineering laboratory.

A.B. Cua, H.I. Maibach, K.P. Wilhelm, **Elastic properties of human skin: relation to age, sex and anatomical region**, Dermatologica Research, 1990

Using a recently developed noninvasive, in vivo suction device for measuring skin elasticity, we evaluated age, sex, and regional differences in the visco-elastic properties of skin. A total of 33 volunteers participated in the study consisting of (a) 8 young females, (b) 9 old females, (c) 8 young males and (d) 8 old males. Measurements were performed on 11 anatomical regions; three different loads were applied: 100, 200, and 500mbar. The parameters used were: immediate distension (U_e); delayed distension (U_v); immediate retraction (U_r); and, final deformation (U_f). To compare between subjects and anatomical regions, relative parameters independent of skin thickness were calculated: U_v/U_e , the ratio between the viscoelastic properties of skin and immediate distension, and U_r/U_f , which measures the ability of the skin to regain its initial position after deformation. Generally, U_v/U_e increased while U_r/U_f decreased with aging. Responses were variable with respect to load applied. Variability, within anatomical regions was also noted. However, differences between the sexes were not statistically significant for most regions. These findings are in congruence with earlier studies suggesting the differences are mainly attributable to alterations in the elastic fiber network. This procedure provides a simple, quantitative assessment of elastic properties of the skin. Its application may help in future investigations of other connective tissue disorders.

P. Elsner, **Mechanical properties of human vulvar skin**, 8th international symposium "Bioengineering and the skin", Stresa / Italia, June 1990

Using a newly developed suction device, the mechanical properties of forearm and vulvar skin were studied in 22 healthy women, 12 before and 10 after the menopause. The ratio between viscous deformation (U_v) and elastic deformation (U_e) and the biological elasticity, i.e. the ratio between immediate recovery (U_r) and total deformation (U_f), were both significantly lower in vulvar than in forearm skin. U_r/U_f decreased significantly with load in vulvar, but not in forearm skin, whereas U_v/U_e was not load-dependent in either site. U_v/U_e remained constant with age in both test sites, whereas U_r/U_f was significantly lower in post-menopausal women in both forearm and vulvar skin. In vulvar, but not in forearm skin, U_v/U_e was significantly correlated with body height which may be an indicator of mechanical connective tissue properties. Viscous deformation plays a lesser role and biological elasticity is decreased in vulvar compared to forearm skin. Despite differences in mechanical parameters at both sites, age-related changes seem to be similar.

T. Anfossi, Influence of environment factors on skin elastometric patterns, 8th international symposium "Bioengineering and the skin", Stresa / Italia, June 1990

S. Bonazzi, Gazzaniga, Skin plastoelasticity modifications due to application of a reconstructed moisturizing compound, 3rd international congress on cosmetic dermatology, Wien, 27.-29.10.1989

D. Bosio, T. Anfossi, S. Audi Grivetta, Indici biofisici della cute in rapporto all'età determinati in elastometria cutanea, Incontri di cosmetologia, 06/89

L'indagine è condotta mediante l'impiego del CUTOMETER SEM 474; il principio di funzionamento dello strumento si basa sulla possibilità di misurare, mediante uno speciale sensore optoelettronico, l'altezza della cute aspirata all'interno di una sonda da una depressione di 250 mBar (2,3). I risultati di ogni singola determinazione vengono presentati sotto forma di grafico delle deformazioni cutanee dove in ordinata è indicata l'altezza in mm della cute aspirata nella sonda ed in ascissa sono indicati i tempi a cui il parametro altezza viene rilevato. Si osserva di norma il seguente comportamento: rapido e lineare incremento del parametro altezza seguito da una fase di crescita lenta fino al raggiungimento del valore della massima deformazione cutanea indotta dalla forza applicata.