Vol. 28, No. 6, 2006

Review Article

The Riddle of Genuine Skin Microrelief and Wrinkles

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Wrinkles result from distinct structural changes occurring in specific parts of the dermis and subcutaneous tissue. There is a need for evidenced-based cosmetology identifying and quantifying the different aspects of wrinkling. Histology allows to detect specific changes associated with particular types of wrinkles. Four main types of wrinkles can thus be recognized, including the atrophic crinkling rhytids, the permanent elastotic creases, the dynamic expression lines, and the gravitational folds. Each type usually develops on specific skin regions exhibiting distinct microanatomical characteristics. Whereas skin microrelief, expression lines and skin folds appear clearly marked at the histological level, only little dermal changes are identified under other reducible or permanent wrinkles compared with the skin immediately adjacent to them. Distinguishing different types of wrinkles brings more precision to the clinical practice. This is of importance because the different types of wrinkles respond differently to cosmetic, dermatological and surgical treatments.

Review Article

Stratum Corneum Keratin Structure, Function and Formation – a Comprehensive Review

L. Norlén

A comprehensive review on stratum corneum keratin organization, largely based on the recently published cubic rod-packing and membrane templating model [J. Invest. Dermatol., 123, 2004, 715], is presented. Keratin is the major non-aqueous component (wt/wt) of stratum corneum. As 90–100% of the stratum corneum water is thought to be located intracellularly one may presume that keratin also is a major factor (together with filaggrin-derived free amino acids) determining stratum corneum hydration level and water holding capacity. This water holding capacity depends in turn on the structural organization of the corneocyte keratin intermediate filament network. The cubic rod-packing model for the structure and function of the stratum corneum cell matrix postulates that corneocyte keratin filaments are arranged according to a cubic-like rod-packing symmetry. It is in accordance with the cryo-electron density pattern of the native corneocyte keratin matrix and could account for the swelling behaviour and the mechanical properties of mammalian stratum corneum. The membrane templating model for keratin dynamics and for the formation of the stratum corneum cell matrix postulates the presence in viable epidermal cellular space of a highly dynamic small lattice parameter (<30 nm) membrane structure with cubic-like symmetry, to which keratin is associated. It further proposes that membrane templating, rather than spontaneous self-assembly, is responsible for keratin intermediate filament formation and dynamics. It is in accordance with the cryo-electron density patterns of the native keratinocyte cytoplasmic space and could account for the characteristic features of the keratin network formation process, the dynamic properties of keratin intermediate filaments, the close lipid association of keratin, the insolubility in non-denaturating buffers and pronounced polymorphism of keratin assembled in vitro, and the measured reduction in cell-volume and hydration level between stratum granulosum and stratum corneum.

Skin Color and Makeup Strategies of Women from Different Ethnic Groups

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The development of a world-wide makeup foundation range requires a thorough understanding of skin color features of women around the world. To understand the cosmetic needs of women from different ethnic groups, we measured skin color in five different groups (French and American Caucasian, Japanese, African-American, and Hispanic-American) and compared the data obtained with women's self-perception of skin color, before or after applying their usual foundation product. Skin color was measured using a spectro-radiometer and a spheric lighting device with CCD camera ensuring a highly reliable imaging and data acquisition. The diversity of skin types involved in the study lead to define a large, continuous color space where color spectra from various ethnic groups overlap. Three types of complexion – dark, medium, or light – were distinguished in each group. Only Japanese women did not identify with this lightness scale and considered it makes more sense to classify their skin according to a pink–ocher–beige color scale. The approach however revealed the great variety of skin colors within each ethnic group and the extent of unevenness. A fairly good agreement appeared between women's self-perception and data from color measurements but in Hispanic-American group. Data recorded, after foundation was applied, showed overall consistency with makeup strategy as described by volunteers except for the latter group whose approach looked more uncertain and variable. The findings of the study demonstrate the advantage of combining qualitative and quantitative approach for assessing the cosmetic needs and expectations of women from different ethnic origin and cultural background.

3,3,5-Trimethylcyclohexanols and derived esters: green synthetic procedures, odour evaluation and in vitro skin cytotoxicity assays[1]

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The alcohols 3,3,5-trimethylcyclohexanols (cis, trans epimers, cosmetic fragrance) and some derived esters, potential and well-known actives in the cosmetic field, such as Homosalate, were synthesized using fast solvent-free methodologies with the aim of renewing and simplifying the conventional procedures. The alcohols were prepared by reduction of 3,3,5-trimethylcyclohexanone (dihydroisophorone) with sodium borohydride/alumina in solid state. The esters from propanoic, butanoic, octanoic, 10-undecenoic, cyclopropanecarboxylic, mandelic and salicylic acids were synthesized with microwave-mediated solvent-free procedures under acidic and basic catalysis. Several experiments were carried out to study advantages and limits of the selected methodologies and the results are reported. Microwave irradiation was carried out using a scientific monomode reactor. In order to evaluate the cosmetic interest of the studied compounds, the sweet-scented substances were submitted to an odour evaluation test; the most promising fragrances and the ester from 10-undecenoic acid, as an example of lipophilic derivatives, were tested to assess their in vitro skin toxicity.

Evaluation of Anti-Wrinkle Efficacy of Adenosine-Containing Products Using the FOITS Technique

M.L. Abella

The objective of this study was to evaluate formulations containing adenosine to reduce periorbital lines and glabellar frowns in a blind, randomised, placebo-controlled study. One hundred twenty-six female volunteers between 45 and 65 years of age fulfilled inclusion criteria for periorbital lines. They were provided with two of three products (cream with adenosine, dissolvable film with adenosine or placebo), to be applied to the periorbital area on each side of the face (84 subjects per product). Eighty-four of these subjects also fulfilled the inclusion criteria for glabellar frowns, and received placebo or cream with adenosine to be applied to the glabellar area. Products were applied twice daily for 2 months, and evaluation was performed under dermatological supervision at 0, 3 and 8 weeks using Fast Optical in vivo Topometry of human Skin (FOITS) analysis to describe skin profile. Both adenosine-containing products led to significant improvements in skin smoothness in the periorbital area. Improvements were evidenced after 3 weeks of product application as measured by Ra and Rz parameters using the FOITS technique, and were steadily confirmed after 2 months, despite severe climatic conditions and independently of the analysis technique that was used with the FOITS data. Adenosine-containing cream also significantly improved glabellar frowns. This study demonstrates the potential beneficial effects of adenosine-containing products on crow's feet and glabellar facial wrinkles.

Equivalence of Face and Volar Forearm for the Testing of Moisturizing and Firming Effect of Cosmetics in Hydration and Biomechanical Studies

R. Bazin and C. Fanchon

The objective of the study was to compare measurements of skin hydration and of biomechanical properties performed on different zones of face and volar forearm. Two short-term (1 h) and two long-term (3 weeks) studies were conducted with a moisturizing and a firming product, respectively, on groups of female volunteers with dry skin. Measurements (Corneometer® and Dermal Torque Meter® or DTM) were performed on different zones of the face and of the volar forearm, 1 h after product application, and after 1, 2 and 3 weeks of repeated twice daily application. While the sebaceous-gland rich T-zone behaves differently, probably due to sebum/skin, sebum/product and/or sebum/measuring device interactions, there are no statistically significant differences between measurements made on temple, cheek, maxilla and volar forearm. The volar forearm is representative of the face for measuring skin hydration and biomechanical properties, and relevant for the assessment of the efficacy of cosmetic products destined for facial use.