J. Cosmet. Sci., **60,** 49–50 (January/February 2009)

Abstracts

IFSCC Magazine
Vol. 11, No. 3, 2008*

Water, water everywhere…?

Paul J. Matts

Research Fellow, The Procter & Gamble Company, Rusham Park Technical Centre, Egham, Surrey, UK; Visiting Professor, School of Pharmacy, University of London, UK

Life on earth would not be possible without skin, meaning that it must have unique properties that allow us to exist here. These properties are discussed in this short review, in particular, the physical and chemical barrier characteristics of the stratum corneum, which we now know are only possible due to the presence of water at precise and carefully controlled levels and locations. The review discusses the pivotal role water plays in both stratum corneum mechanics/integrity and stratum corneum regulation/maturation and reinforces the critical role played by cosmetic products, which »moisturize« and augment stratum corneum barrier function.

Paper presented as a keynote lecturw at the IFSCC Conference 2007, Amsterdam, The Netherlands

Detection and Identification of Free Radicals Generated by UV and Visible Light in Ex Vivo Human Skin

Leonhard Zastrow[1], Norbert Groth[2], Frank Klein[2], Dieter Kockott[3], Jürgen Lademann[4], and Louis Ferrero[1]

[1]Coty/Lancaster SAM, International R&D Center, 2 rue de la Lüjernetta, 98000 Monaco, Monaco [2]Privatinstitut Galenus GmbH, Volmerstrasse 7a, 12489 Berlin Germany [3]UV-Technik, Vogelsbergstrasse 27, 63456 Hanau, Germany [4] Charité-Universitätsmedizin, Department of Dermatology, Center of Experimental and Applied Cutaneous Physiology, Schumannstr. 20/21, 10098 Berlin, Germany

Contrary to the skin biological end points used for determination of the sun protection factor and UVA protection factor, generation of excess free radicals in skin - mainly reactive oxygen species - is potentially the source of much skin damage and so represents a more general biophysical answer to the effects of sun exposure of different wavelengths. By applying electron spin resonance spectroscopy to human skin biopsies, we determined in previous work a free radical action spectrum covering the ultraviolet and visible light range. Convolution of the action spectrum with sunlight spectral irradiance (280nm-700nm) showed the importance of visible light in free radical generation. This unexpected finding led us to perform further investigations. Firstly, an existing sun simulator was modified so that its output truly mimics the sun's full spectrum, including visible light. Human skin biopsies were irradiated either by this device or a conventional UV source, confirming our previous calculations: half of the free radicals are generated in the 400-700nm visible wavelength range. Secondly, the visible spectrum of the modified sun simulator was divided into narrow-band lights using different pairs of short- and long-pass filters. Human skin biopsies impregnated with specific spin traps were exposed to the different narrow-band lights in order to identify different types of free radicals. Generation of dangerous radical species like $^{\bullet}O_2$-, $^{\bullet}$OH and $^{\bullet}$CH-R was observed in different parts of the visible range, confirming the relevance of the free radical action spectrum and its ability to predict skin protection.

* These abstracts appear as they were originally published. They have not been edited by the *Journal of Cosmetic Science.*

Oat-Based Complex Stimulates Skin Barrier Protein Synthesis and Reduces Skin Aging

Frank Gafner*, Kuno Schweikert*, Giorgio Dell'Acqua**

* Induchem AG, Industriestrasse 8a, 8604 Volketswil, Switzerland ** Dellacqua Consultant, Switzerland

Epidermal differentiation is crucial to guarantee a physiological cornification process. The cornified envelope is the final skin barrier which protects against external aggressions such as UV light and reduces water loss. Skin aging is associated with decreased functionality of this barrier and reduced epidermal differentiation. We present a new bioactive complex for the stimulation of protein synthesis associated with cornified envelope and markers of epidermal differentiation. Composed of a hydrolyzed oat protein extract and particularly rich in glutamine and glutamic acid combined with ATP and niacinamide, 1% of this complex increases significantly the synthesis of proteins such as filaggrin, late envelope protein and small proline-rich proteins, all markers of epidermal differentiation, in a reconstituted human skin model as measured by DNA array chip analysis, reverse transcription-polymerase chain reaction and immunohistochemistry. When a cream containing 3% of this bioactive complex was applied to the skin of 25 human volunteers, an increase in skin hydration of more than 60% after 14 days of application and a reduction of wrinkles and roughness by more than 50% in 4 weeks were observed compared with a placebo cream. In conclusion, the bioactive complex stimulated synthesis of proteins which are important for epidermal differentiation and skin barrier function and was helpful in fighting skin aging.

Matrix Proteins of the Papillary Dermis - Primary Targets of Intrinsic Dermal Aging?

David Boudier, Valérie Dubreuil, Laetitia Marchand, Nathalie Guichard, Brigitte Closs

R&D Department, SILAB, BP 213, 19108 Brive Cedex, France

The dermis is considered a highly dynamic structure that determines the biomechanical properties of the skin. It is composed of two dermal compartments separated by a vascular plexus: the papillary dermis and the reticular dermis. In the last few years, several studies have demonstrated the role of the dermal epidermal junction in the cutaneous aging process. Recently, teams specialized in the study of the dermal matrix have focused their studies on the superior dermis in close contact with the dermal epidermal junction: the papillary dermis. They defined the role of matrix proteins in this area. Collagens XII and XVI, non-fibrillar collagens specific to the papillary dermis, are responsible for skin deformability and extensibility. Oxytalan fibers are related to elastic properties of the skin. Ubiquitous collagens such as collagens I and VI are associated with the cohesion and the resistance of the dermis. As the papillary dermis is the primary site of intrinsic dermal aging, we studied expression of these molecules in our own in vitro model of intrinsic aging of the papillary dermis. The results of this innovative approach confirmed that their expression was reduced. Nevertheless, active molecules may exist in nature that are capable of restoring a normal expression profile of these markers for a cosmetic anti-aging application.

First Skin-Physiological Tests in Weightlessness in the ISS Space Station

Hagen Tronnier, Mathilde Wiebusch, Ulrike Heinrich

Dermatronnier, Institute for Experimental Dermatology, University of Witten/Herdecke, 58455 Witten, Germany

A prolonged stay in weightlessness induces 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 the ASTROLAB-Mission within the Skin Care program initiated by the ESA. The skin was analyzed before, partly during and after the mission. In addition, the tests were repeated after one year. During the mission a control skin area was treated with a skincare product. The results showed corneal disturbance caused by environmental conditions, suboptimal skin cleansing and skin care. The observed effects were minimized by application of a skincare product. Measurements of the epidermis showed an accelerated rate of epidermal keratinization; skin elasticity was reduced distinctly and the sonographic examination showed a disaggregation of the cutis with hypoechoic areas. Additional measurements performed a year after the mission indicate that the verified alterations, which in a broader sense seem similar to skin aging and appear as a time lapse process in weightlessness, are reversible. Further testing of the preventive efficacy of anti-aging products from a cosmetic point of view would appear to be an appropriate objective for prospective long-term space missions.

Paper presented as a keynote lecture at the Forum Cosmeticum 2008, Vienna, Austria