

Abstracts

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Evidence for the Existence of a Body-Brain Connection for Skin Moisturization

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Maintenance of the right water levels in the skin is of crucial importance to maintain healthy, young-looking skin. Moisturizing products have therefore aimed to influence the constitutive levels of natural moisturizer factor (NMF) and/or the formation of the skin lipid barrier. In humans, keratinocyte differentiation is influenced by sex hormones, in particular positively by estrogen and negatively by testosterone. It has been noted that postmenopausal women experience a decline in estrogen levels and a concomitant drop in skin moisturization. In our previous near-infrared reflectance (NIR) spectroscopy work on human skin, we noted that skin moisturization was influenced by gender, age, psychological stress and lifestyle habits such as alcohol consumption and smoking. Many of these also affect the level of sex hormones. We therefore re-evaluated NIR spectra from which we had already assessed the levels of skin moisturization in human volunteers to determine their levels of estrogen and testosterone non-invasively. We subsequently built mathematical models to link skin moisture content to the levels of these sex hormones. In this way, we were able to establish the importance of sex hormones in skin moisturization. In men, skin moisturization levels are linked to their estrogen levels, whereas in females, skin moisturization levels are linked to both estrogen and testosterone concentrations. From the medical literature, it is known that smoking is associated with increased testosterone

and reduced estrogen levels, which suggests that people that smoke are characterized by less hydrated skin as well as by increased testosterone levels. On the other hand, pregnant females that have significantly elevated estrogen to progesterone ratios, i.e. their increase in estrogen level exceeds their increase in testosterone levels, also often remark that their skin is well hydrated, confirming the link between sex hormone levels and skin moisturization. For them, we found a good correlation coefficient for skin moisturization levels and their estrogen to testosterone ratio. This work does not, however, answer question of a cause-and-effect relationship between the two. Increased levels of estrogen can either directly increase skin moisture levels or do so via a positive effect on skin barrier formation. It does, however, reveal once again the existence of a connection between our body (the skin) and our brain. Synthesis of sex hormones is regulated via the pituitary gland in our brain and it can therefore be argued that skin moisturization is directly or indirectly regulated via our brain. As many other factors like smoking and alcohol consumption actually influence estrogen levels in our blood, the influence of our brain on maintaining a skin moisture homeostasis may actually be much more pronounced than hitherto assumed.

A poster of this work was presented at the 24th IFSCC Congress 2006, Osaka, Japan

Revolutionary Trends in the Advancement and Integration of Cosmetic Science: Combinatorial Formulation

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The creation of modern cosmetic products is underpinned by an enormous and diversified array of sophisticated science, regulatory requirements and commercial knowledge. The marketplace is demanding an increasing rate of innovation

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that is being accelerated by crowded intellectual property portfolios and constraining regulations. Formulators of complex mixtures have long known that the characteristics of their final formulation and the position of "equilibrium" often depends critically upon the order of addition of ingredients and the precise processing conditions under which the formulation was made. The large variety of possible outcomes derive from the many eigenstates that are available to each composition of a complex mixture due to the fact that the bonds between the component molecules are weak physical bonds and therefore a potential multitude of nanostructures can be formed. Conventional formulation is severely limited by the number of compositions that can be investigated in a reasonable time.

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Design and Development of an Innovative Hybrid Powder Based on a Computer Simulation and Its Application to Foundation Makeup Products

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An innovative hybrid powder prepared using computer simulation allowed development of a new foundation having a fine, smooth texture that has never been achieved before. The optical structure/design of the powder was based on the results of measurements and analyses conducted on the optical characteristics of a baby's delicate skin, which is the envy of many women. To obtain the optimal optical characteristics, the finite difference time domain (FDTD) method for solving Maxwell's differential equation by difference and time domain was applied to the computer simulation method. For synthesis of the hybrid powder based on the optical model, a proprietary shape regulation coating technology was used in which flaky substrates were coated with microspherical forms of barium sulfate crystals. The

hybrid powder developed exhibited optical characteristics that showed a significant diffusion characteristic in the visible light region. The foundation containing this powder could conceal pores, small wrinkles, freckles, and age spots and owing to its microscopic reflection characteristics provided a fine, smooth texture that has never before been available with a conventional foundation.

Part of this study was presented at the 24th IFSCC Congress 2006, Osaka, Japan

Stabilization and Release Profile of Retinol and Tocopherol with Microcapsules Based on Chitosan

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The incorporation of unstable cosmetic actives such as retinol into formulations requires methods of stabilization to ensure their long-term activity and efficacy. A delivery system entrapping lipophilic vitamins such as retinol and tocopherol based on chitosan coacervation with negative polymers is described in this paper. The microcapsules appear to be spherical with a narrow particle size distribution, not aggregated, and with a homogeneous surface. Microencapsulation with such a system prolongs the active's life in skin care O/W formulations by at least one order of magnitude in the tested formulas. Furthermore, the biodegradation profile of this delivery system is consistent with a sustained release profile in human epidermis.

A preliminary version of this work was presented in the XXXV Jornadas del Comité Español de la Detergencia, Barcelona (Spain), 2005 [1]