

Abstracts

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A New Covalently Bound Ceramide from Human Stratum Corneum – ω -Hydroxyacylphytosphingosine.

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The outermost layer of the skin, the stratum corneum, consists of non-viable keratin-filled cells, or corneocytes, embedded in a matrix of lipids. The boundary of the cells consists of cross-linked proteins with covalently bound lipids on the outer surface. The spaces between cells are filled with a mixture of ceramides, cholesterol and fatty acids. The stratum corneum provides a protective barrier against water loss through the skin and limits the penetration of potentially harmful substances from the environment. Among the covalently bound lipids on the corneocyte surface are ω -hydroxyacylphytosphingosine and ω -hydroxyacyl-6-hydroxyphytosphingosine. The previously suspected presence of ω -hydroxyacylphytosphingosine is confirmed in this report through its specific isolation and characterization based on chromatographic behaviour and proton magnetic resonance spectral data.

Validation of a HPLC Method for Simultaneous Determination of Five Sunscreens in Lotion Preparation.

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The aim of this research was to develop and validate a high-performance liquid chromatographic (HPLC) method for simultaneous determination of five sunscreens, namely benzophenone-3 (B-3), butyl methoxydibenzoylmethane (BM), octyl methoxycinnamate (OM), octyl salicylate (OS) and homosalate (HS). The separation and quantitative determination was made by HPLC at 40 \pm 1°C with a gradient elution from 10% to 100% mobile phase B in mobile phase A. The gradient liquid chromatographic system constituted of mobile phase A [acetonitrile : water (10 : 90 v/v)] and mobile phase B [acetonitrile : water (90 : 10 v/v)], at a flow rate of 1.0 mL min⁻¹ and ultraviolet detection at 310 nm. The separation was

obtained with two Waters® reversed phase columns: Novapak® C-18 and Symmetry® C-18 connected in series. All sunscreens were efficiently separated within 17 min. The coefficient of correlation and average recovery for B-3, BM, OM, OS and HS were 0.9798 and 98.5%, 0.9672 and 98.8%, 0.9922 and 99.1%, 0.9961 and 98.9% and 0.9909 and 99.4% respectively. The relative standard deviations obtained were between 1.07% and 2.44%. The excipients did not interfere in the analysis. The results showed that the proposed method could be used for rapid and simultaneous determination of B-3, BM, OM, OS and HS in sunscreen lotions with precision, accuracy and specificity.

Cellulite: Nature and Aetiopathogenesis

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Only a limited number of studies on cellulite have been published in the international literature and many of them reach somewhat antithetical conclusions. Consequently, it is not yet possible to reconcile the extreme differences of opinion which have lingered on for years concerning the nature of this disorder, as well as its origin and even the most basic aspects of its histopathological classification. It does not even have a recognized name: in fact, the term 'cellulitis' is used in scientific English to indicate a spreading gangrenous infection of the subcutaneous cellular tissue. The other terms used from time to time [panniculitis, lipodystrophy, edematofibrosclerotic panniculitis (EFP), liposclerosis, lipoedema, etc.] have quite different morphological and pathogenetic connotations in general. Over the last few decades, three major conflicting theories have emerged in relation to the aetiopathogenesis of cellulite. These indicate, respectively, the following causes: 1. Oedema caused by excessive hydrophilia of the intercellular matrix. 2. A homeostatic alteration on a regional microcirculatory level; this pathogenetic theory is summarized in a synthetic and self-explanatory denomination: EFP. 3. A peculiar anatomical conformation of the subcutaneous tissue of women, different from male morphology. These theories must all now be updated in the light of recent advances on the sophisticated and composite

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physiopathology of the adipose organ – which acts not only as a control device which regulates the systematic equilibrium of energy and modulates the food intake and the metabolism of other tissue substrate through a multiple glandular secretion of hormones and parahormones.

Cellulite Histopathology and Related Mechanobiology.

P. Quatresooz, E. Xhaufaire-Uhoda, C. Piérard-Franchimont and G. E. Piérard

Cellulite, sometimes called gynoid lipodystrophy, is much more prevalent in women than in men. There are glaring discrepancies regarding the microanatomical descriptions of this condition in the literature. A lumpy aspect of the dermo-hypodermal interface is often cited, but it appears to represent a gender-linked characteristic of the thighs and buttocks without being a specific sign of cellulite. Incipient cellulite recognized by a discrete padded look or 'orange peel' aspect appears correlated with the presence of a network of focally enlarged fibrosclerotic strands partitioning the hypodermis and serving as a physiological buttress limiting the outpouching of fat lobules on pinching the skin. These connective tissue structures might represent a hormonal-dependent reactive process to sustained mechanical tensions caused by the adipocyte lobules. Full blown cellulite is recognized by a lumpy-bumpy and dimpled skin surface. It likely represents subjugation of the hypertrophic response of the hypodermal connective tissue strands when their resistance is overcome by progressive fat accumulation. In these cases, histological aspects reminiscent of striae distensae are identified within the hypodermal connective tissue strands. The mechanical properties of skin involved by cellulite process are altered, but may tend to resume to normal under treatment. These functional changes influence the mechanobiology of connective tissue cells, in particular the Factor XIIIa-positive dermal dendrocytes.

Determination of Optimal Cream Formulation from Long-Term Stability Investigation Using a Surface Response Modelling.

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The aim of this work was to apply an experimental design to formulate a stable depilatory cream at ambient temperature. A preliminary study was performed to optimize the most accurate operating parameters, which are then used for the determination of the rheological properties. Long-term stability of the emulsion formulations was investigated to obtain the optimal region of each factor. An experimental design using response surface modelling was then applied and emulsion stability was estimated by introducing new characteristic parameters correlated with the experimental results. An optimal region characterized with high stability was found and further explored to verify the effectiveness and tolerance of depilation. As part of the optimized process, the main effects of the formulation ingredients were also investigated.

Testing Anticellulite Products

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Cellulite represents the most common lipodystrophic disease. It affects more likely women than men and it usually develops in particular anatomic sites such as lateral thighs and buttocks. In these areas skin resembles 'orange peel' surface. The pathophysiological aspects of cellulite are still not clear. Many predisposing factors seem to influence cellulite onset, including gender, heredity, race, body weight and age. Hormones and impairment of both microvascular and lymphatic circulation are considered the most important etiological factors. The evaluation of cellulite is based principally on clinical observation, thigh circumference measurements, body mass index and thermography but for testing anticellulite products, more objective and non-invasive methods of evaluation are requested.

Efficacy of a Multifunctional Plant Complex in the Treatment of the So-Called 'Cellulite': Clinical and Instrumental Evaluation.

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'Cellulite' or more correctly oedematous fibrosclerotic panniculopathy, or local lipodystrophy, is a common aesthetic problem for many women, visually characterized by the orange peel or dimpled look of the skin, mainly on the buttocks and thighs. The cause of cellulite is still a matter of debate. It is currently considered an endocrine-metabolic microcirculatory disorder that causes interstitial matrix alterations and structural changes in subcutaneous adipose tissue. The first step in cellulite treatment is stimulation of microcirculation and the removal of accumulated fluids and toxic elements. This can improve the interstitial matrix basal regulation, fibroblast activity and decrease interstitial oedema, with subsequent increase in lipolysis and a better oxygen and nutrition of the adipose tissue. In this paper are reported two trials aimed at evaluating clinically and instrumentally the effects of different orally administered multifunctional plant extracts-based formulations in the treatment of cellulite compared with a placebo.

Cellulite and its Treatment

A. V. Rawlings

The presence of cellulite is an aesthetically unacceptable cosmetic problem for most post-adolescent women. It is largely observed in the gluteal-femoral regions with its 'orange-peel' or 'cottage cheese' appearance. It is not specific to overweight women although increased adipogenicity will exacerbate the condition. It is a complex problem involving the microcirculatory system and

lymphatics, the extracellular matrix and the presence of excess subcutaneous fat that bulges into the dermis. It has been described as a normal condition that maximizes subcutaneous fat retention to ensure adequate caloric availability for pregnancy and lactation. Differences in the fibrous septae architecture that compartmentalize the adipose tissue have recently been reported in women with cellulite compared with men. Weight loss has been reported to improve the cellulite severity by surface topography measures although in obese subject's skin dimpling does not seem to change appreciably. However, histological analysis suggests that fat globules retract out of the dermis with weight loss. Cellulite has been treated with massage which decreases tissue oedema but it is also likely to have its effects at the cellular level by stimulating fibroblast (and keratinocyte) activity while decreasing adipocyte activity. In addition to massage, effective topical creams with a variety of agents were used to ameliorate the condition. Nevertheless, only a few studies are reported in the

scientific literature. Xanthines, botanicals, fragrances and ligands for the retinoid and peroxisomal proliferator-activated receptors appear to be giving some benefit. Reducing adipogenesis and increasing thermogenesis appear to be primary routes and also improving the microcirculation and collagen synthesis. Many agents are being investigated for weight management in the supplement industry [hydroxycitrate, epigallocatechin gallate, conjugated linoleic acid (CLA), etc.] and some of these agents seem to be beneficial for the treatment of cellulite. In fact, CLA was proven to ameliorate the signs of cellulite. One product, Cellasene, containing a variety of botanicals and polyunsaturated fatty acids also appears to provide some relief from these symptoms. Although more work is needed, clearly these treatments do improve the appearance of skin in subjects with cellulite. It is quite possible, however, that synergies between both oral and topical routes may be the best intervention to ameliorate the signs and symptoms of cellulite.

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Expression and Function of Neurotrophins and Their Receptors in Human Melanocytes

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Melanocytes and cells of the nervous system are of common ectodermal origin and neurotrophins (NT) have been shown to be released by human keratinocytes. We investigated the expression and function of NT [nerve growth factor (NGF), brain-derived neurotrophic factor (BDNF), NT-3, NT-4/-5] and their receptors in human melanocytes. Human melanocytes produce all NT in different amounts, whereas they only release NT-4. NT-4 release is downregulated, whereas NT-3 is upregulated by ultraviolet (UVB) irradiation. Melanocytes treated with phorbol 12-myristate 13-acetate (PMA) express TrkA and TrkB, but not TrkC. NT fail to stimulate melanocyte proliferation, whereas they stimulate the synthesis of tyrosinase and tyrosinase-related protein-1 (TRP-1). Finally, NT-3, NT-4 and NGF increase melanin production. Taken together, these results demonstrate an intriguing interaction between melanocytes and the nervous system. We speculate that NT could be considered the target of therapy for disorders of skin pigmentation.

Whitening Effect of a Dermocosmetic Formulation: A Randomized Double-Blind Controlled Study on Melasma

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Melasma is an endocrine-mediated facial hypermelanosis with epidermal and occasionally dermal components. We tested in a randomized double-blind design the effect of a whitening formulation (Thiospot intensive®) on this skin disorder. The product containing ethyl linoleate, thioctic

acid, octadecenedioic acid, lactic acid and ethylhexyl methoxycinnamate was applied twice daily for 3 months by 20 young women. Another control group of seven women received a non-skin lightening formulation. Clinical assessments were made at 1-month intervals. In addition, objective measurements of the hypermelanosis were performed using narrow-band reflectance spectrophotometry, image analysis of video-recorded ultraviolet light reflection (ULEV method) and photodensitometry of the comeamelanometry test. A significant lightening effect was evidenced beginning the second month of treatment with the whitening formulation. No significant effect was observed with the control product.

Protective Effects of Taurine on Human Hair Follicle Grown in Vitro¹

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Taurine is a naturally occurring β -amino acid produced by methionine and cysteine metabolism. It is involved in a variety of physiological functions, including immunomodulatory and antifibrotic. Taking advantage of the ability of human hair follicle grown in vitro to recapitulate most of the characteristic features of normal hair follicle in vivo, we studied (i) taurine uptake by isolated human hair follicles; (ii) its effects on hair growth and survival rate; and (iii) its protective potential against transforming growth factor (TGF)- β 1, an inhibitor of in vitro hair growth and a master switch of fibrotic program. We showed that taurine was taken up by the connective tissue sheath, proximal outer root sheath and hair bulb, promoted hair survival in vitro and prevented TGF- β 1-induced deleterious effects on hair follicle.