Reconstructive Surgery & Anaplastology

Short Communication

Skin examination in extreme conditions withe use of Dalmatian pyrethrum daisy

Joanna Igielska-Kalwat

Abstract

Extreme indoor and outdoor conditions in patients' places of stay (hot or cold air and changes in humidity) lead to weakening of the lipid barrier function and disproportionate epidermal microflora, which results in a lower threshold of physical and chemical tolerance of the skin manifesting as erythema, burning, dryness and deterioration of skin condition. Chronic epidermal irritation caused by the above factors leads to discomfort and prevents the proper functioning of the skin, as it results in thickening of the epidermis, widening of the sebaceous glands and pigmentation disorders. Regenerative mechanisms preventing lipid peroxidation or carbonylation of skin cell proteins, including epidermis, are focused on restoring physiology and not on "fibroblast protection", which can accelerate the loss of firmness. Taking into account the theory of free radical or telomeric aging, it may be stated that the skin exposed to extreme conditions ages faster. When faced with such a problem, it seems pointless to apply invasive rejuvenating treatments without prior diagnosis or acquiring basic knowledge of care and hygiene of the epidermis. Daily skin care and cosmetics play a key role in the anti-aging process. Hygiene and proper cosmetic habits are essential for health and youthful appearance of the skin. Appropriate regulatory exfoliation, or the so-called turnover of the epidermis, should be used so as not to generate excessive free radical stress. Antioxidants are necessary for this. Modern products based on a liquid crystal base compatible with the liquid crystal structure of epidermal cement together with active emollients allow for restoration of appropriate epidermis parameters. The method of exfoliation with selected ingredients enables long-term skin cleansing by accelerating the turnover of the epidermis without excessive free radical stress, drying and irritation

Optimization of drug delivery to the exact compartment and biophase where the drug is needed is an important goal to increase e ectivity and to decrease side e ects. To achieve this, it has to be known which mechanical barriers the drug and its delivery system have to cross. In the skin there are the mechanical barriers of the stratum corneum (SC) and the tight junctions (TJs) in the interfollicular epidermis and in hair follicles (HFs). Furthermore, there is putatively a mechanical barrier at the basement membrane at the dermal–epidermal junction and barriers in glands and blood vessels.

In addition, barrier function in particular skin conditions should be known as mechanical barriers are often a ected in the course of skin diseases such as atopic dermatitis. Therefore, advanced methods to denote these barriers and to determine their exact localization as well as their tightness or leakiness to (marker) molecules or ions of di erent sizes and charges are necessary. Ideally, the methods can also measure concentrations of the (marker) molecules/ions overcoming the barrier. The markers can be taken as surrogate molecules for topically applied drugs. Optimally, the drugs themselves (or their delivery system) can be detected by the method. This is especially true for the investigation.

The present review highlights current knowledge on skin barriers that have to be overcome by a drug or its carrier system and tools that allow the localization and quantification of skin barrier functions, skin barrier components or tracking of tracer molecules on their way through the skin from outside to inside and from inside-out. The SC is considered as the most ecient barrier that controls the
entrance and permeation of topically applied substances. TJs are a second barrier, especially important when SC is impaired—either by e.g., skin diseases or due to penetration enhancers—or for drugs not limited by the SC. However, also other parts of the skin may limit or decelerate drug di usion and systemic delivery. For example, the basement membrane at the interface between dermis and epidermis as dense mesh of structural proteins and carbohydrates or the blood vessels underneath the membrane may play a role in the overall barrier system of the skin

Among many other interesting methods, advances in electrical impedance spectroscopy, Cluster-FLIM, X-ray or stimulated Raman spectromicroscopy [134,223,224] envision an improved view on skin barrier functions and associated structures as well as the simultaneous tracking of distinct molecules within the skin.

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Joanna Igielska-Kalwat
Dermatology Center Laboratory Symbiosis, Poland E-mail: joanna.igielska@wp.pl