

〈シンポジウム〉

(Evidence にもとづく化粧品を求めて—化粧品はどこまでバリア機能を制御できるか?)

## 皮膚のバリア：その傷害と修復

田上 八朗\*

### Skin Barrier: Its Damage and Repair

Hachiro TAGAMI\*

#### Abstract

The stratum corneum (SC) covers our body as an ultra-thin membranous structure providing our skin surface its softness and smoothness by binding water. In any pathological conditions the SC fails to hold a sufficient amount of water, producing a dry, rough skin surface noted as scales and fissures. The SC plays a much more important and essential role in the body by providing it the barrier function. Such an effective functional properties as noted in SC cannot be found in any other portions of the skin. The living tissues cannot function well or living organisms are even unable to sustain life without the presence of water whose loss is prevented to a minimum amount by the barrier function of the skin which mainly depends upon the presence of SC on its surface. The SC also exerts its barrier function to protect our body from the invasion of injurious external agents. We can evaluate the barrier function of the skin under a physiological condition by measuring transepidermal water loss (TEWL). TEWL shows elevation in any kinds of pathological situations that involve the epidermis to influence its proliferation and differentiation. Thus, in common inflammatory dermatoses such as contact dermatitis, atopic dermatitis, psoriasis and various skin infections, we can easily demonstrate elevated TEWL levels that reflects disruption of the SC barrier function. For the recovery of barrier function, it takes time for its complete recovery after mechanical damage of the SC. If we strip the SC totally from the skin surface, it takes about 2 weeks for the recovery of the barrier function. When we remove the epidermis above the basement membrane by producing a suction blister, it takes about 50 days. In the case of dermal injury produced by skin graft collection, it requires up to one year for the total recovery of the SC barrier function. Thus, it takes a long period of time for the skin recovers its normal functions after a longstanding inflammatory process such as noted in atopic dermatitis. Although the inflammatory signs of the skin are almost invisible except for xerosis, such skin can be easily stimulated to develop inflammation especially by chemical stimulation from the environment such as caused by a detergent. Finally, it should be mentioned here that the barrier function of the skin is not uniform but differs greatly even in normal skin depending upon the location. For example, the facial skin of normal individuals shows a much higher TEWL level than that of atopic xerosis present on other bodily regions, being almost comparable to those found in lesional skin of chronic dermatitis. The facial skin of normal individuals shows functional derangements in the dry and cold winter environment, which can at least partially be prevented by daily applications of effective moisturizers, which not only improve the hydration state of the skin surface but also the SC barrier function.

**Key words:** atopic dermatitis, barrier function, dermatitis, stratum corneum, transepidermal water loss.