

# Effect of external factors on the human skin corneocyte morphology

Seren Maeda<sup>\*</sup>, Hiromitsu Nakazawa, Satoru Kato

*Department of Physics, Graduate School of Science and Technology  
Kwansei Gakuin University, Sanda, Japan*

<sup>\*</sup>*duv93355@kwansei.ac.jp*

Stratum corneum (SC) located in the outermost layer of human skin consists of about a dozen layers of corneocyte cells, working as an intelligent interface between the skin and the environment. In this study we focused on the corneocyte morphology, which is thought to be related to the skin barrier function. We evaluated the shape of corneocytes tape-stripped from the skin surface of three healthy male subjects by the simple cryo-section technique we have developed for its ex vivo observation. The corneocytes transferred onto an adhesive tape were covered by another adhesive tape (sandwich method) and rapidly frozen in liquid nitrogen slush to make an ultrathin section with an ultramicrotome Leica EM FC6. The sections were observed with an electron microscope (JEM1400, JEOL). We compared the cross-sectional shape of the corneocytes collected from various body sites and found that the thickness of corneocyte is widely distributed from 200 nm to 1500 nm, depending on the body site. In particular, the corneocytes collected from the palm and the sole had irregular shapes with larger thickness than the typical flat cell.

Moreover, in some body sites there seemed to be a dependence of the corneocyte thickness on the subject. Interestingly, the thickness of the corneocyte from the wrist was evidently smaller in the subject wearing a wristwatch than in the one with a bare wrist. To clarify the influence of wearing a wristwatch, we examined the thickness of the corneocyte from the wrist of a subject, who usually wore a wristwatch, a month after his taking it off. As a result, we found that the thickness became more than five times larger by eliminating the influence of the wristwatch. These results suggest that the corneocyte morphology is very sensitive to the external factors imposed onto the skin surface.

The external factors could include temperature, mechanical stimulation, humidity, occlusive environment, and so on. We carried out some experiments to identify the factor responsible for the change in the corneocyte morphology induced by wearing a wristwatch. Our simple cryo-section technique used in these experiments was very useful in quantitative evaluation of the corneocyte morphology because it allowed us to obtain sufficient data for statistical analysis. We will discuss the influence of the external factors on the corneocyte morphology and its mechanism on the basis of our observations.

**Acknowledgement** This work was supported by Grant-in-Aid for Scientific Research (C) (15K05253) for H. N. from the Ministry of Education, Culture, Sports, Science and Technology.