## IN THIS ISSUE… (see article on pp 303)

### A New Perspective on the Formation of Stratum Corneum Intercellular Space

The past 40 years have seen a huge increase in knowledge about the function of the stratum corneum (SC) and its homeostasis. Put simply, the SC can be visualized as a 2-compartment model, with protein-rich corneocytes and an intercellular space filled with lipids. It has become evident that the SC not only provides a diffusion barrier, but also plays an important role in immune defence, especially in the innate immune response. Anti-microbial peptides, pre-cursors for interleukin-1, as well as lipases and proteases that process components of the intercellular space, can be found here. These molecules are delivered to the intercellular space during the transition from stratum granulosum to SC. The question is: How is this done?

Back in 1960 (1) George F. Odland described submicroscopic granular structures of size 200–300 nm (termed Odland bodies) in the upper part of the epidermis. These structures were subsequently found to contain closely packed membranes (2, 3) and were also called membrane-coating granules or lamellar bodies. They are thought to act as a "multifunctional secretory organelle", delivering their contents to the intercellular space of the SC through exocytosis (2, 4). The ultrastructural concept of this organelle is based mainly on 2-dimensional sections prepared for electron microscopy.

Lars Norlén and co-workers have, in a series of studies, applied a sophisticated freeze fixation technique, thin freeze sectioning and serial sectioning for electron microscopy (5, 6). In this issue (7) they present results that provide a new perspective on the ultrastructure of Odland bodies. They propose that these structures are not discrete granules, but have a continuous membrane structure. This implies a new interpretation of the dynamics of SC formation; instead of exocytosis the intercellular space is formed through a process of membrane unfolding. This idea opens up new perspectives in our view of SC function and homeostasis.

REFERENCES

1. Odland GF. A submicroscopic granular component in human epidermis. J Invest Dermatol 1960; 34: 11–15.
2. Lavker RM. Membrane coating granules: the fate of the discharged lamellae. J Ultrastruct Res 1976; 55: 79–86.
3. Wolff K, Holubar K. Odland-Körper (Membrane Coating Granules, Keratinosomen) als epidermale Lysosomen. Ein elektronenmikroskopisch-cytochemischer Beitrag zum Verhornungsprozeß der Haut. Arch Klin Exp Dermatol 1967; 231: 1–19.
4. Elias PM, Feingold K, Fartasch M. Epidermal lamellar body as a multifunctional secretory organelle. In: Elias PM, Feingold K, eds. Skin Barrier. New York: Taylor and Francis, 2006: p. 262–272.
5. Norlén L. Update of technologies for examining the stratum corneum at the molecular level. Br J Dermatol 2014; Suppl 3: 13–18.
6. Norlén L, Oktem O, Skoglund U. Molecular cryo-electron tomography of vitreous tissue sections: current challenges. J Microsc 2009; 235: 293–307.
7. den Hollander L, Han H, de Winter M, Svensson L, Masich S, Daneholt B, Norlén L. Skin lamellar bodies are not discrete vesicles but part of a tubuloreticular network. Acta Derm Venereol 2016; 96: 303–309.

*Magnus Lindberg*
*Section Editor*