

of cornification, including *keratinization*, the synthesis of the principal fibrous proteins of the keratinocyte; *keratohyalin* deposition, associated with synthesis of "histidine-rich protein," stratum corneum basic protein, or filaggrin; formation of a highly cross-linked, *insoluble peripheral envelope* of the corneocyte, composed of two or more precursor proteins, including involucrin and keratolinin; and the generation of neutral lipid-enriched intercellular domains, resulting from the secretion of distinctive structures termed *lamellar bodies* (membrane-coating granules, Odland bodies, keratinosomes, cementsomes; 24).

Although the precise role of these components in protective function remains to be discovered, the insoluble stratum corneum envelope appears to provide a rigid structural ectoskeleton for the cornified cells, a scaffold for insertion of keratin filaments, and a highly resistant barrier to external chemical assault. Additionally, in conjunction with extracellular lipids, the peripheral envelope may selectively regulate the permeability of the cornified cell to water, hydrophobic electrolytes, and nonelectrolytes (11). Although both keratin filaments and keratohyalin-derived proteins are major epidermal differentiation products, their function remains conjectural. Clearly, the filament-matrix complex in the cornified cells imparts structural and chemical integrity, acts as a filter to incident ultraviolet radiation, and acts as an absorptive "sponge" for water and other small hydrophobic molecules. Whether the cornified cell interior also represents a potential pathway or reservoir for substances in transit across the stratum corneum is less clear.

B. Lamellar Bodies

The lamellar body, a 0.2 to 0.3 μm diameter, ovoid, secretory organelle, which is considered the central actor in the formation of the intercellular "mortar," is synthesized primarily within the spinous cell and then displaced to the apex and periphery of the granular cell (24). In response to an unknown signal, it fuses with the plasma membrane, secreting its contents into the intercellular spaces, thereby generating an expanded intercellular compartment that constitutes from 10% to 40% of the total volume of this tissue (25). Thus, secretion is one of two cellular events associated with lamellar body exocytosis; fusion also occurs, and the "splicing" of additional organelle membrane into the plasma membrane may contribute a large reservoir of surface area that could explain the stratum corneum's remarkable water-holding capacity (25).

Lamellar bodies appear to contain three types of materials: first, sugars, in the form of glycosphingolipids and possibly glycoproteins; second, free sterols and phospholipids; and third, a selective array of hydrolytic enzymes possibly charged with degrading