Further particulars of this work will be published elsewhere.

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## Occurrence of Foldings of Plasma Membrane (β-Cytomembrane) in Cells of Pig's Carpal Organ as revealed by Electron Microscopy

THE carpal organ of the pig is a conglomerated sweat gland, and histologically it is known to be similar to the usual small sweat gland (eccrine gland)[1]. This organ is useful for investigating the fine structure of sweat glands with the electron microscope, since the conglomerated body of the gland is easily seen with the naked eye and most of the glandular tissue is found within the small field of the electron microscope. The tissue was fixed in 1 per cent osmic acid and buffered at *p*H 7·4 with acetate–veronal or phosphate buffer, washed for a short time and then dehydrated with ethanol in a graded series of concentrations. The specimens were embedded in a mixture of *n*-butyl and methyl methacrylate (7 : 3), and were cut into sections less than 0·05μ thick with a thermal expansion microtome (*JUM*-4) fitted with a glass knife. Embedded sections were examined in a *JEM*-3 electron microscope.

The presence of two kinds of glandular cells in the secretory portion of eccrine sweat glands has already been demonstrated by light microscopy in both human and certain mammalian skins, as well as in the carpal organ of the pig[1–3]. Dark cells, which are observed with the light microscope to contain a number of secretory granules stainable with iron-hæmatoxylin and are periodic acid–Schiff positive, show a number of large electron-lucent vacuoles, which may correspond to the dark-stained granules seen with the optical microscope. While the cells which are clear in light microscopy are rather dark under the electron microscope, secretory granules of this cell type were seen as relatively small, extremely dense granules (Fig. 1).

The free surface of both types of cell is covered by microvilli which are rather irregular in shape when compared with those of the brush or striated border seen in the proximal convoluted tubule of the kidney or intestinal epithelium. The development of microvilli is less marked on the dark cells than on the clear cells (Fig. 1). This was also observed with the light microscope[1].

In the basal cell zone and the lateral boundaries of both cell types, complicated foldings of the plasma membrane were observed (Figs. 1, 2 and 3); this is analogous to the structure called the "β-cytol membrane" by Sjöstrand[4]. The folding at the lateral cell margin is less developed than that of the basal one. The folding in the basal cell zone facing the myoepithelial cell or the basement membrane is similar to the basal infoldings observed in the proximal convoluted tubule of the kidney, the epithelium of the duct of some salivary glands, ependymal cells of the choroid plexus, and in the ciliary body of the eye, all of which are thought to be closely associated with water transport[5]. This suggests that these cells are also associated with the active transport of water from the surrounding connective tissue and blood capillaries into the lumen of the gland producing the sweat, that is, the dilution of the secretory product.

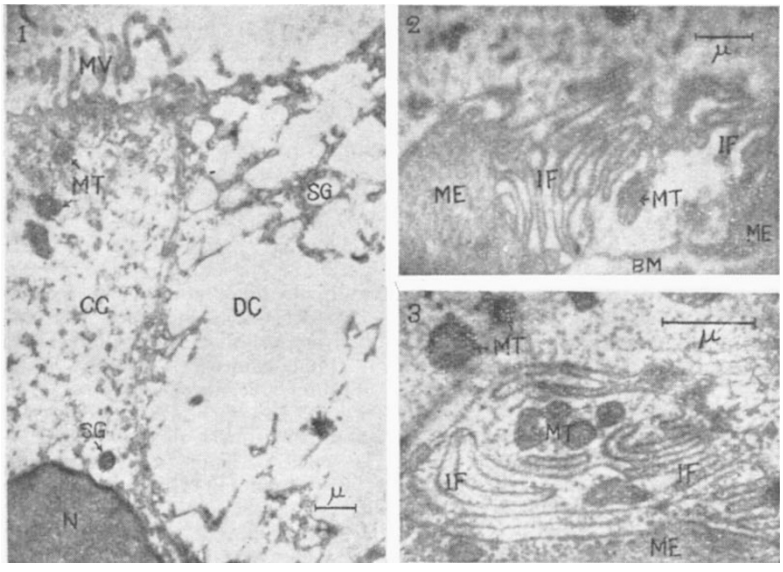


Fig. 1. An electron micrograph of apical and intermediate zone of two adjacent glandular cells (*CC*, clear cell; *DC*, dark cell). *MV*, microvilli; *MT*, mitochondria; *SG*, secretory granules; *N*, nucleus. Figs. 2 and 3. Electron micrographs of nasal portion of the glandular cell, showing the elaborated infolding (*IF*) of basal plasma membrane. *MT*, mitochondria; *ME*, myo-epithelial cells; *BM*, basement membrane

The α- and γ-cytomembranes[4] (called the rough and smooth surfaced varieties of endoplasmic reticulum by Palade[6]; the latter is also identical to the Golgi complex of Dalton[7]) as well as mitochondria are also contained in both glandular cell types. The features corresponding to the various states of the secretion cycle will be described elsewhere.

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