

goosefish tubule is probably a true secretory cell. The fine structure of the dark cells is similar to what has been described in, for instance, mucous cells of the trachea or gastric glands of mammalian tissue.

The Structure Of The Gills Of The Fresh Water Catfish (*Ameiurus Nebulosus*).

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A combined light and electron microscopic analysis of the gill filament of the fresh water catfish indicated that two quite different areas can be recognized. The larger of these areas is represented by the lamellae which generally are considered to serve as respiratory surfaces in the exchange of gases between blood and water. The second area is smaller and comprises mainly the lateral edges of the filament and the interlamellar surface. The structure of this area seems to indicate that it is the secretory portion of the gill filament.

The blood-water barrier proved to be more complex than indicated by earlier studies. It consists of cuboidal epithelial cells in a surface layer inside of which is a basal squamous cell layer, a basement membrane and a continuous endothelial lining of the lacunar spaces in which the blood circulates freely. In addition, an intercellular space exists between the respiratory surface epithelium and the basal cell layer. This space communicates freely with the large lymph spaces present at the base of each lamella. Lymphocytes are frequently seen in these spaces.

The so-called pillar cells, which constitute the central framework of the lamellar lacunae, were identified to represent smooth muscle cells. This makes it probable that slow pulsations or temporary alterations of the width of the lacunae can take place in the respiratory lamellae of the gill filament.

It was discovered that a cell type, rich in mitochondria and smooth surfaced endoplasmic reticulum does exist in fresh water fish. This cell type is referred to in sea water fish as chloride secreting cell. Also another type of cell was identified which displayed an abundance of smooth surfaced endoplasmic reticulum but few mitochondria. This cell type was found only in the secretory part of the gill filament where mucous cells were abundant.

A protective mechanism of the fresh water gill epithelium was evidently discovered. The surface of the epithelial cells is provided with a thick cuticle which contains numerous small granules embedded in a dense cytoplasmic zone. The granules can be seen discharged at the surface of the cells. The cuticle itself may prevent an extensive loss of salts, and the micro-discharge of the small granules may be regarded as part of a protective mechanism against parasites and other small organisms.