

The Glands

Some epithelial cells may be specialized to perform a secretory function. Such cells, present singly or in groups, constitute glands.

Classification of glands:

Glands may be unicellular or multicellular. Unicellular: Unicellular glands are interspersed amongst other (non-secretory) epithelial cells. They can be found in the epithelium lining the intestines. Multicellular: Most glands are multicellular. Such glands develop as diverticula from epithelial surfaces. The 'distal' parts of the diverticula develop into secretory elements, while the 'proximal' parts form ducts through which secretions reach the epithelial surface, e.g., lacrimal gland, parotid gland, etc.

Glands that pour their secretions on to an epithelial surface, directly or through ducts are called *exocrine glands* (or *externally secreting glands*). Some glands lose all contact with the epithelial surface from which they develop and they pour their secretions into blood. Such glands are called *endocrine glands*, *internally secreting glands*, or *ductless glands*.

Classification of exocrine glands:

Exocrine glands can be further classified on the basis of:

Branching of ducts :

-Simple: When all the secretory cells of an exocrine gland discharge into one duct, the gland is said to be a *simple gland*, e.g., gastric glands, sweat glands, etc.

-Compound: Sometimes there are a number of groups of secretory cells, each group discharging into its own duct. These ducts unite to form larger ducts that ultimately drain on to an epithelial surface. Such a gland is said to be a compound gland, e.g., parotid gland, pancreas, etc.

Shape of the secretory unit: Both in simple and in compound glands the secretory cells may be arranged in various ways:

-Tubular glands: Glands with secretory unit tubular in shape. The tube may be straight, coiled or branched, e.g., gastric glands.

-Acinar glands: Glands with secretory unit round or oval in shape, e.g., salivary glands.

-Alveolar glands: Glands with secretory unit flask-shaped. Glands in which the secretory elements are greatly distended are called *saccular glands*.

Nature of their secretions: mucous glands and serous glands

-Mucous glands: Cells of mucous acini are tall with flat nuclei at their bases. The lumen of these acini is larger than the

serous acini. In mucous glands the secretion contains mucopolysaccharides. The secretion collects in the apical parts of the cells. As a result nuclei are pushed to the base of the cell, and may be flattened.

-Serous glands: Cells of serous acini are triangular in shape with a rounded nucleus. Their nuclei are centrally placed. The secretions of serous glands are protein in nature. The lumen of their acini is small

Note: Some glands contain both serous and mucous elements (mixed).

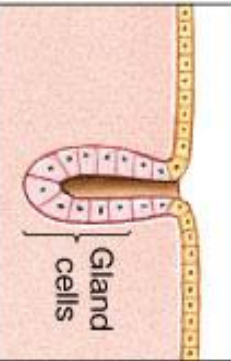
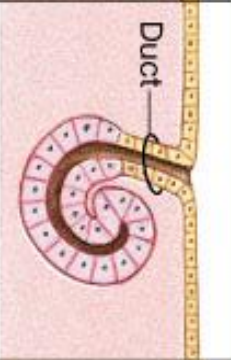
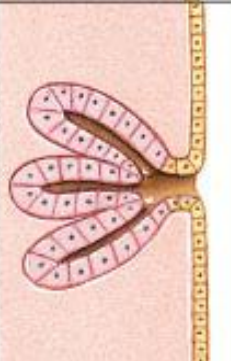

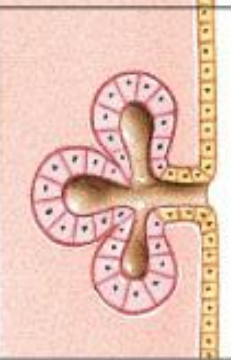
The manner in which their secretions are poured out of the cells:


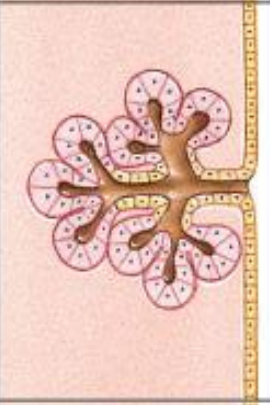
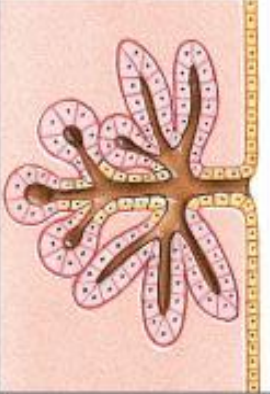
-Merocrine: In most exocrine glands secretions are thrown out of the cells by a process of exocytosis, the cell remaining intact, this manner of secretion is described as *merocrine*, e.g., goblet cell (sometimes also called *eccrine* or *epicrine*).

-Apocrine: In some glands the apical parts of the cells are shed off to discharge the secretion, this manner of secretion is described as apocrine. An example of apocrine secretion is seen in some atypical sweat glands and in mammary glands.

-Holocrine: In some glands, the entire cell disintegrates while discharging its secretion. This manner of discharging secretion is

described as *holocrine*, and is seen typically in sebaceous glands.

| SIMPLE GLANDS | | | | |
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| <p>SIMPLE TUBULAR</p> <p>Examples: Intestinal glands (crypts of Lieberkühn)</p>  | <p>SIMPLE COILED TUBULAR</p> <p>Examples: Merocrine sweat glands</p>  | <p>SIMPLE BRANCHED TUBULAR</p> <p>Examples: Gastric glands Mucous glands of esophagus, tongue, duodenum</p>  | <p>SIMPLE ALVEOLAR (ACINAR)</p> <p>Examples: Not found in adult; a stage in development of simple branched glands</p>  | <p>SIMPLE BRANCHED ALVEOLAR</p> <p>Examples: Sebaceous (oil) glands</p>  |

| COMPOUND GLANDS | | | |
|--|--|--|--|
| <p>COMPOUND TUBULAR</p> <p>Examples: Mucous glands (in mouth) Bulbourethral glands (in male reproductive system) Testes (seminiferous tubules)</p>  | <p>COMPOUND ALVEOLAR (ACINAR)</p> <p>Examples: Mammary glands</p>  | <p>COMPOUND TUBULOALVEOLAR</p> <p>Examples: Salivary glands Glands of respiratory passages Pancreas</p>  | |

