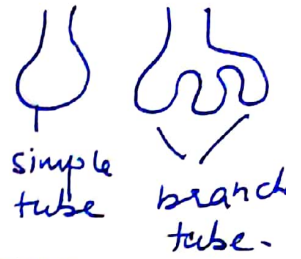


# Gastric Glands in Vertebrates

(1)

Gastric glands are formed by the invagination or sinking in of the gastric epithelium (columnar epithelial cells of the mucosa layer) into the lamina propria of the mucosa layer usually as simple tube or branched tubes.

## Comparative Account of Gastric glands



① Cyclostomes: In cyclostomes eg in Lamprey, the stomach is not well developed and the anterior part of the intestine represents the stomach so no gastric glands are present in them.

Fishes: In elasmobranch such as Scoliodon, the gastric glands are present. These glands produce proenzyme pepsinogen and HCl. Pepsinogen is converted into pepsin by HCl. Pepsin breaks proteins into proteoses and peptones. In most of the teleosts also the stomach <sup>contains gastric glands which</sup> produce pepsinogen + HCl. but in some teleosts like lele the stomach is absent so no gastric glands are found.

Amphibians. - same as in elasmobranchs.

Reptiles — same as in elasmobranch - Gastric glands present → produce pepsinogen + HCl. Pepsinogen converted to pepsin by HCl. Pepsin breaks proteins into proteoses + peptones.

Birds - In birds also the gastric glands are present in the proventriculus and secrete pepsinogen + HCl.

mammals: Gastric glands are present in mammals also. They are of three kinds depending upon their location. They are cardiac glands, fundic & pyloric glands. The fundic glands contain chief cells or zymogen or peptic cells; parietal cells or oxyntic cells - mucous secreting neck cells and surface mucous cells. The chief cells secrete 2 proenzymes namely pepsinogen and prorenin and an enzyme gastric lipase. The parietal cells secrete HCl.

The surface neck cells and the mucous secreting neck cells secrete mucous. Mucous protects the gastric lining from the action of gastric juices. Pepsinogen and prorenin are changed <sup>by HCl</sup> into active enzymes pepsin and renin respectively. Pepsin breaks down proteins into proteoses and peptones. Renin changes soluble milk protein casein to insoluble compound paracasein in the presence of calcium. The paracasein is then acted upon by pepsin. Gastric lipase breaks fats into fatty acid and glycerol. The gastric lipase specifically acts upon fats that exist in fine state of emulsion such as butter fat in milk and fat of egg yolk (otherwise <sup>tough</sup> fats need to be emulsified first and that is done in the intestine by the bile salts).

The cardiac and pyloric glands secrete mucous only.

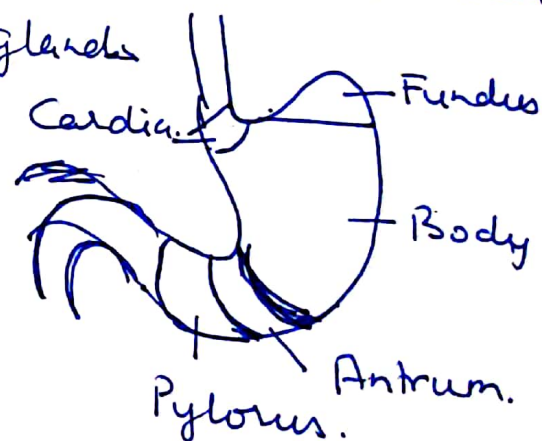
## Secretion of Gastric Juice

(3)

The secretion of Gastric juice is under multiple control.

- 1) Sight, smell or taste of food stimulates the gastric glands to secrete gastric juices. The stimulus reaches the glands through the vagus nerve.
- 2) Many food materials reaching the stomach directly stimulate the gastric glands to produce gastric juice.
- 3) Gastric juices are also produced under the influence of a polypeptide hormone Gastrin which is released by the G-cells found in the pyloric antrum. Gastrin is absorbed into the blood which carries it to the fundic glands.

Gastrin is produced by almost all vertebrates



  
Gastric Pit  
(or Foveolus)

Isthmus

Neck

Base of gland

Surface mucous cells

Parietal cells

Neck mucous cells  
Parietal cells  
Stem cells

Peptic cell

Parietal cell

Neck mucous cell

Neuroendocrine cells