

# GASTRIC GLANDS

Four types of cells are found in gastric glands:

1. Parietal cells
2. Chief cells
3. Mucus-secreting cells
4. Hormone-secreting cells

## 1. PARIETAL CELLS

Parietal cells secrete:

- i) Hydrochloric Acid
- ii) Intrinsic Factor

### D) HCL

\* Hydrogen ions are generated within the parietal cell from dissociation of water. The hydroxyl ions formed in this process rapidly combine with  $\text{CO}_2$  to form bicarbonate ion ( $\text{HCO}_3^-$ ), a rxn catalyzed by carbonic anhydrase.

\* Bicarbonate is generated out of the basolateral membrane in exchange for chloride. The outflow of bicarbonate into blood results in a slight elevation of blood pH known as the "alkaline tide". This ~~intracellular~~ process serves to maintain intracellular (within a cell) pH in the parietal cell.

\* Chloride and potassium ions are transported into the lumen of the canaliculus (a deep infolding, or little channel, which serves to increase surface area) by conductance channels, and such is necessary for secretion of acid.

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\* Hydrogen ion is pumped out of the cell, into the lumen, in exchange for potassium through the action of the proton pump; potassium is thus effectively recycled.

\* As a result of the cellular export of hydrogen ions, the gastric lumen is maintained as a highly acidic environment.

### ~~IMPORTANCE~~ FUNCTION OF HCl

The acidity aids in digestion of food by promoting the unfolding (or denaturing) of ingested proteins. As proteins unfold, the peptide bonds linking component amino acids are exposed. Gastric HCl simultaneously activates pepsinogen, an endopeptidase that advances the digestive process by breaking the now-exposed peptide bonds, a process known as proteolysis.

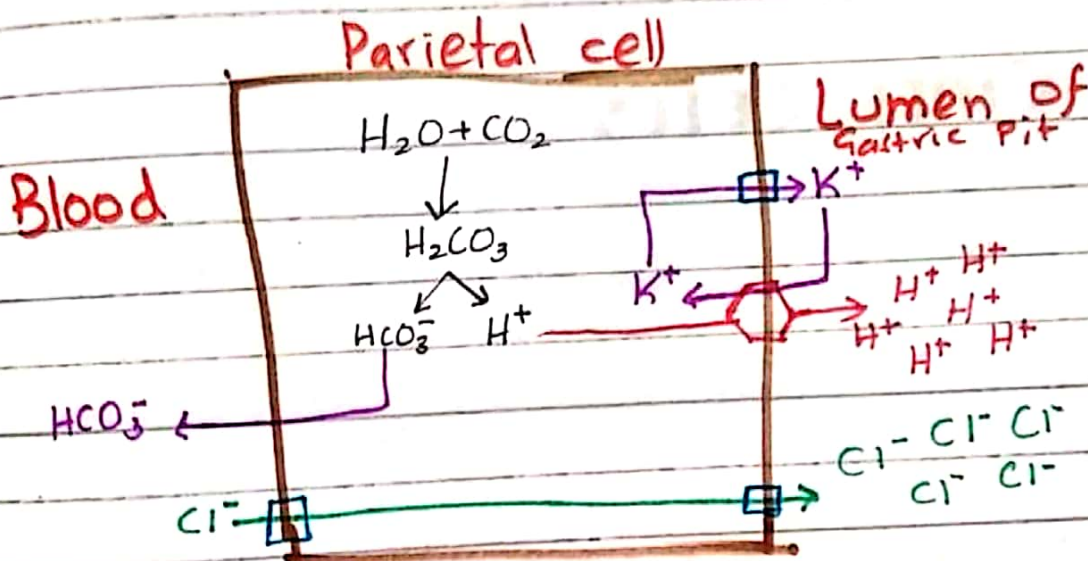
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## REGULATION

Parietal cells secrete acid in response to three types of stimuli:

1. Histamine
2. Acetylcholine
3. Gastrin



## ii) INTRINSIC FACTOR

Parietal cells also produce intrinsic factor. Intrinsic factor is a protein that binds ingested vitamin B<sub>12</sub> and enables it to be absorbed by the intestine.

## MALFUNCTION OF INTRINSIC FACTOR

Atrophic gastritis, particularly in the elderly, will cause an inability to absorb B<sub>12</sub> and can lead to deficiencies

202  
such as decreased DNA synthesis and nucleotide metabolism in the bone marrow.

## IMPORTANCE OF VITAMIN B<sub>12</sub>

Vitamin B<sub>12</sub> is a nutrient that helps keep the body's nerve and blood cells healthy and helps make DNA, the genetic material in all cells.

## 2. CHIEF CELLS

The chief cells synthesize and secrete pepsinogen, the precursor to the proteolytic enzyme pepsin. Pepsin helps to digest the proteins in food.

## 3. MUCUS SECRETING CELLS

Special cells secrete a protective covering called mucus, on the stomach walls to prevent damage from gastric acids. They protect the stomach walls from the corrosive nature of gastric acids.

Originally it was thought that peptic ulcers were caused by an erosion of this mucus lining by gastric acids. However recent research indicates that these ulcers are caused largely by the spread of a type of bacteria called *Helicobacter Pylori* bacterium into the gastric wall.



H. pylori bore the stomach wall while HCl cause burning effect known as peptic ulcers.

#### 4. HORMONE SECRETING CELLS

These are endocrine cells in the stomach which secrete three hormones :

- a. Histamine
- b. Gastrin
- c. Somatostatin

##### a. HISTAMINE

Histamine helps in secretion of gastric juice.

##### b. GASTRIN

Gastrin helps in activation of gastric glands i-e they stimulate gastric juice secretion.

##### c. SOMATOSTATIN

Somatostatin regulates secretion of gastrin and histamine.