HUMAN ANATOMY & PHYSIOLOGY-II- BP201T

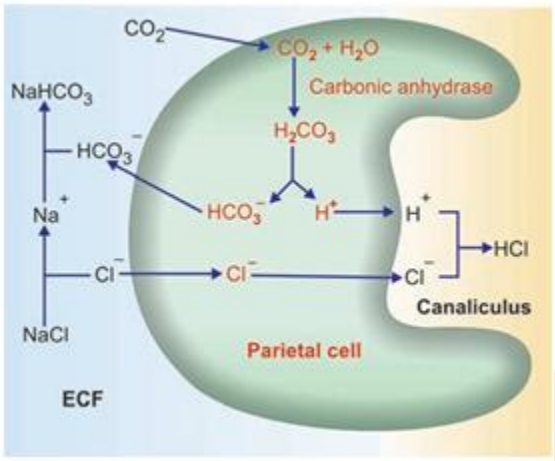
UNIT: 2 (DIGESTIVE SYSTEM)

CLASS: 03

TOPIC: Acid Production

SECRETION OF PEPSINOGEN Pepsinogen is synthesized from amino acids in the ribosomes attached to endoplasmic reticulum in chief cells. Pepsinogen molecules are packed into zymogen granules by Golgi apparatus. When zymogen granule is secreted into stomach from chief cells, the granule is dissolved and pepsinogen is released into gastric juice. Pepsinogen is activated into pepsin by hydrochloric acid.

SECRETION OF HYDROCHLORIC ACID According to Davenport theory, hydrochloric acid secretion is an active process that takes place in the canaliculi of parietal cells in gastric glands. The energy for this process is derived from oxidation of glucose. Carbon dioxide is derived from metabolic activities of parietal cell. Some amount of carbon dioxide is obtained from blood also. It combines with water to form carbonic acid in the presence of carbonic anhydrase. This enzyme is present in high concentration in parietal cells. Carbonic acid is the most unstable compound and immediately splits into hydrogen ion and bicarbonate ion. The hydrogen ion is actively pumped into the canaliculus of parietal cell. Simultaneously, the chloride ion is also pumped into canaliculus actively. The chloride is derived from sodium chloride in the blood. Now, the hydrogen ion combines with chloride ion to form hydrochloric acid. To compensate the loss of chloride ion, the bicarbonate ion from parietal cell enters the blood and combines with sodium to form sodium bicarbonate. Thus, the entire process is summarized as $CO2 + H2 O + NaCl \rightarrow HCl + NaHCO3$



Factors Stimulating the Secretion of Hydrochloric Acid 1. Gastrin 2. Histamine 3. Vagal stimulation.

Factors Inhibiting the Secretion of Hydrochloric Acid 1. Secretin 2. Gastric inhibitory polypeptide 3. Peptide YY