

Gastric acid

Gastric juice is produced in tubular glands gastric mucosa. Acid production is **2 to 3 l** per day. Its pH is acidic and reaches a value of **1.8 to 4**.

The following are involved in the production of acid

Mucinous cell

They produce mucin. It forms a 0.6 mm thick layer over the mucous membrane and protects it from chemical and mechanical effects. Mucus is an extremely important part of the stomach's defense against mucosal digestion. It is characterized by mechanical resistance and low friction, which facilitates the smooth passage of food particles. Its formation is very dependent on the proper blood supply to the stomach wall.

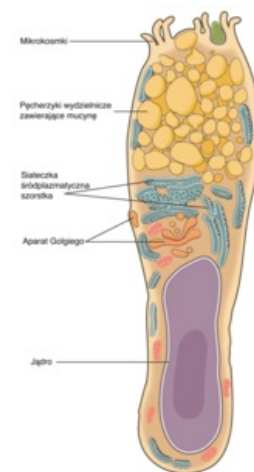
Main cell

They form pepsinogens, which are inactive precursors of the proteolytic enzymes of gastric juice. Pepsinogens are converted into pepsins after contact with acid juice. Pepsins are endoproteases that break down proteins. The optimal pH for their function is between 1.8 and 3.5. If the pH rises above 5, their proteolytic activity rapidly decreases and part of the molecule that was split off during activation is able to reversibly inactivate pepsinogen. Irreversible inactivation takes place at pH 7 to 8.

Parietal (covering) cell

They secrete HCl and internal factor (a glycoprotein necessary for the absorption of vit. B12). Hydrochloric acid is responsible for the acidic pH and therefore has many functions:

- activates inactive pepsinogen to pepsin;
- maintains an acidic pH at which pepsin is most effective;
- coagulates proteins, resulting in faster enzymatic breakdown;
- reduces iron to absorbable divalent ion form;
- by creating an acidic environment, it protects some vitamins (e.g. C).



Goblet Cell

Secretion can be divided into several phases

Cefalic phase

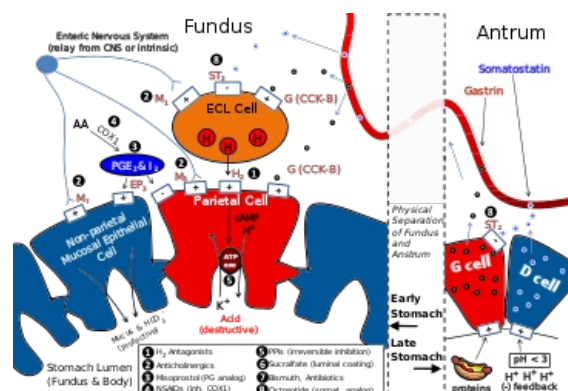
The increase and suppression of secretion is an active event influenced by the CNS, to trigger it, it is enough to capture a food signal, taste or smell. The vagus stimulates the parietal cells. Parasympathetic activity causes increased juice production, which we can block by interrupting the vagus nerve.

Gastric phase

The moment the food is swallowed, the gastric phase begins. The entry of a morsel into the stomach causes an increase in the volume of the stomach. This change is picked up by mechanoreceptors in the stomach wall. By irritating them, the activity of the intestinal nervous system increases and it stimulates the parietal cells directly or indirectly with the help of gastrin to histamine. The action of the food component will increase the pH. This releases gastrin, which leads to stimulation of the parietal cells and thus an increase in HCl secretion.

Intestinal phase

The final stage occurs when the chyme leaves the stomach. Initially, secretion is increased by the release of gastrin, later, when the chyme passes into the duodenum, suppressing hormones are released – secretin, gastric inhibitory polypeptide, cholecystokinin. The released hormones then suppress the production of gastrin and thus the secretion of HCl.



Determinants of Gastric Acid

Links

Related articles

- Stomach
- Digestion

References

- KITTNAR, Otomar. *Lékařská fyziologie*. 1. edition. Grada, 2011. ISBN 978-80-247-3068-4.
- LÜLLMANN-RAUCH, Renate. *Histologie*. 3. edition. Grada, 2012. ISBN 978-80-247-3729-4.