Peptic Ulcer Disease

Peptic → stomach ; Ulcer → sore or break in memb.

Having one or more sores in stomach → Gastric ulcer

If in duodenum → Duodenal ulcers

*The innermost wall of the entire GI tract is lined by

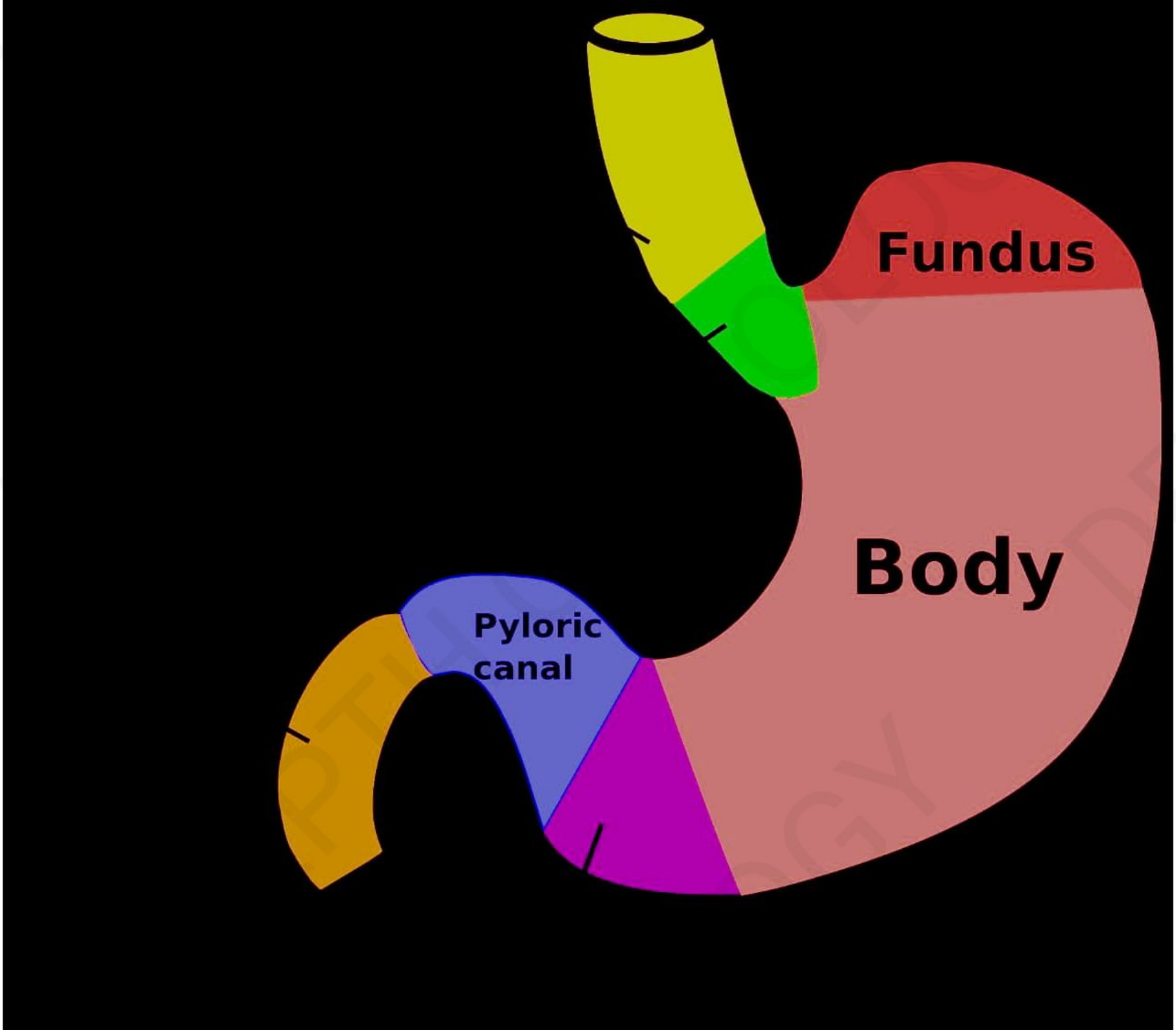
Mucosa

- **Epithelium** (Innermost) ↓ absorbs & secrete mucous & digestive enzymes
- **lamina propria** (middle) ↓ Blood + lymph vessle
- **muscularis mucosae** (outermost) ↓
  - layer of smooth muscle contracts
  - Breakdown of food.

Areas of Stomach

- Cardia
- Fundus
- Body
- Pyloric
  - Pyloric antrum
  - Pyloric canal

* a sore that develops on the lining of stomach.


Fundus
Body
Pyloric
canal

*There is a pyloric sphincter at the end of stomach which gets closed while eating to keep food inside stomach.

1. **Cardia** – have mostly foveolar cells – secrete mucus (water and glycoprotein)

2. **Fundus & Body (corpus)** – have mostly parietal cells and chief cells

Parietal cells – secrete HCl

chief cells – secrete pepsinogen → digest protien

3. **Antrum (Pyloric)** – has mostly G-cells → secrete Gastrin also found in duodenum & Pancreas

Now,

Gastrin —(stimulate)→ Parietal cells —(to secrete)→ HCl

↳ also stimulate the growth of glands in epithelial layer.

→ Duodenum has Brunner's gland in submucosa

↓

secrete mucus rich in HCO_3^- into lumen

* Stomach walls are constantly exposed to acid so have thicker mucus layer as compared to duodenum where acid exposure is less and momentarily.

• Duodenum has single layer of mucus built around the MUC2 mucin – this is not attached to epithelium and more permiable to bacteria.

• Stomach has 2 layer mucus system – inner attached – outer unattached, loose

both inner and outer are built by MUC5AC mucin produced by superficial epithelium.

[DEPTH OF BIOLOGY]

* In addition, to the momentarily exposure of acid to duodenum — the blood flowing stomach and duodenum have more HCO_3^- → neutralize acid: HCl.

Finally, small signalling molecules called Prostaglandins gets secreted in stomach and duodenum

↓

they stimulate mucus and bicarbonate secretion.

[DEPTH OF BIOLOGY]

If vasodilate nearby blood vessle → Blood flow↑↑↑

-This promote the growth of new epithelial cells and inhibits the acid secretion.

Causes of Gastric ulcer and Duodenal Ulcer

Main cause → infection by H. Pylori bacteria (Gram-ve) especially in low income countries and settings

H. Pylori bacteria colonize in Gastric mucosa

→ and release adhesions.

[DEPTH OF BIOLOGY]

↓

helps them to adhere → Foveolar cells.

→ and also release proteases cell

→ damage to mucosal cells

* It cause patchy pattern of damage.

H. Pylori cause damage in Antrum (Pyloric region) and spread to most of stomach and eventually to duodenum.

→ Overtime, the damage go deeper and deeper in mucosa that eventually cause ULCER

Another cause,

(NSAID) Non-steroidal Anti Inflamatory drugs

↓

inhibit the enzyme cyclooxygenase

(which is involved in synthesis of Inflamatory Prostaglandins)

* Reduced level of prostaglandins over a prolonged period of time leave the gastric mucosa susceptible to damage and overtime ulcers starts to develop.

Peptic ulcers results in →

1. Small, punched out hole in mucosa
2. Clean base → ∵ HCl secretion and constant chewing acts as dishwasher actually keeping debris out of ulcers.
3. Typically beneath the base layer of scar tissue and Blood vessle.

4. ulcers can bleed if erosion goes deep.

Symptoms

① Epigastric pain – aching or burning in upper abdomen.
② Bloating
③ Belching
④ Vomiting (emesis)

* Gastric ulcer pain increases while eating – due to physical presence of food in stomach.
- as well as HCl production gets stimulated with eating.
Duodenal ulcer pain ↓↓↓ with eating.
Maybe that is why

- Gastric ulcers are associated with weight loss.
- Duodenal ulcers are associated with weight gain

Diagnosis

① Upper endoscopy — tube is inserted in stomach and to proximal duodenum through mouth in order to visualise ulcers.
but during the procedure
② Biopsy – also done
- To find signs of malignant cells.
- To see and figure out H. Pylori infection.

Treatment

If H. Pylori infection occurs —

(1) Combination of antibiotics —
metronidazole + tetracycline or metronidazole + Amoxicillin

(2) Acid lowering agents (Antacids)

(3) Proton pump Inhibitors

Do not consume ⟶ Alcohal, Tobacco and caffeine

In extreme cases surgery can be done.