Gastrointestinal pathology esophagus and stomach lecture 3

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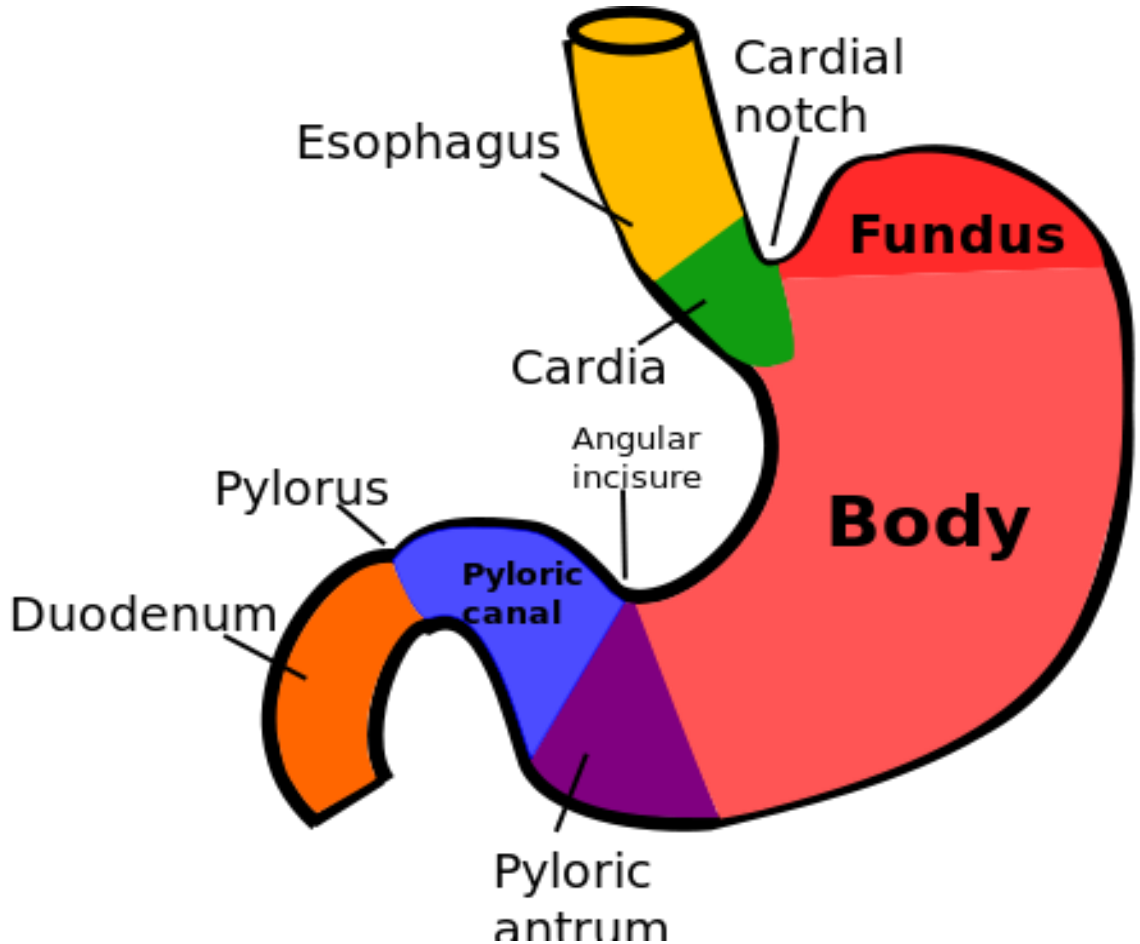
FRCPath

Diseases of the stomach


Cardial
notch
Esophagus
Fundus
Cardia
Angular
incisure
Pylorus
Body
Pyloric
canal
Duodenum
Pyloric
antrum

- Mucin is secreted mainly from the foveolar cells in the cardia
- Acids are secreted from the parietal cells in the fundus and body.
- Pepsinogen secreted from the chief cells in the body and fundus
- Gastrin is secreted from G cells in the antrum (endocrine cells)… gastrin stimulates acid secretion

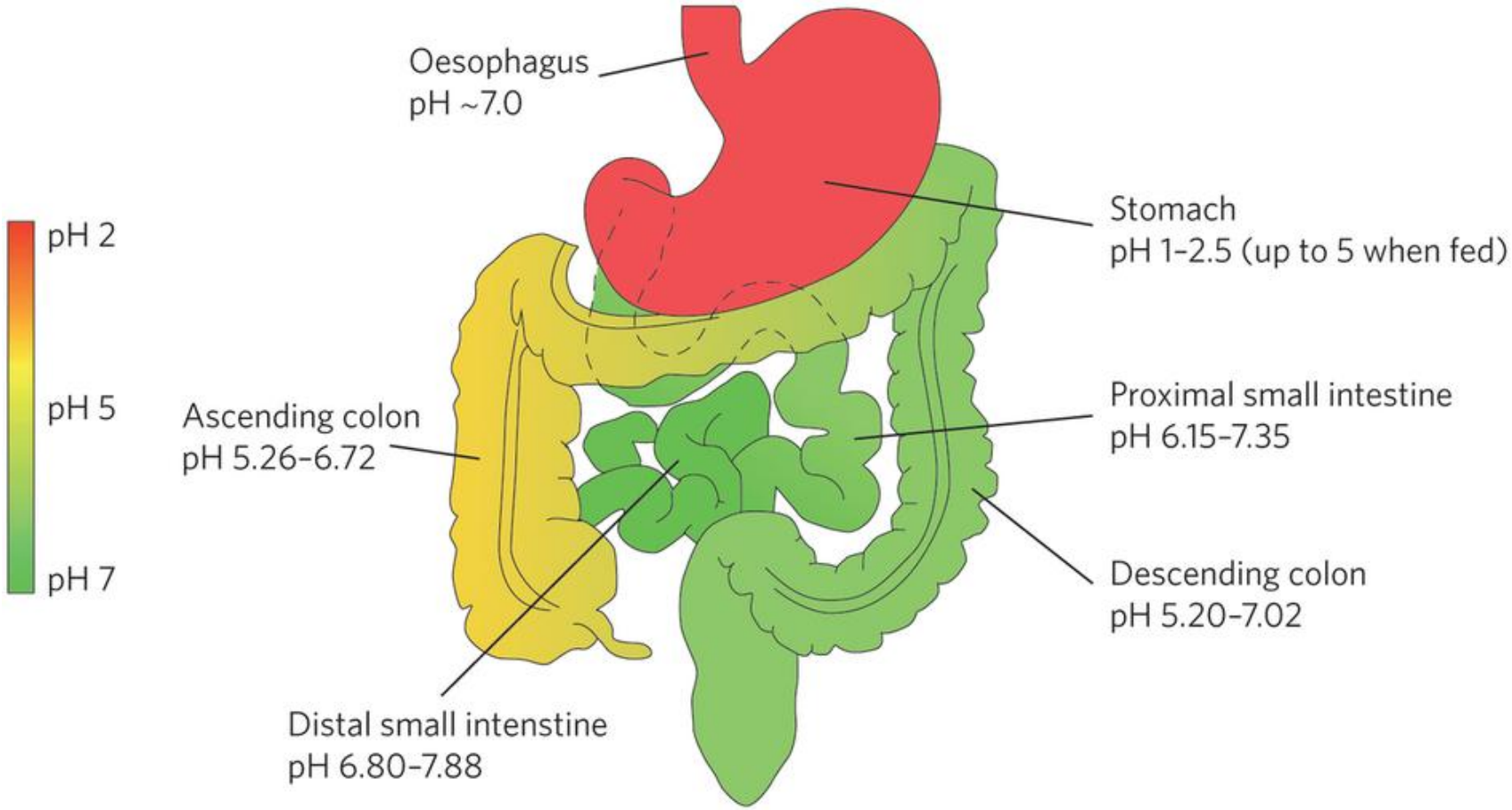
Main diseases affecting the stomach

- Inflammations: acute gastritis, acute peptic ulcer, chronic gastritis, peptic ulcer disease (chronic ulcer)
- Neoplastic disease: gastric polyps and gastric malignancies.

ACUTE GASTRITIS

- Is acute inflammation of the stomach which can be caused by any process that disrupts the mucosa.
- Disruption occurs due to direct mucosal injury or due to disturbance between acid secretion and protective mechanisms.

Stomach acidity is important for digestion



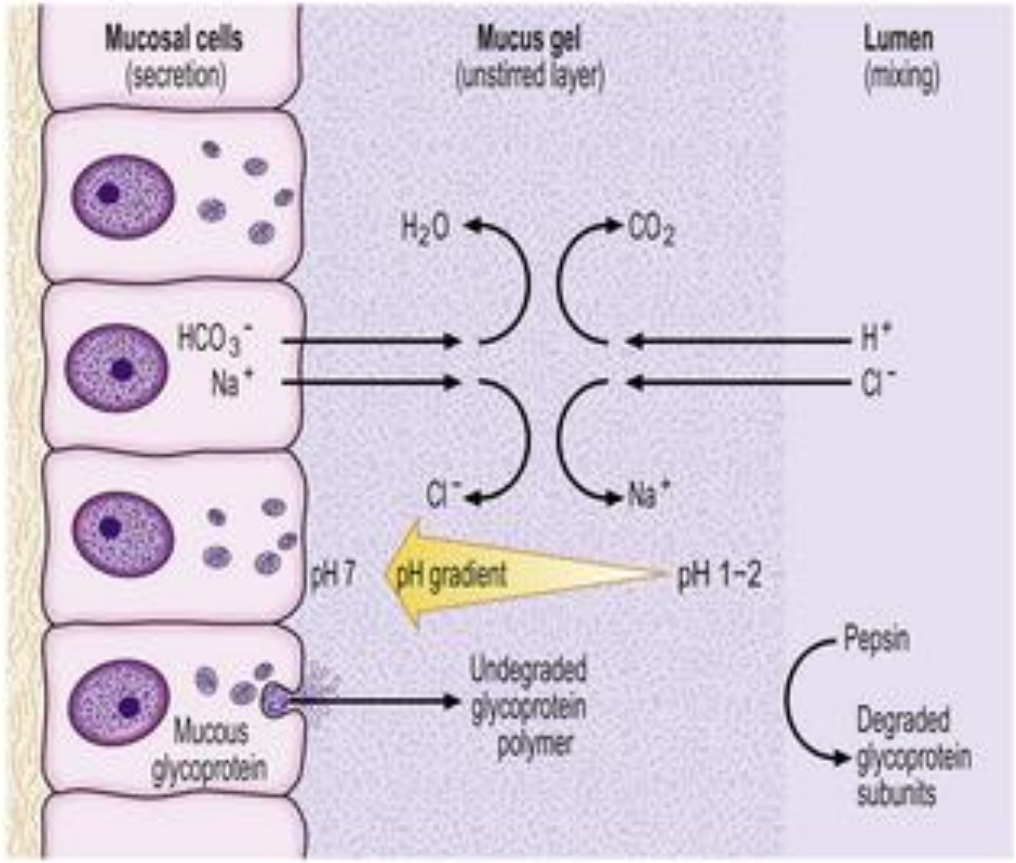
pH of the stomach

	pH	Example
strong alkali	14	drain cleaner
	13	bleach
	12	soapy water
	11	ammonia
	10	milk of magnesia
	9	baking powder
	8	sea water
neutral	7	pure water
	6	saliva
	5	black coffee
	4	acid rain
	3	vinegar
	2	lemon juice
	1	stomach acid
strong acid	0	battery acid

- This high acidity is important for digestion.
- The stomach is protected from this high acidity by : mucus layer and bicarbonate release….. Both are secreted under the influence of protective prostaglandins.

- Inflammation in the stomach occurs when the balance between the damaging effect of acid and the protection mechanisms is disturbed.

Protection of gastric mucosa against the acidity



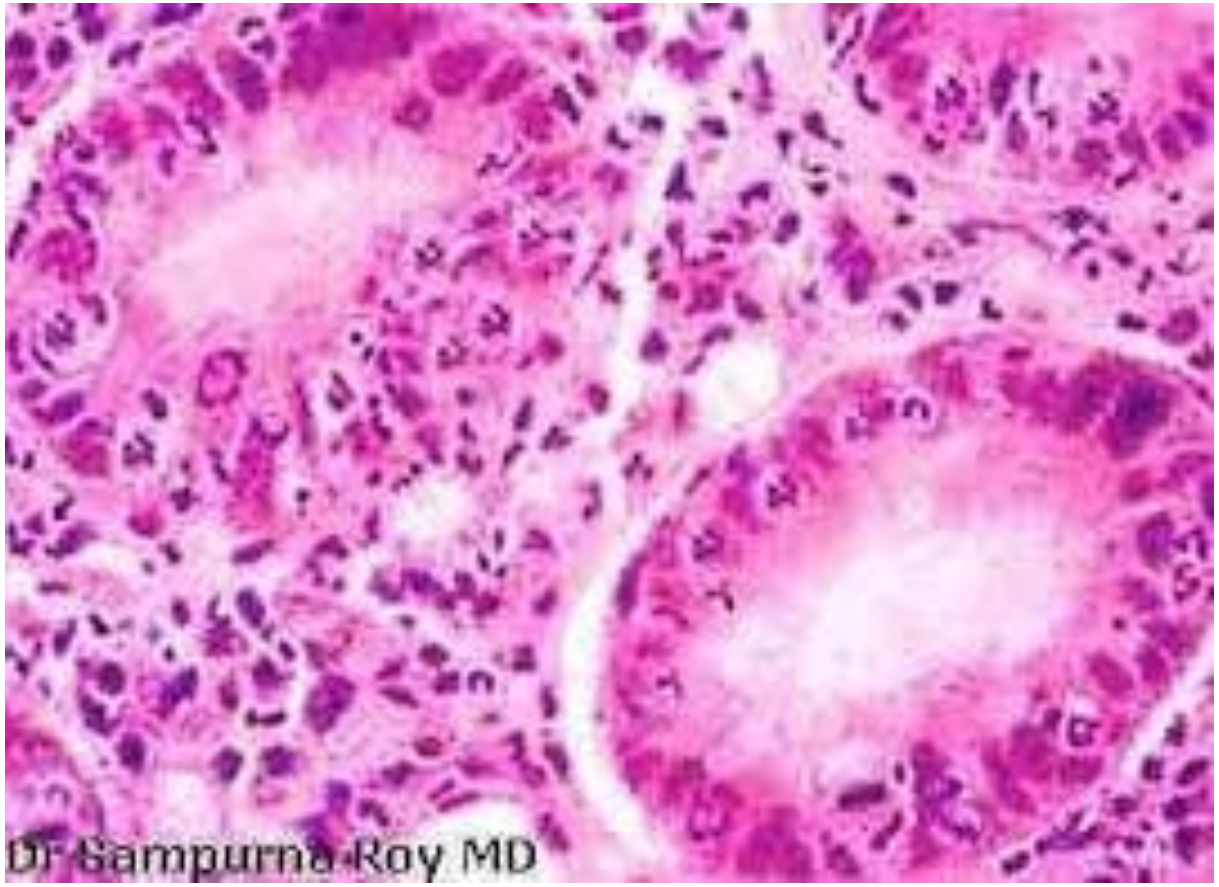
Acute gastritis occurs when the protective mechanisms fail

- Reduced mucin secretion in the elderly
- NSAIDS interfere with protective prostaglandins or causes reduced bicarbonate synthesis
- Chemical ingestion can damage the mucosa
- Alcohol and Radio or chemotherapy can cause mucosal damage

Signs and symptoms

- Nausea
- Vomiting
- Epigastric pain.

Morphology/ neutrophils are the main cells in a cute gastritis



Acute peptic ulcer

- = focal loss of the mucosa.

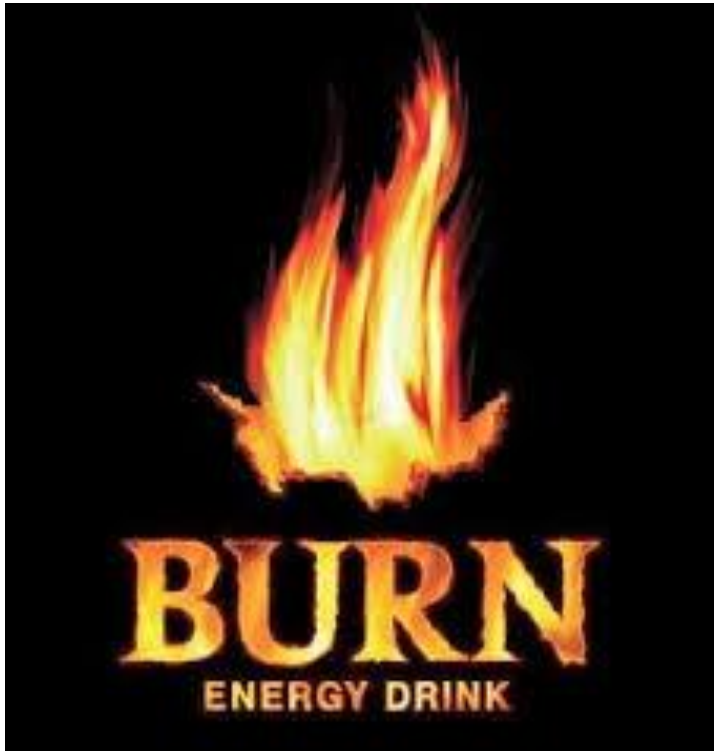
<u>Causes:</u>

1. NSAIDS
2. Stress ulcer (physiologic stress in critically ill patients)
3. Curling ulcer, in burns and trauma
4. Cushing ulcer, occur in association with increased intracranial pressure.

Stress ulcer

- Critically ill patients: shock or sepsis

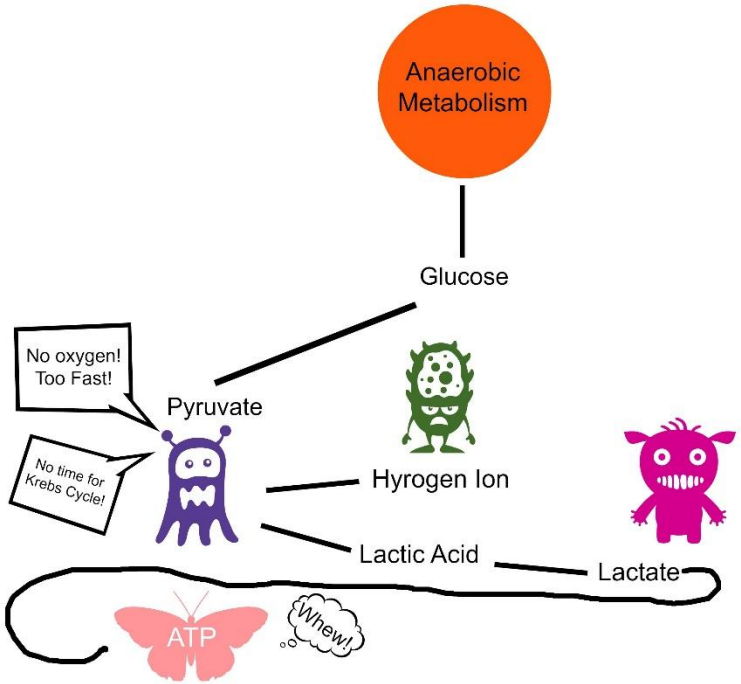
Curling ulcer: usually seen in duodenum



Pathogenesis of stress and curling ulcers

- Critically ill patients or those with hypovolemia or shock have decreased blood volume
- To protect vital organs from hypoxia, some blood vessels constrict like those of the stomach
- This vasoconstriction causes hypoxia which damages gastric epithelial cells causing ulceration
- Also hypoxia causes decreased oxidative phosphorylation .. This results in anaerobic glycolysis with lactic acid production … this results in acidosis and epithelial cell damage

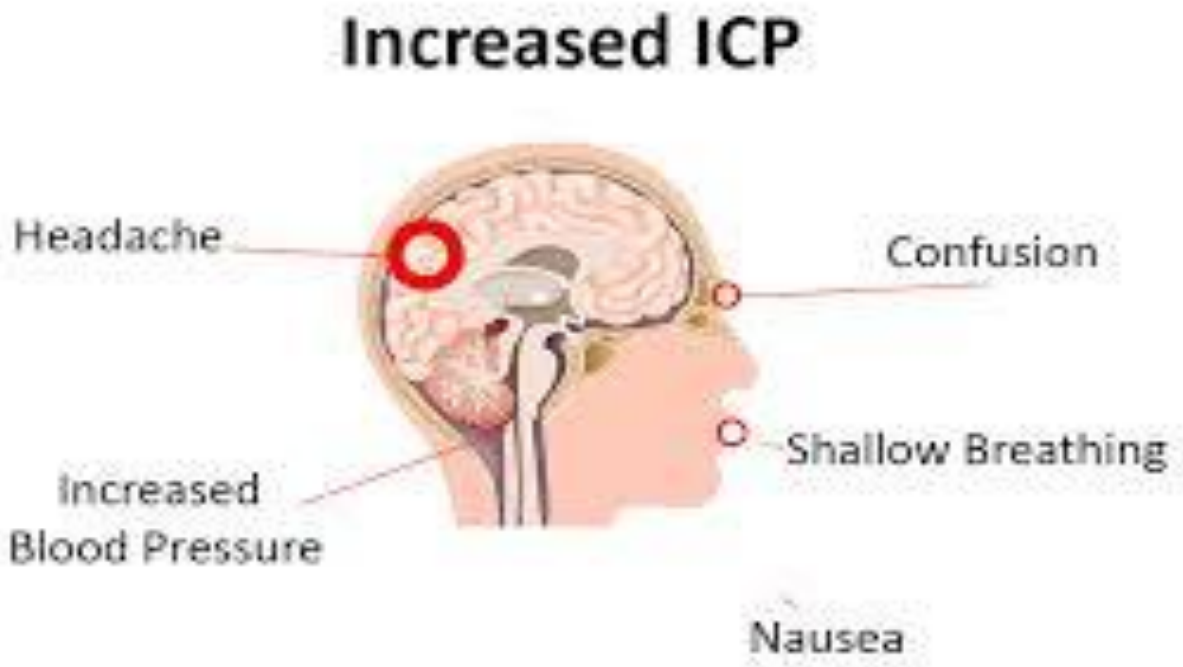
Curling and stress ulcers



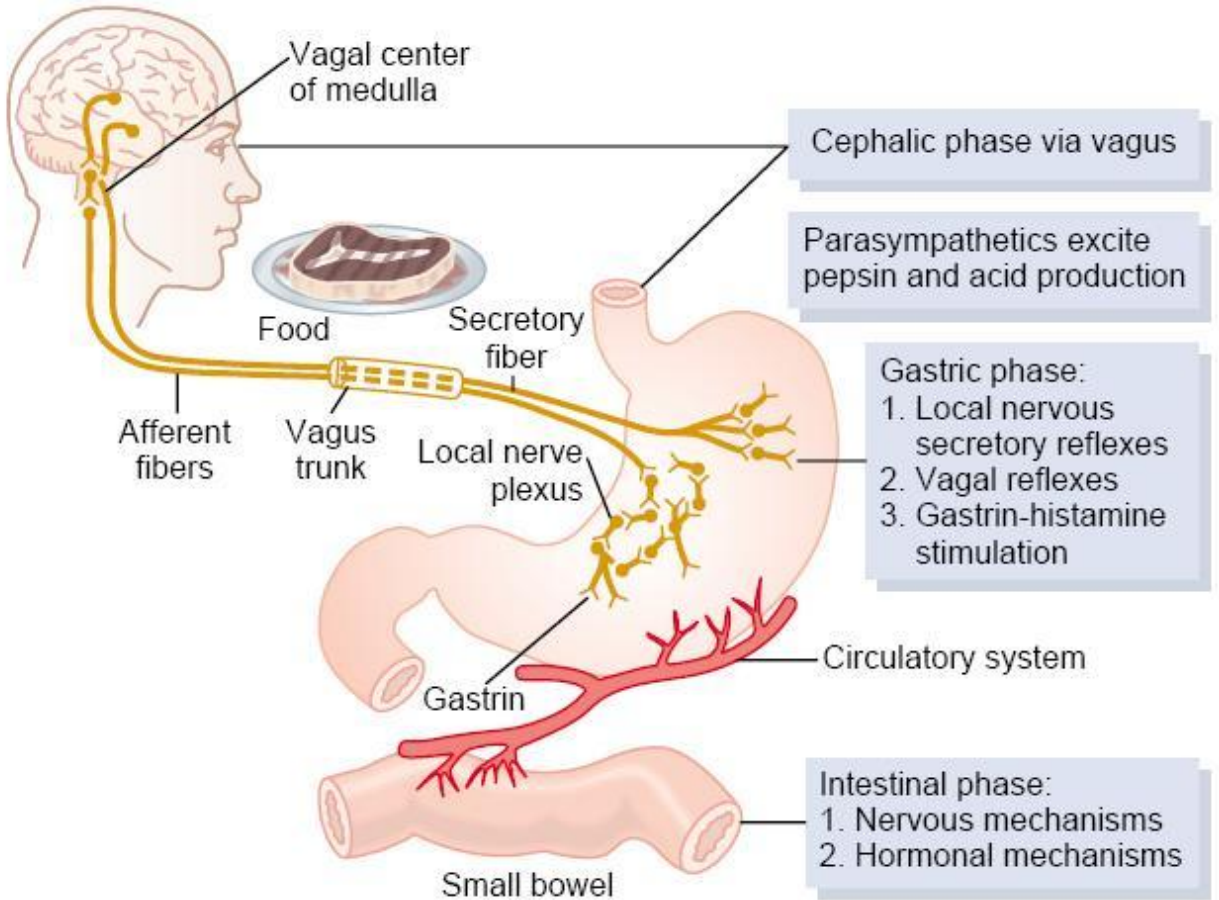
Pathogenesis of Cushing ulcer

- Increased intracranial pressure due to any cause (tumor, bleeding, stroke) can cause stimulation of the vagus nerve which will stimulate acid production in the stomach

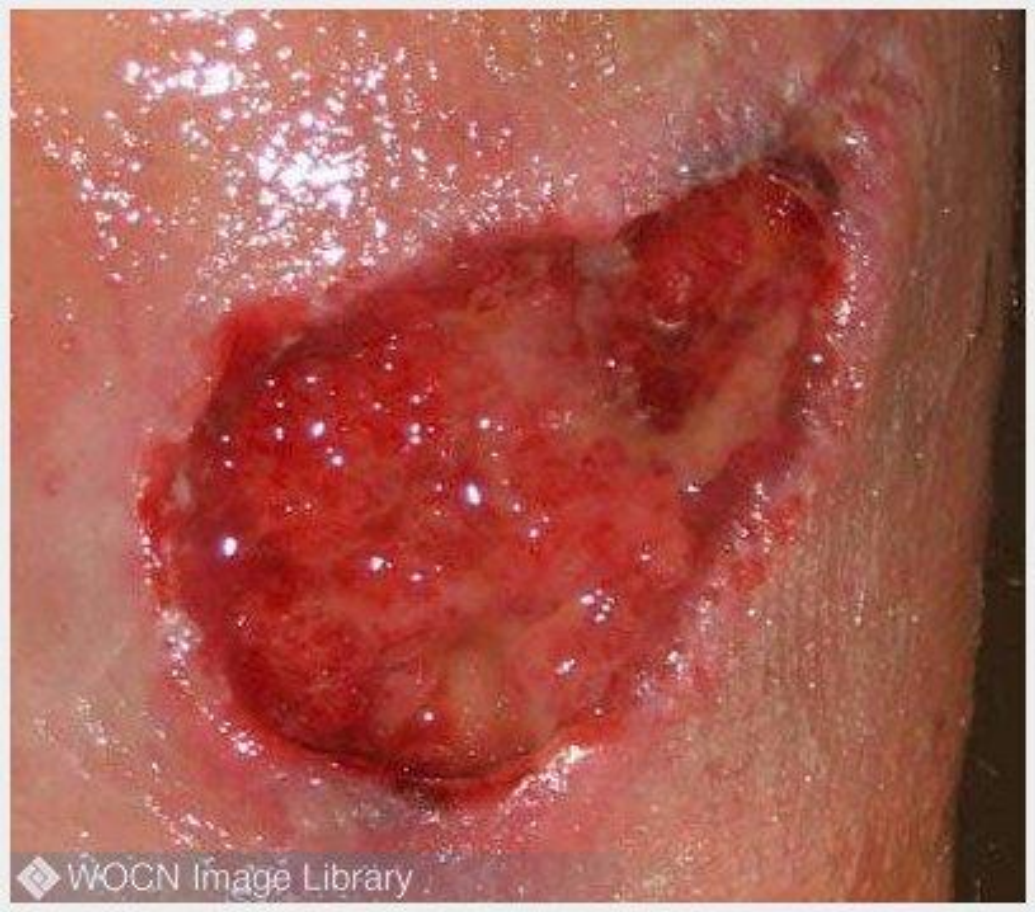
Cushing ulcer: affect stomach, duodenum or esophagus



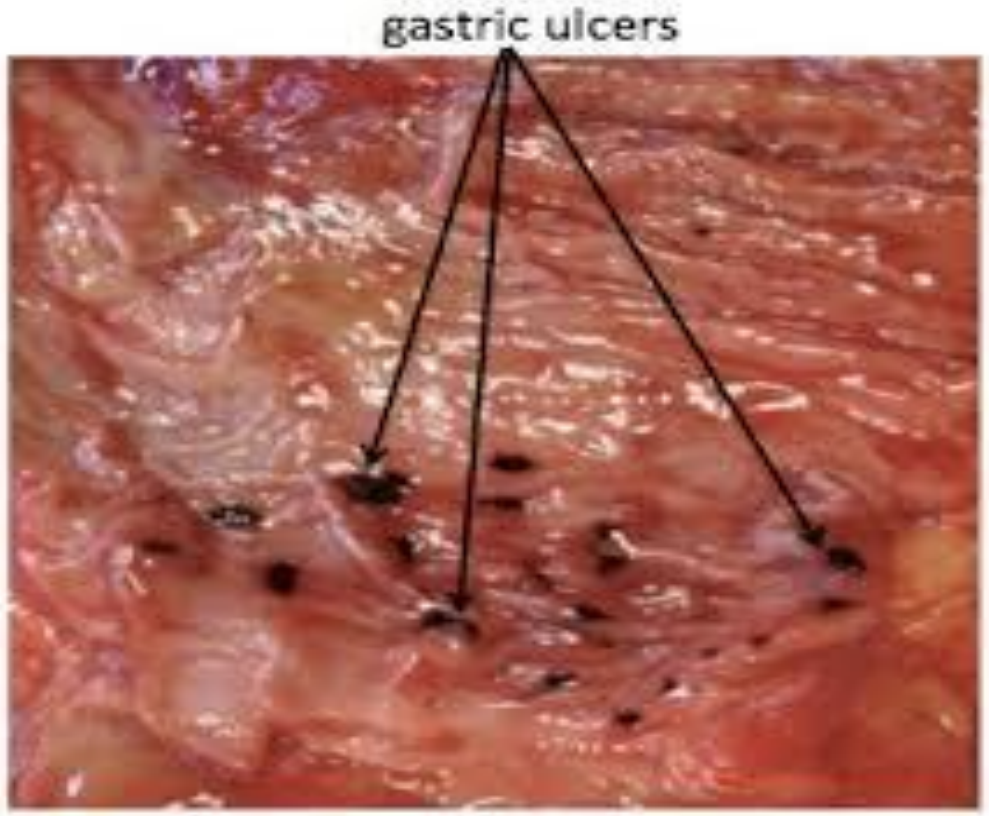
Pathogenesis of Cushing ulcer



Morphology: ulcer with hemorrhagic base surrounding mucosa is normal



morphology



note

- ACUTE ULCERS HEAL AFTER REMOVING THE CAUSE

Clinical picture

- Nausea
- Vomiting
- Coffee ground hematemesis

- Complications:
- Bleeding
- Perforation

- Outcome mainly determined by the severity of the underlying condition

Chronic gastritis

- Symptoms less severe than acute gastritis.
- Nausea, vomiting, abdominal discomfort.
- Hematemesis is rare

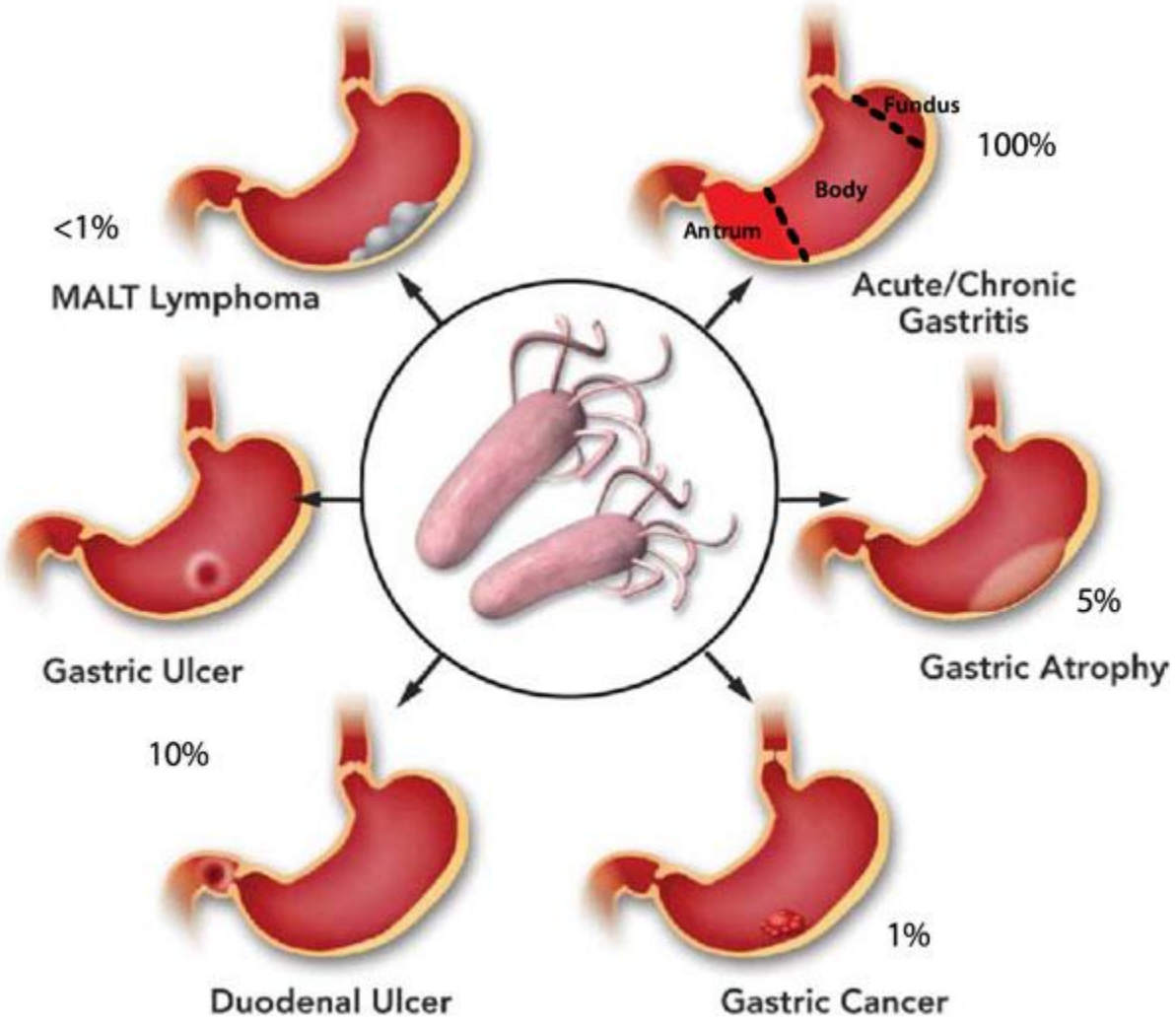
Chronic gastritis

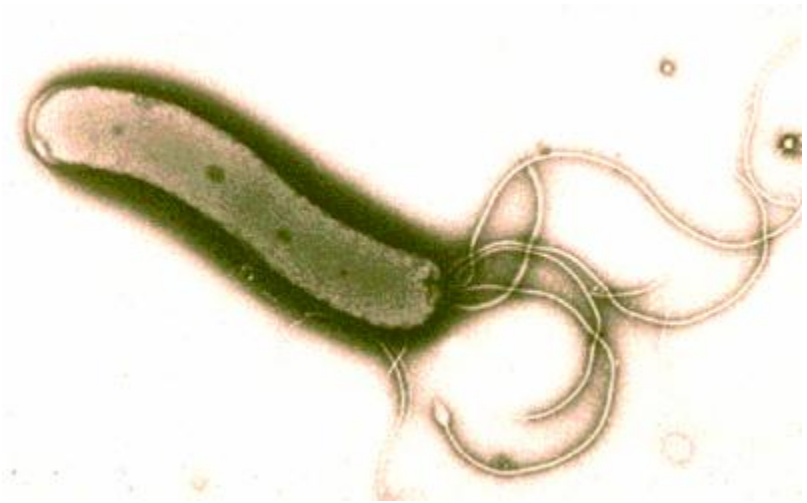
- H Pylori associated chronic gastritis.. Type B gastritis.. majority of cases..
- Autoimmune gastritis.. Type A, 10% of cases

H pylori

- Gram negative bacilli
- Found in : duodenal ulcer, gastric ulcer, chronic gastritis
- Also associated with gastric carcinoma and lymphoma

H pylori


Fundus
Body
Antrum
100%
<1%
MALT Lymphoma
Acute/Chronic
Gastritis
5%
Gastric Ulcer
10%
Gastric Atrophy
1%
Duodenal Ulcer
Gastric Cancer

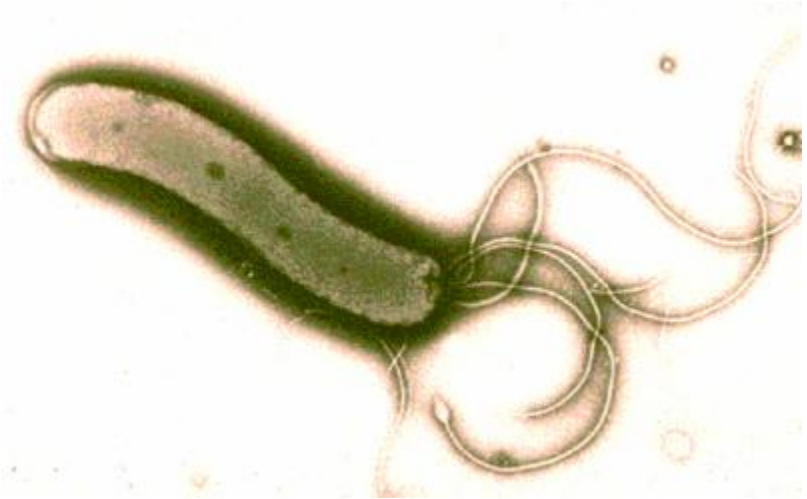


H pylori infection

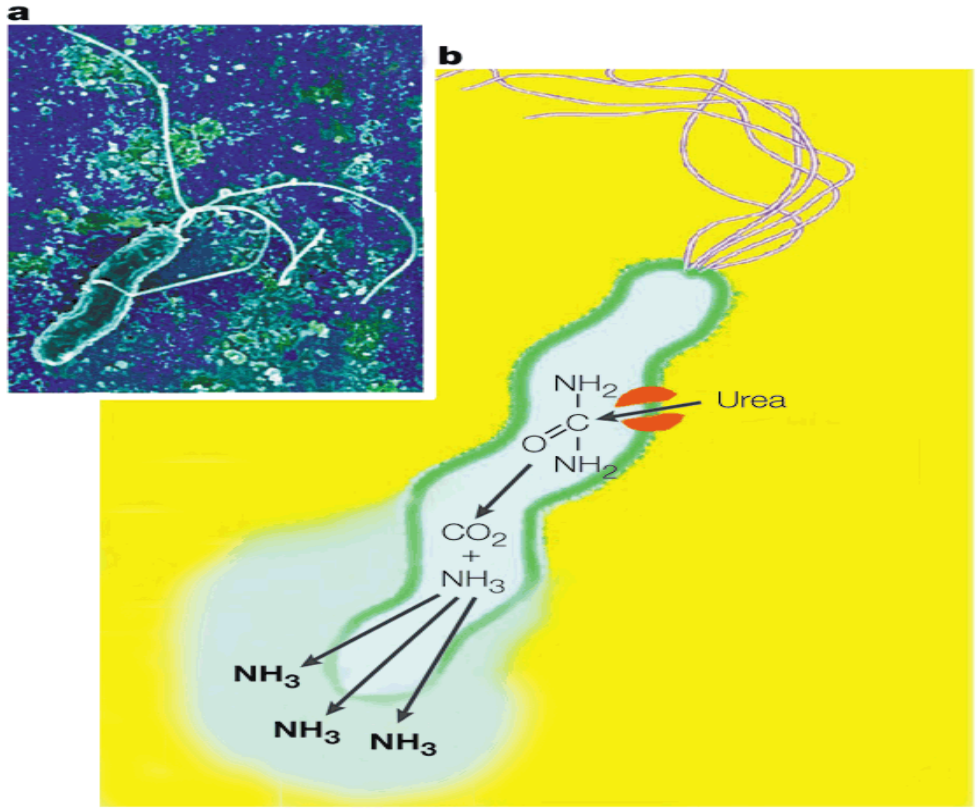
- Poverty
- Crowding
- Poor sanitation

pathogenesis

- Flagella help the bacteria to move through the thick viscous mucin



H pylori urease allows the bacteria to produce NH3 from urea.. NH3 is basic and helps buffer the acidity around the bacteria



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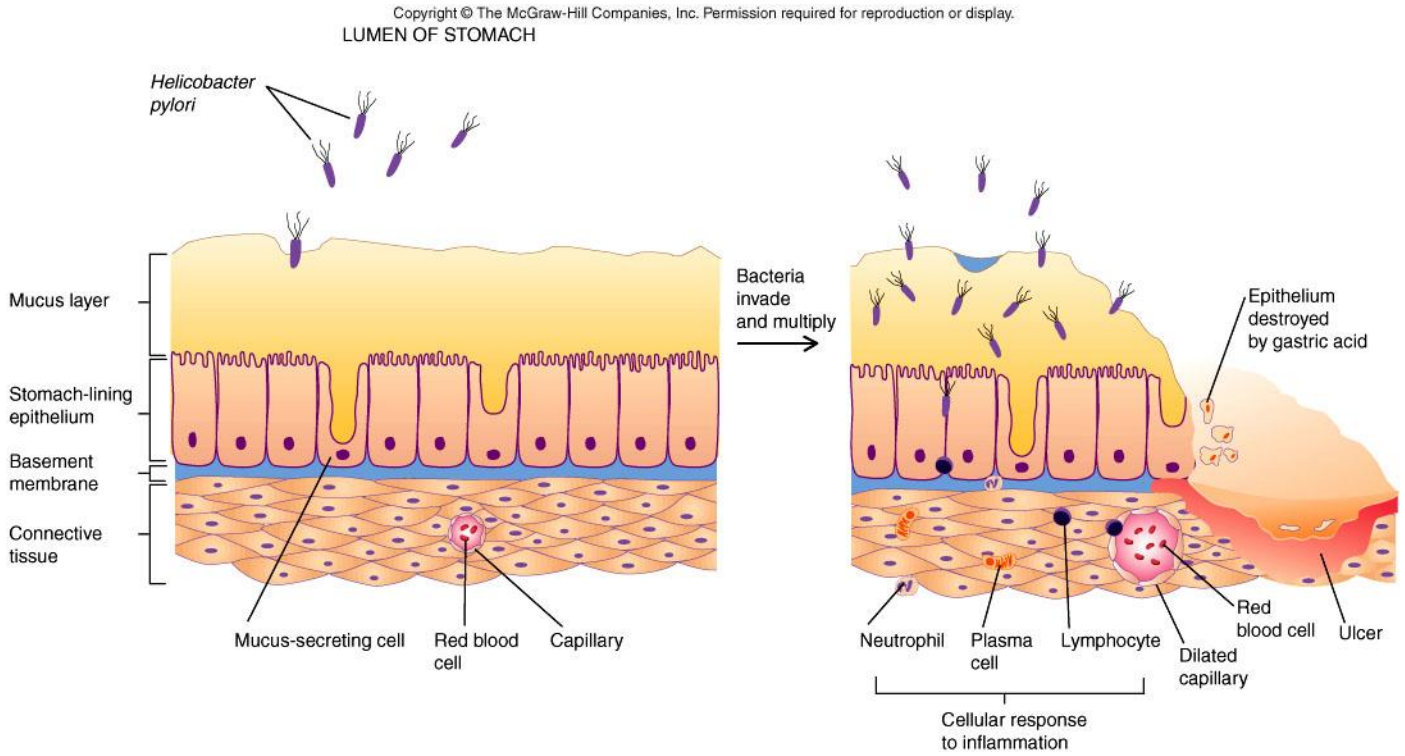
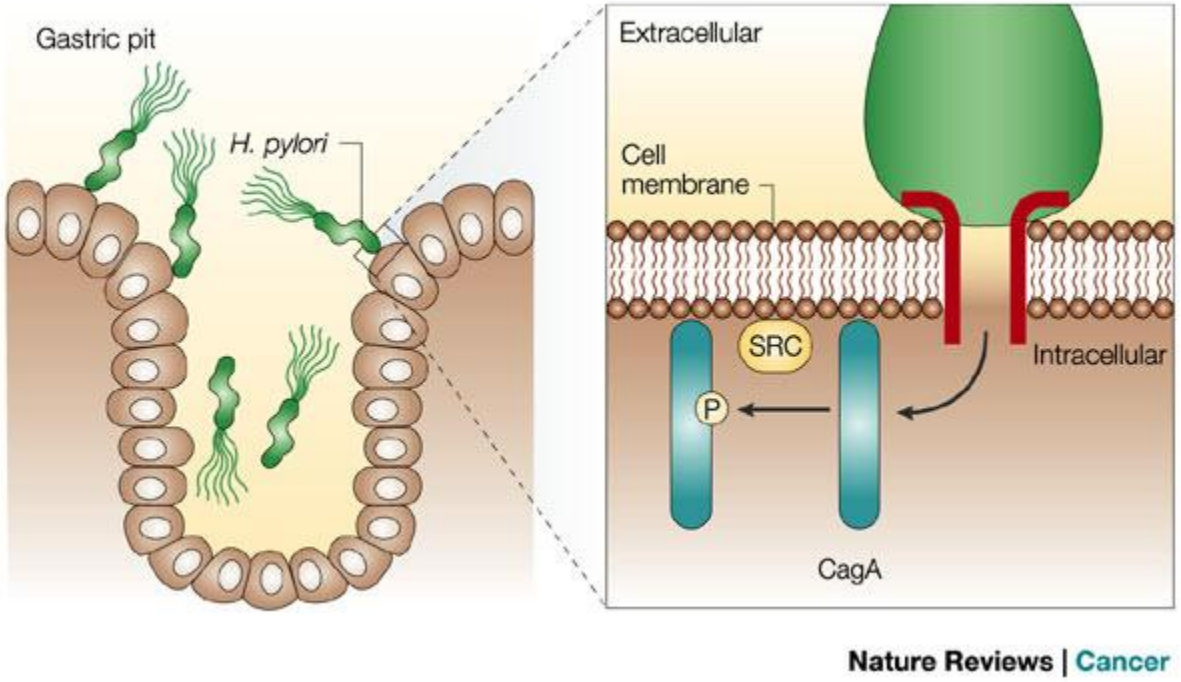
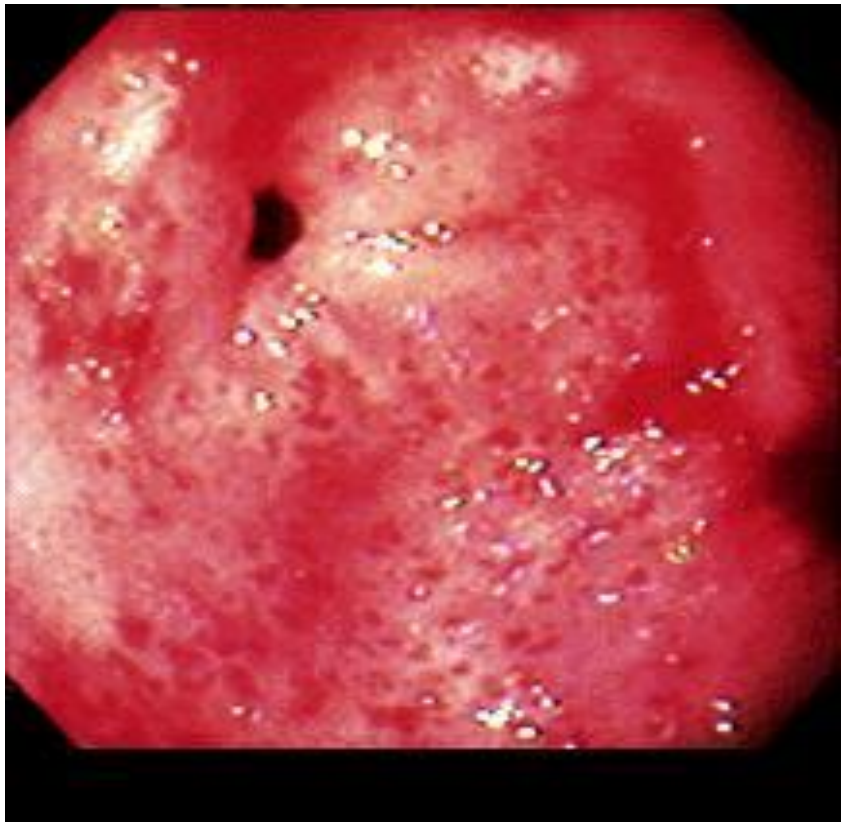
Ability to attach to epithelium is also important in tis bacterial athogenesis



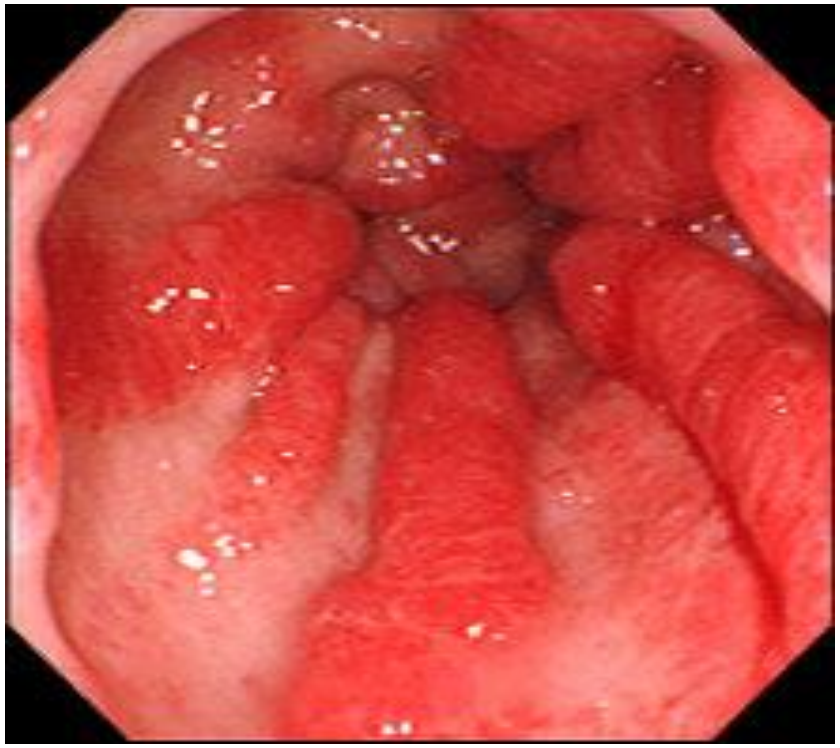
CAG A toxin by H pylori is thought to be important in gastritis and gastric carcinoma



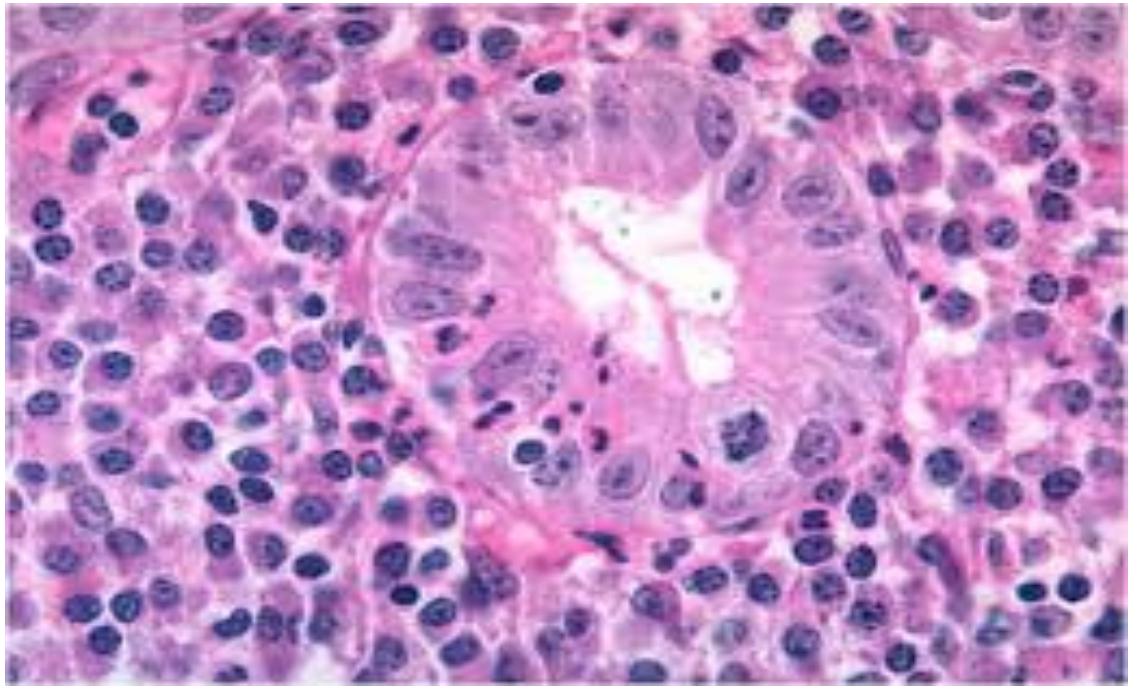
Morphology.. Chronic inflammation with redness and edema



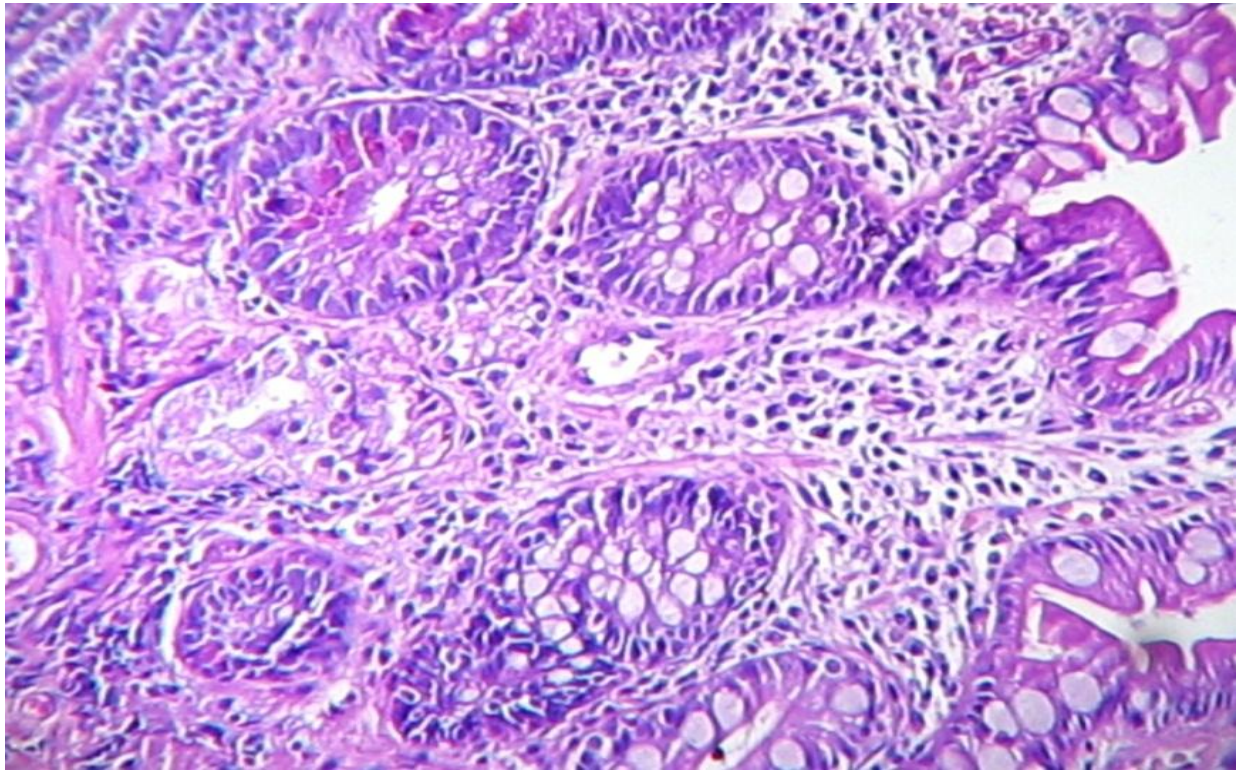
Chronic gastritis



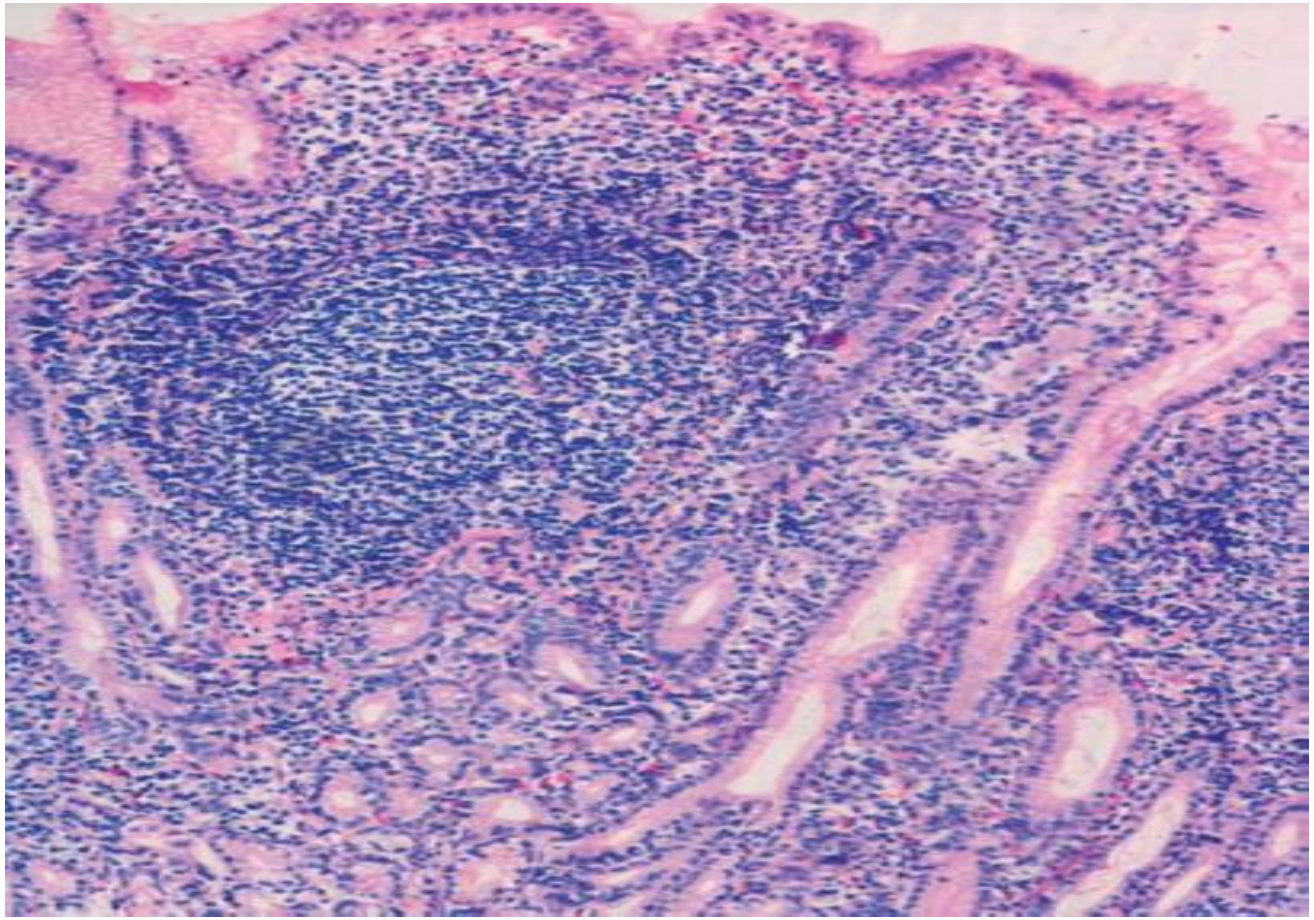
Chronic gastritis.. Increased chronic cell inflammatory infiltrate mainly lymphocytes and plasma cells



Intestinal metaplasia can complicate chronic gastritis.. And this predisposes to adenocarcinoma



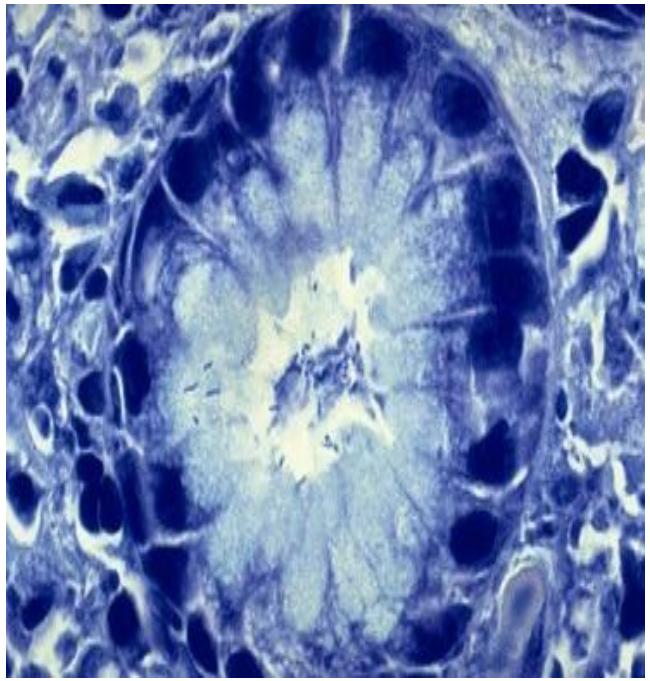
Lymphoid aggregates in chronic gastritis

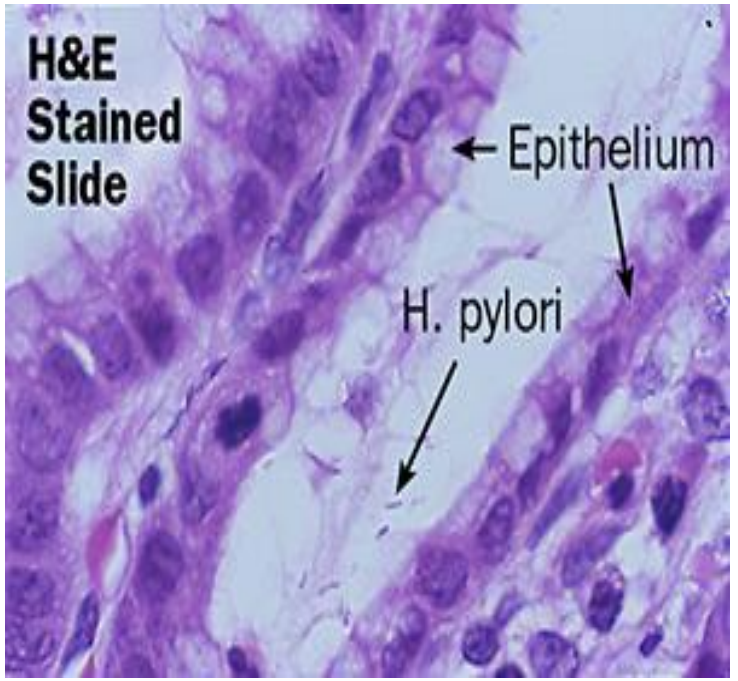


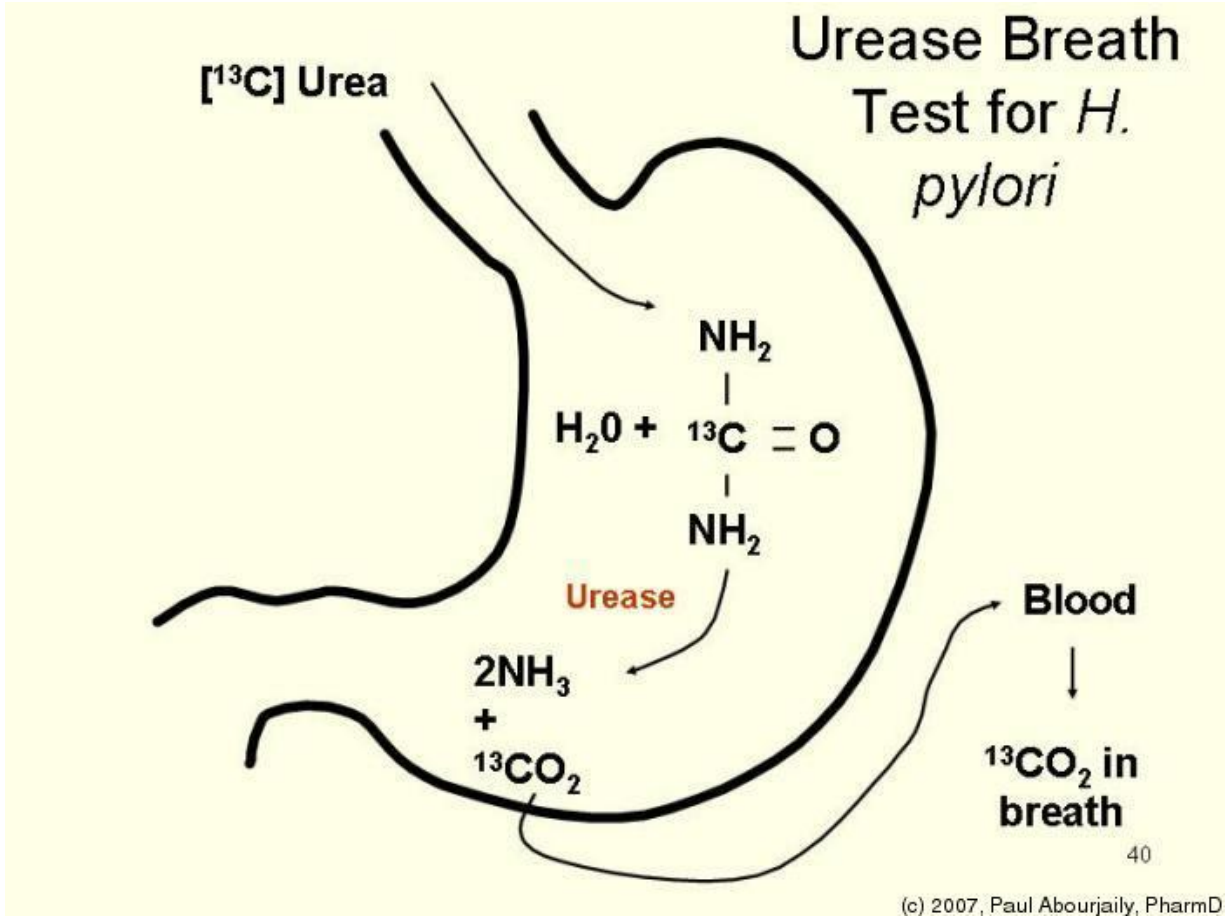
How to diagnose H Pylori

- Serology to detect anti H pylori antibodies
- Fecal bacterial detection
- Urea breath test
- Gastric biopsy
- PCR
- culture

H pylori diagnosis






Urease Breath Test for *H. pylori*
[13C] Urea
NH2
H20 + 13C = O
NH2
Urease
2NH3 + 13CO2
Blood
13CO2 in breath
40
(c) 2007, Paul Abourjaily, PharmD

serology


H. Pylori Antigen RapiCard™ InstaTest
REF
118564-1
LOT
9042345
2010-10
IVD
CE
CORTEZ
DIAGNOSTICS, INC.
ONE-STEP TESTS
EC REP
Cortez Diagnostics, Inc.
H. Pylori Ag
ID
C
T
S


QUICKVUE
C T
H. pylori
Control
Kontrolle
Contrôle
Controlo

Culture

Fig. Helicobacter pylori on Columbia blood agar

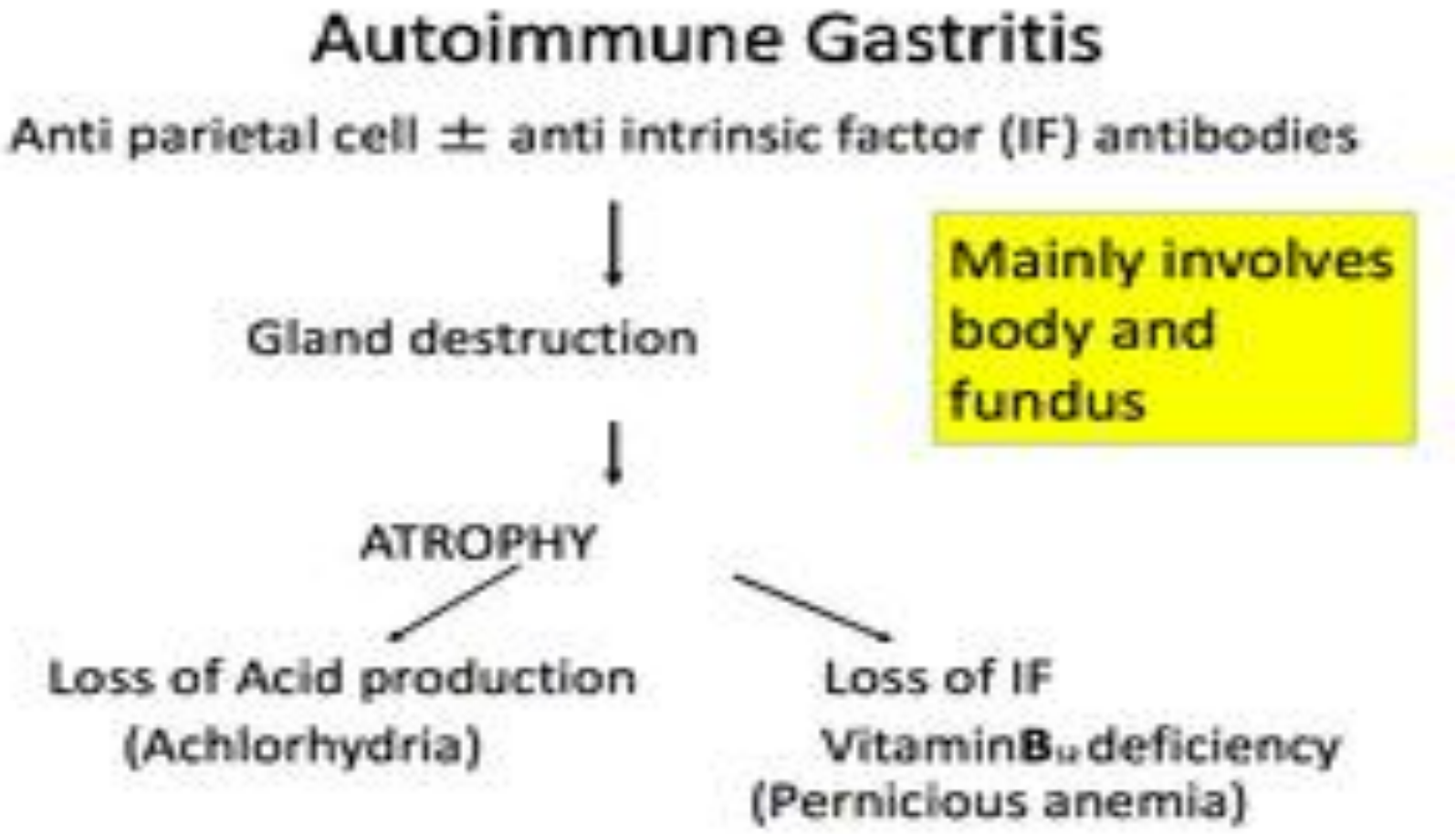
Autoimmune gastritis

- Less than 10% of chronic gastritis
- Usually spares the antrum
- Induces hypergastrinemia

Characteristics of autoimmune gastritis

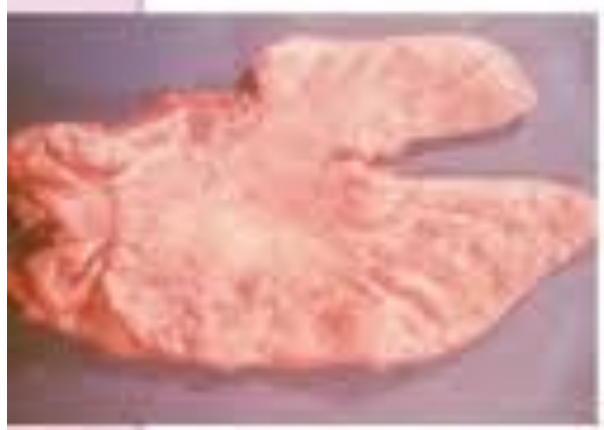
- Antibodies to parietal cells and intrinsic factor
- Reduced pepsinogen 1 level
- Antral endocrine cell hyperplasia
- Vitain B 12 def
- achlorohydria

pathogenesis

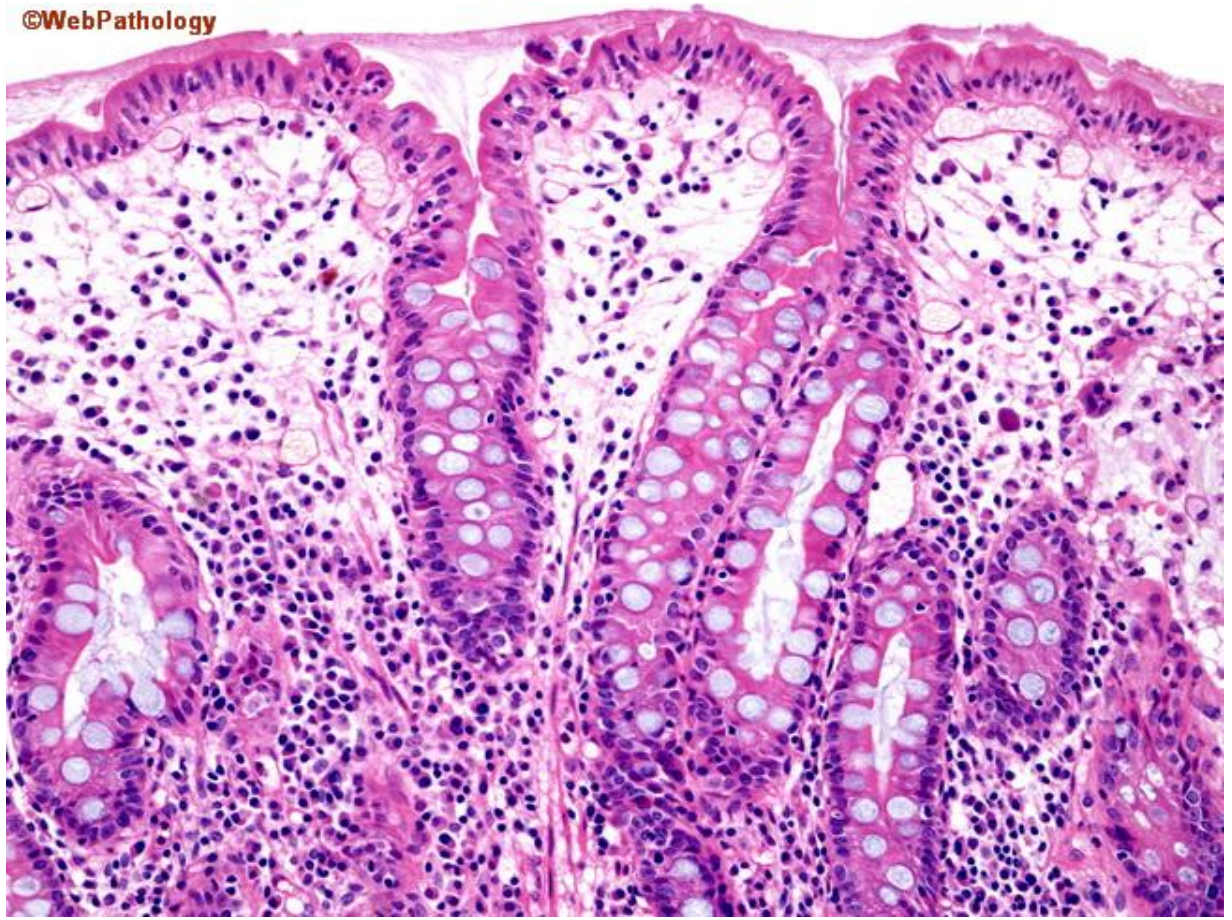


Autoimmune Gastritis -Morphology

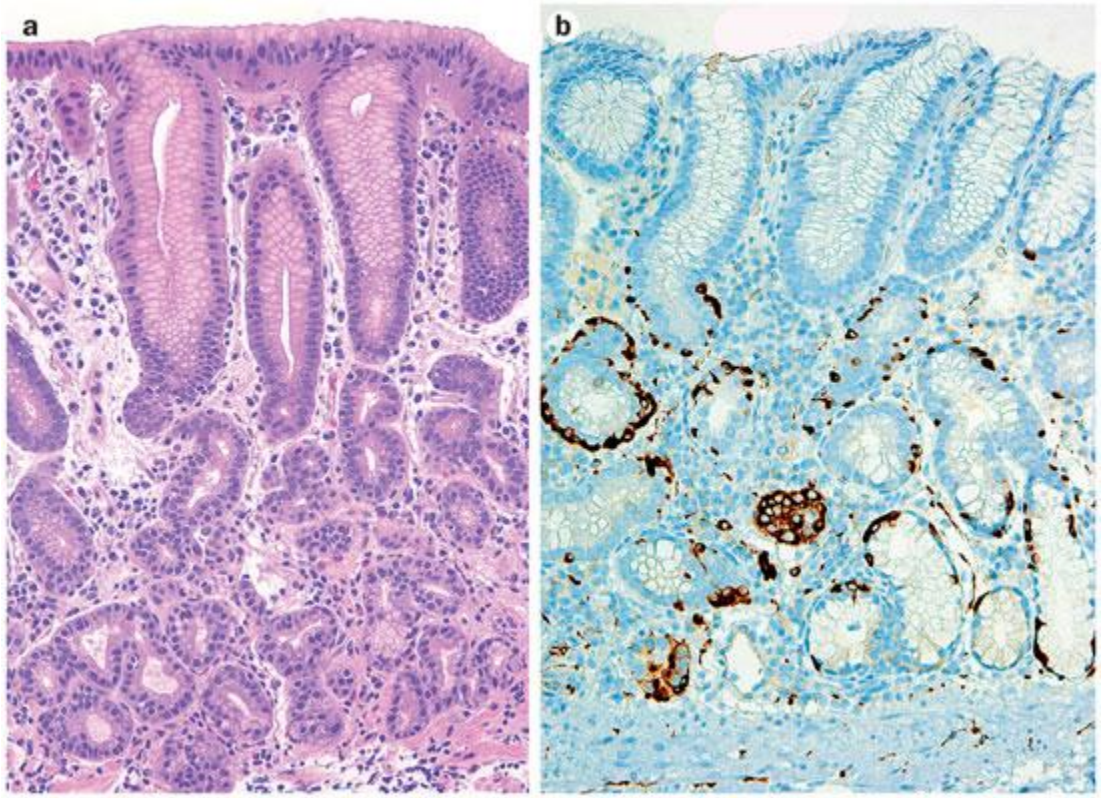
Diffuse mucosal damage of the **body and fundic mucosa**. Antrum less involved.



Intestinal metaplasia can be seen in autoimmune gastritis



G cell hyperplasia… a precursor to carcinoid tumor



	H pylori gastritis	Autoimmune gastritis
site	Mainly antrum	Body.. Spares antrum
Acid production	Usually increased	decreased
gastrin	Normal or decreased	increased
serology	H pylori antibodies	Antibodies to parietal cells and intrinsic factor
complications	Peptic ulcer, adenocarcinoma, lymphoma	Atrophy, pernicious anemia, adenocarcinoma, carcinoid tumor
associations	Poverty, low socioeconomic class	Other autoimmune diseases: thyroiditis, diabetes,