Update on the pathological classification of gastritis

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CLASSIFICATION

GASTRITIS

1. Acute
2. Chronic
3. Uncommon Forms

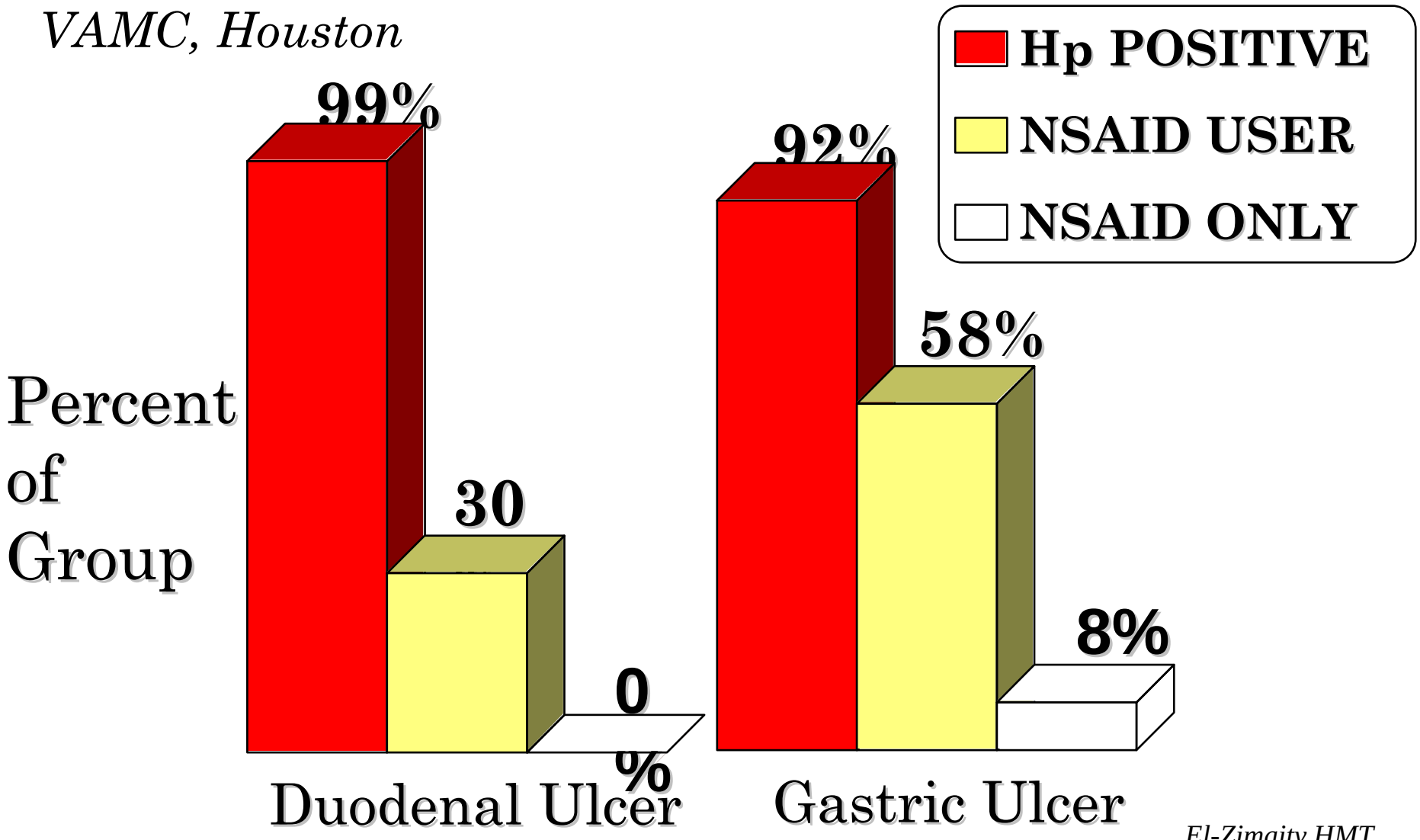
GASTROPATHY

Chemical gastropathy (NSAID/Bile reflux)

CAUSES OF PEPTIC ULCER

100 Consecutive DU and 154 GU PATIENTS

VAMC, Houston



El-Zimaity HMT

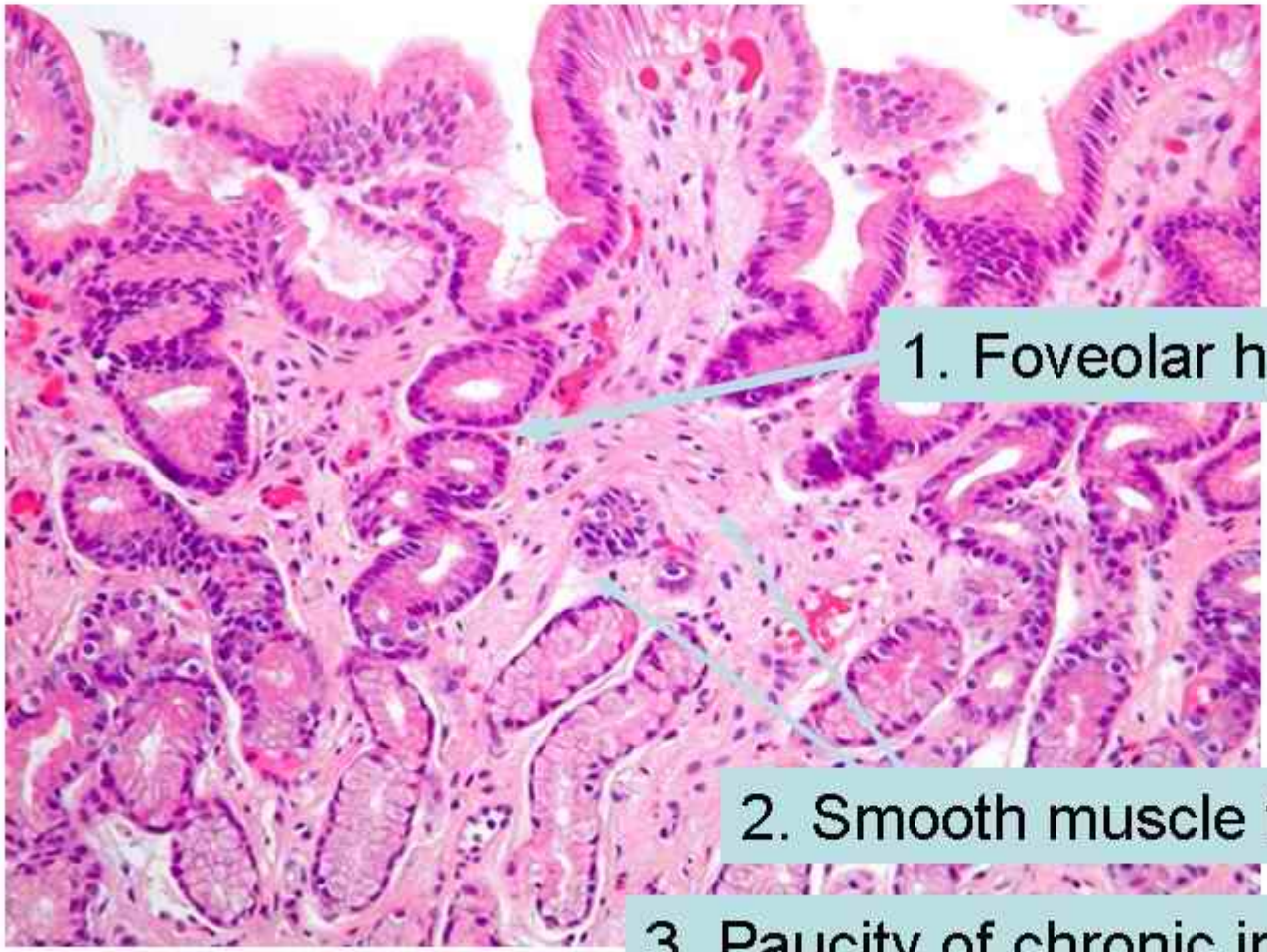
Case 1: 45 year old with dyspepsia

Gastropathy
= no acute inflammation (unless there is an erosion)

El-Zimaity HMT

Chemical gastropathy

3 things



1. Foveolar hyperplasia

2. Smooth muscle fiber hyperplasia

3. Paucity of chronic inflammatory cells

Q: Should we care?

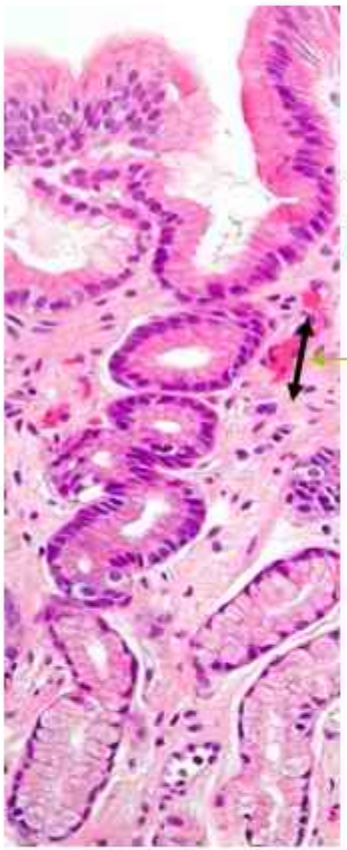
1. OTC analgesics including NSAID are widely used, frequently taken inappropriately, and users are generally unaware of potential for adverse side effects.

2. Can cause serious side effects including dyspepsia, peptic ulcer, hemorrhage, and even result in death.

HOW TO IDENTIFY FOVEOLAR HYPERPLASIA?

2 things

1. LENGTH OF NECK REGION
2. MUCIN DEPLETION (50:50)



1. Foveolar region
Long & tortuous

normal

FH- 3x normal

2. Amount of mucin

normal- mucin 80% of cell

FH- mucin ≤ 50%

It's more blue

NORMAL SMOOTH MUSCLE FIBERS

aken for
ear cells
er

Chemical gastropathy
3x normal

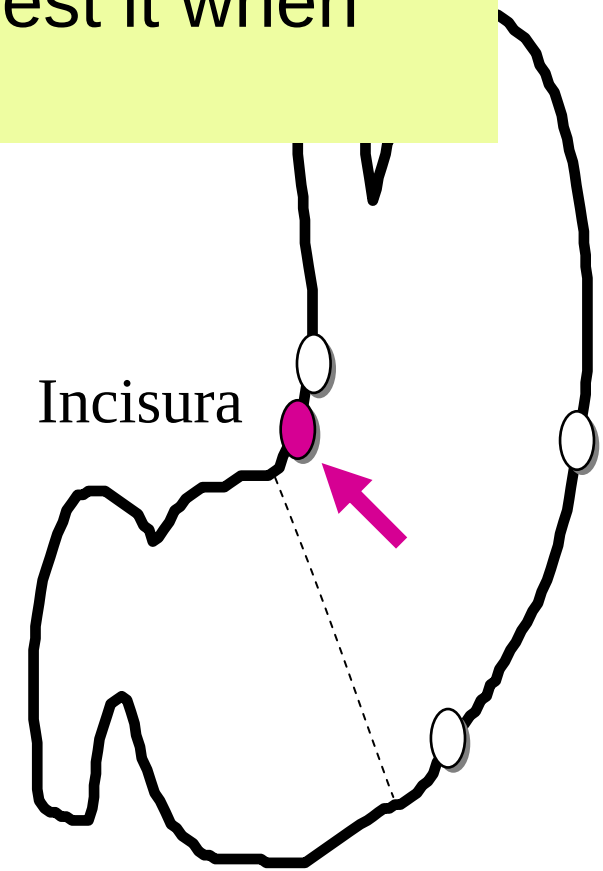
a propria

Thin you only see the nucleus

Q1: HOW OFTEN DO YOU SEE

Chemical gastropathy is common; you will not always see the triad; suggest it when suspected

- [illegible] chronic NSAID users.
- Triad is most seen at incisura (less marked at other regions of the stomach).
- Remaining 70%:
  - edema
  - foveolar hyperplasia only
  - Fibrosis
  - FH only or SMF-H only



El-Zimaity et al Hum Pathol 1996; 27(12): 1348-54

CLASSIFICATION

GASTRITIS

1. Acute
2. Chronic
3. Uncommon Forms

GASTRITIS

- ACUTE
  - *H. pylori*
  - Other
    - Other bacteria (Heilmanni, mycobacteria)
    - Syphilitic
    - Viral
    - Parasitic
    - Fungal
- Chronic
  - *H. pylori* (chronic atrophic gastritis)
  - Autoimmune (body predominant)

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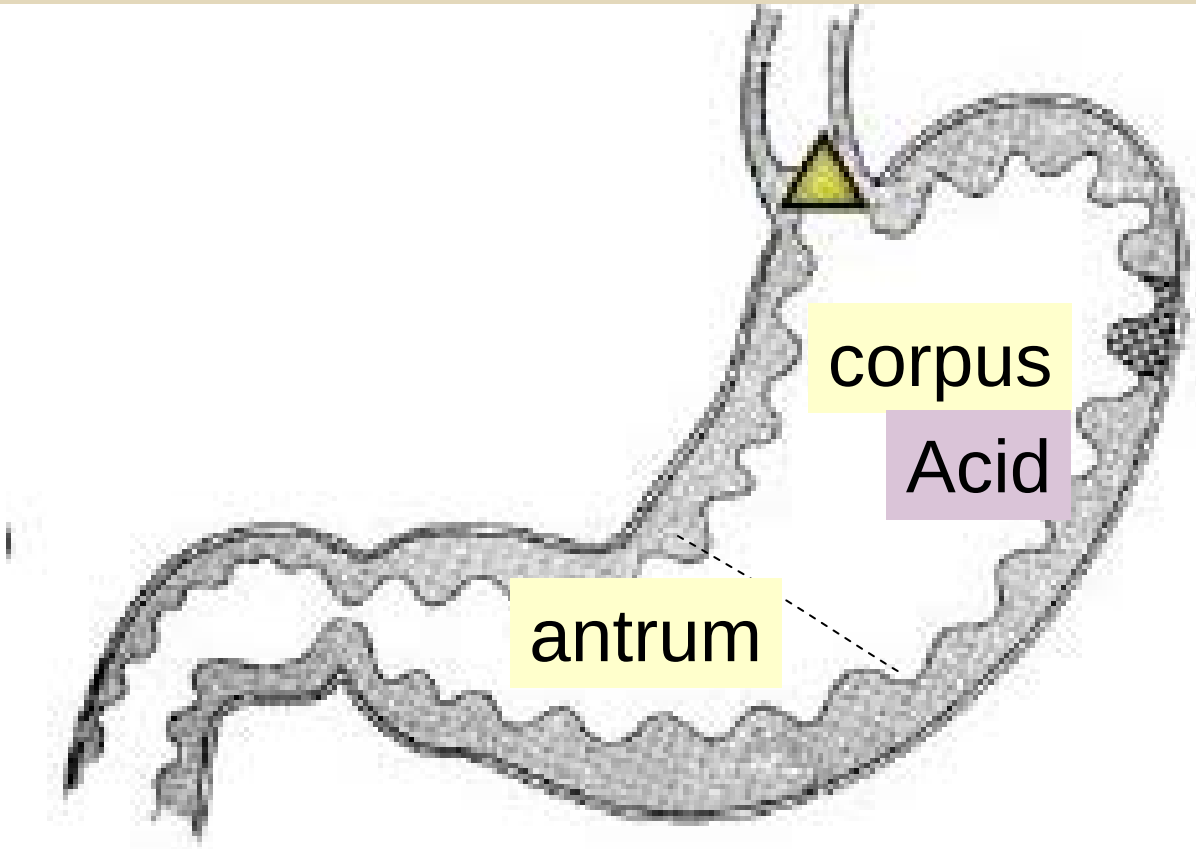
Anatomy of The Stomach
WHAT IS NORMAL?

Anatomy of The Stomach



Anatomy of The CORPUS

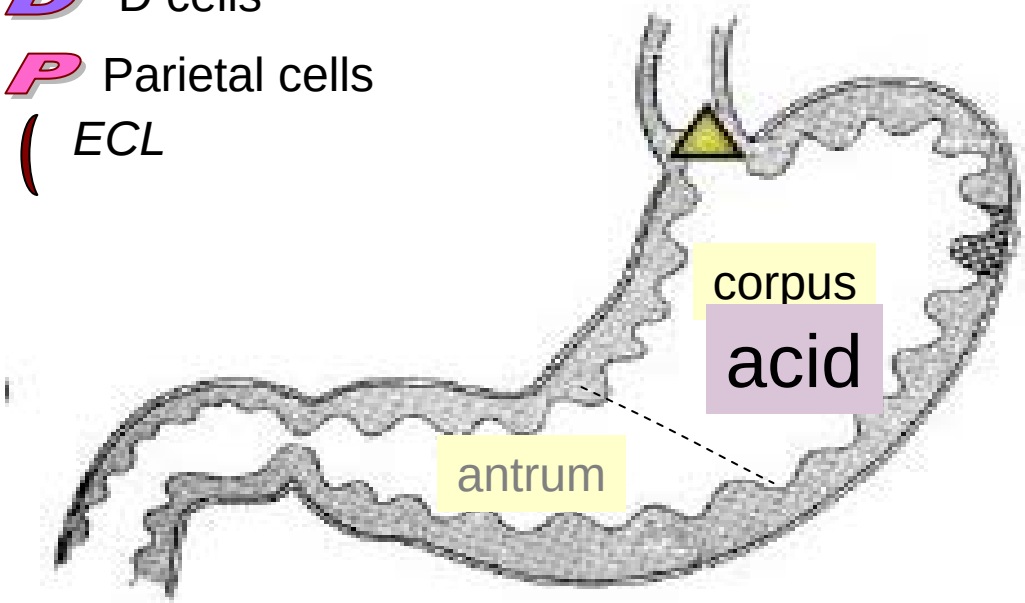
Antrum-corpus junction

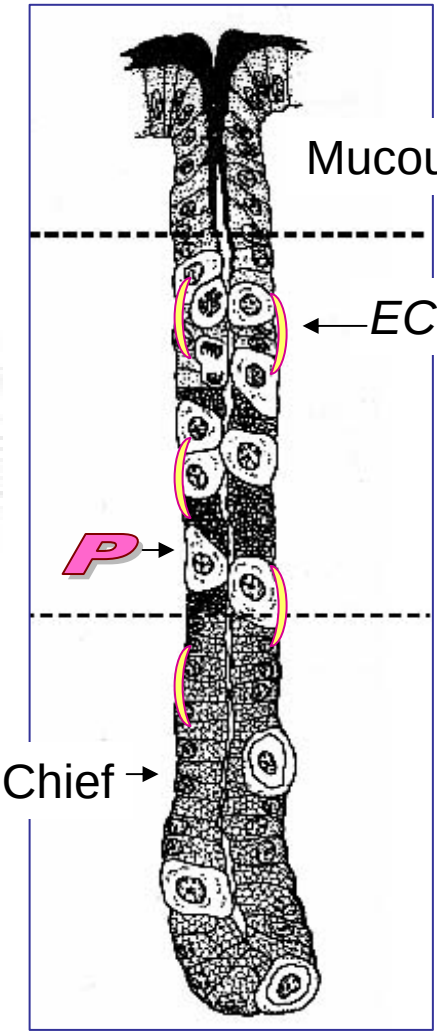
G G cells

D D cells

P Parietal cells

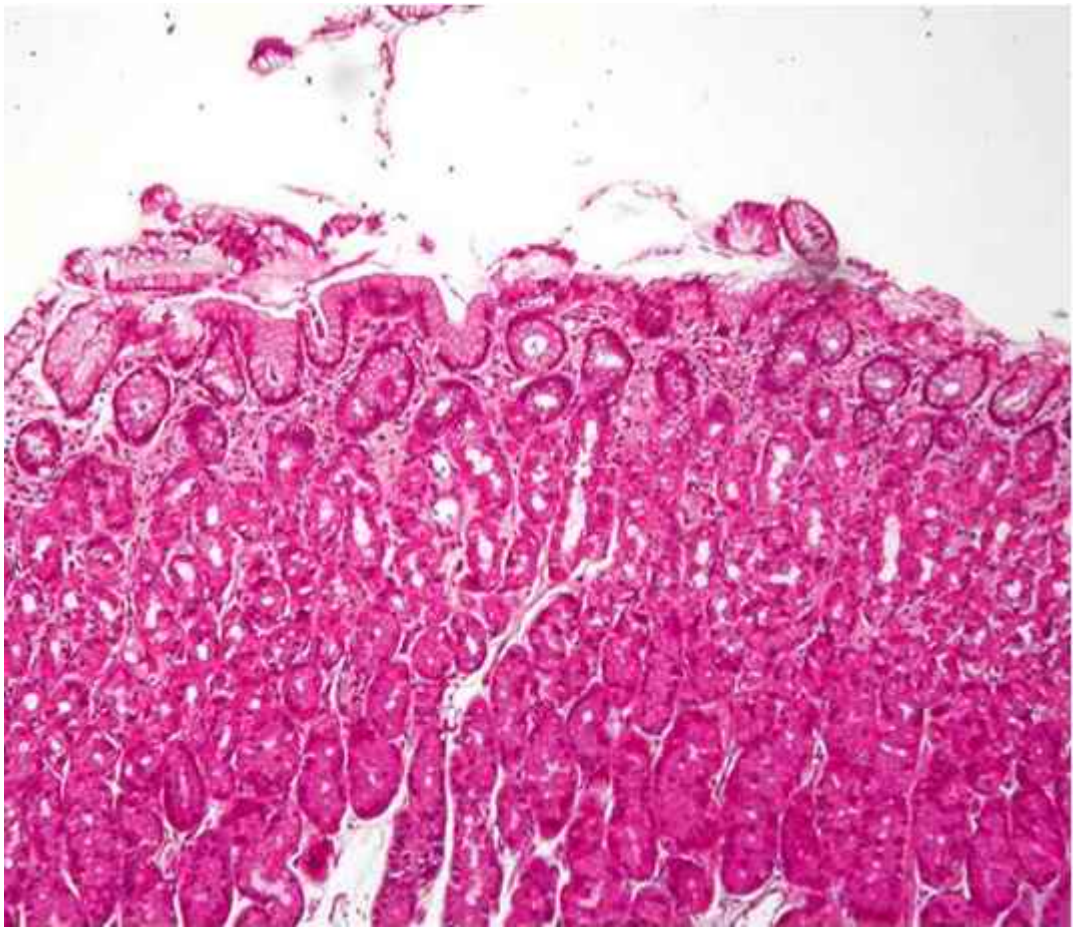
(*ECL*

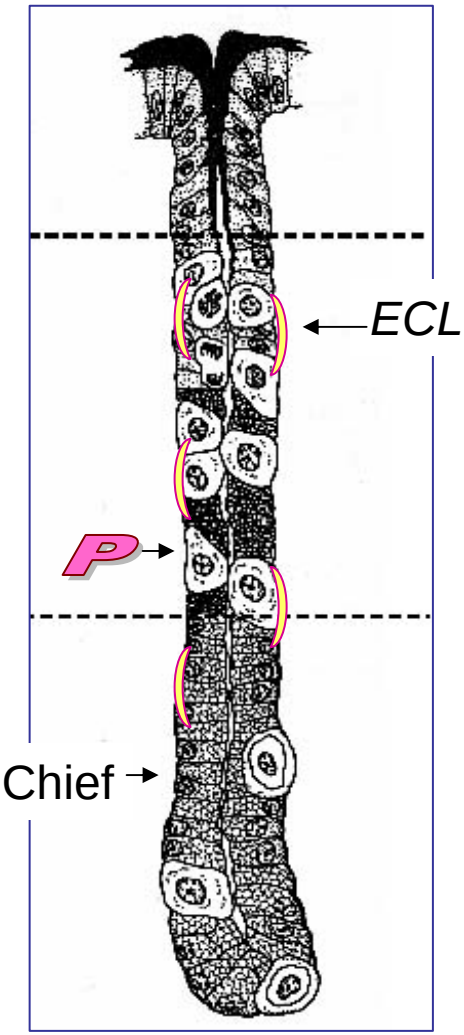




corpus

NORMAL CORPUS





Anatomy of The ANTRUM

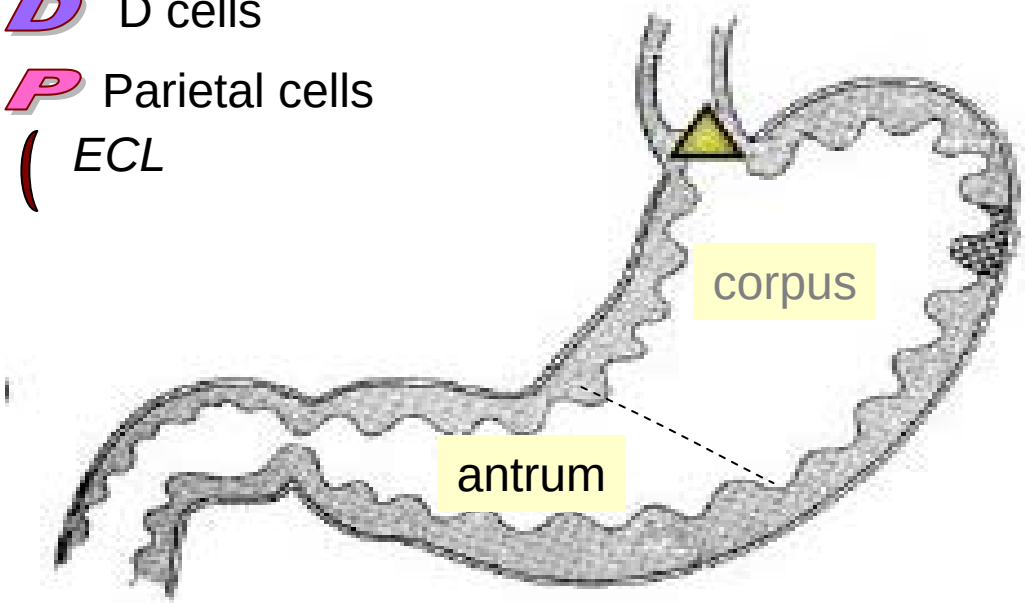
Antrum-corpus junction

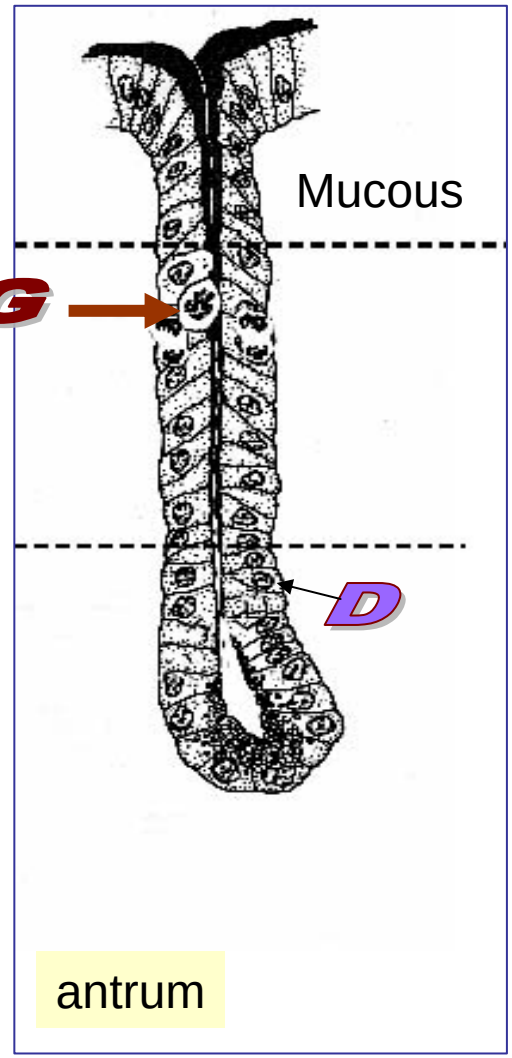
G cells

D cells

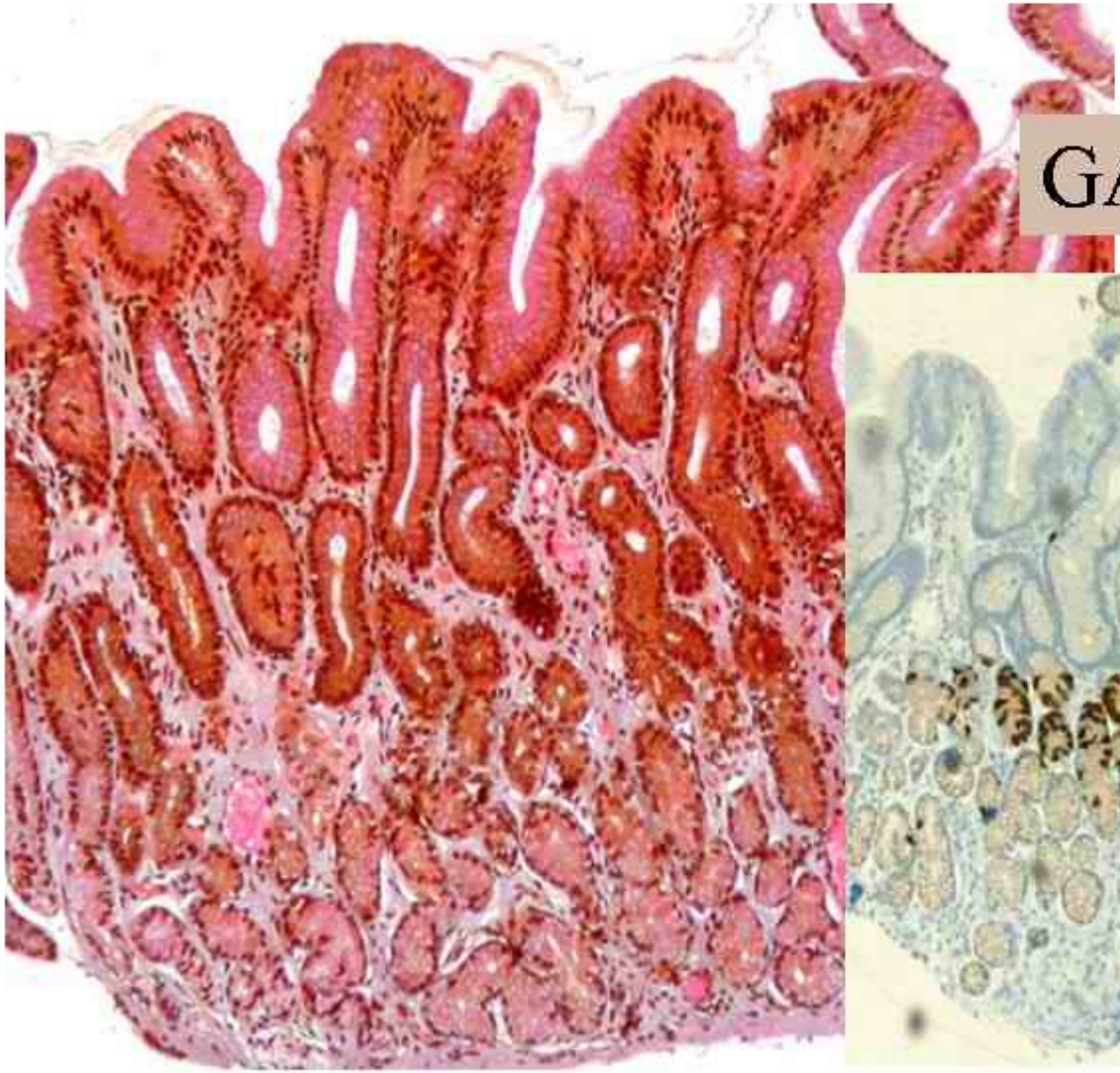
P Parietal cells

ECL

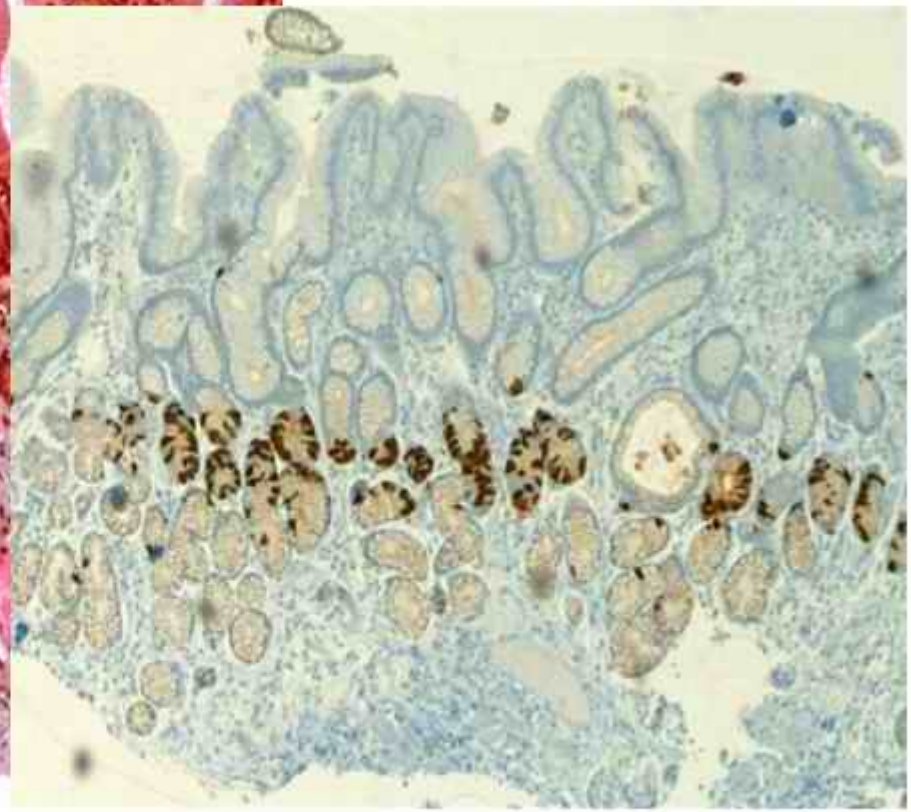




NORMAL ANTRUM



GASTRIN



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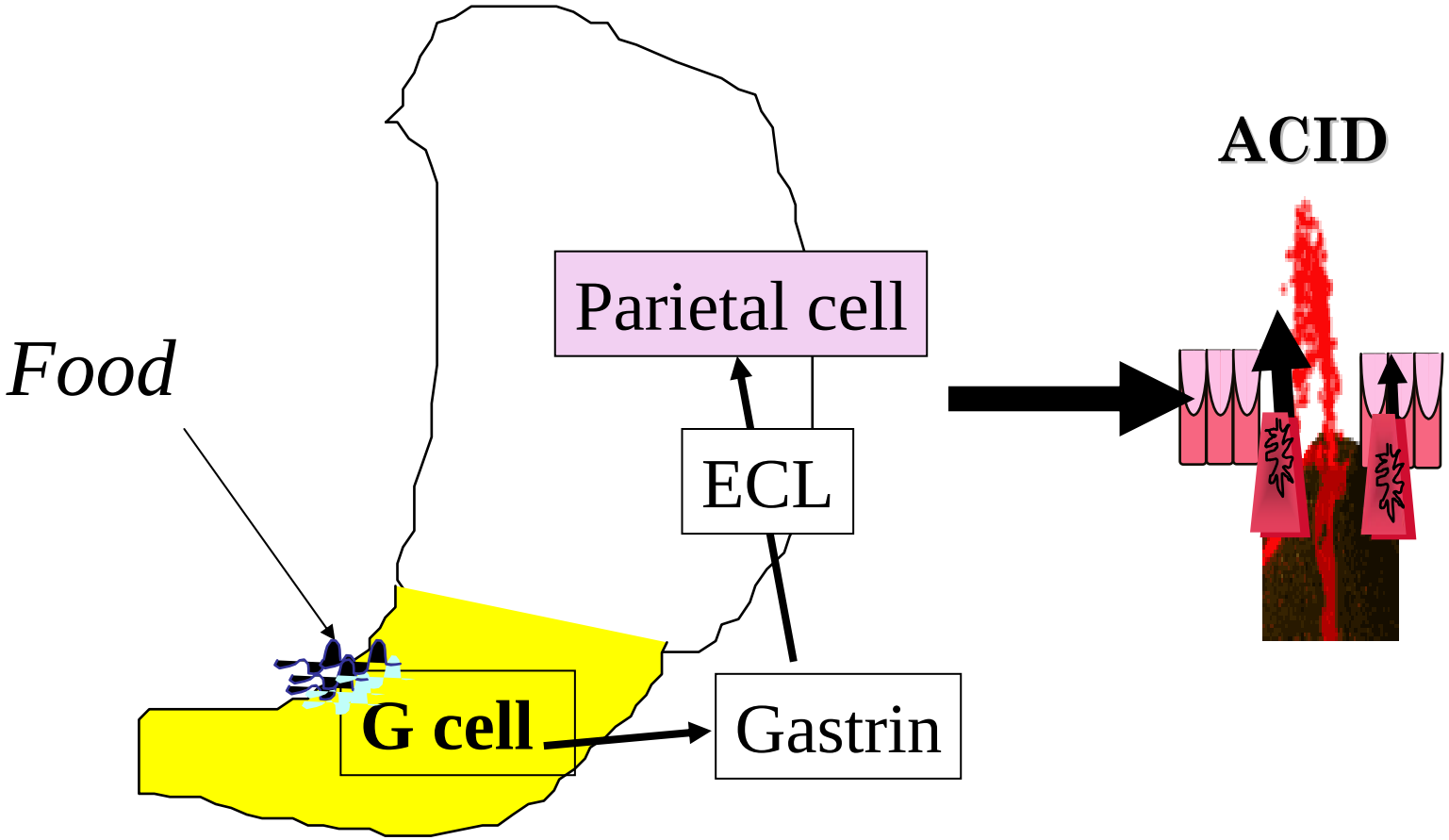
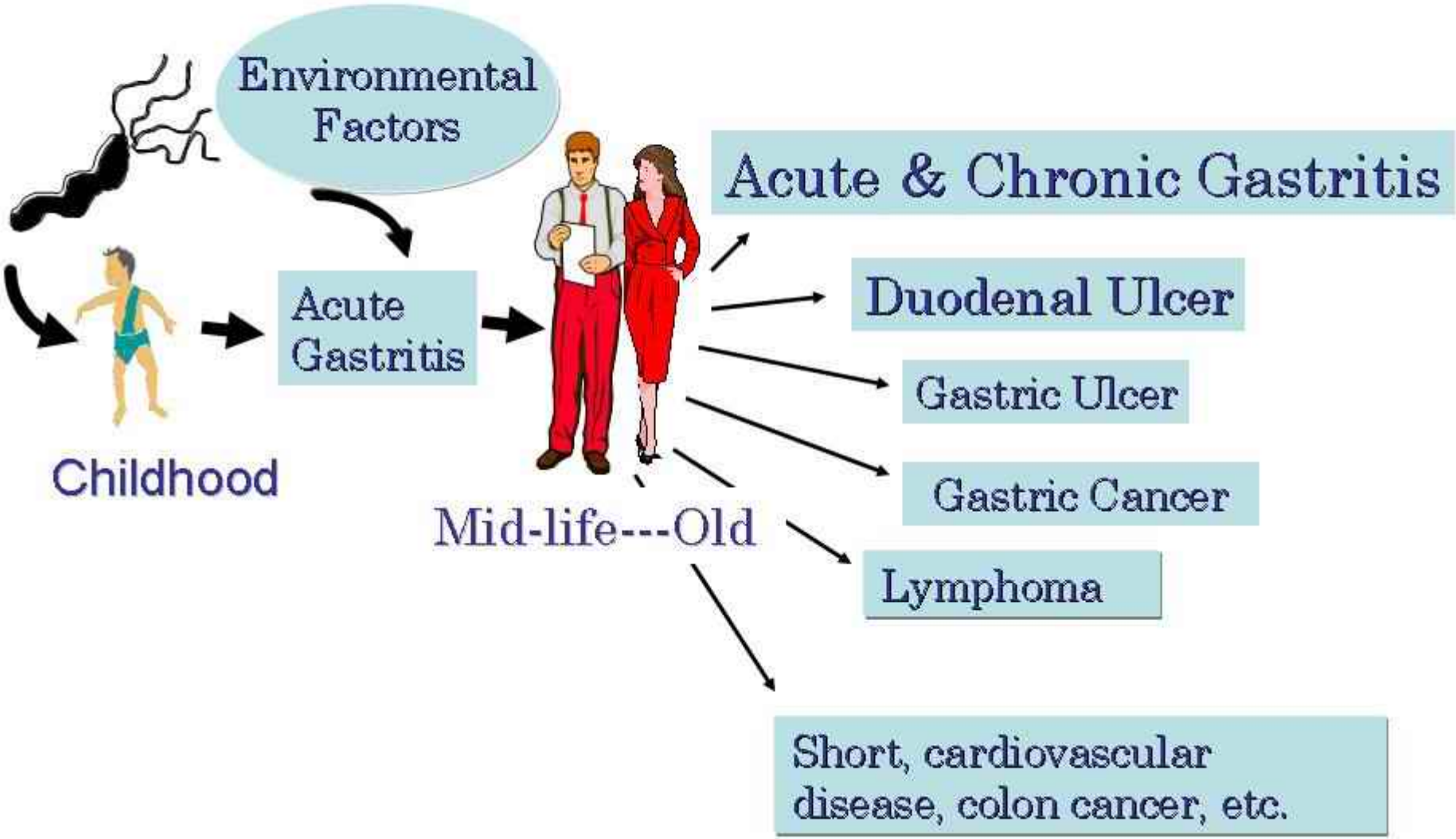
Acid Secretion Pathophysiology



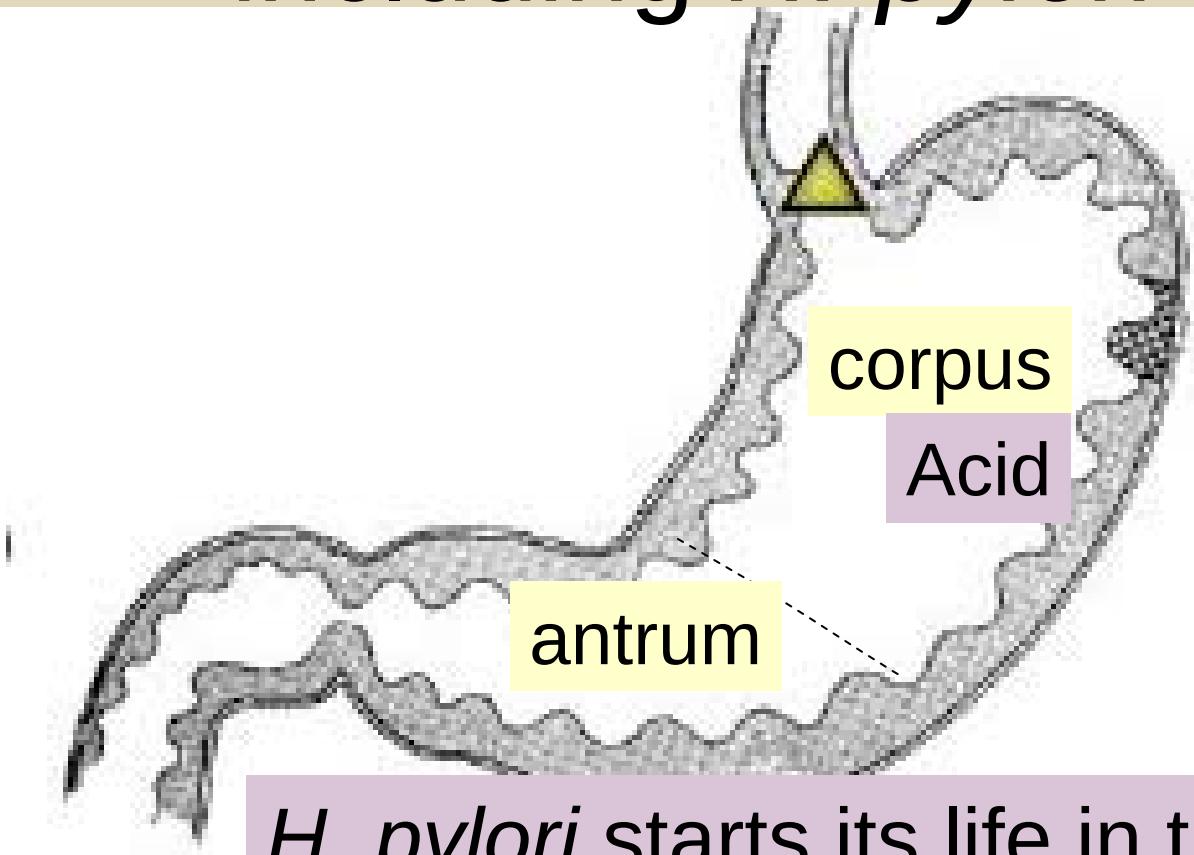
OUTCOMES OF *H. PYLORI* INFECTION



Should you care?

- If you speak “Arabic” you have *H. pylori*!
- Yes, you should care.

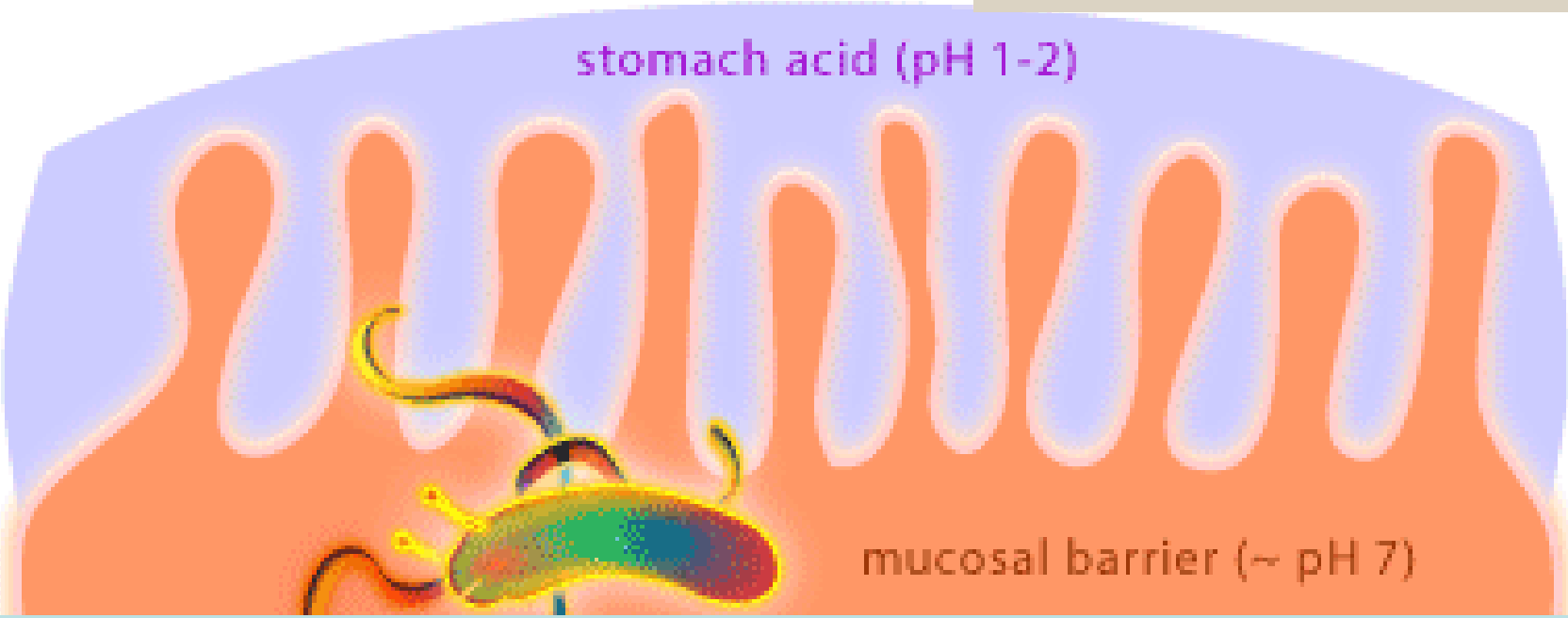
No bacteria likes too much acid including *H. pylori*



H. pylori starts its life in the antrum where it is less acidic

No bacteria likes acid

Starts in the antrum

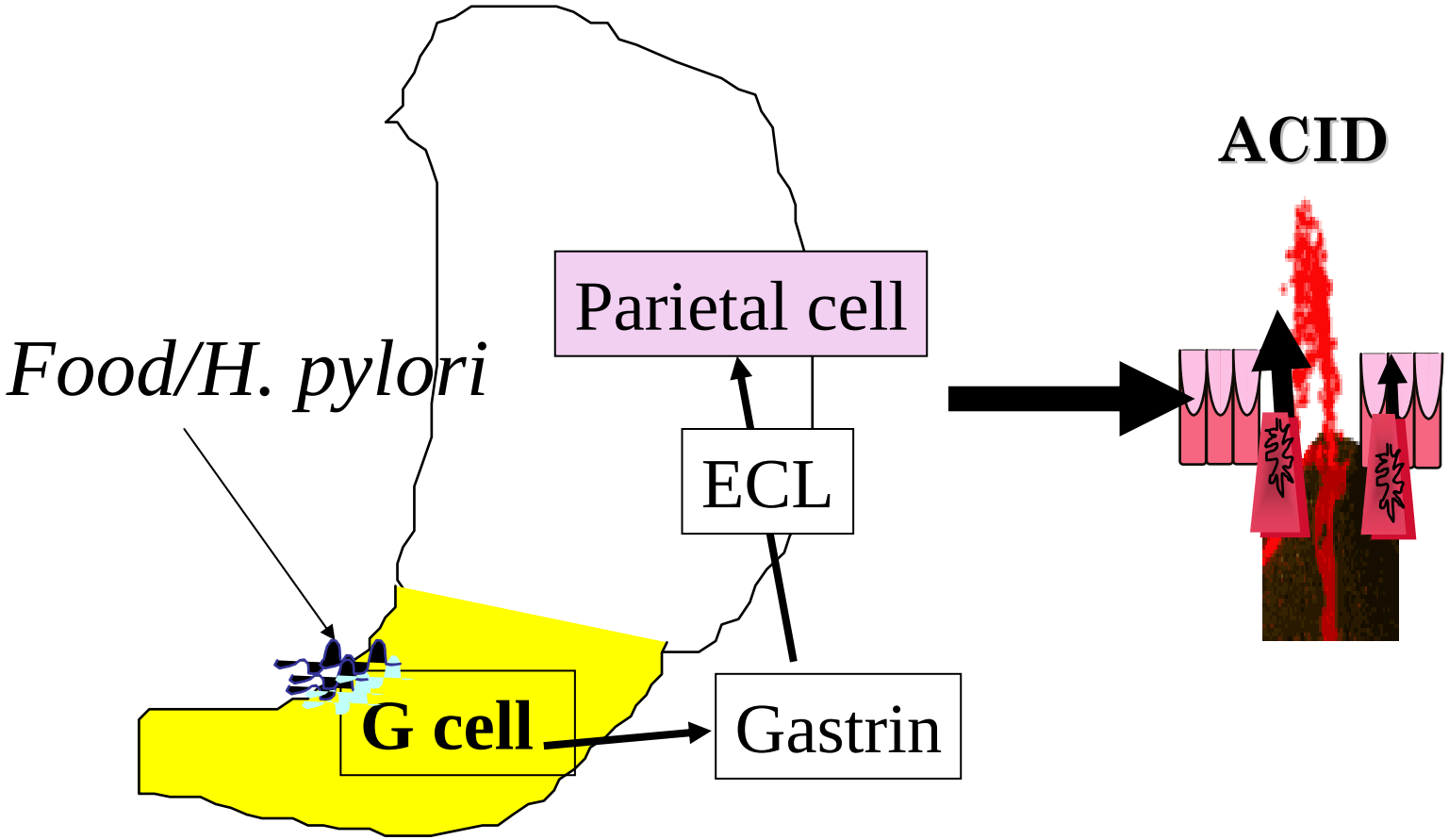


***H. pylori* surrounds itself with a bicarbonate cloud to counter gastric acidity**

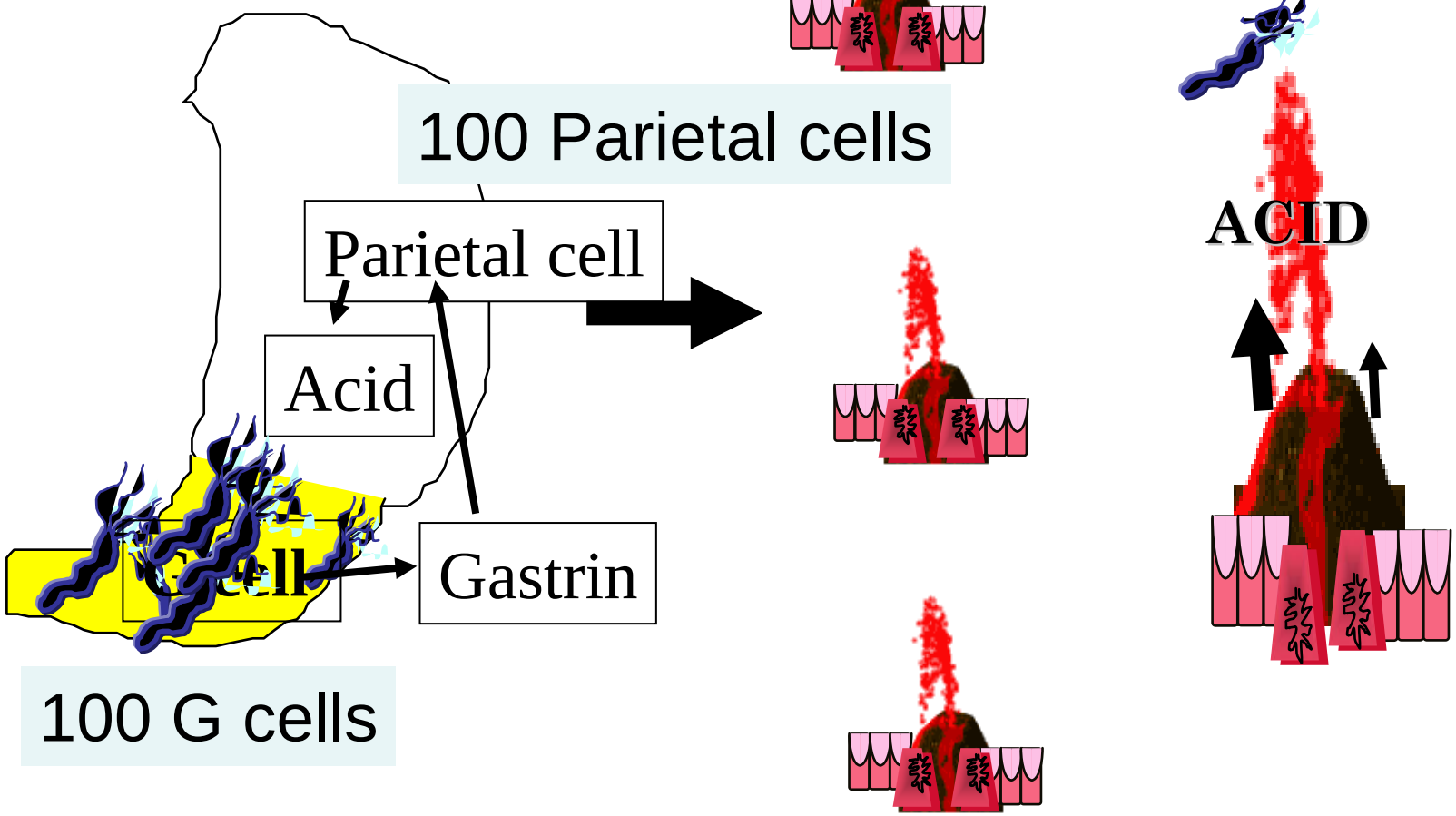
(it produces urease which converts urea (abundant in saliva & gastric juices) to ammonia and bicarbonate)

C=0(NH2)2 + H+ +2H20 --urease--> HCO3- + 2(NH4)

Acid Secretion Pathophysiology



Duodenal Ulcer



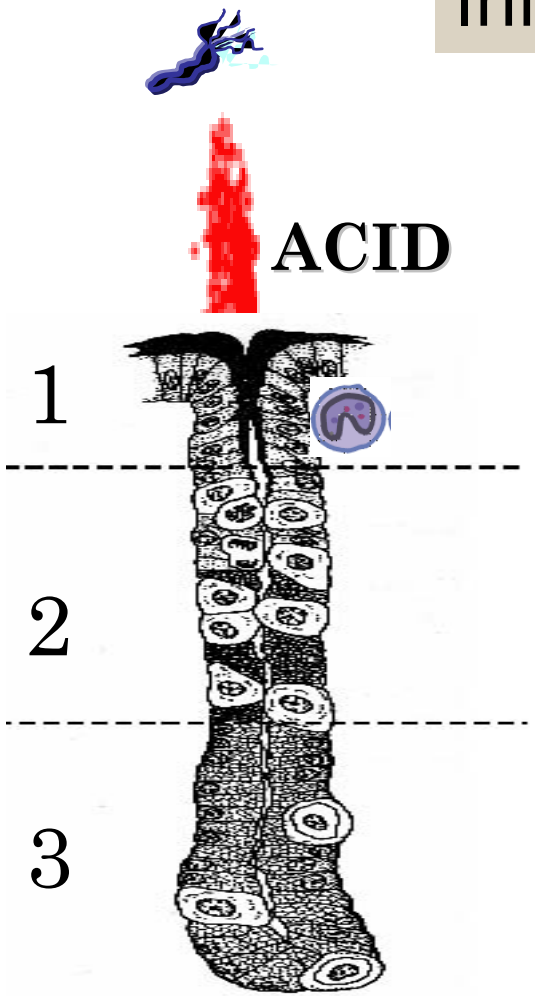
Inflammation Depth-Duodenal Ulcer

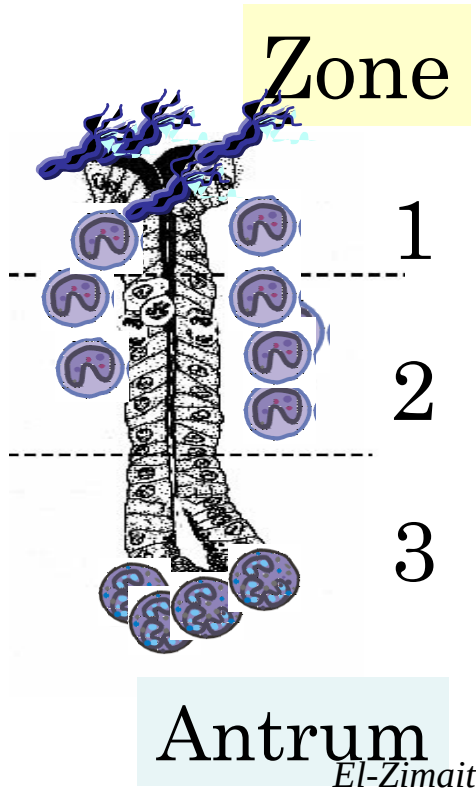
MNC

PMN

H. pylori

Inflammation in antrum only





Inflammation Depth-Duodenal Ulcer


MNC


PMN


H. pylori

H. pylori

↓

toxins

↓

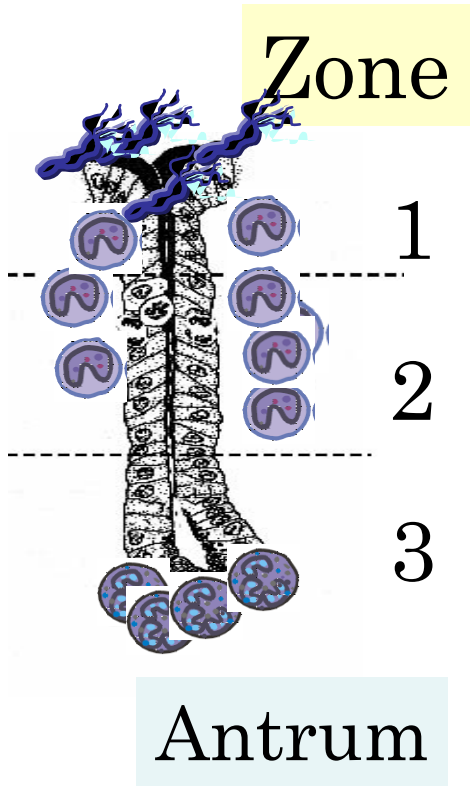
Cytokines

↓

Massive inflammatory response

↓

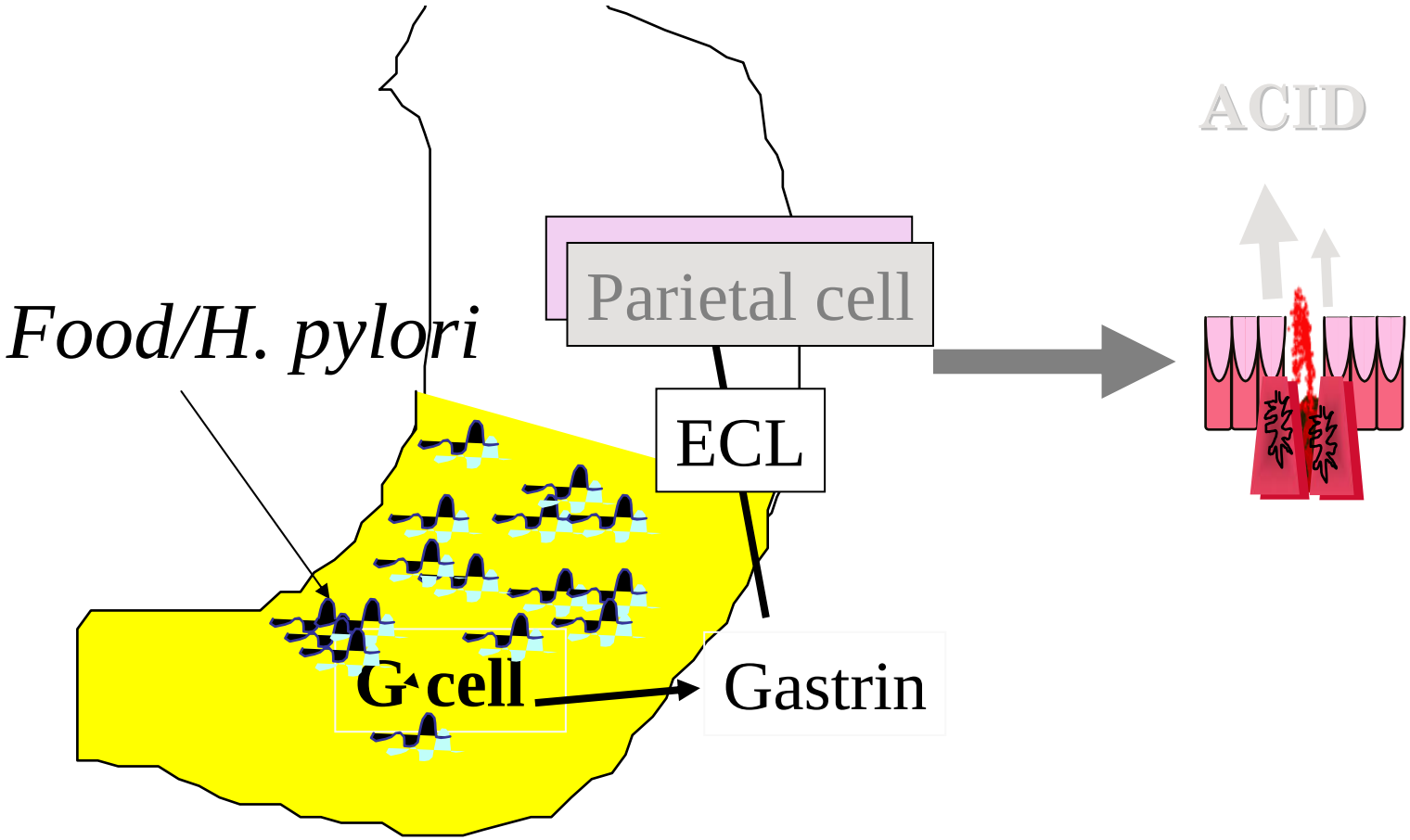
Destroy stomach



Acid Secretion

GASTRIC ATROPHY

Destroyed corpus = no acid = bacteria moves proximal



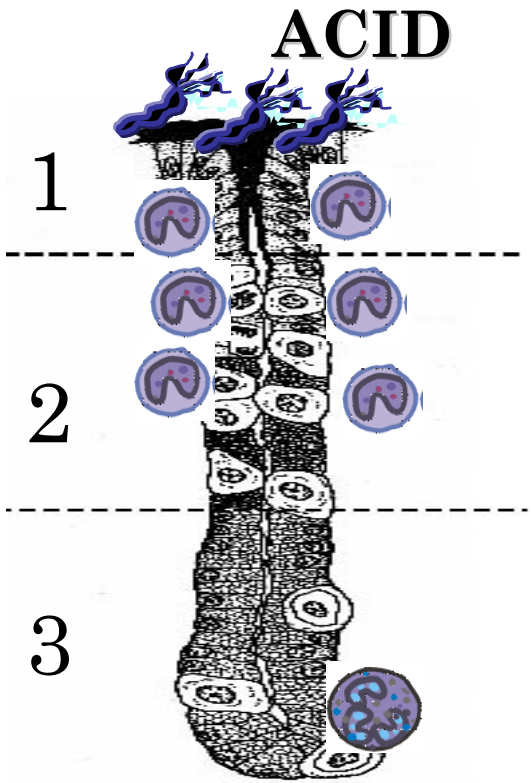
Inflammation Depth-Gastric Ulcer

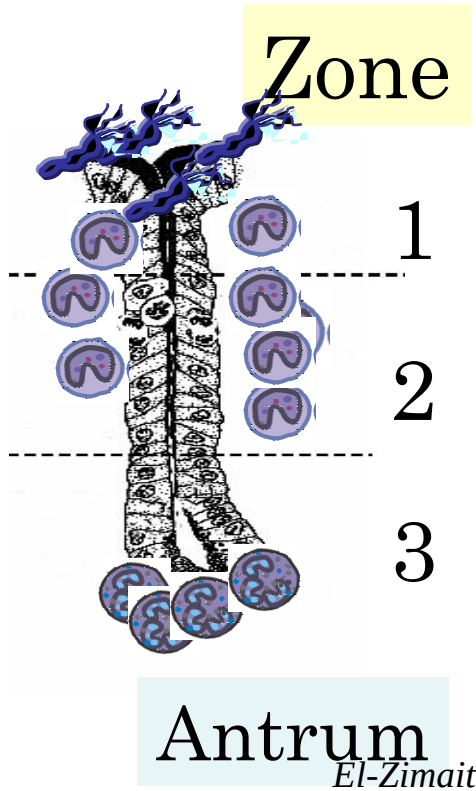
MNC

PMN

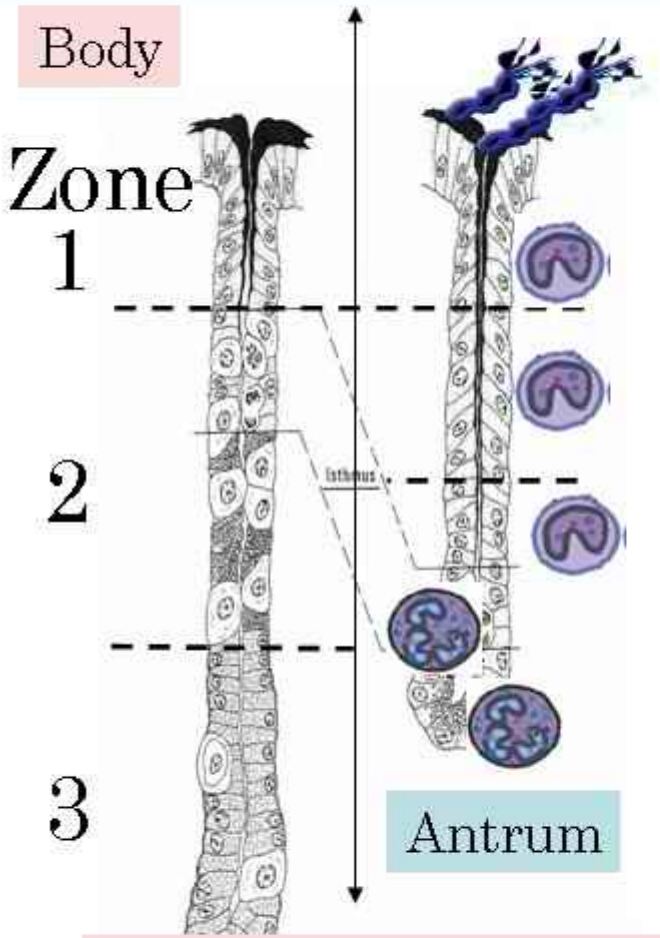
H. pylori

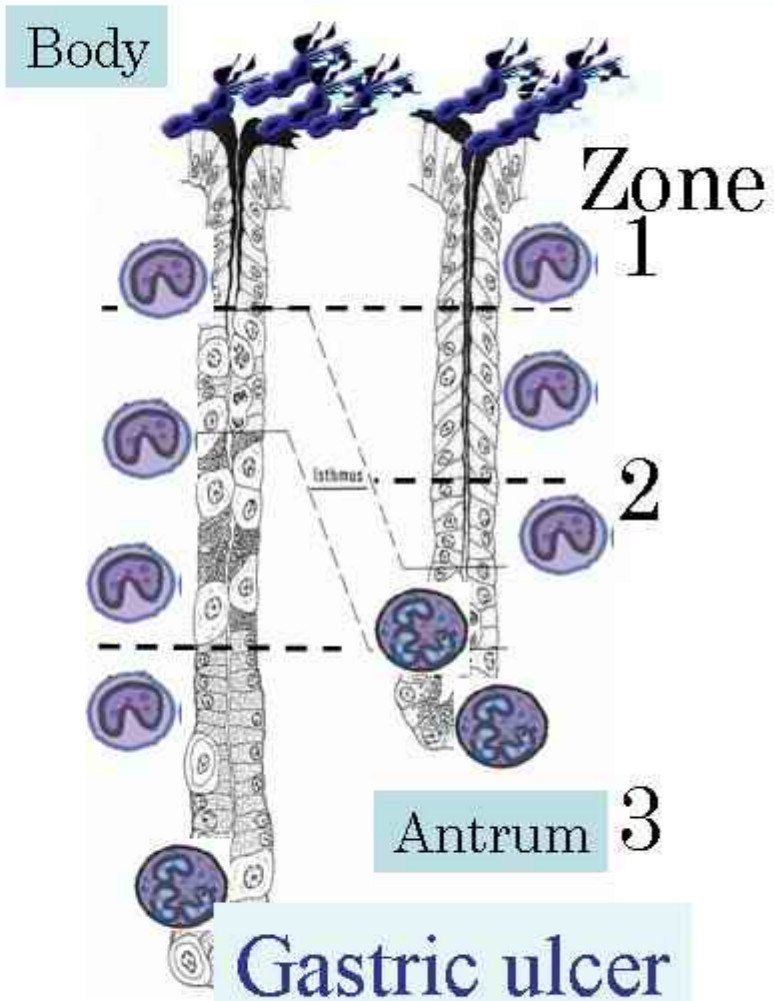
Inflammation in both antrum and corpus





Duodenal ……→……Gastric Ulcer





Duodenal Ulcer
Antral Predominant

→

Gastric ulcer
Pan Gastritis

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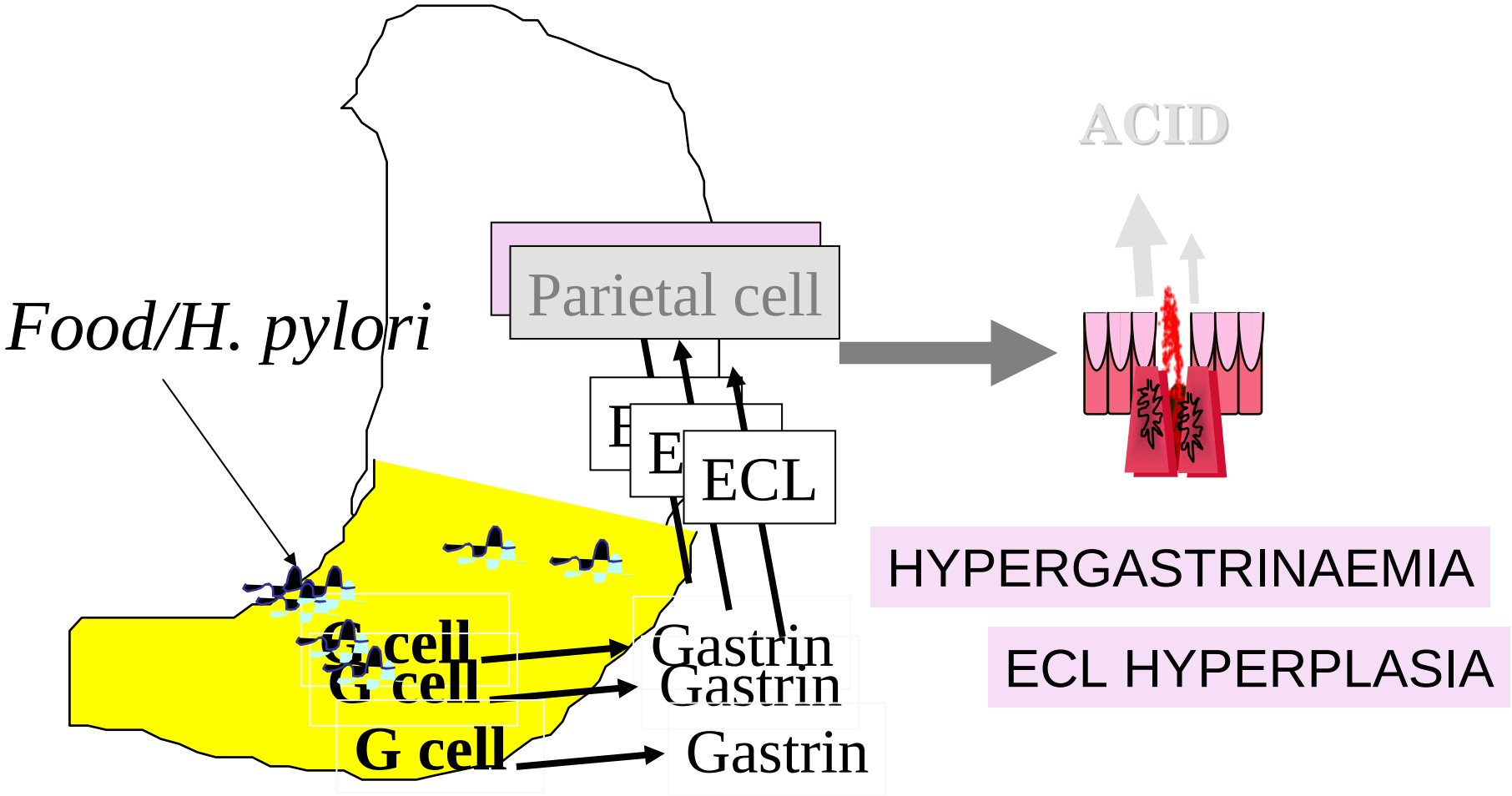
Why is this important?

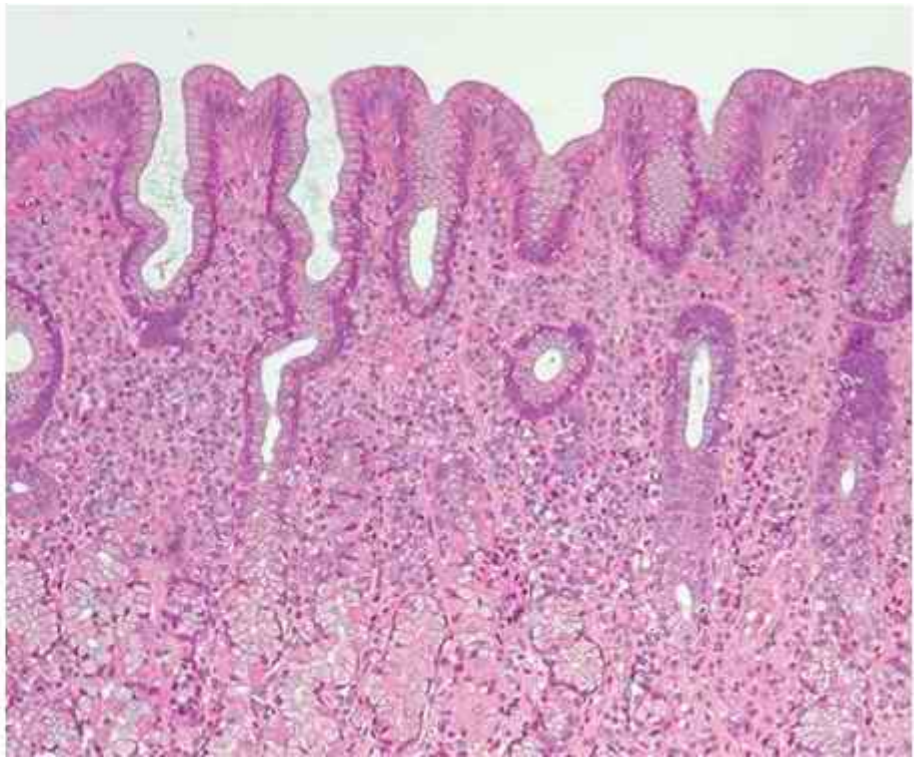
- *If patient is H. pylori* positive
  - Receives acid suppressor therapy without treating the infection (e.g. GERD patient and *H. pylori* infection missed)
  - You will help him develop gastric atrophy

Acid Secretion

PPI treatment = high pH



ANTRAL MUCOSA



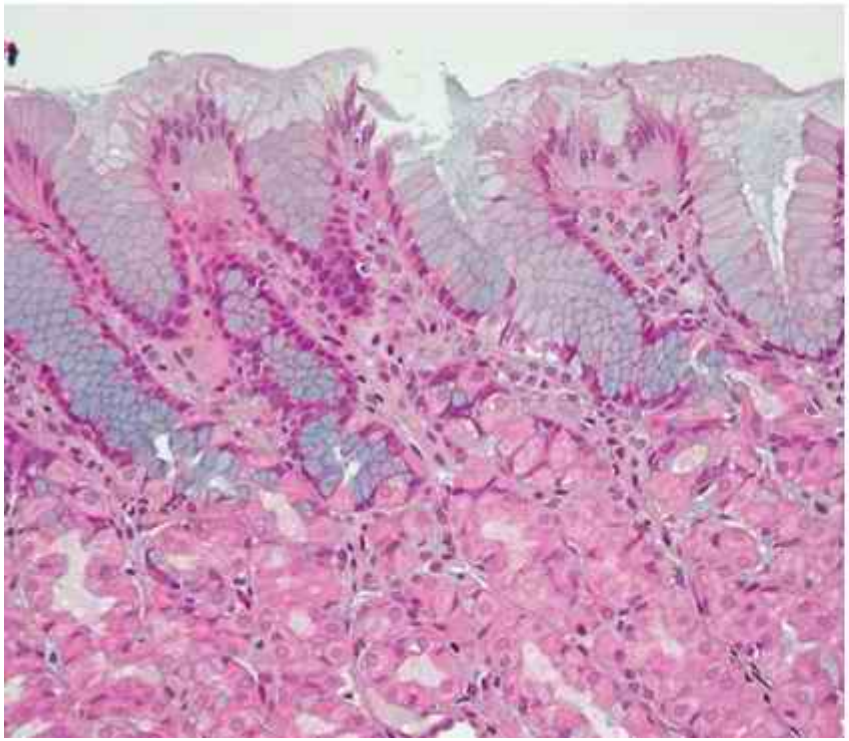
Before

After PPI

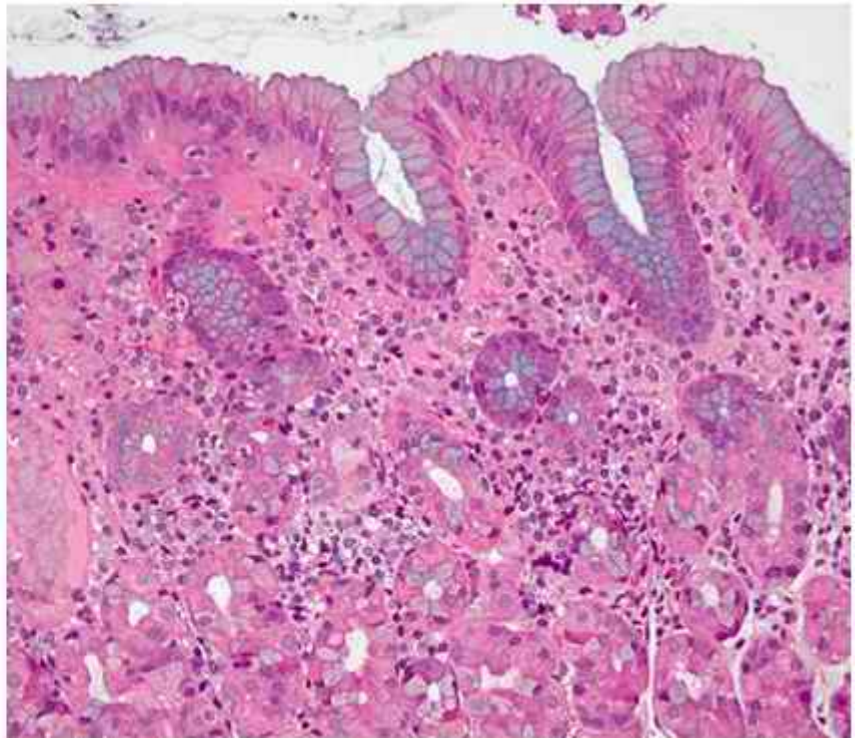
El-Zimaity HMT

CORPUS MUCOSA

VAMC, Houston



Before

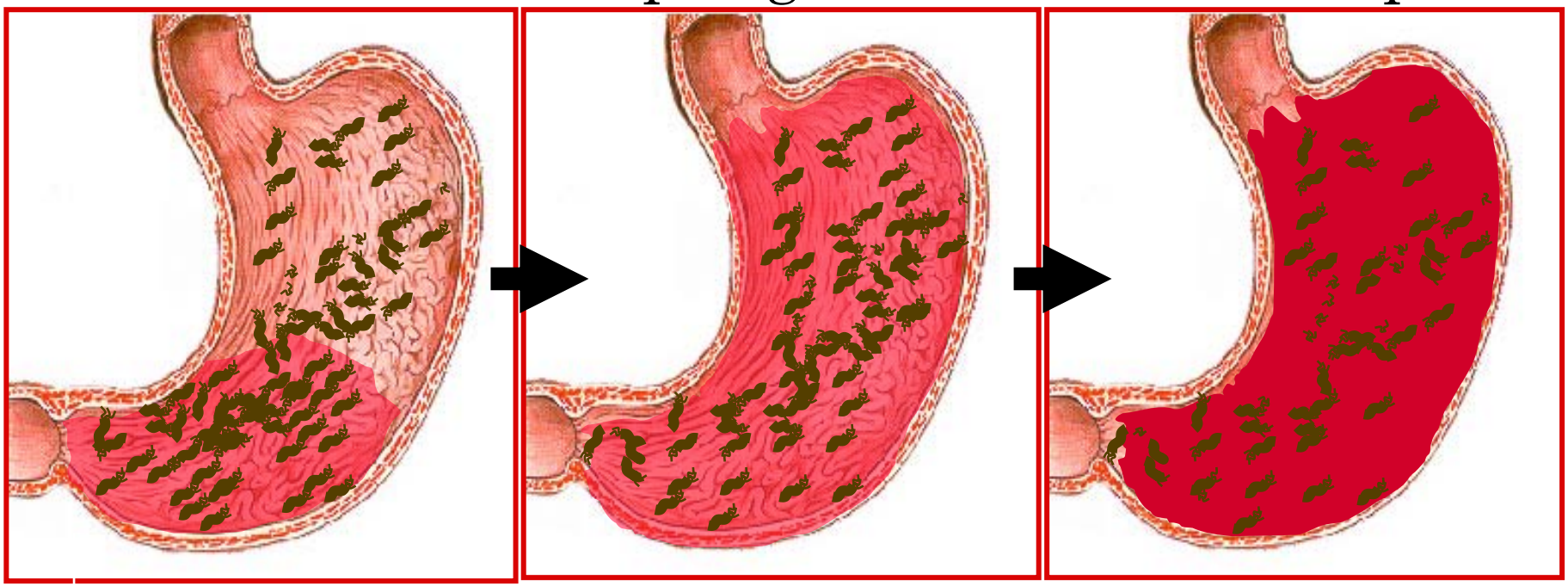


After PPI

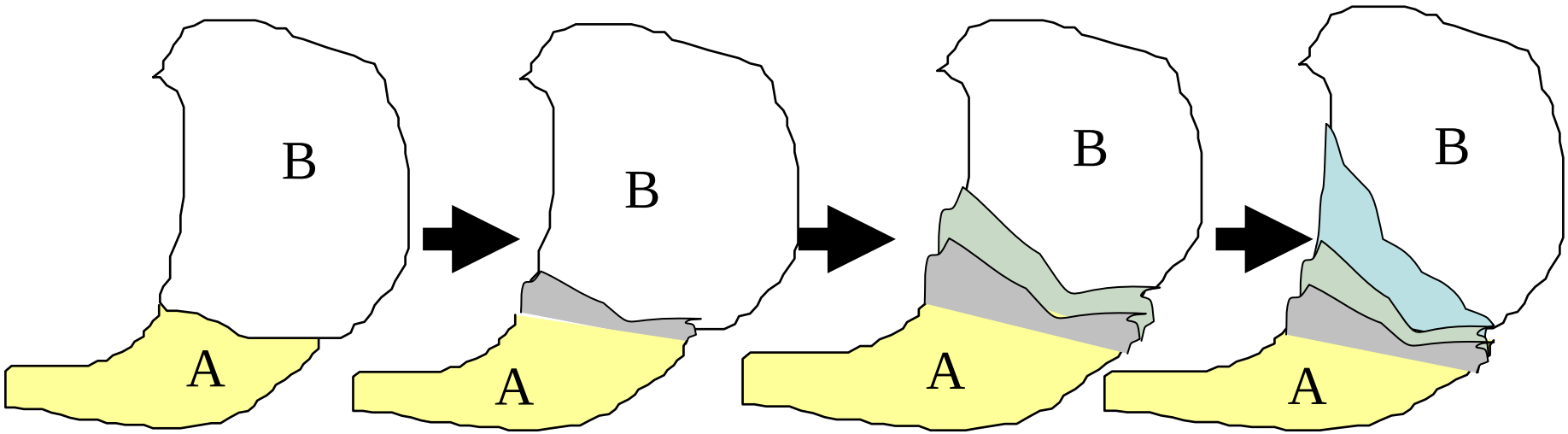
El-Zimaity HMT

Gastritis Stages

Antral Predom. Corpus gastritis Pan-atrophic



Gastritis Stages



Corpus atrophy

Normal corpus

Normal antrum

Atrophic border (antral corpus junction) moves proximally and towards greater curve with disease progression.

El-Zimaity et al Am J Gastro 2001;96:666-672

El-Zimaity HMT

Endoscopic Recognition of the Atrophic Border
Kimura and Takemoto 1969

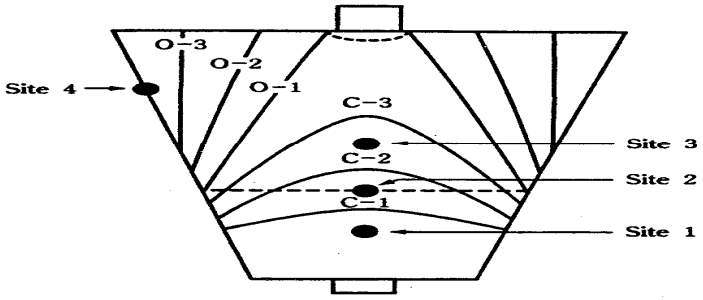
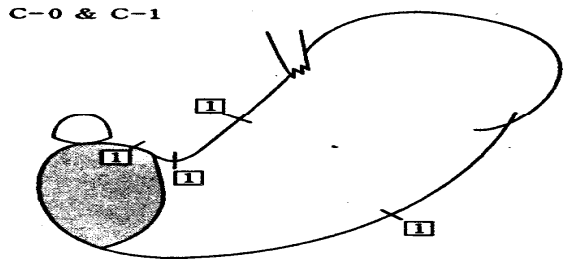
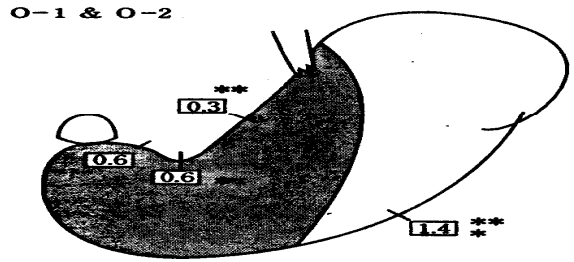
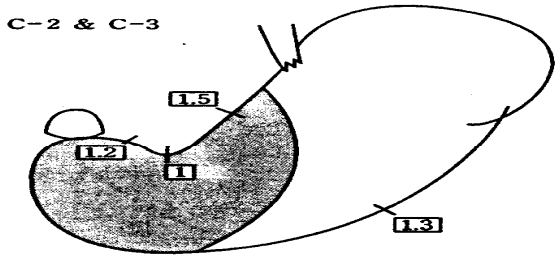


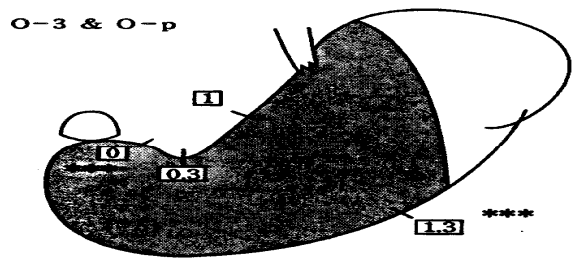
図 2　生検部位の図

Eastern (Japanese) beliefs



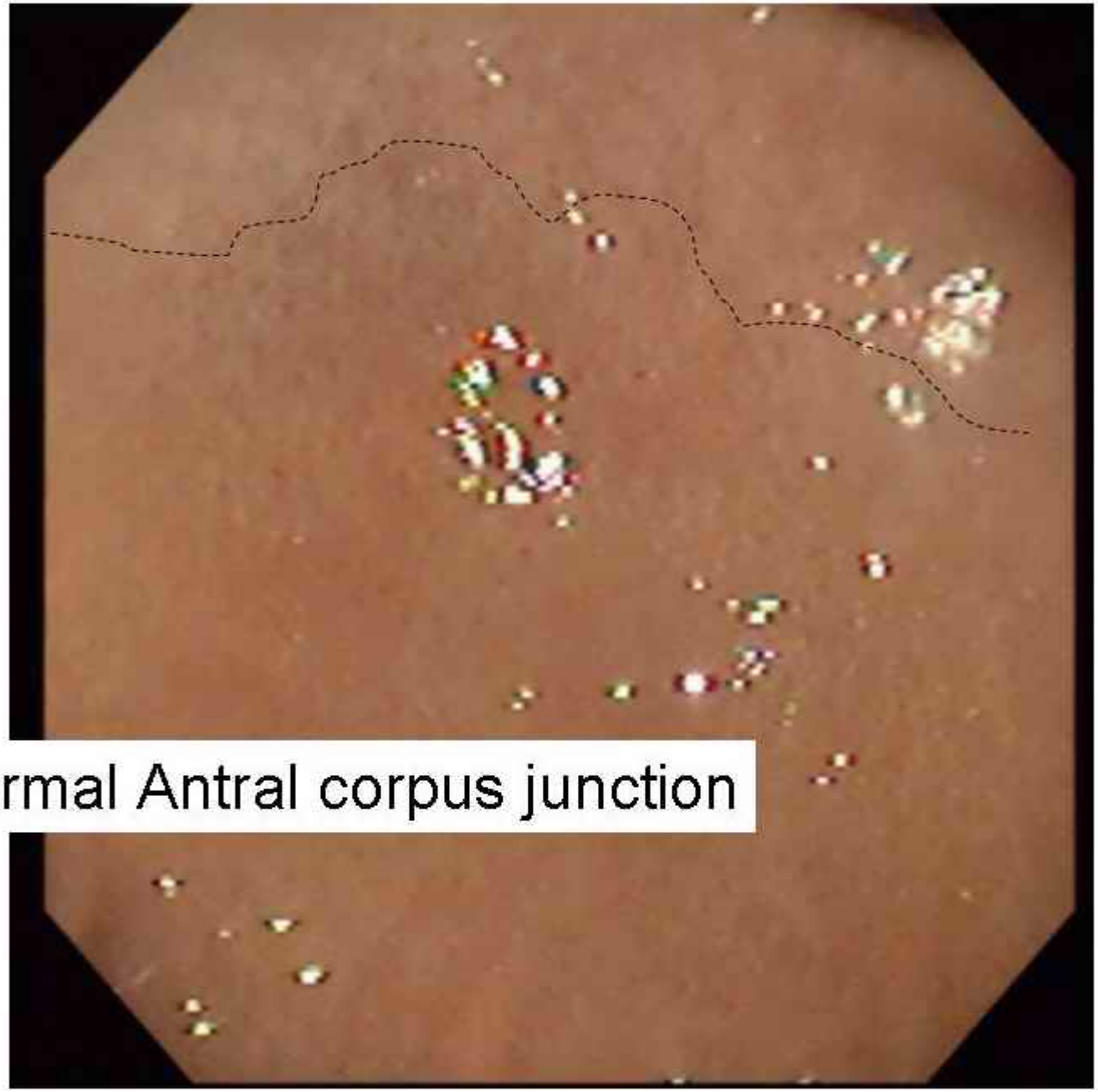






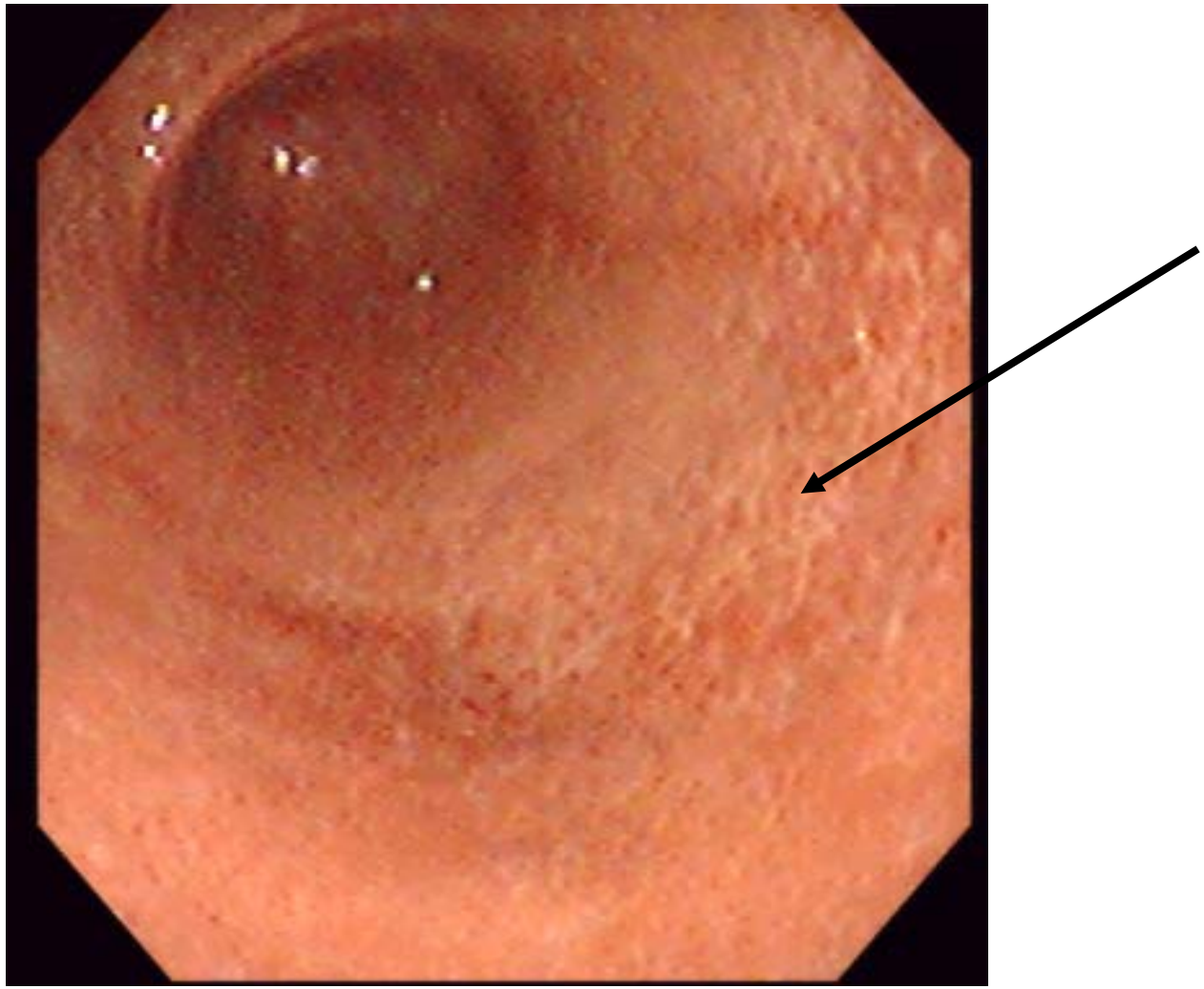
*p<0.05, **p<0.01, ***p<0.001

Endoscopy 1969;1:87-97



Normal Antral corpus junction

Lesser curvature



Advancing atrophic border

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3 questions to answer if you already decided it is *H. pylori*

1. Is it in the antrum only or antrum and corpus?
2. If in the corpus, is inflammation superficial or deep?
3. Is there corpus atrophy?

Gastric atrophy

- Absence of what is normally there:
  - Simple absence of glands (reduced thickness, increased fibrosis)
  - Replacement of what is normally there (with intestinal metaplasia or pseudopyloric metaplasia)

Atrophy in Gastric cancer (Intestinal type)

(a) advancing atrophic border

(b) total atrophy of antrum

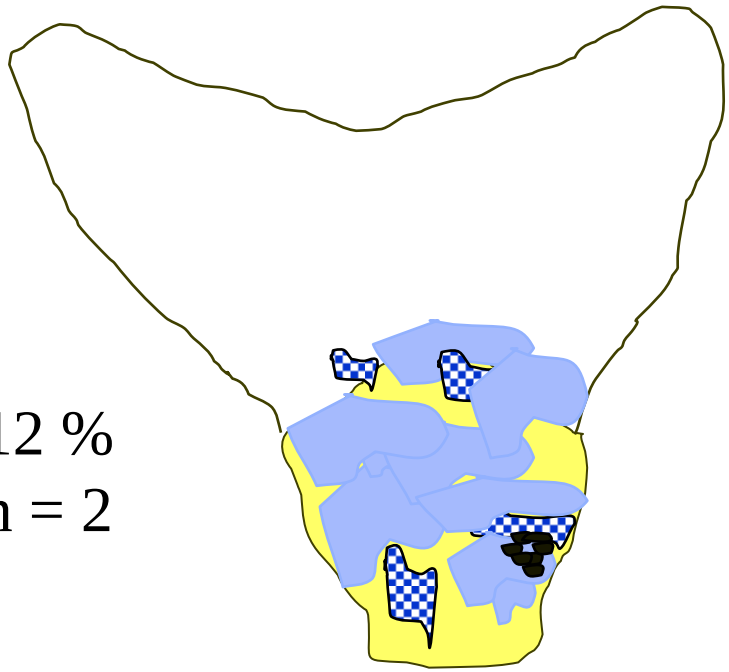
Phenotypic corpus

Phenotypic antrum

Intestinal metaplasia I & II

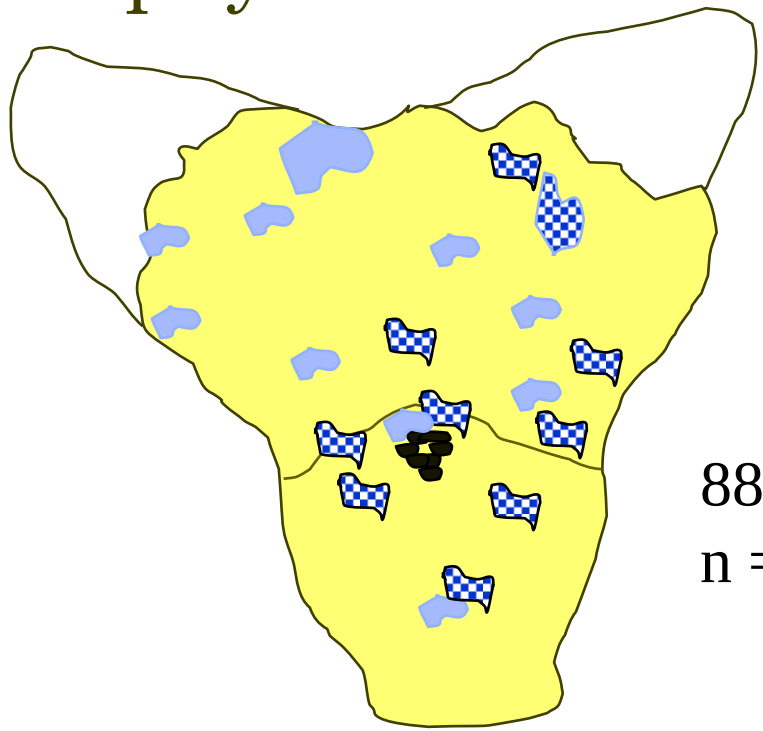
Intestinal metaplasia III

Tumor



12 %
n = 2

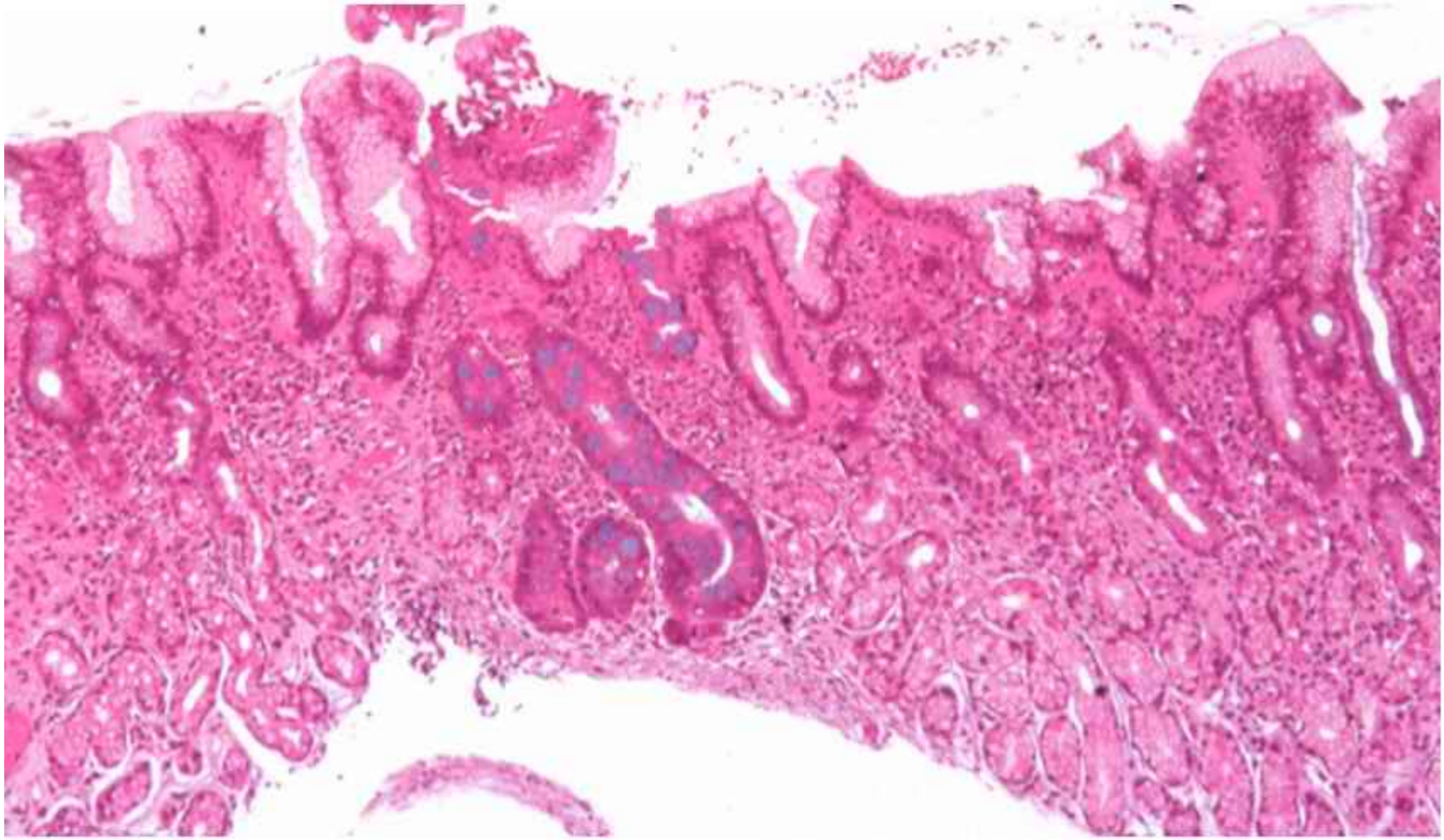
total atrophy of the antrum



88 %
n = 14

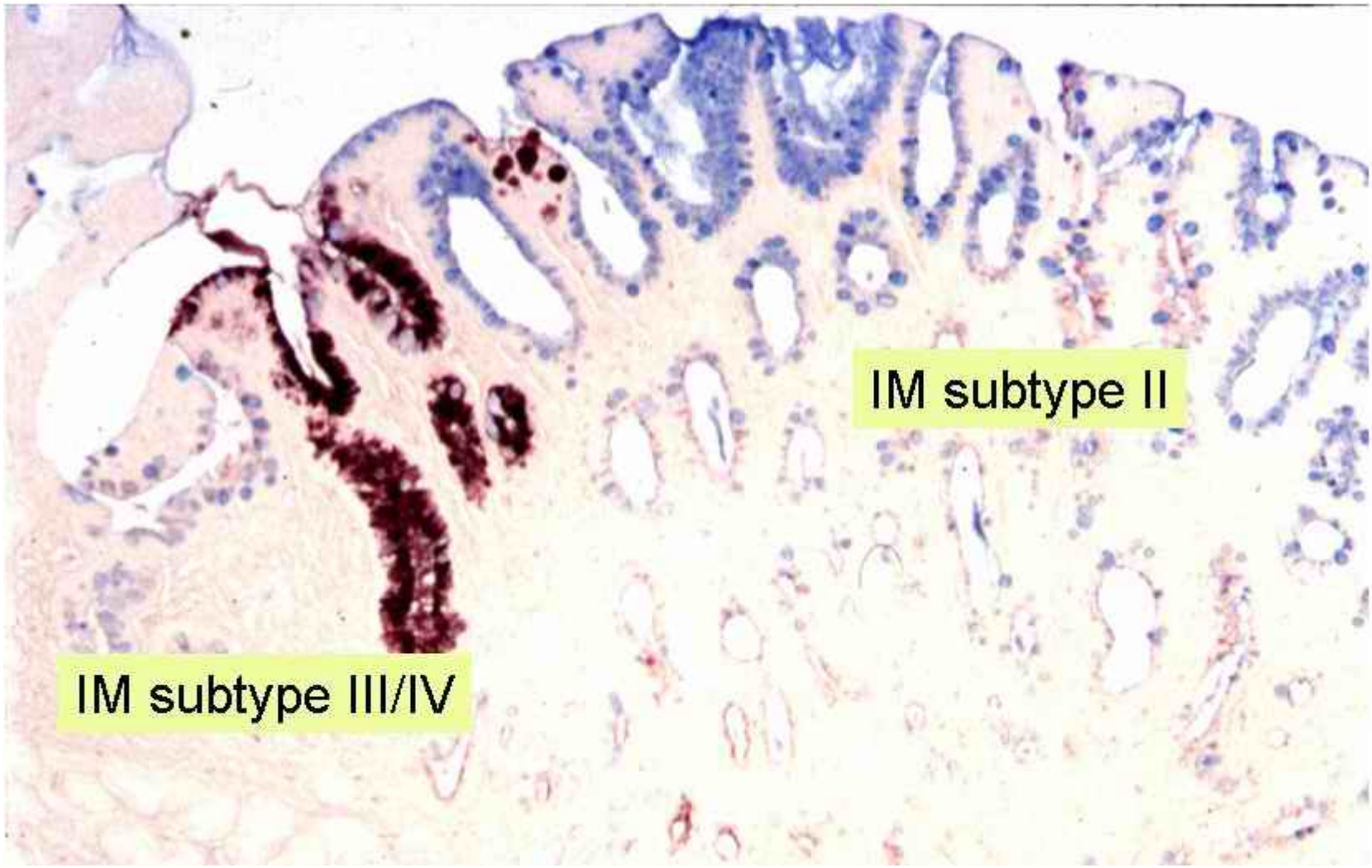
advancing atrophic border

El-Zimaity HMT



Isolated intestinal metaplasia = not important

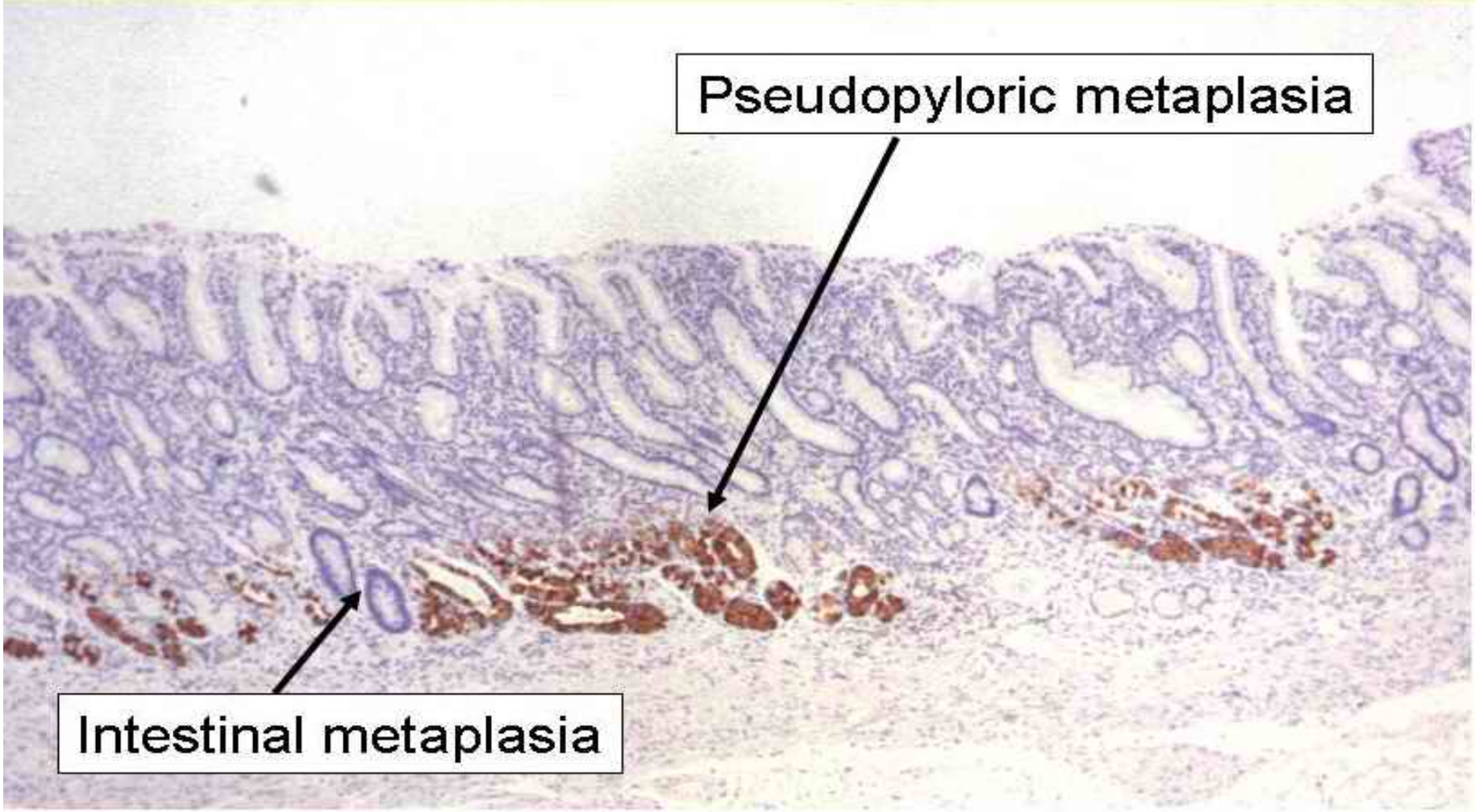
El-Zimaity HMT



Continuous sheets of atrophy (IM and/PPM) is ominous irrespective of IM subtype

El-Zimaity HMT

Continuous sheets of atrophy (IM and/PPM) is ominous



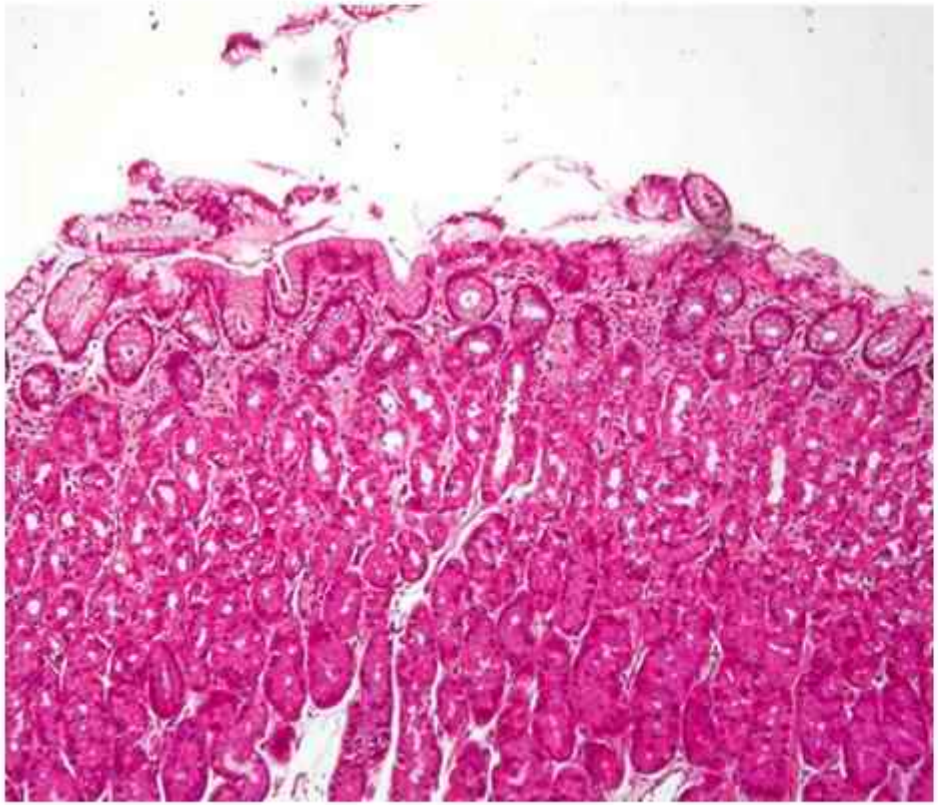
PGI in Pseudopyloric metaplasia

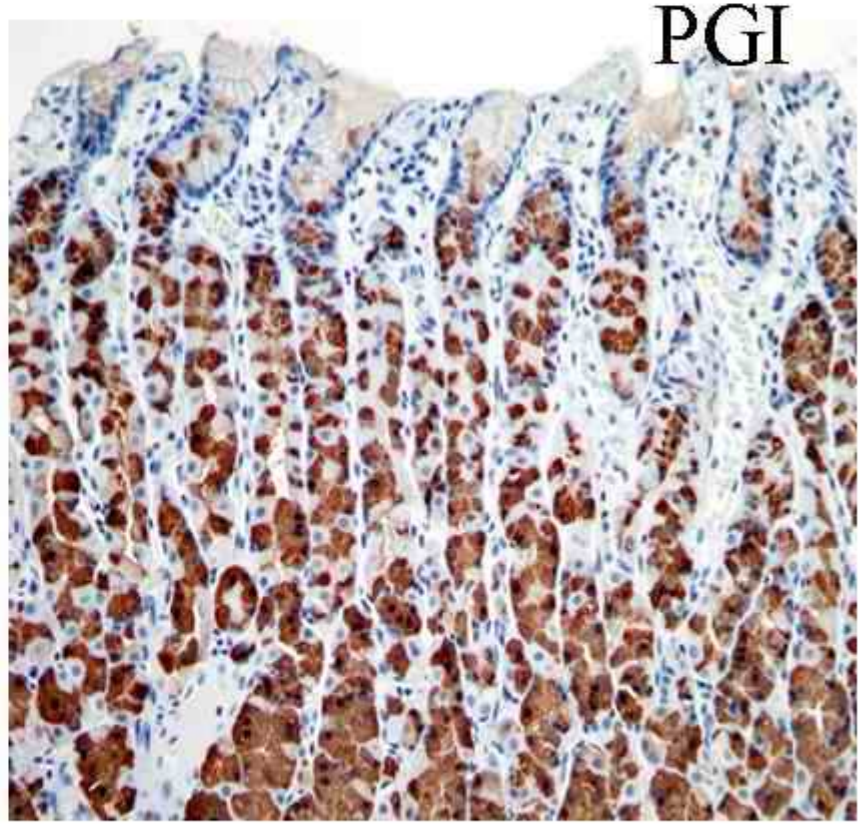
El-Zimaity HMT

- We know how to recognize intestinal metaplasia
- How do we recognize pseudo-pyloric metaplasia?

Pepsinogen I (PG I) Normal Corpus

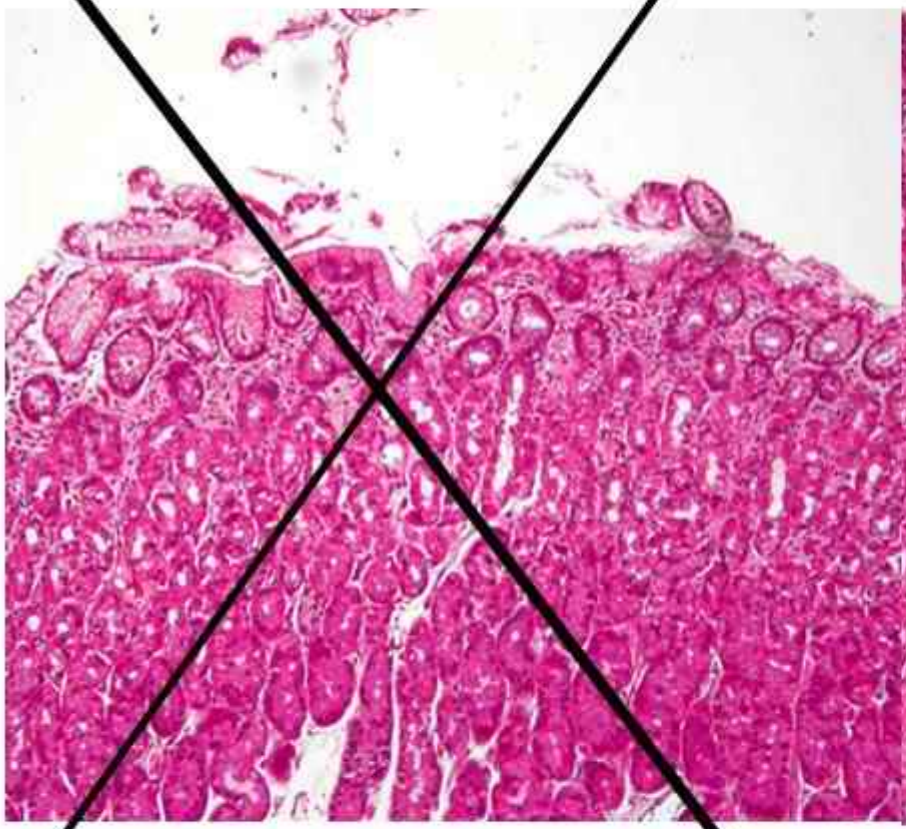
NORMAL CORPUS



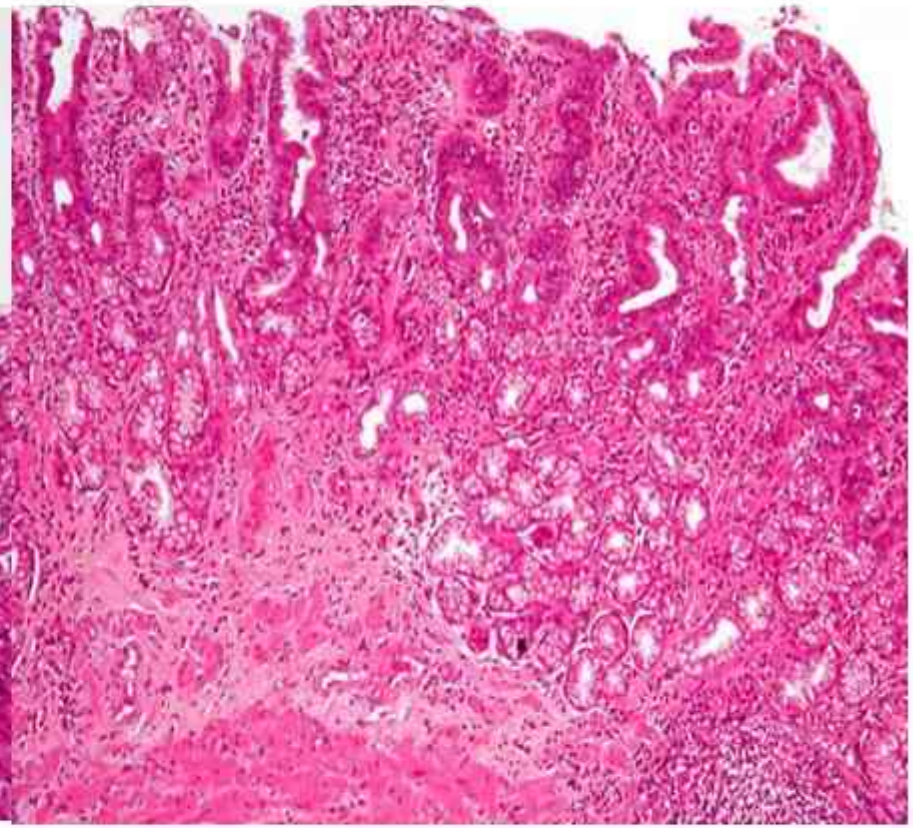


El-Zimaity HMT

PSEUDOPYLORIC METAPLASIA



Normal corpus
In Anatomic corpus



Antral looking
In Anatomic corpus

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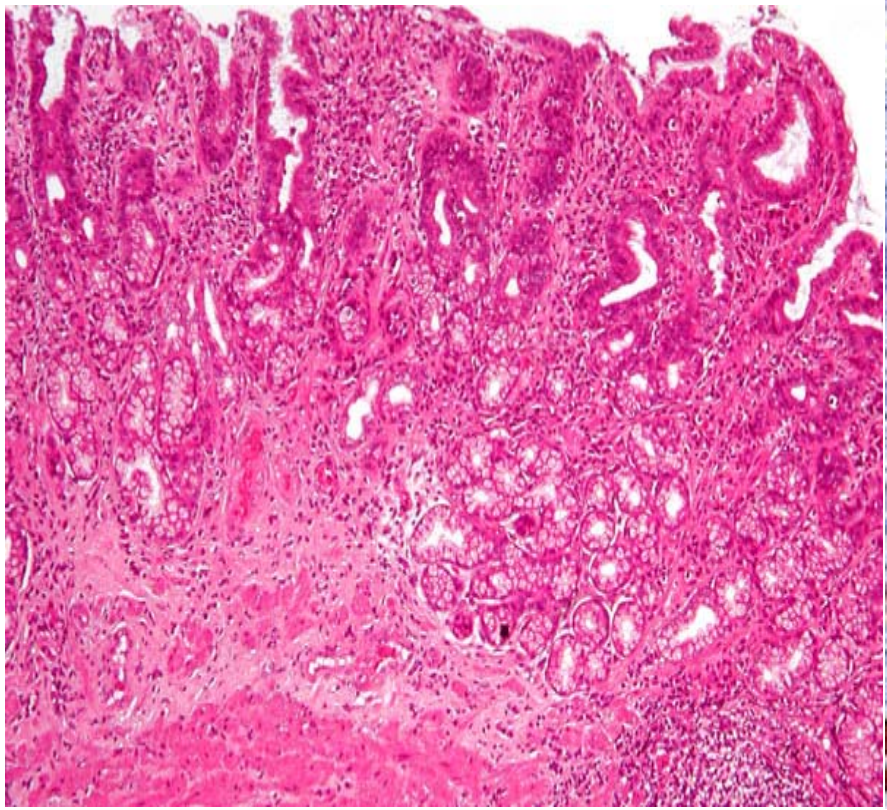
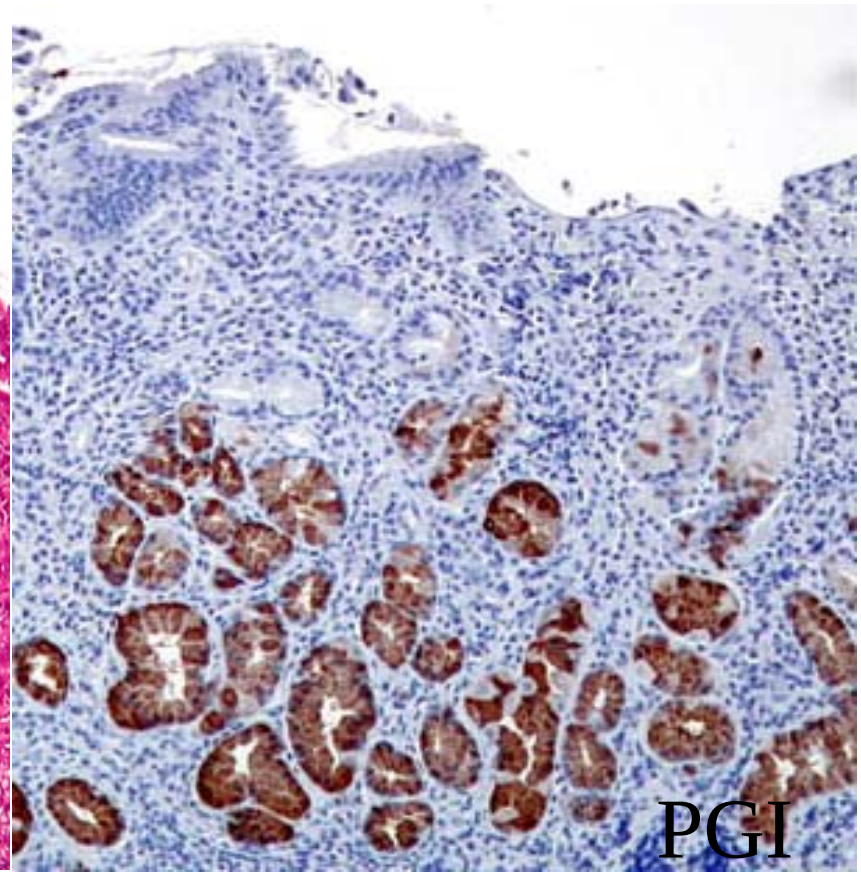
Pepsinogen I (PG I) Anatomic Corpus (pseudopyloric metaplasia)

ANATOMIC CORPUS



PGI



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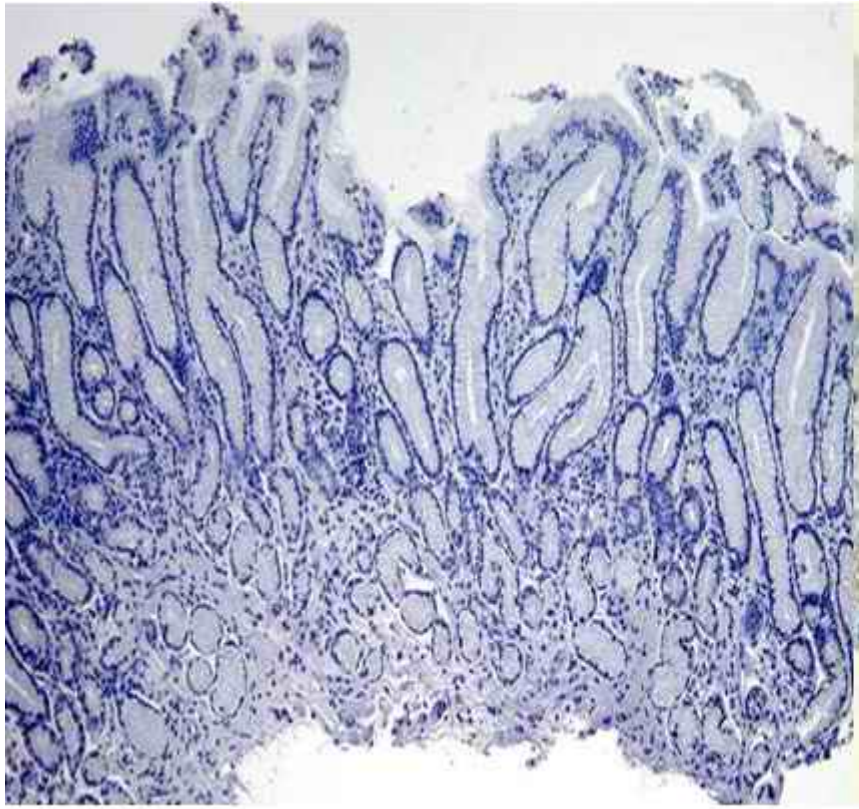
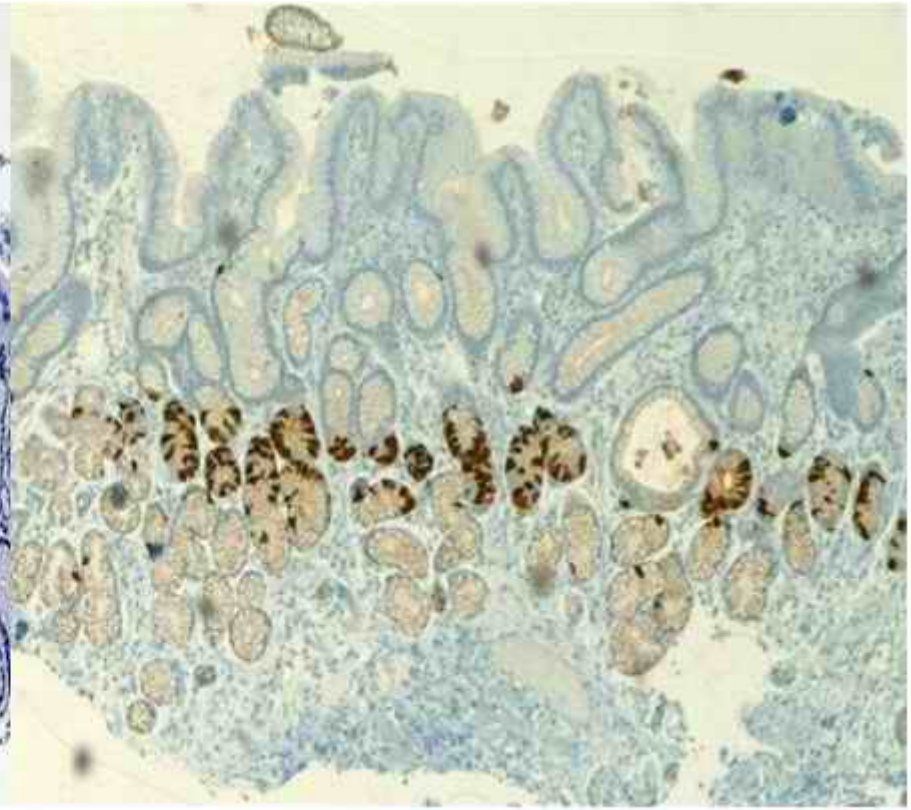
GASTRIC ANTRUM

PEPSINOGEN I

GASTRIN





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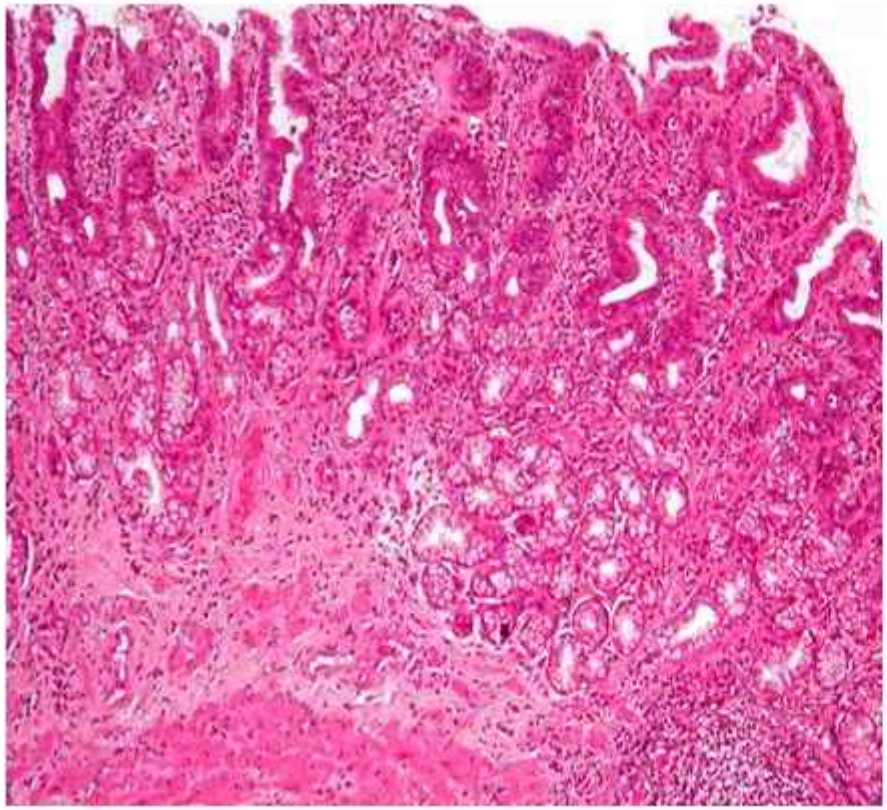
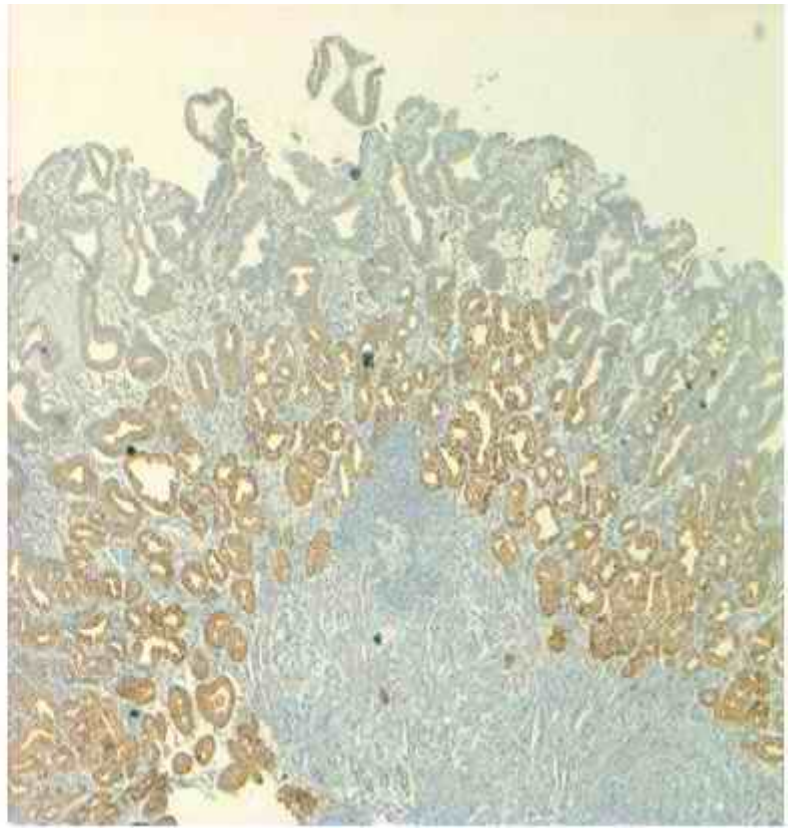
Pepsinogen I (PG I) Anatomic Corpus (pseudopyloric metaplasia)

ANATOMIC CORPUS

Gastrin





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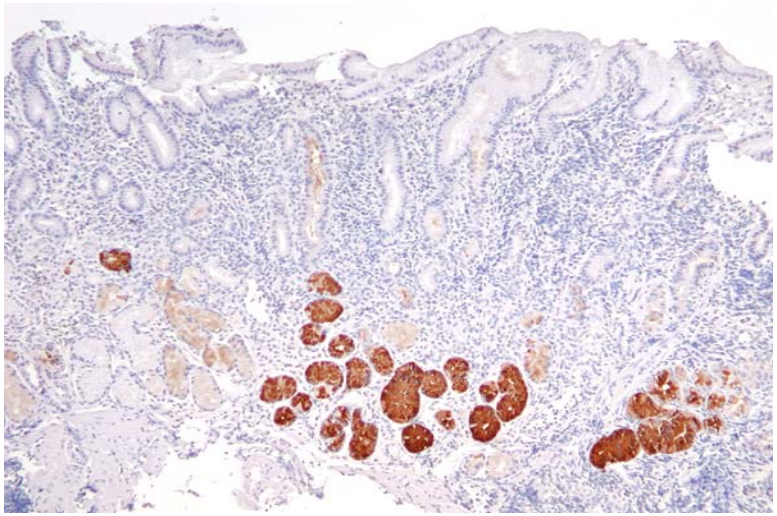
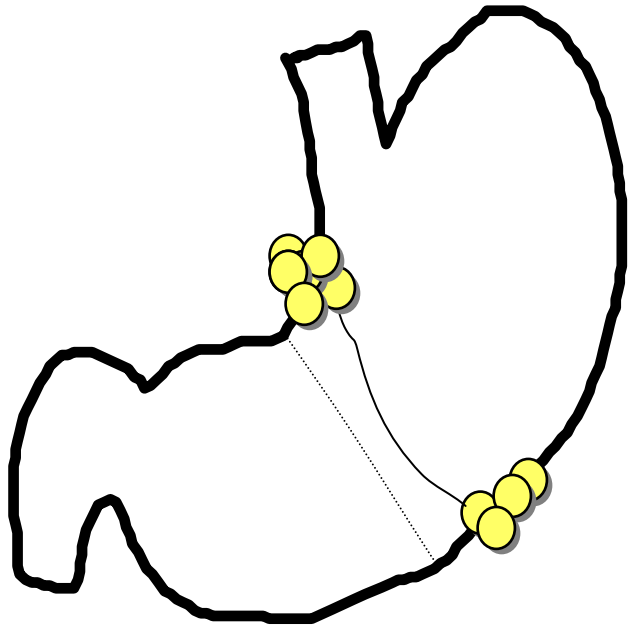
PSEUDO-PYLORIC METAPLASIA





- PPM starts as early as 9 years old.
- Atrophy always starts at antral corpus junction and moves proximally and towards the greater curve.

Cardona et al Journal of Clinical Pathology; 2005;58(11):1189-93.

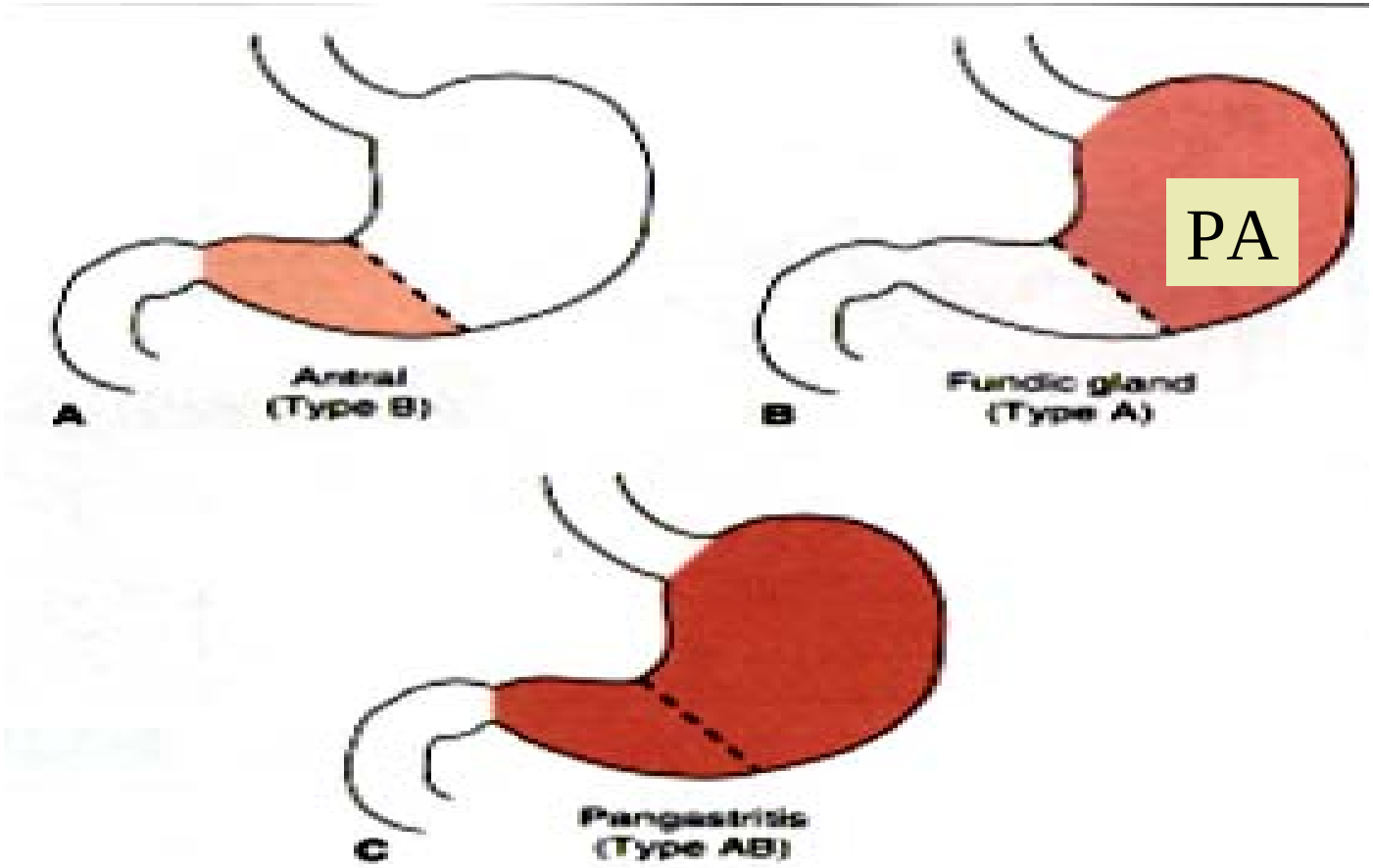
Two things to remember

1. Look for the Atrophic Front (starts at antral corpus junction)
2. Recognize all forms of atrophy (absence of normal or replacement with intestinal metaplasia and/or pseudopyloric metaplasia)

What about Pernicious Anaemia?

- Scandinavian decent
- Auto immune gastritis
- Parietal cell and Intrinsic Factor antibodies- megaloblastic anemia
- Three to five fold increased risk of gastric cancer

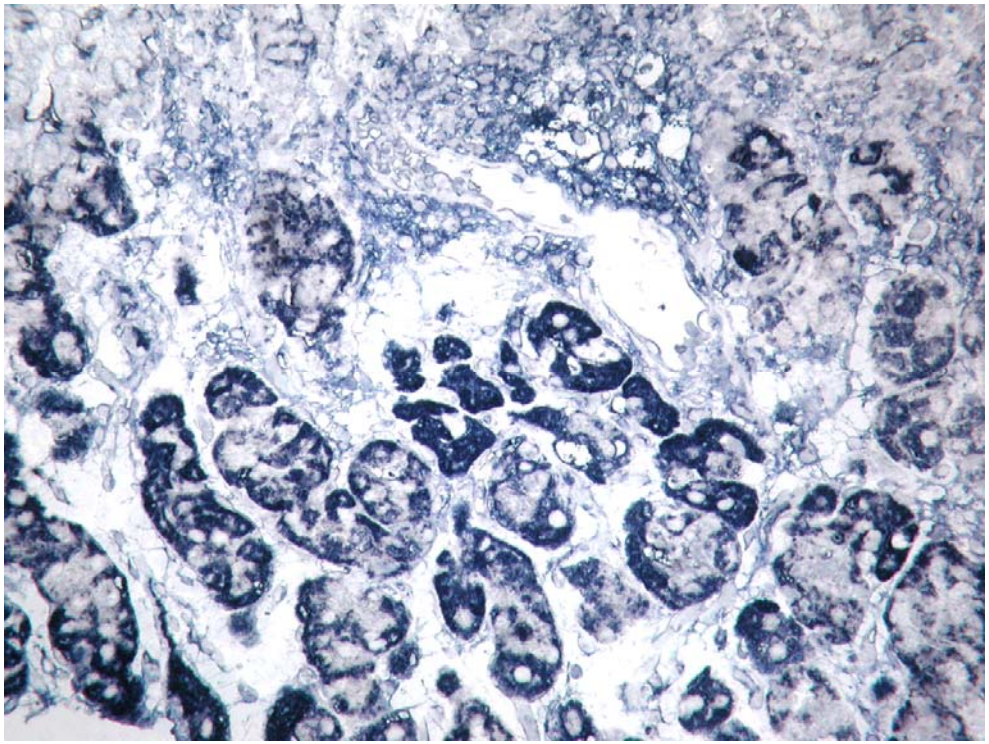
GASTRITIS PATTERN



pernicious anaemia

Big overlap in the literature since most PA studies were done before *H. pylori* era; *some deny its existence!*

In any *H. Pylori* Gastritis

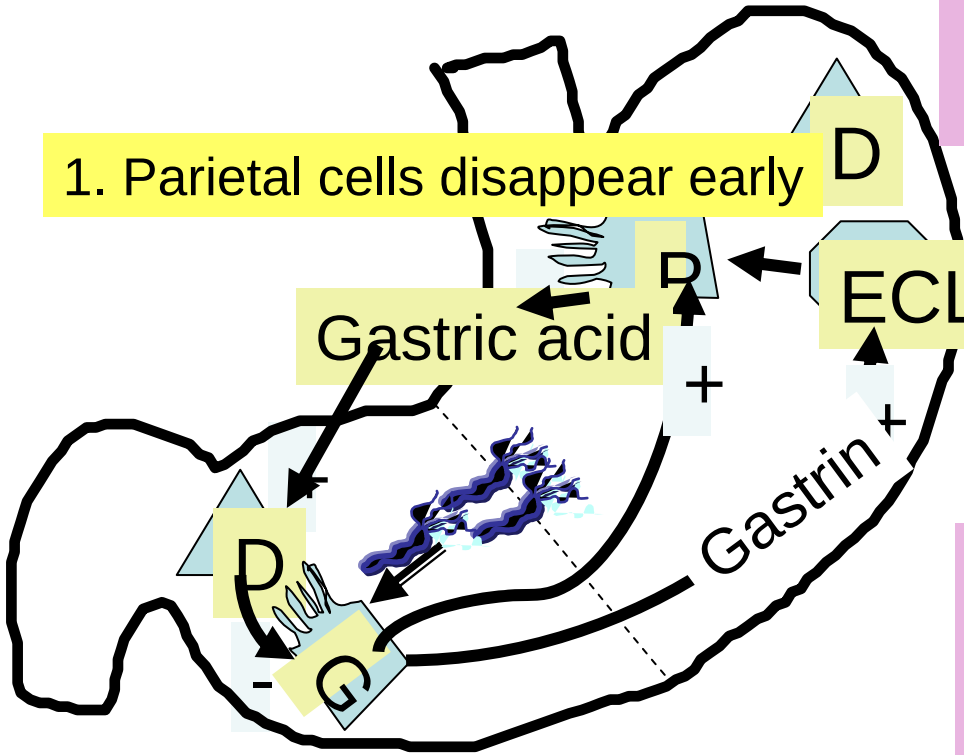


- *H. pylori* positive patient
- Use patient's serum as primary antibody
- Parietal cells stain dark blue

= autoantibodies in every day *H. pylori* gastritis

PERNICIOUS ANEMIA

Parietal cell antibodies
Many folds higher

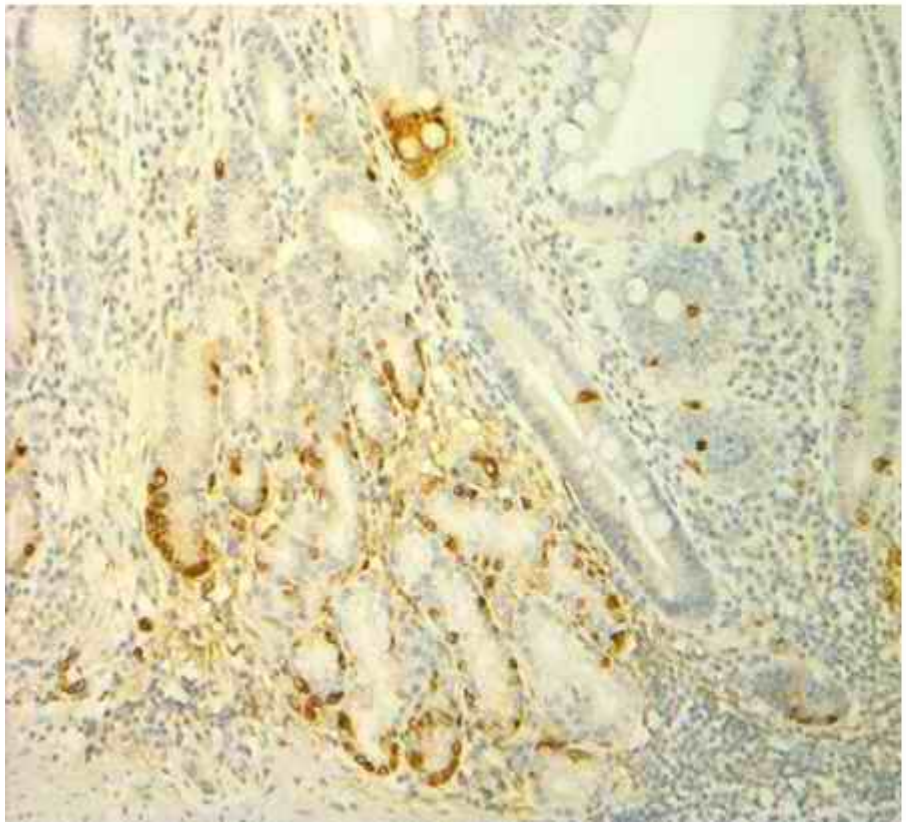


3. ECL cells keep growing

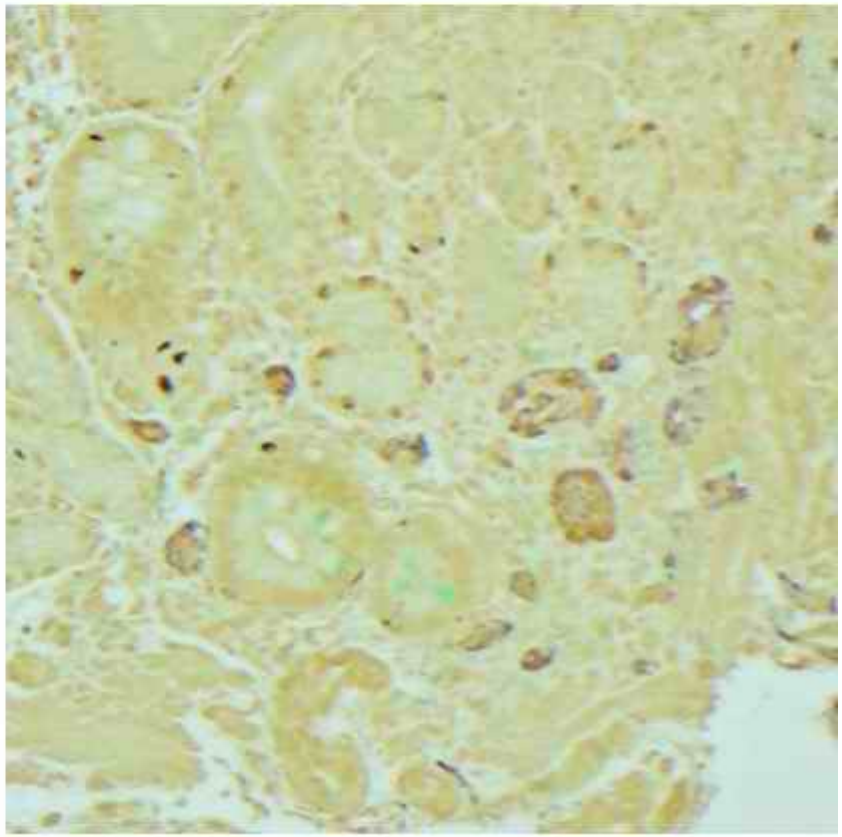
Acid production drops much faster in PA; so, *H. pylori* and associated inflammation moves proximally much faster.

2. G cells increase in number

CORPUS
ECL HYPERPLASIA



Chromogranin



Grimelius

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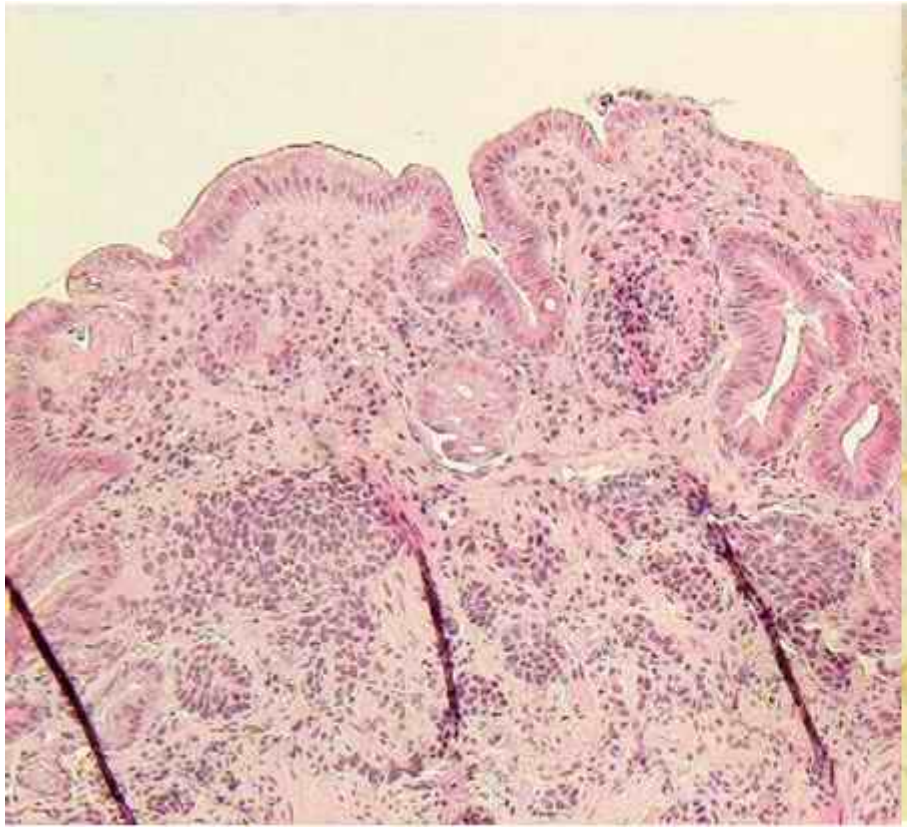
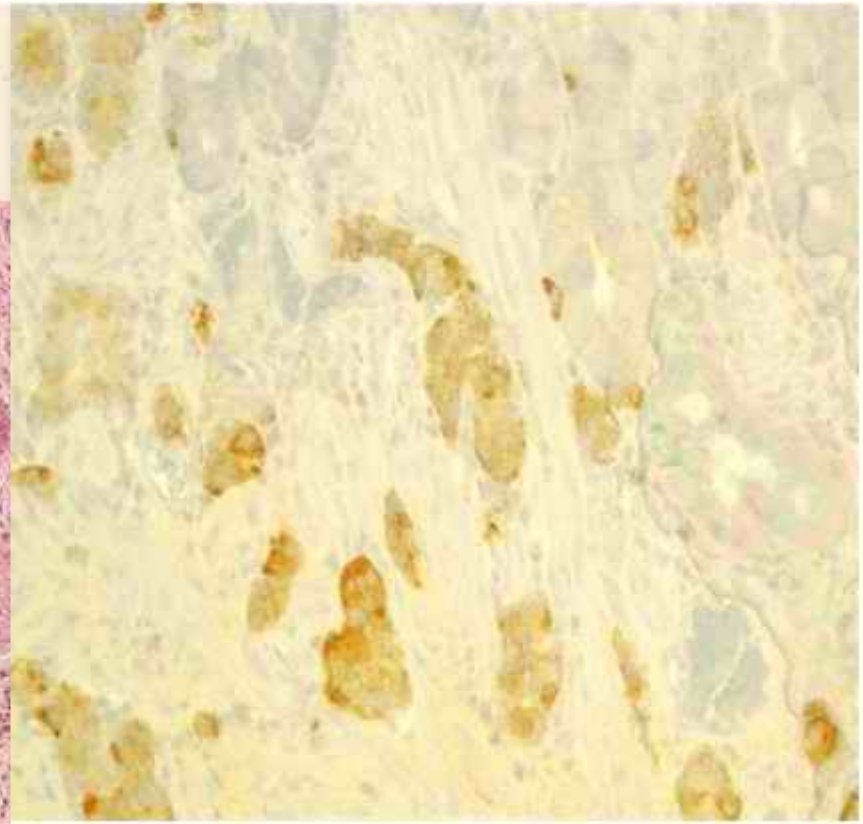
PERNICIOUS ANAEMIA



Corpus atrophy with
gastric cancer risk (intestinal type)



ECL hyperplasia and
eventually carcinoids

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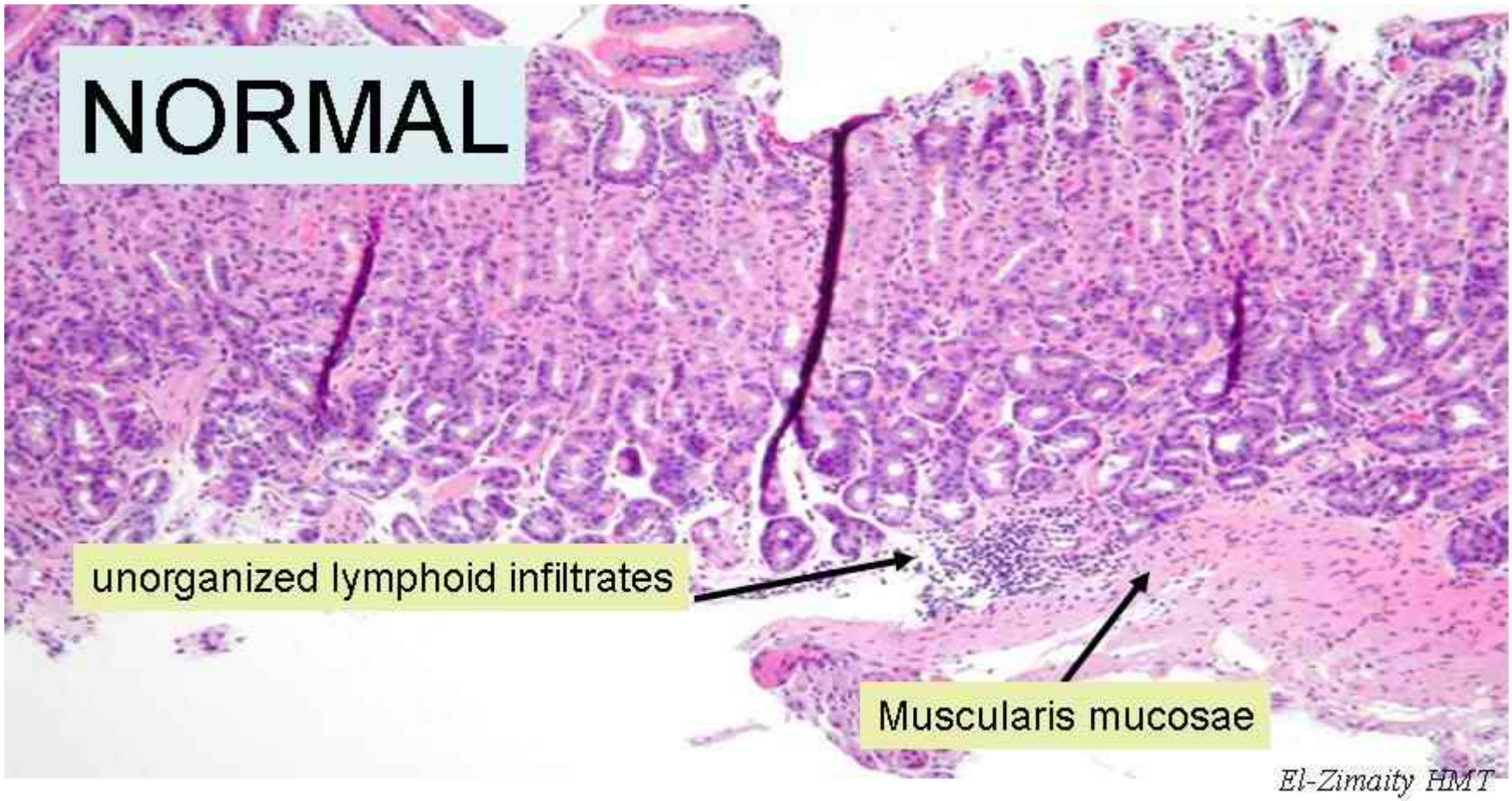
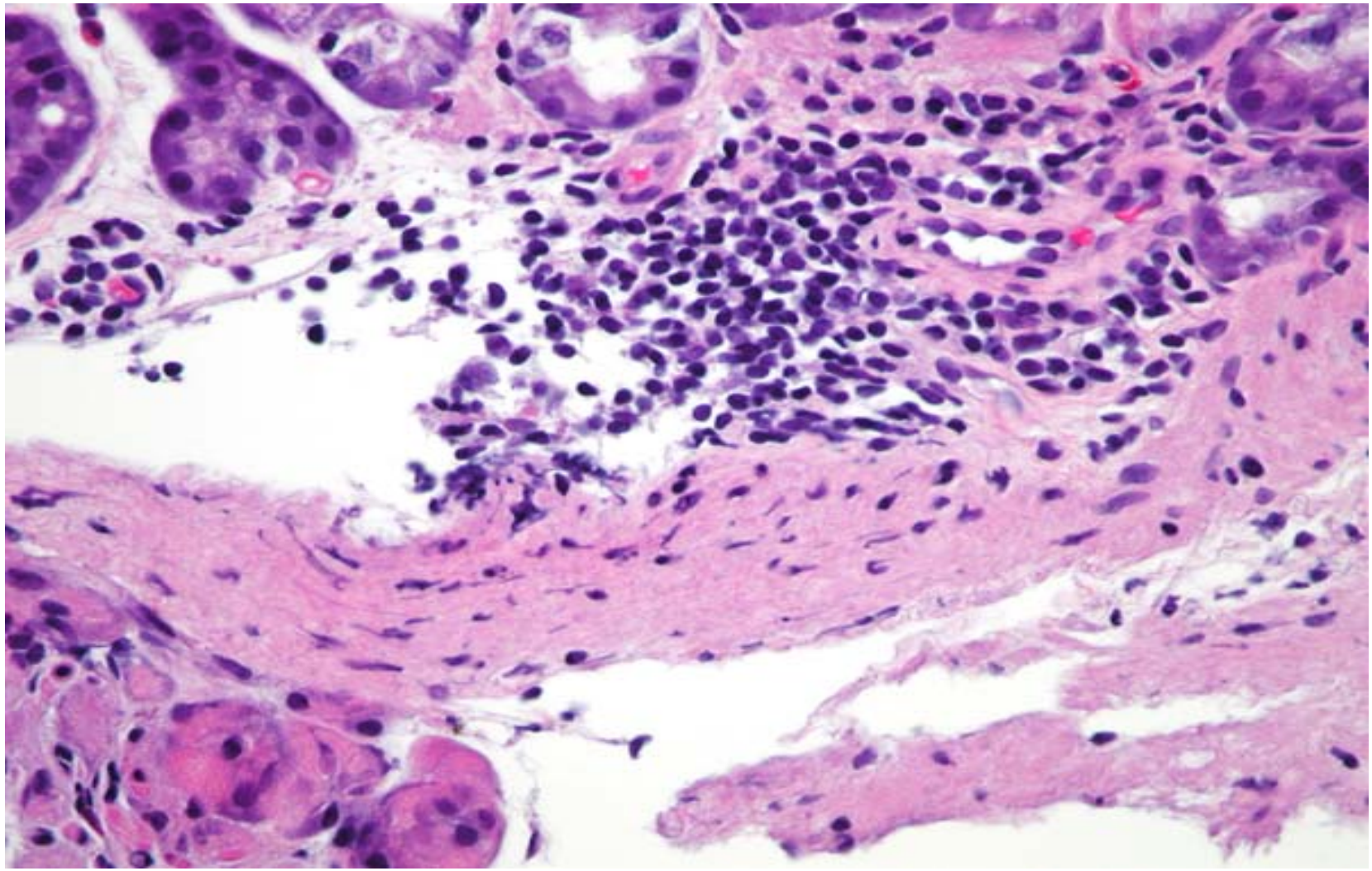
QUESTIONS TO ANSWER IN GASTRIC BIOPSIES?

1. Is it normal? Is it a gastritis or a gastropathy?
2. Why it looks like *H. pylori* but no bacteria found?
3. Is there atrophy?

Landmark for NORMAL lymphoid infiltrates muscularis mucosae





Lymphoid infiltrate:
Loose next to muscularis mucosae = Normal

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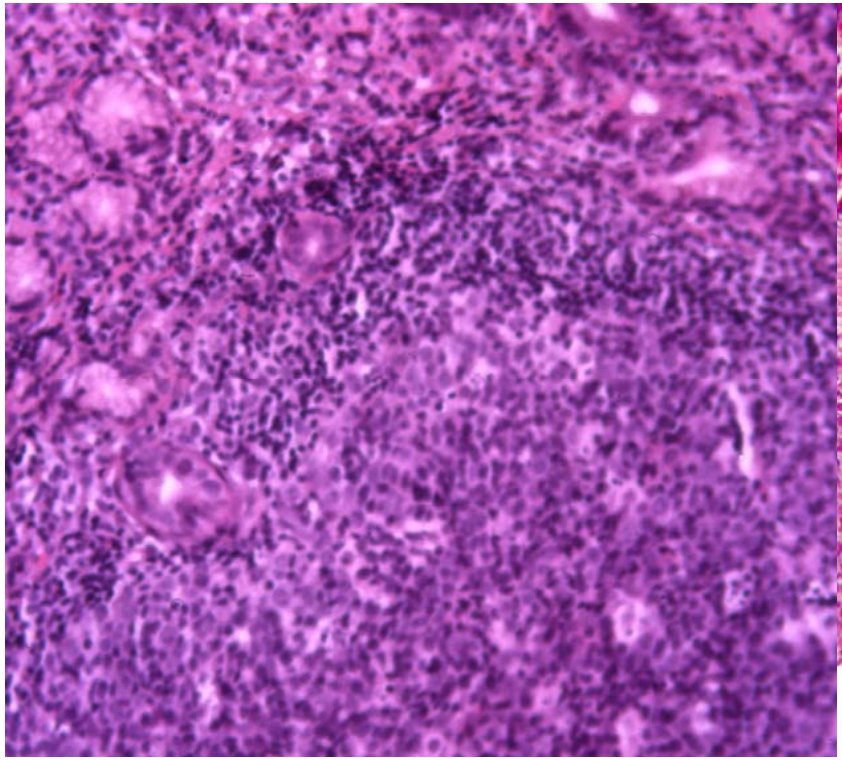
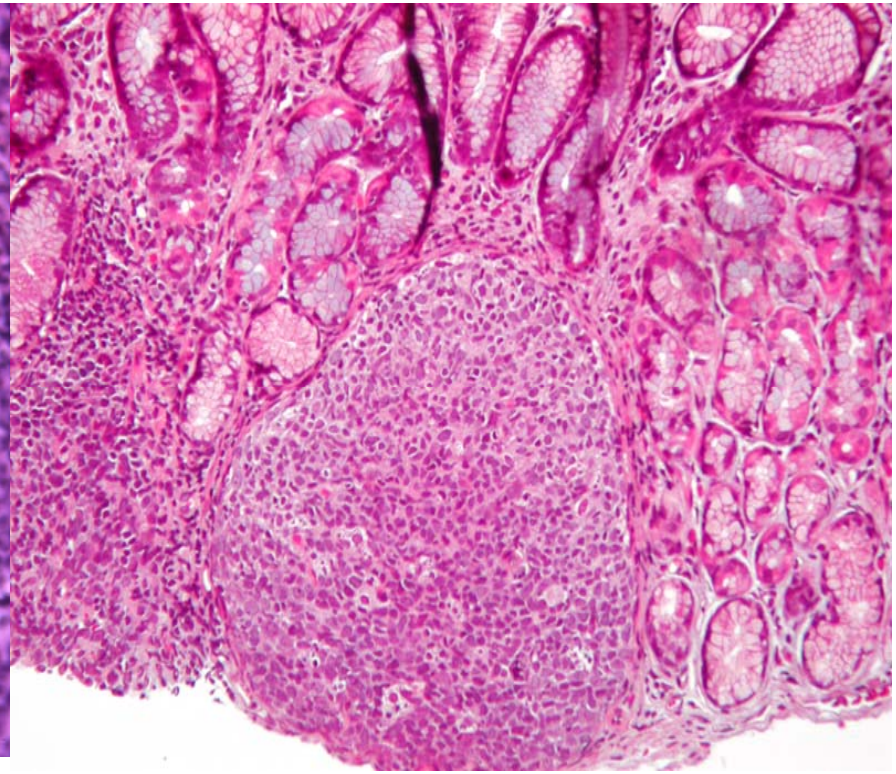
Lymphoid Follicles in *H. pylori* infection



Pre-treatment

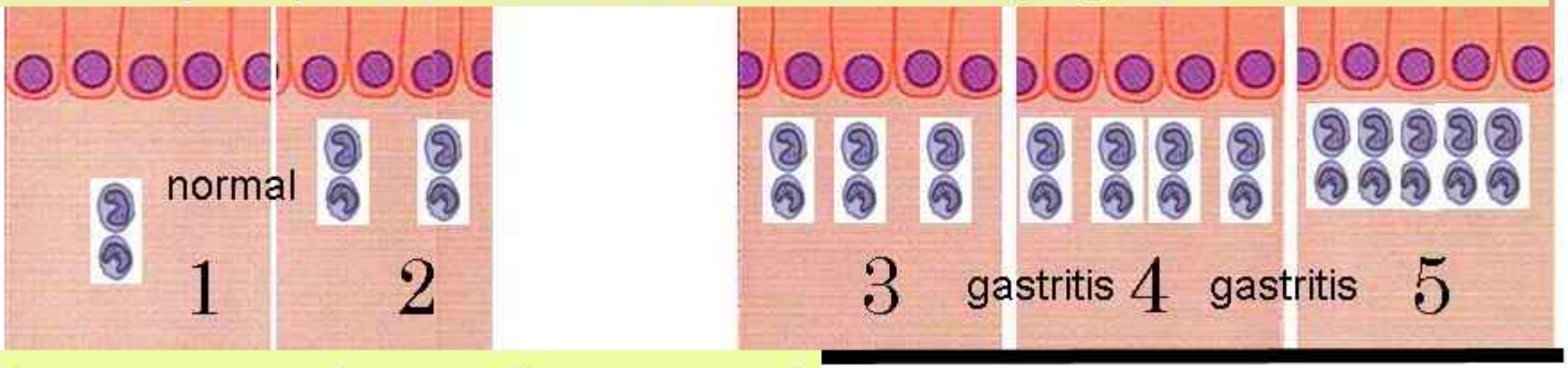
Have marginal zone, mantle, and follicle center



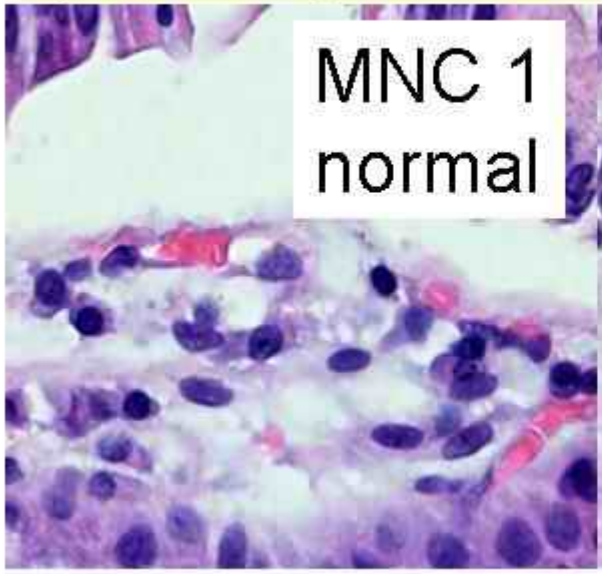
Post treatment

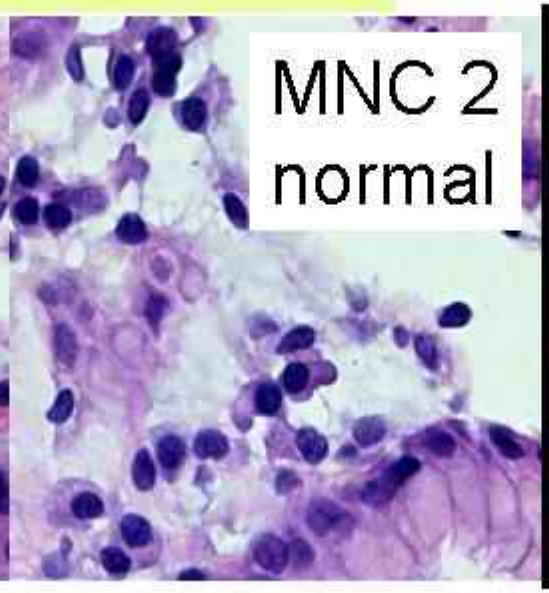
Lymphoid tissue first disappear from marginal zone, followed by mantle zone.

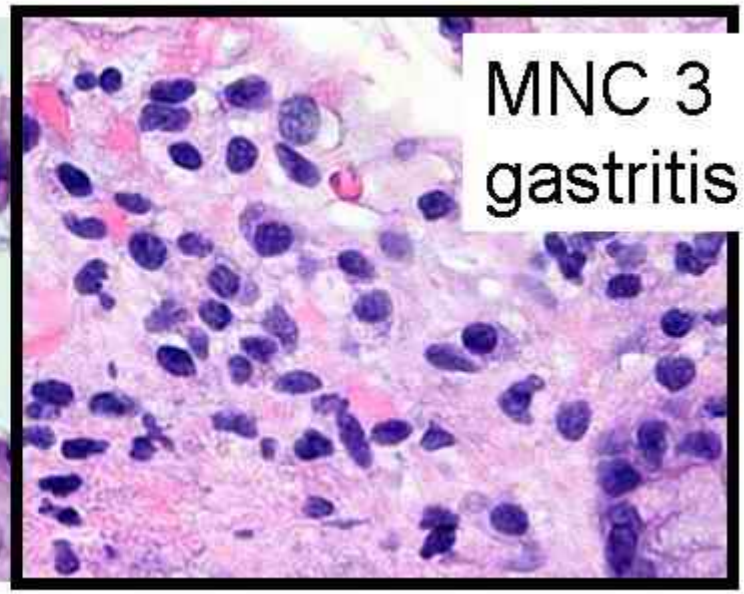
More Mononuclear cells MNC in lamina propria means more likely gastritis



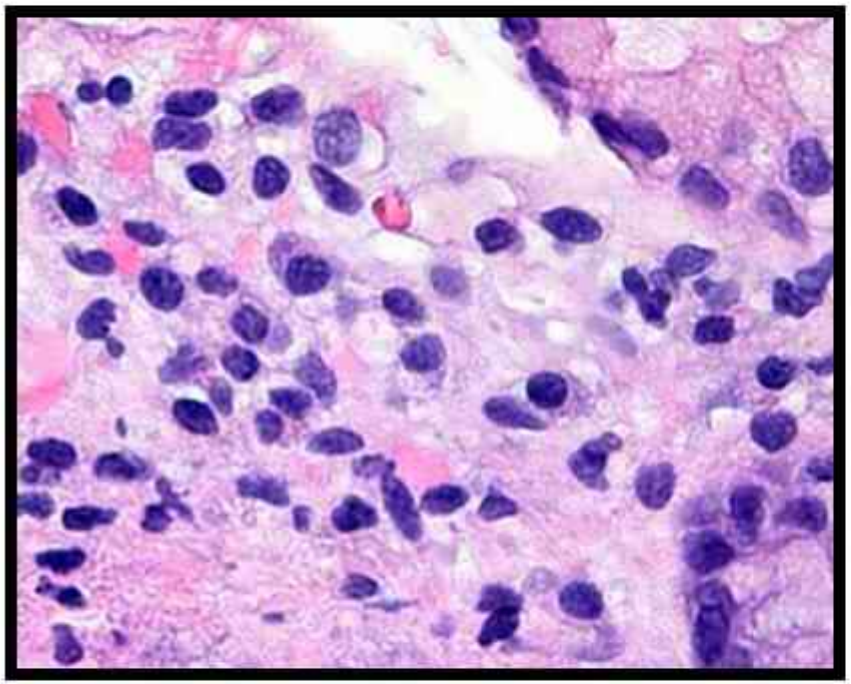
Few mononuclear cells = normal (scale 1-2)



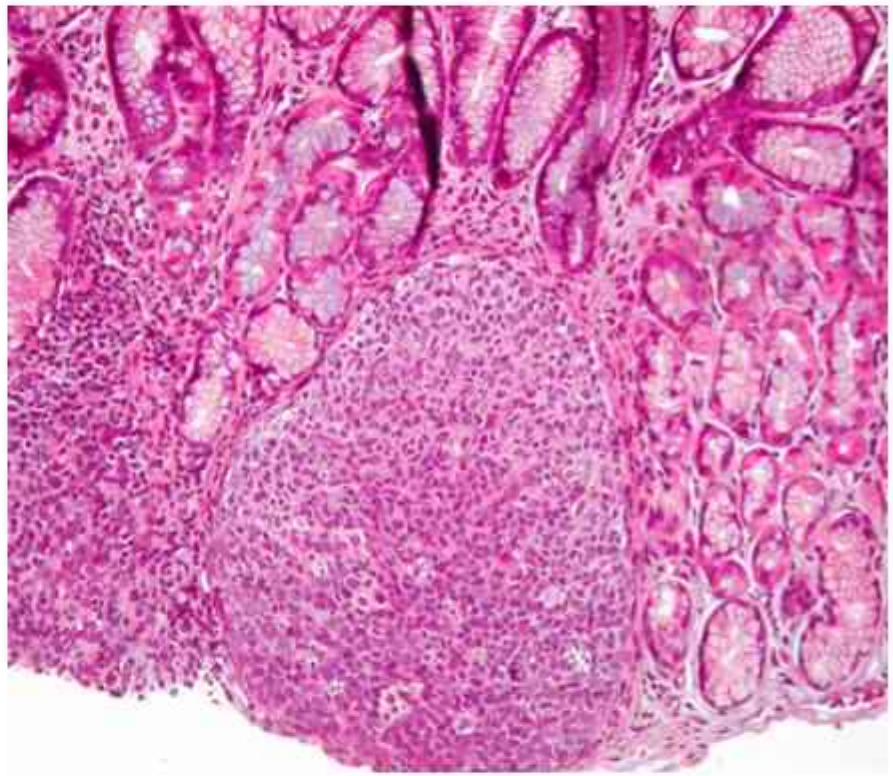




To Diagnose Chronic inactive *H. pylori* infection (post treatment)

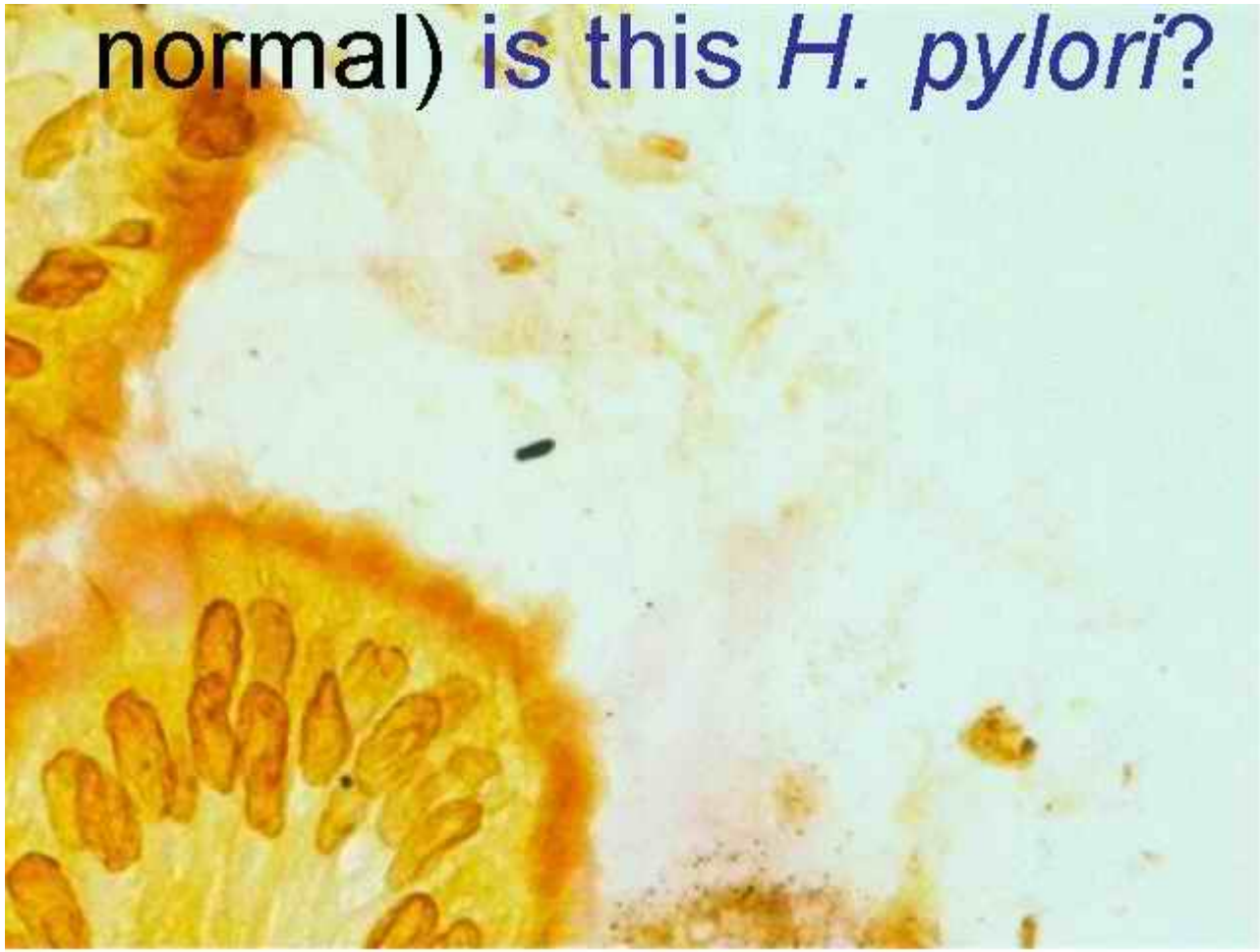


Lamina propria should have more than a few MNC (score of 3)



Lymphoid aggregates should have signs of organization

If you found this in a 45 year old with dyspepsia (mucosa looks normal) is this *H. pylori*?



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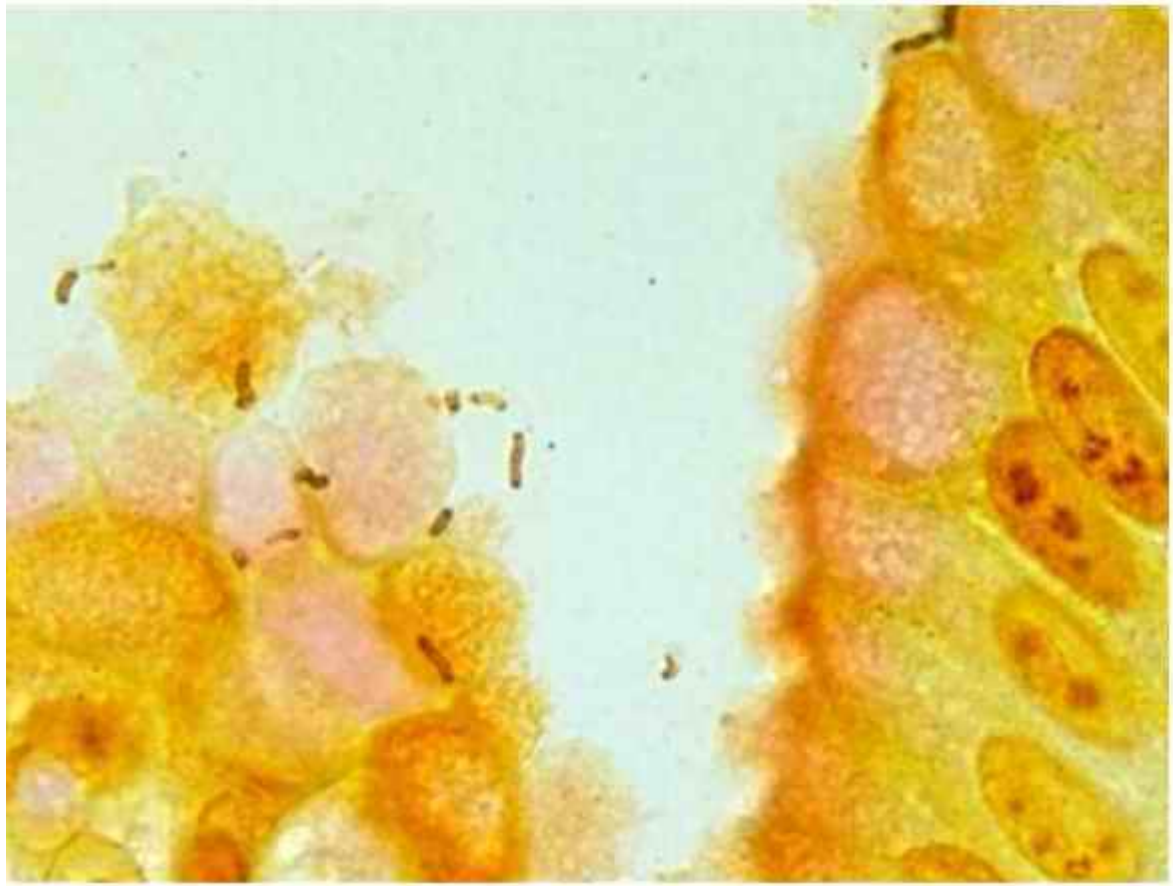
Safety Pin Appearance HP



NOT ALL BACTERIA IN THE STOMACH ARE *H. pylori*

- With PPI use, the gastric pH increases which allows other bacteria to survive in the stomach.
- Make sure you are really looking at *H. pylori*. Look for squiggle bacteria with safety pin appearance.

Causes of (apparent) *H.pylori* negative gastritis

- Proton pump inhibitors (omeprazole etc.)
- Recent antibiotics or eradication therapy
- Missed organisms - few bugs
- Focal chronic active colitis - Crohn’s disease
- Other types of gastritis (e.g. lymphocytic gastritis)

GASTRITIS

1. Acute
2. Chronic
3. Uncommon Forms

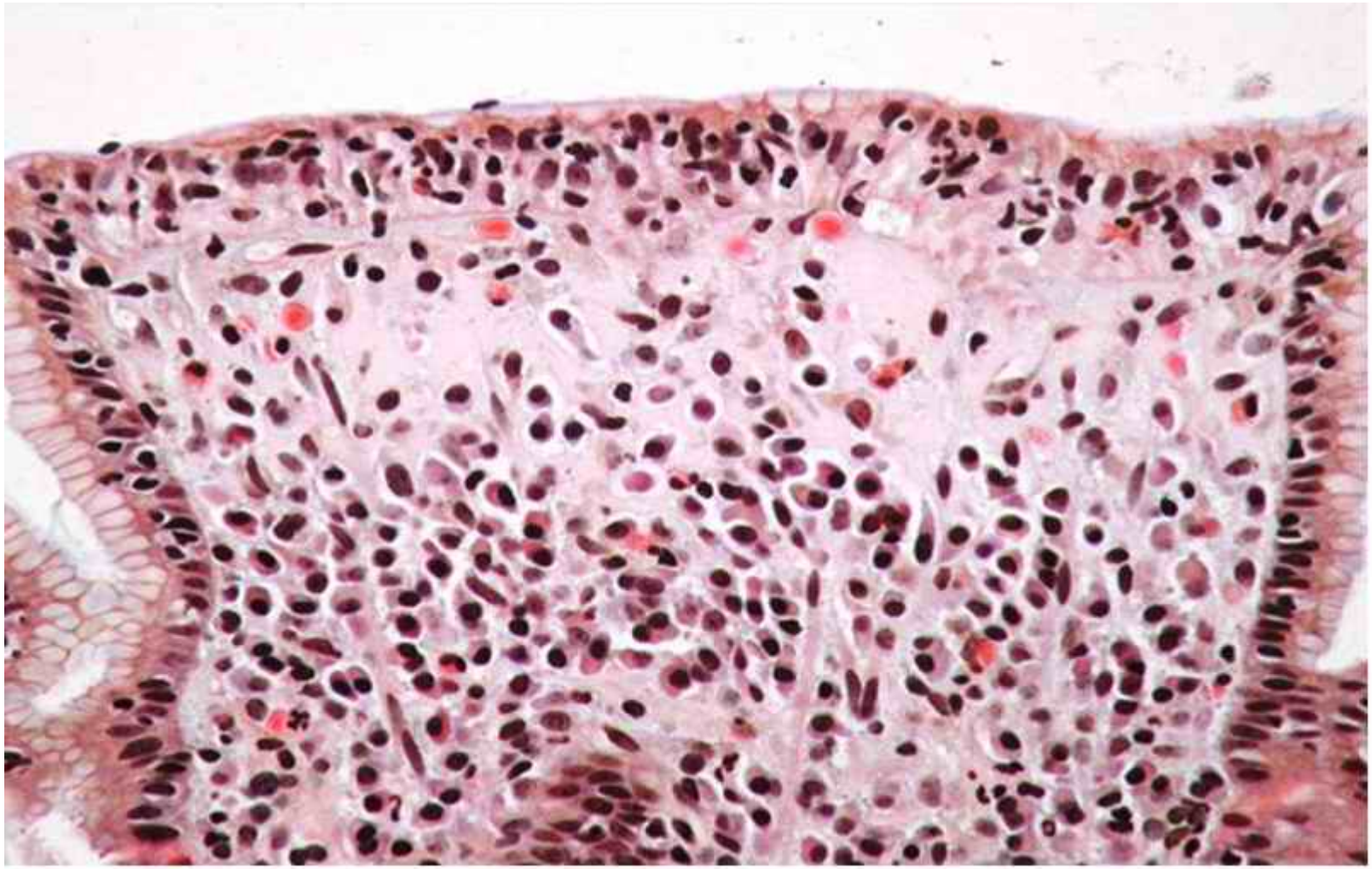
- Lymphocytic
- Eosinophilic
- Crohn's disease
- Sarcoidosis
- Isolated granulomatous

Lymphocytic Gastritis

- Protein loss.
- Ratio of 25 CD3+ IEL/100 epithelial cells (focal).
- Usually accompanied by lamina propria plasmacytosis

- Celiac Disease, Gastric Lymphoma, Menetrier's Disease.
- *H. pylori* (low *H. pylori* count)

Lymphocytic Gastritis



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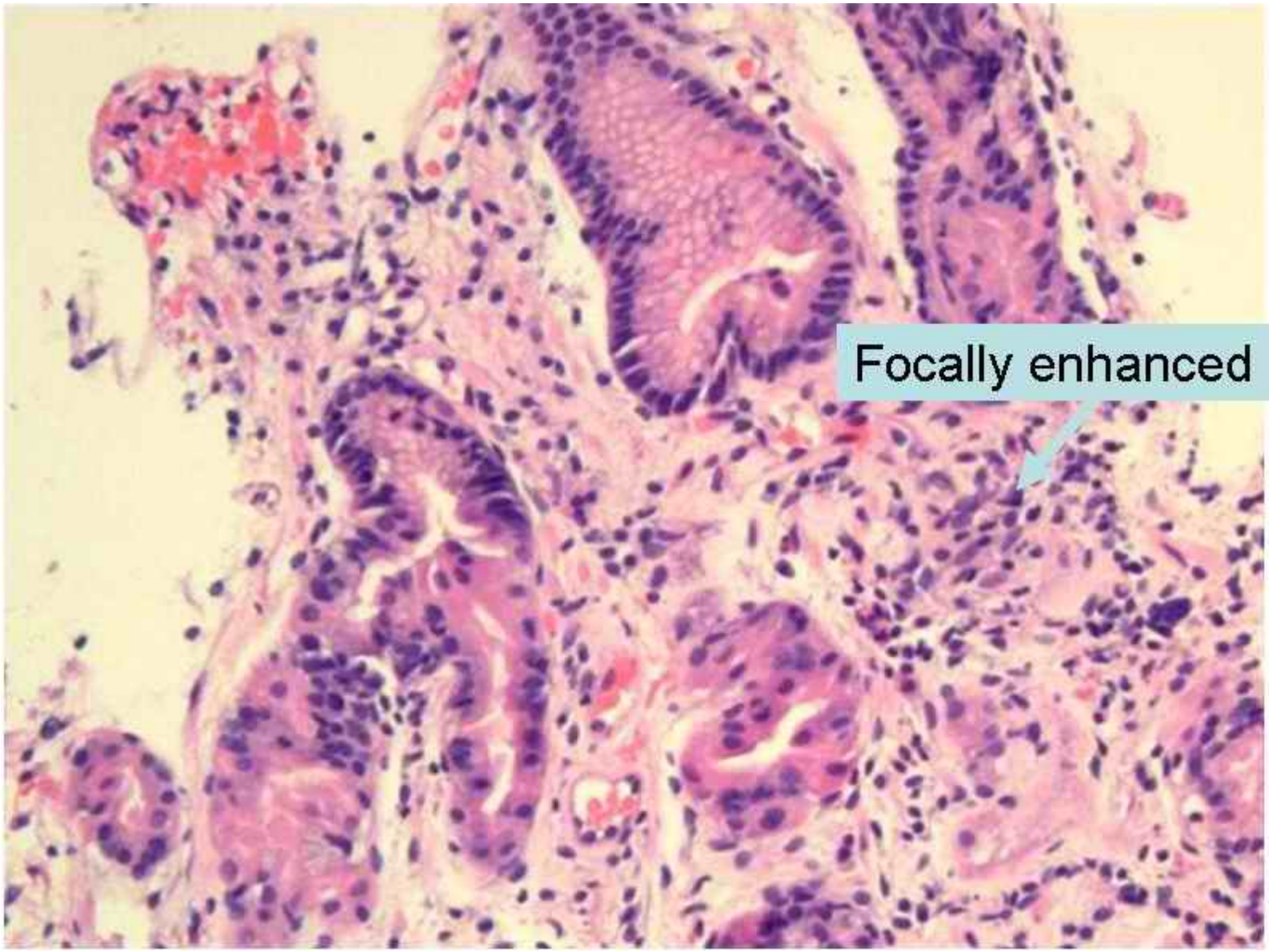
Crohn's Gastritis

Same as any other part of the gastrointestinal tract

1. Focal enhanced inflammation
2. Granulomas



Gastritis (acute and chronic) is multifocal

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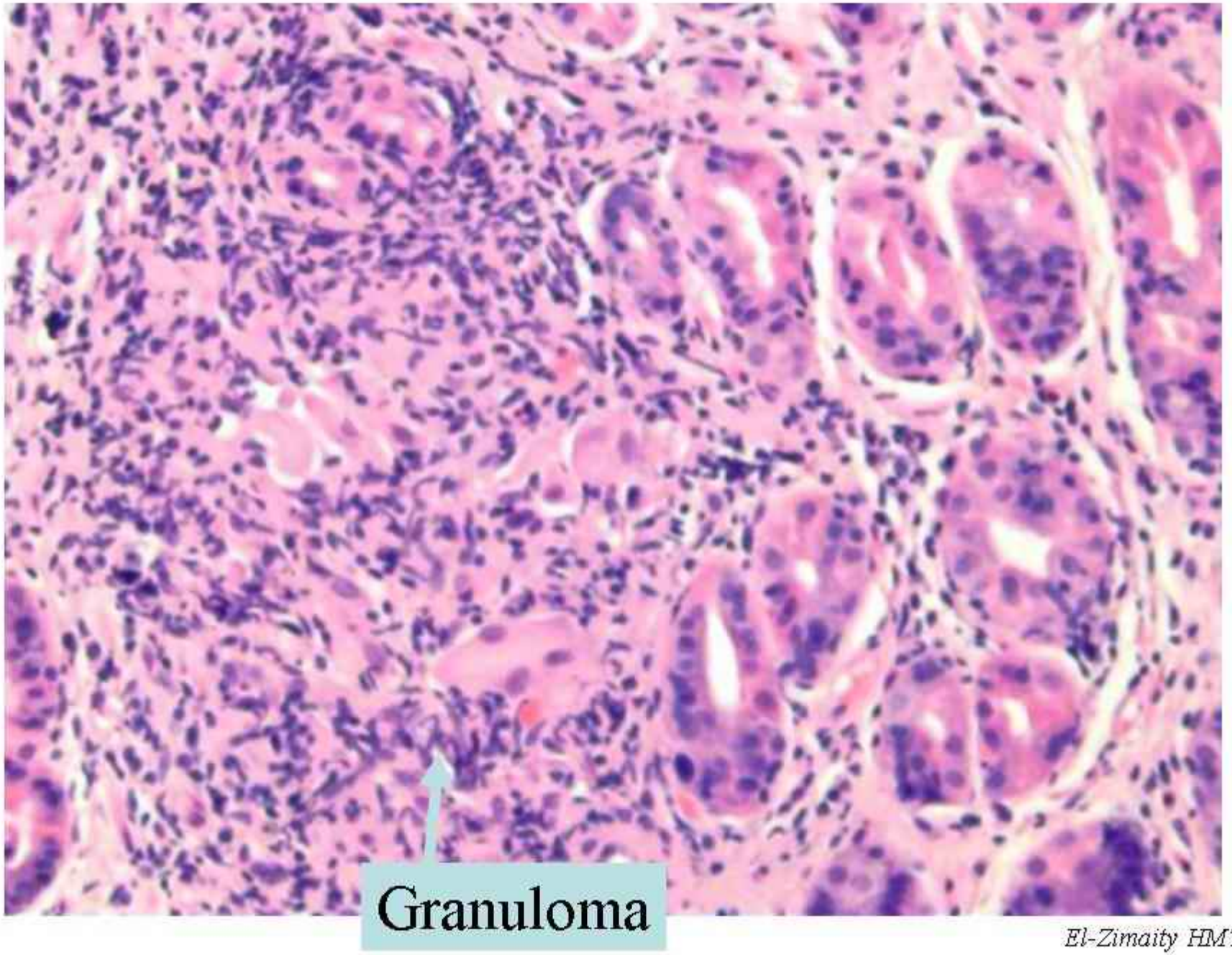

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Granuloma's in the Stomach

Crohn's

1. Focally enhanced gastritis (acute and chronic)
2. Granuloma

- *H. pylori*
- Granuloma basics:
  - IBD
  - T.B.
  - Sarcoid
  - Foreign body

Reporting gastritis

1. Where am I? (Site - Antral, Oxyntic, Cardiac, Pangastritis, Focal)
2. Is it a gastritis or a gastropathy?
3. Are there epithelial/vascular changes (e.g. dysplasia or cancer)?