Harvard-MIT Division of Health Sciences and Technology
HST.121: Gastroenterology, Fall 2005
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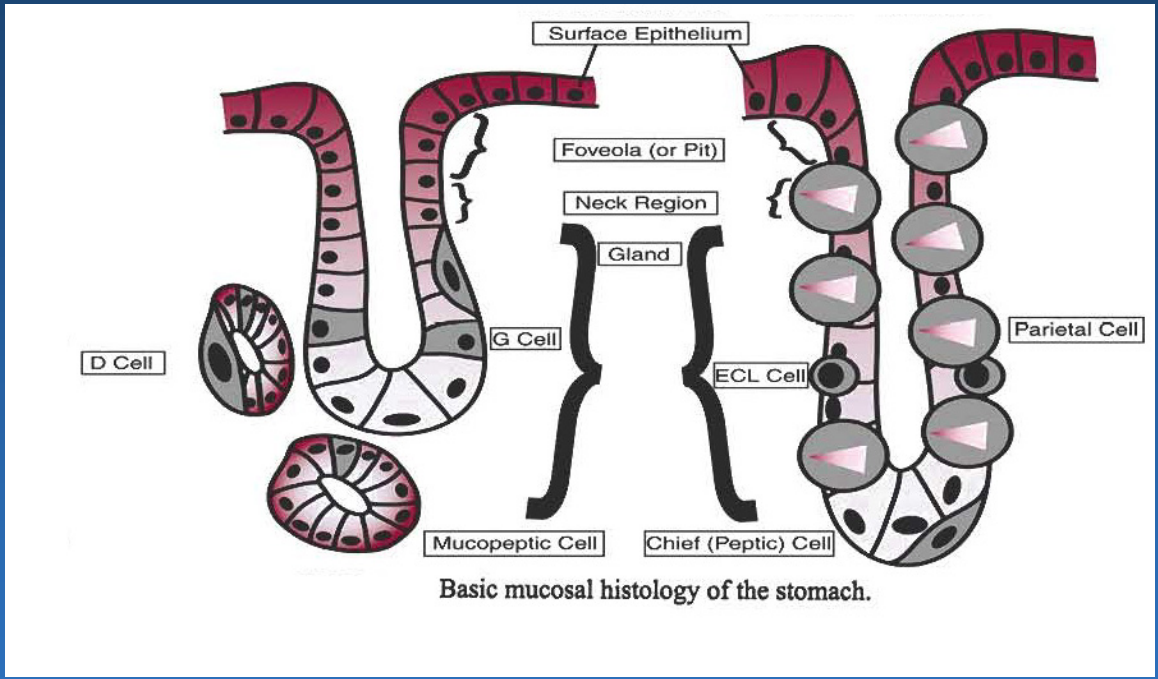
Overview of Gastric Pathology:

Non-Neoplastic Diseases

Structural Units of the Normal Gastric Mucosa



Basic mucosal histology of the stomach.

Figure by MIT OCW

Antral-Type

Fundic-Type

Non-Neoplastic Diseases of the Stomach

- Developmental abnormalities
- Chronic gastritis
- Acute gastritis
- Gastric ulcers
- Mucosal hypertrophy
- Infections
- Vascular disorders
- Systemic disorders

Patterns of Injury

- *Acute Injury:*
  - **Edema, congestion, and hemorrhage**
  - **Acute inflammation (neutrophils and eosinophils)**
  - **Erosions and ulcers**
- *Chronic Injury:*
  - **Chronic inflammation (lymphocytes and plasma cells)**
  - **Lymphoid aggregates and follicles**
  - **Atrophy of specialized glands**
  - **Metaplasia (intestinal, pyloric, and pancreatic)**
- *Repair Reactions:*
  - **Regenerative activity**
  - **Foveolar hyperplasia**
  - **Granulation tissue**

Working Classification of Gastritis

- Acute (erosive, hemorrhagic)
- Chronic:
  - *H. pylori* gastritis
  - Atrophic gastritis
    - Type A *or* autoimmune *or* diffuse body
    - Type B *or* multi-focal *or* environmental
  - Eosinophilic gastritis (gastroenteritis)
  - Lymphocytic gastritis
  - Granulomatous gastritis
- Infections
- Chemical "gastropathies"
    - Bile reflux
    - NSAIDS
    - Alcohol

Gastritis- etiologic classification

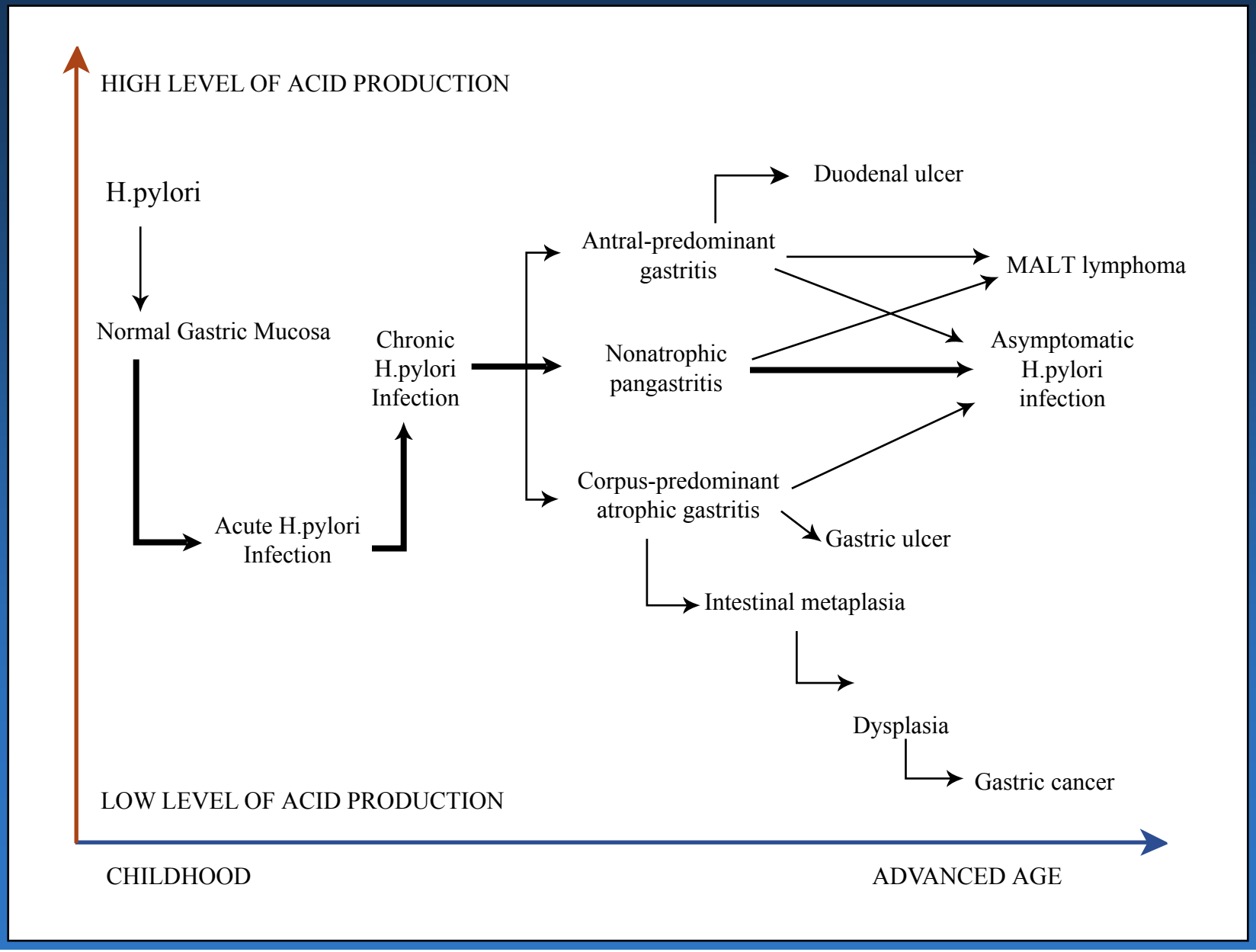
- Acute (erosive) gastritis
  - trauma, chemical injury, ischemia
- Helicobacter-associated gastritis
- Non-Helicobacter infectious gastritis
- Immune-mediated- autoimmune, GVHD
- Lymphocytic gastritis
- Allergic (eosinophilic) gastritis
- Crohn's disease
- Other- chemical, collagenous

Helicobacter Pylori Gastritis

- Typical histopathology is characterized by:
  - Chronic active antral gastritis, with or without
  - Chronic active superficial gastritis in the corpus
    - Lymphoplasmacytic inflammation in the lamina propria
    - Neutrophils in the lamina propria and gastric pits
    - Lymphoid aggregates and follicles
  - Characteristic bacilli, primarily in the foveolar mucus

- Histology may also include:
  - Increased intraepithelial lymphocytes in the antrum
  - Eosinophilic infiltrate

H pylori- Natural history



Distributions of gastritis

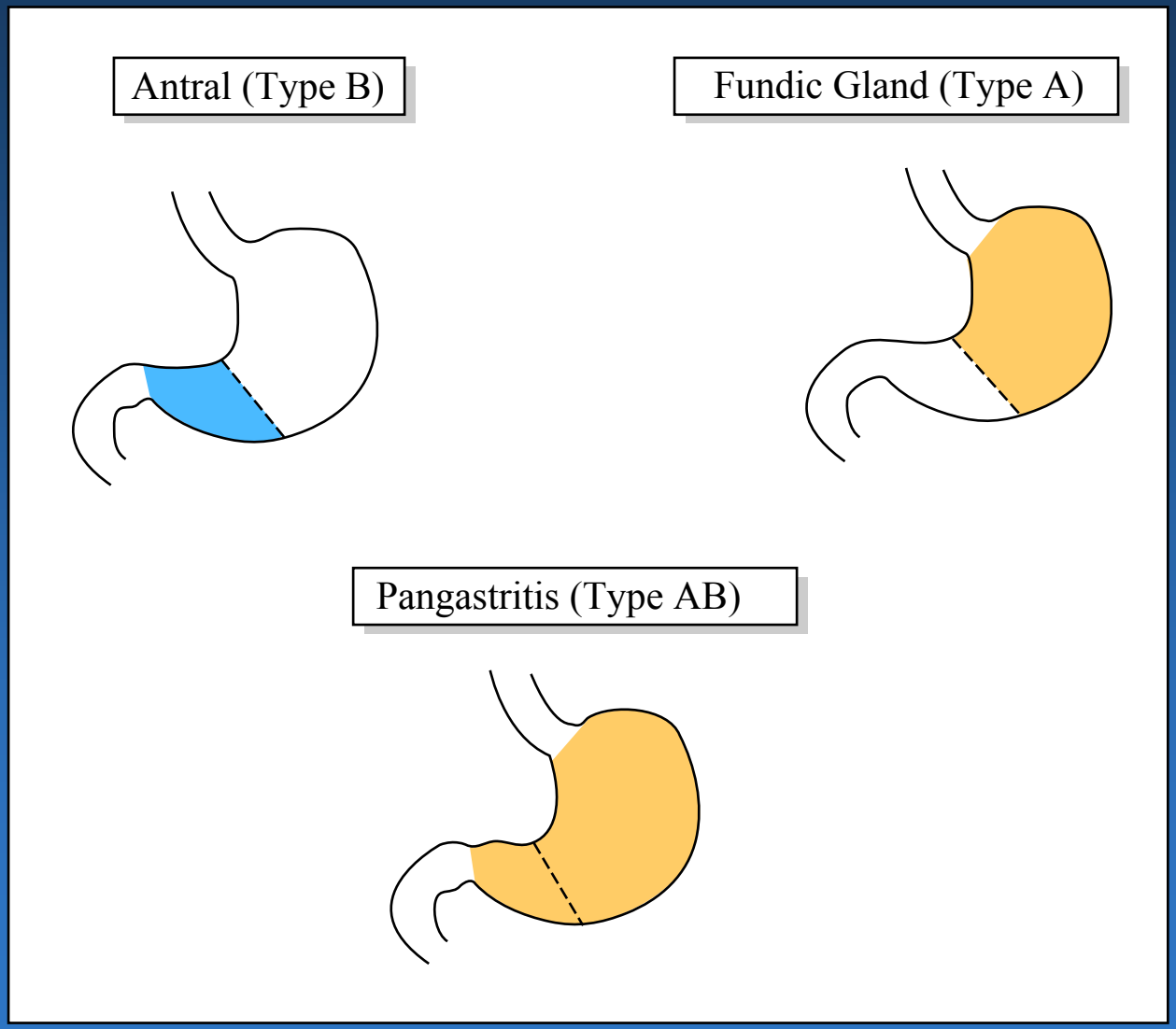


Image by MIT OCW

Autoimmune/Type A/Diffuse Atrophic Gastritis

- An autoimmune autosomal dominant disease with anti-parietal cell or anti-intrinsic factor autoantibodies
- Histopathology is characterized by:
  - Chronic inflammation
  - Gland atrophy
  - Loss of parietal cells
  - Pyloric and intestinal metaplasia
- Specific targeting of the parietal cells leads to:
  - Disease limited to the corpus and the fundus
  - Achlorohydria du to the loss of parietal cells
  - Pernicious anemia due to the loss of intrinsic factor
  - Hypergastrinemia due to the loss of gastric acid production
  - Endocrine cell hyperplasia and neoplasia due to hypergastrinemia

Environmental/Type B/Multifocal Atrophic Gastritis

- Heterogeneous disease due to chronic *H. pylori* gastritis, dietary factors, etc.
- Disease most commonly involves the antrum and/or antrum-corpus junction, but may be seen anywhere in the stomach
- Histopathology is characterized by:
  - Chronic inflammation
  - Gland atrophy
  - Intestinal metaplasia
  - Pylori metaplasia (with involvement of the corpus)
  - Patchy and/or focal involvement
- Identified as the precancerous lesion in 95% of early gastric adenocarcinomas in Japan

"Chemical" Gastropathy

- The final common pathway of mucosal damage due to chemicals, drugs, or bile reflux, characterized by any combination of:
  - Mucosal edema, congestion, and hemorrhage
  - Foveolar hyperplasia
  - Foveolar mucin depletion
  - Regenerative changes
  - Microscopic mucosal erosions
  - Increased smooth muscle fibers in the lamina propria
  - Relative paucity of inflammation

- Alcohol, NSAIDS, and other drugs produce a similar pattern of injury

Infections

Eosinophilic Gastritis

- **Eosinophilic gastritis is typically part of eosinophilic gastroenteritis, which may take one of three forms:**
  - ***Mucosal*** **(bleeding, protein loss, malabsorption)**
  - ***Mural*** **(mass lesion)**
  - ***Serosal*** **(ascites)**
- **The mucosal form of allergic gastroenteritis accounts for the majority of cases, is typically "allergic" in nature, and commonly involves the gastric antrum**
- **To establish a diagnosis of eosinophils/allergic gastroenteritis, eosinophils must be the predominant cell type, and other possible conditions must be excluded:**
  - **IBD**
  - **Reflux (esophagitis)**
  - **Parasitic infections**
  - **Vasculitis**
  - **Drug reaction**
  - **Chronic granulomatous disease**
  - **. . .**

Lymphocytic Gastritis

- **Histopathology:**
  - **Increased foveolar intraepithelial T lymphocytes (>3 per 10)**
  - **Variable degree of lymphoplasmacytic inflammation in the lamina propria**
  - **Involvement of the corpus with or without antral involvement**
- **Approximately 80% of cases diagnosed endoscopically as *chronic erosive (varioliform) gastritis* meet the histological diagnostic criteria for lymphocytic gastritis**
- **Approximately 20% of cases diagnosed histologically as lymphocytic gastritis have gross thickening of the mucosa**
- **? Association with *H. pylori***
- **? Association with protein losing gastropathy**
- **Approximately 60% of patients with active celiac disease have increased intraepithelial lymphocytes in the antrum**

Granulomatous Gastritis

- Crohn's disease
- Sarcoidosis
- Infections:
  - Mycobacteria
  - Histoplasma
- Foreign materials
- Isolated granulomatous gastritis
- And possibly:
  - Lymphoma
  - Malakoplakia
  - Whipple's disease
  - Chronic granulomatous disease

Acute Gastritis

- Acute infectious gastritis
- Acute hemorrhagic gastritis
  - Stress, medications, alcohol, ischemia, . . .
- Acute Stress Ulcer Disease
  - Cushing's ulcer (CNS damage)
  - Curling's ulcer (burn trauma)
  - Develops 1-2 weeks post-insult
  - Multifocal ulcers, typically in the body (contrast with PUD)

Developmental and Structural Abnormalities

- Gastric atresia (membranes >> complete segmental defects)
- Microgastria (arrested foregut development)
- Gastric diverticula:
  - 75% are *juxtacardial* (on the posterior wall of the cardia)
- Gastric duplication "cysts"
- Gastric outlet obstruction:
  - Infantile hypertrophic pyloric stenosis
- Heterotopias:
  - Gastric corpus mucosa (inlet patch, duodenal, Meckel's, rectal)
  - Pancreatic tissue (gastric and duodenal wall and submucosa)
  - Brunner glands

Vascular Disorders

- Congestive gastropathy and varices
- Gastric antral vascular ectasis (GAVE)
- Hereditary Hemorrhagic Telangiectasia (Osler-Weber-Rendu disease)
- Sporadic telangiectasias
- Caliber-persistent artery (Dieulafoy ulcer)
- Arterio-venous malformations
- Vasculitis
- Atheroembolic disease
- Amyloid vasculopathy

Gastric Mucosal Hypertrophy

- Congenital hypertrophy of the rugae
- Mucosal hypertrophy due to parietal cell hyperplasia
  - Zollinger-Ellison Syndrome
- Mucosal hypertrophy due to foveolar hyperplasia
  - Menetrier's Disease
- Mucosal thickening (not hypertrophy) secondary to an infiltrative process

Menetrier's Disease

- Hyperplasia of the surface foveolar zone
- Overproduction of mucus results in protein-losing enteropathy
- Chronic disease in adults with a possible increase in the risk of gastric cancer
- Self-limited disease in children typically following to a viral infection

Zollinger-Ellison Syndrome

- Hyperplasia of the parietal cells due to increased gastrin production
- Source of gastrin may be:
  - A pancreatic islet cell tumor (90%)
  - A proximal duodenal tumor (7%)
  - Antral G-cell hyperplasia (3%)
- Maximal stimulation of parietal cells leads to excessive acid production, resulting in multiple peptic ulcers of the stomach and the duodenum

Gastric polyps

- Non-neoplastic
  - Hyperplastic polyp
  - Fundic gland polyp
  - Others (hamartomatous, etc.)
- Neoplastic
  - Adenoma
  - Carcinoma