

# Gastrointestinal Nutrition Block

Pathology lecture

Dec, 2019

## Inflammatory bowel disease

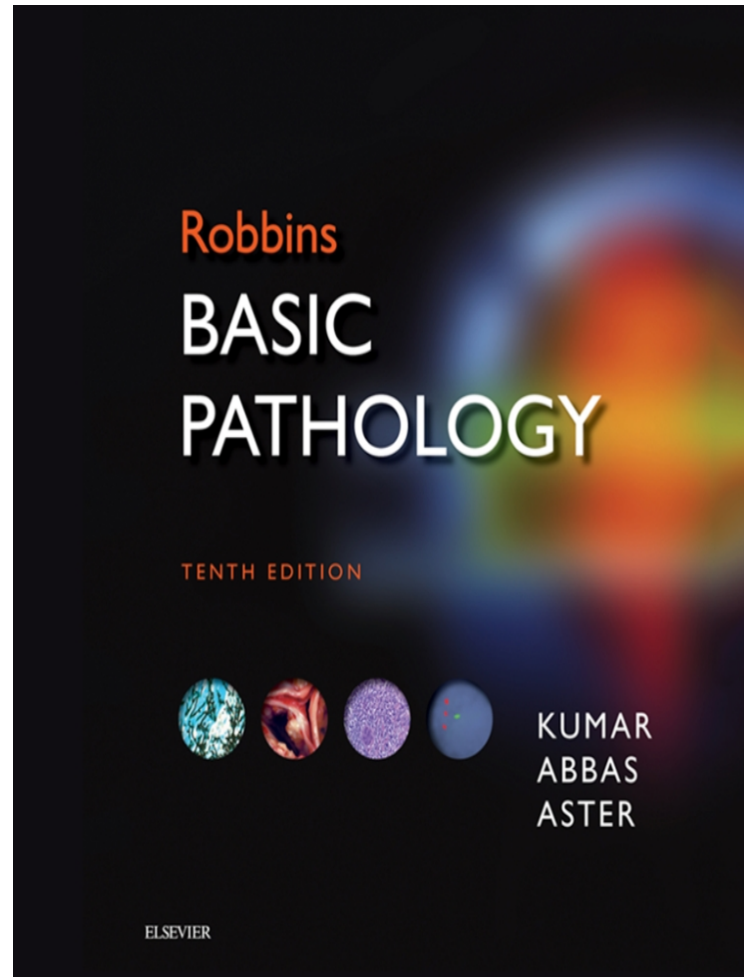
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# Learning Objectives

1. Define inflammatory bowel disease (IBD)
2. Know the two forms of idiopathic IBD
3. Compare and contrast Crohn's disease and Ulcerative Colitis with respect to:
  - a. clinical features and extraintestinal manifestations
  - b. pathogenesis
  - c. pathology (gross and microscopic features)
  - d. complications (especially adenocarcinoma preceded by dysplasia)

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# Inflammatory bowel disease

## Definition

- is a chronic condition resulting from complex interactions between intestinal microbiota and host immunity in genetically predisposed individuals resulting an inappropriate mucosal immune activation.

# Inflammatory Bowel Diseases

Two types

- Crohn's disease (CD) and ulcerative colitis (UC)
- The distinction between ulcerative colitis and Crohn disease is based on the distribution of affected sites and the morphologic expression of disease at those sites
- Ulcerative colitis is the common inflammatory bowel disease
- Although their causes are still not clear, the two diseases probably have an immunologic hypersensitivity basis

# Epidemiology

- Both Crohn's disease (CD) and ulcerative colitis (UC) are more common in females and in young adults

## Ulcerative colitis

More common in whites than blacks

Occurs between 14 and 38 years of age

Lower incidence in smokers and other nicotine users

Lower incidence if previous appendectomy <20 years

## Crohn's disease

More common in whites than blacks, in Jews than non-Jews. More common in children than adults.

Smoking is a risk factor

Majority (>75%) of cases occur between 11 and 35 years of age

# Epidemiology

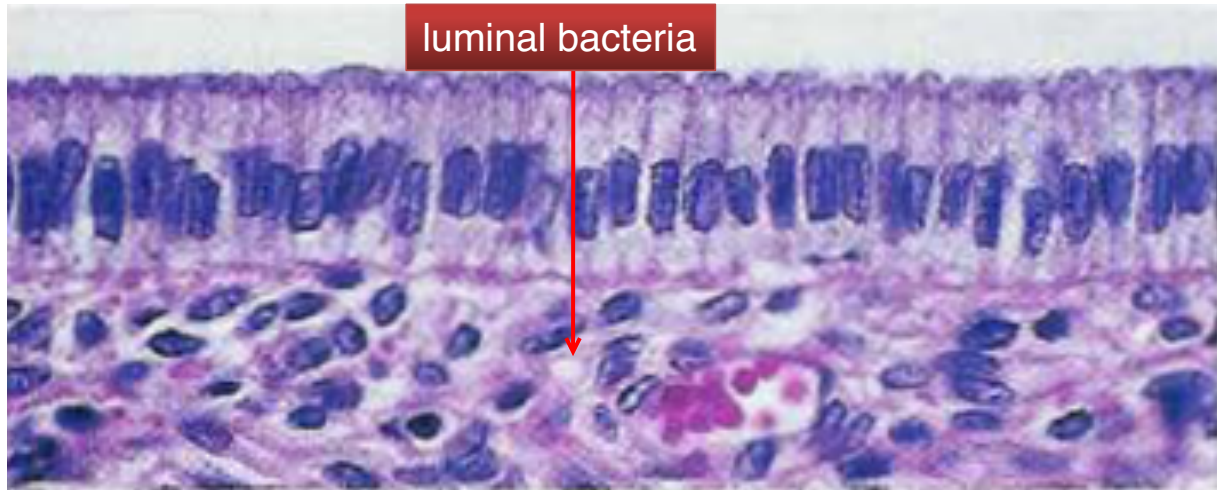
- The geographic distribution of IBD is highly variable
- It is most prevalent in North America, northern Europe, and Australia.
- IBD incidence worldwide is on the rise and is becoming more common in regions in which the prevalence was historically low.

# Epidemiology

- The hygiene hypothesis suggests that these changes in incidence are related to:
  - improved food storage conditions and decreased food contamination.
    - improved hygiene has resulted in inadequate development of regulatory processes that limit mucosal immune responses early in life.
    - As a result, exposure of susceptible individuals to normally innocuous microbes later in life triggers inappropriate immune responses due to loss of intestinal epithelial barrier function.



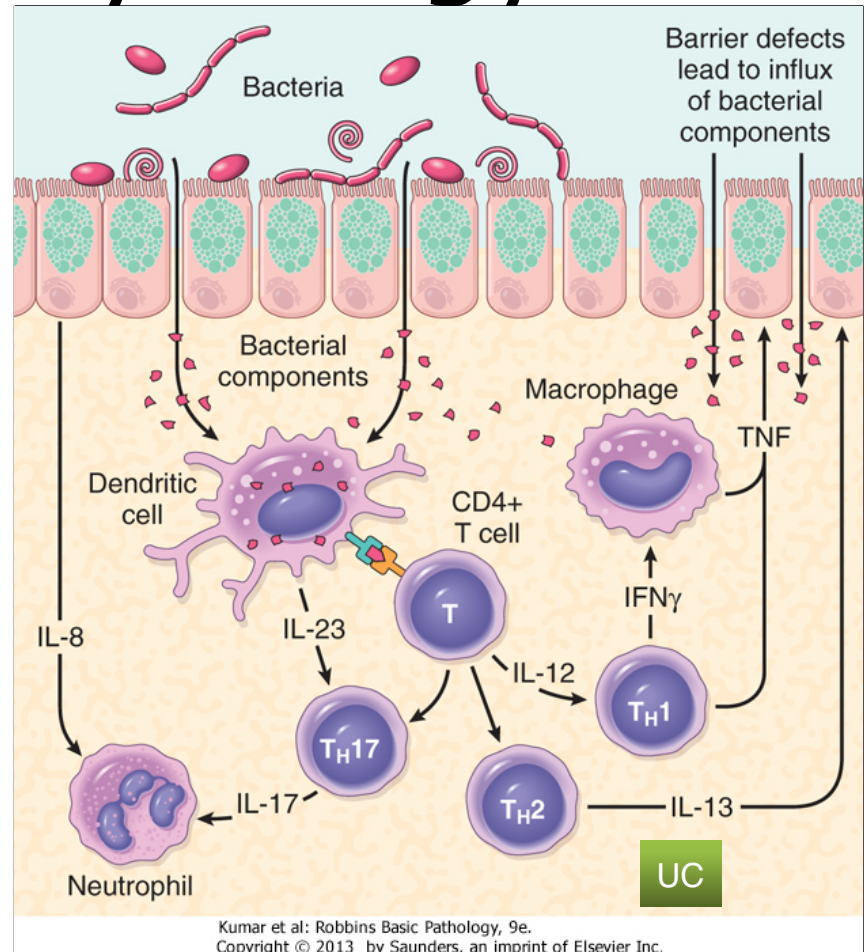
# Pathophysiology



# Pathophysiology

1. Defects in host interactions with intestinal microbes
2. Intestinal epithelial dysfunction
3. Aberrant mucosal immune responses.
4. altered composition of the gut microbiome

Result: activates innate and adaptive immune responses. In a genetically susceptible host, the subsequent release of TNF and other immune signals directs epithelia to increase tight junction permeability, which further increases the flux of luminal material resulting in IBD



# Pathophysiology

- Genetics.

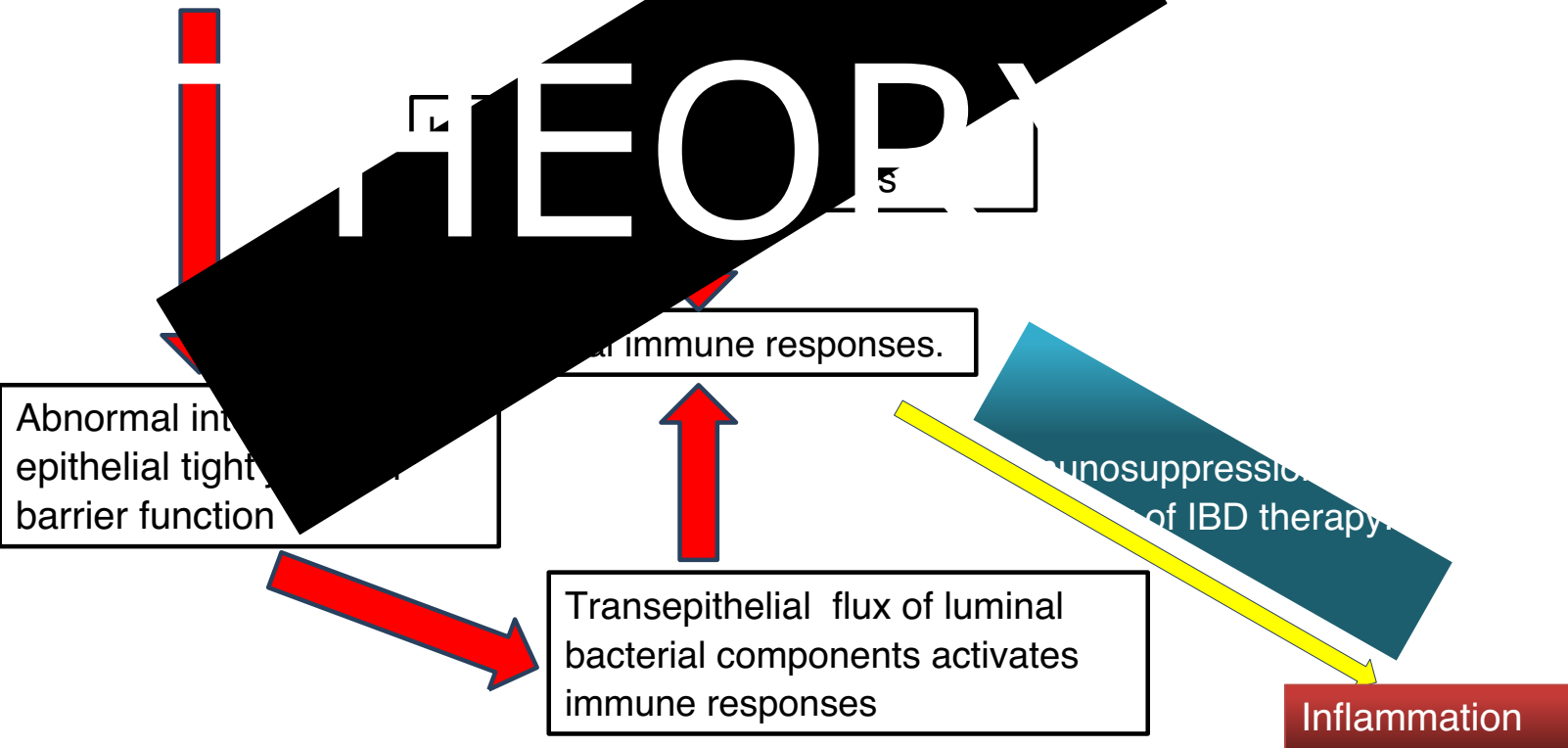
Risk for disease is increased when there is an affected family member

- in Crohn disease, the concordance rate for monozygotic twins is approximately 50%.
- By contrast, concordance of monozygotic twins for ulcerative colitis is only 16%, suggesting that genetic factors are less dominant in this form of IBD

# Pathophysiology

Genetics: mutation in Nucleotide-binding oligomerization domain-containing protein 1 (encodes a protein that binds to intracellular bacterial peptidoglycans) NOD2..... susceptibility gene in Crohn disease  
..... Abnormal recognition and response to pathogens

# IAEOP



# Clinical

The manifestations of IBD generally depend on the area of the intestinal tract involved.

Colon

Bloody diarrhea,  
Tenesmus

Small intestine

Abdominal pain  
Intestinal obstruction.  
Steatorrhea

Extraintestinal manifestations

Arthritis  
Eye manifestation  
Skin manifestation

# Crohn's disease

- is a chronic inflammatory disorder that most commonly affects the **ileum** and colon but has the potential to involve **any part** of the gastrointestinal tract from the mouth to the anus.

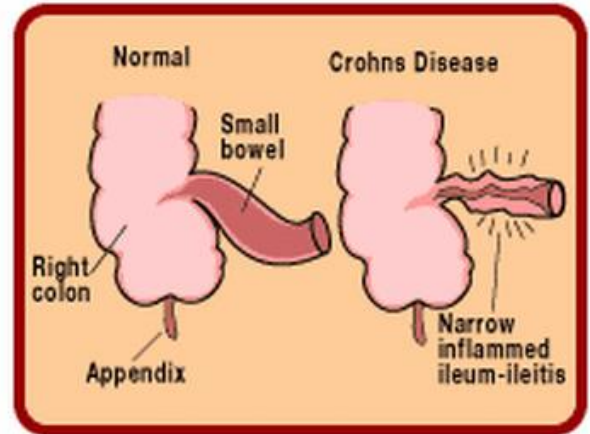
# Crohn's disease

## Clinical Features

- Any age but has its highest incidence in young adults
- Extremely variable clinical feature.
- ❑ **Acute phase:** fever, diarrhea, and right lower quadrant pain may mimic acute appendicitis.
- ❑ **Chronic disease:** remissions and relapses over a long period of time.
- ❑ Thickening of the intestine may produce an ill-defined mass in the abdomen.

# Crohn's disease

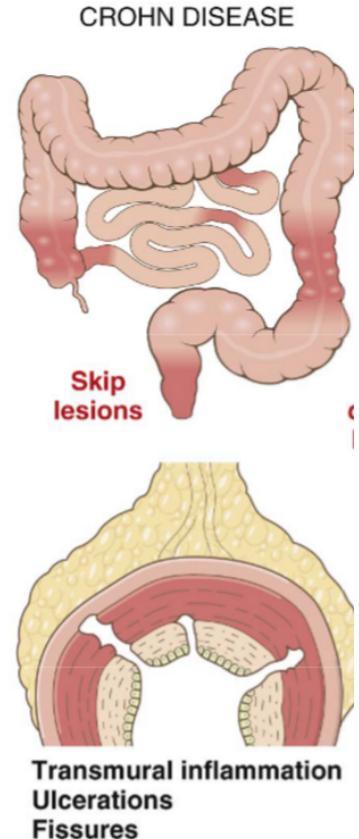
- **Sites of Involvement:**
  - ✓ Any part of the GIT from the mouth to the anus.
  - ✓ ileum (30%) colon (20%).
  - ✓ most commonly terminal ileum
  - ✓ Commonly (75%) have perianal lesions such as abscesses, fistulas, and skin tags.



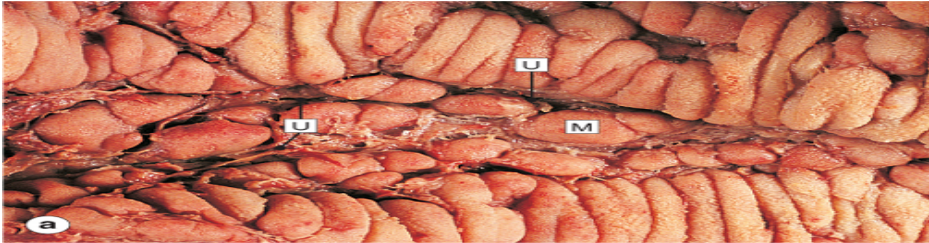


# Crohn's disease

- **Gross Appearance:**
- Involvement is typically **segmental**, with skip areas of normal intestine between areas of involved bowel.
- Marked fibrosis causing **luminal narrowing** with **intestinal obstruction**.
- **Fissures** (deep and narrow ulcers that look like stabs with a knife that penetrate deeply into the wall of the affected intestine)
- **fistulas** (communications with other viscera).



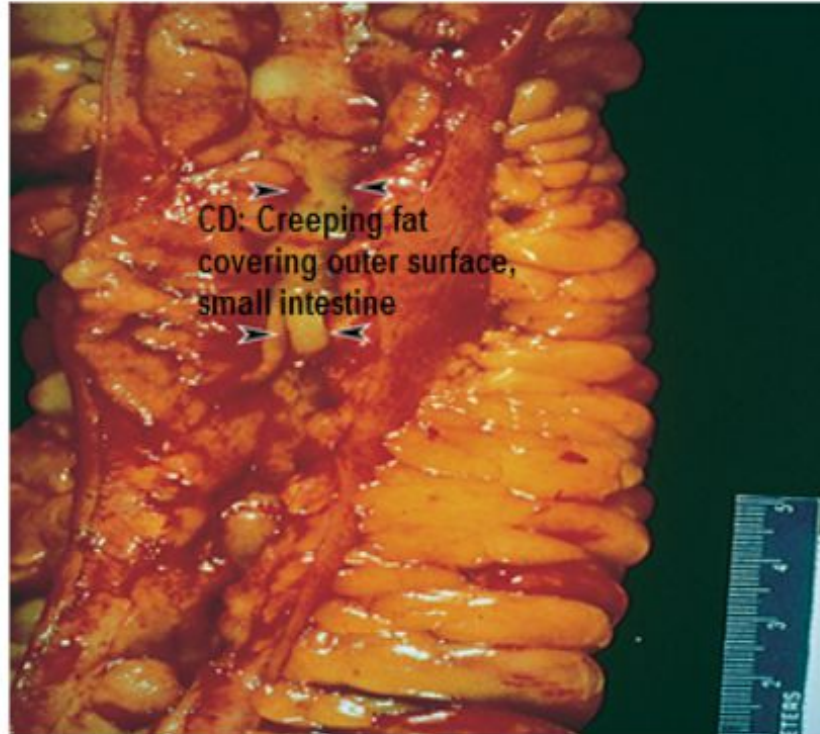
**Mucosa**: longitudinal serpiginous ulcers separated by irregular islands of edematous mucosa. This results in the typical **cobblestone effect**.



Stevens et al: Core Pathology, 3rd Edition.  
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**FAT** : In involved ileal segments, the mesenteric fat creeps from the mesentery to surround the bowel wall (**creeping fat**)



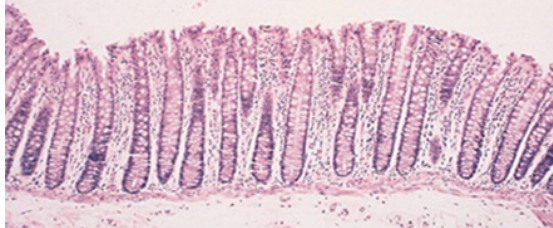
# Crohn's disease

- **Microscopic Features**

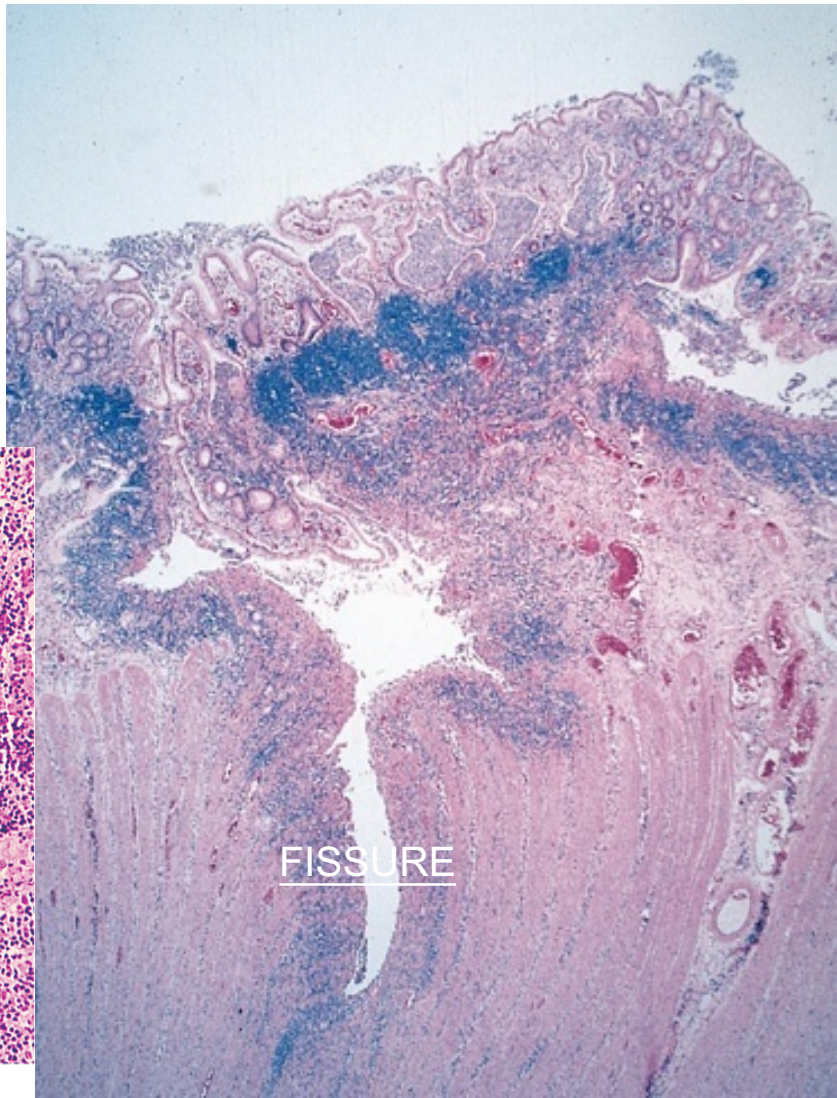
1. Distortion of mucosal crypt architecture with mucosal inflammation
  2. Transmural inflammation
  3. Epithelioid granulomas [60%]
- Fissure-ulcers and fistulas can be seen microscopically



Normal



# Crohn's Disease



# Crohn's disease

## Clinical findings

- Recurrent right lower quadrant colicky pain (obstruction) with diarrhea and weight loss
- Bleeding occurs only with colon or anal involvement (fistulas; abscesses)
- Aphthous ulcers in mouth
- Extragastrintestinal: erythema nodosum, sacroiliitis (HLA-B27 association), pyoderma gangrenosum, iritis (CD > UC), primary sclerosing cholangitis (UC > CD)

# Crohn's disease

## Complications

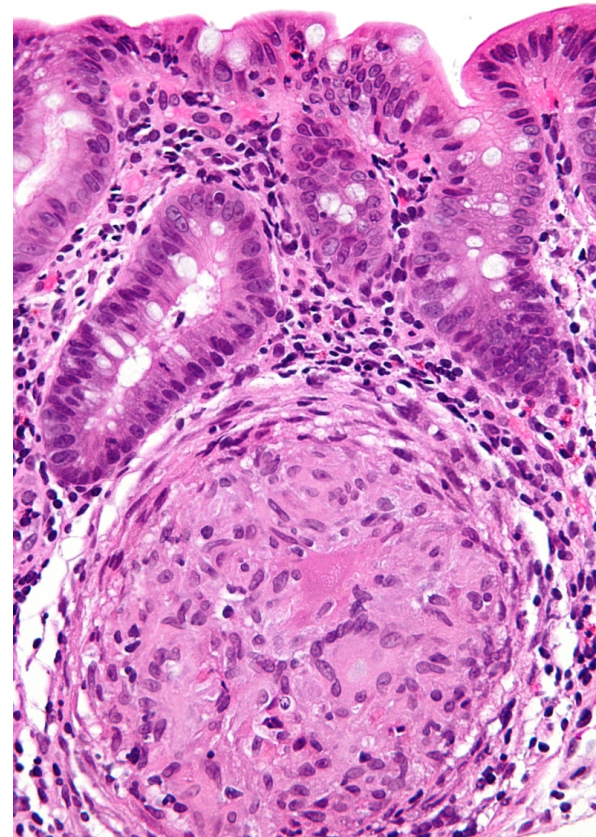
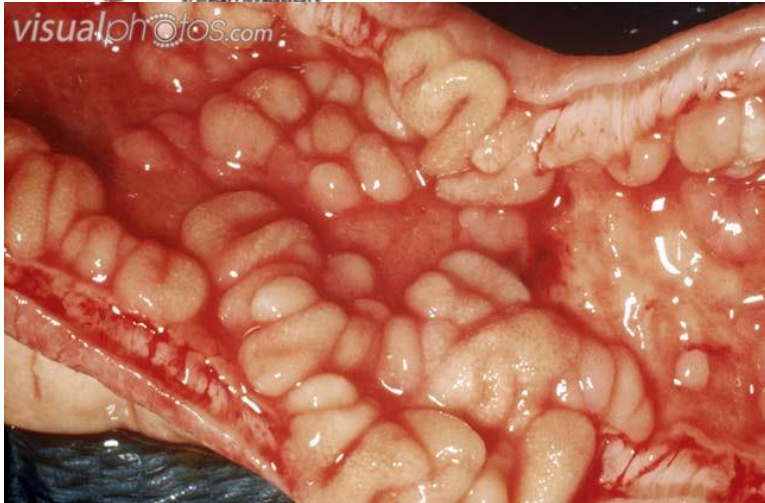
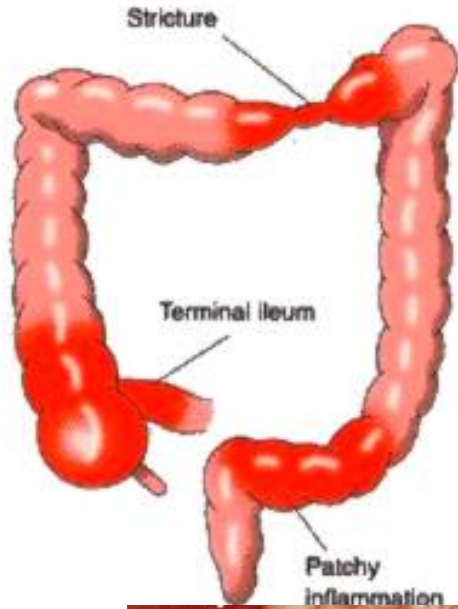
1. Intestinal obstruction
2. Malabsorption
3. Fistula formation
  - a) between the ileum and the colon result in malabsorption
  - b) Enterovesical fistulas lead to urinary infections and passage of gas and feces with urine.
  - c) Enterovaginal fistulas produce a fecal vaginal discharge.
  - d) Peritonitis.
3. **Extraintestinal manifestations** (arthritis and uveitis)
4. Slight increased risk of development of **carcinoma** of the colon - much less than in ulcerative colitis.

# Crohn's disease

- **Summary**
- Involvement of discontinuous segments of intestine (skip areas)
- Can involve any part of GIT.
- Noncaseating epithelioid cell granulomas
- Transmural (full-thickness) inflammation of the affected parts



# Crohn's colitis



# Complications of Crohn's disease

Normal



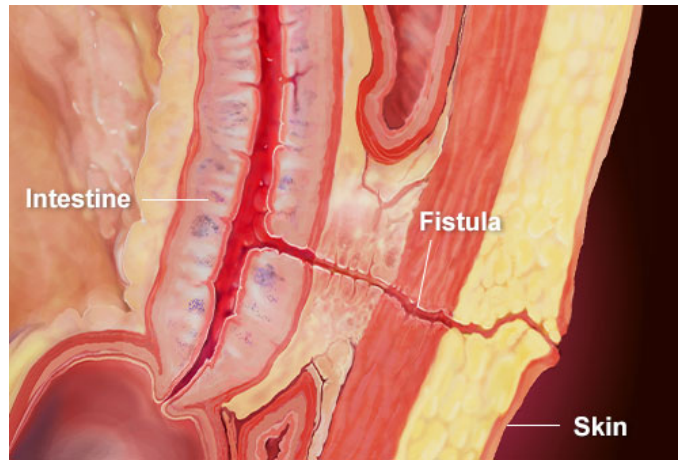
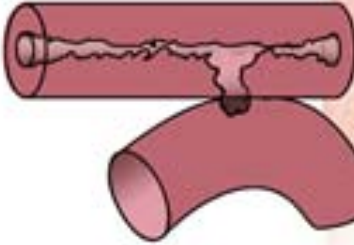
Inflammation



Stricture



Fistula



# Ulcerative Colitis

# Ulcerative Colitis

- Definition—chronic relapsing ulceroinflammatory disease of undetermined etiology
- 20- to 30-year age group but may occur at any age
- Most common inflammatory bowel disease
- Ulcerations are in continuity

# Ulcerative Colitis

## Etiology

- The cause is unknown
- **Antibodies** that cross-react with intestinal epithelial cells and certain serotypes of *Escherichia coli* have been demonstrated in the **serum** of some patients with ulcerative colitis.
- For unclear reasons, research suggests that smoking increases the risk of Crohn's disease but reduces the likelihood of ulcerative colitis.

# Ulcerative Colitis

## Clinical Features

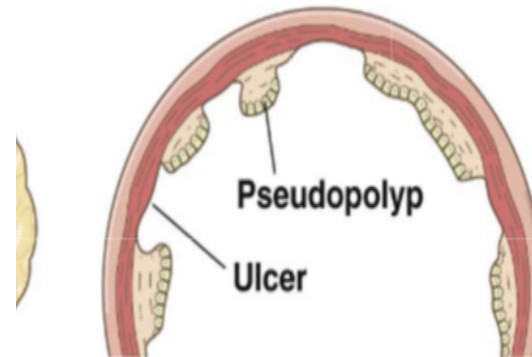
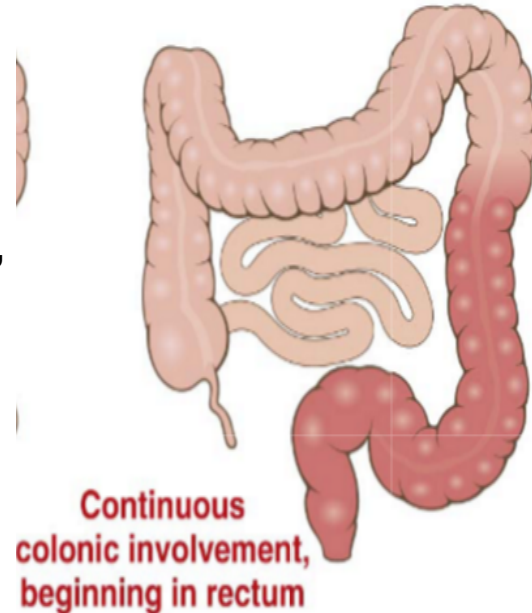
- In the acute phase and during relapse, the patient has fever, leukocytosis, lower abdominal pain, bloody diarrhea and mucus in the stool.
- The disease usually has a chronic course, with remissions and exacerbations.

# Ulcerative Colitis

## Sites of Involvement

- Ulcerative colitis is a disease of the rectum, and the colon.
- Rectum is involved in almost all cases
- The disease extends proximally from the rectum in a continuous manner without skip areas.
- The ileum is not involved as a rule

ULCERATIVE COLITIS

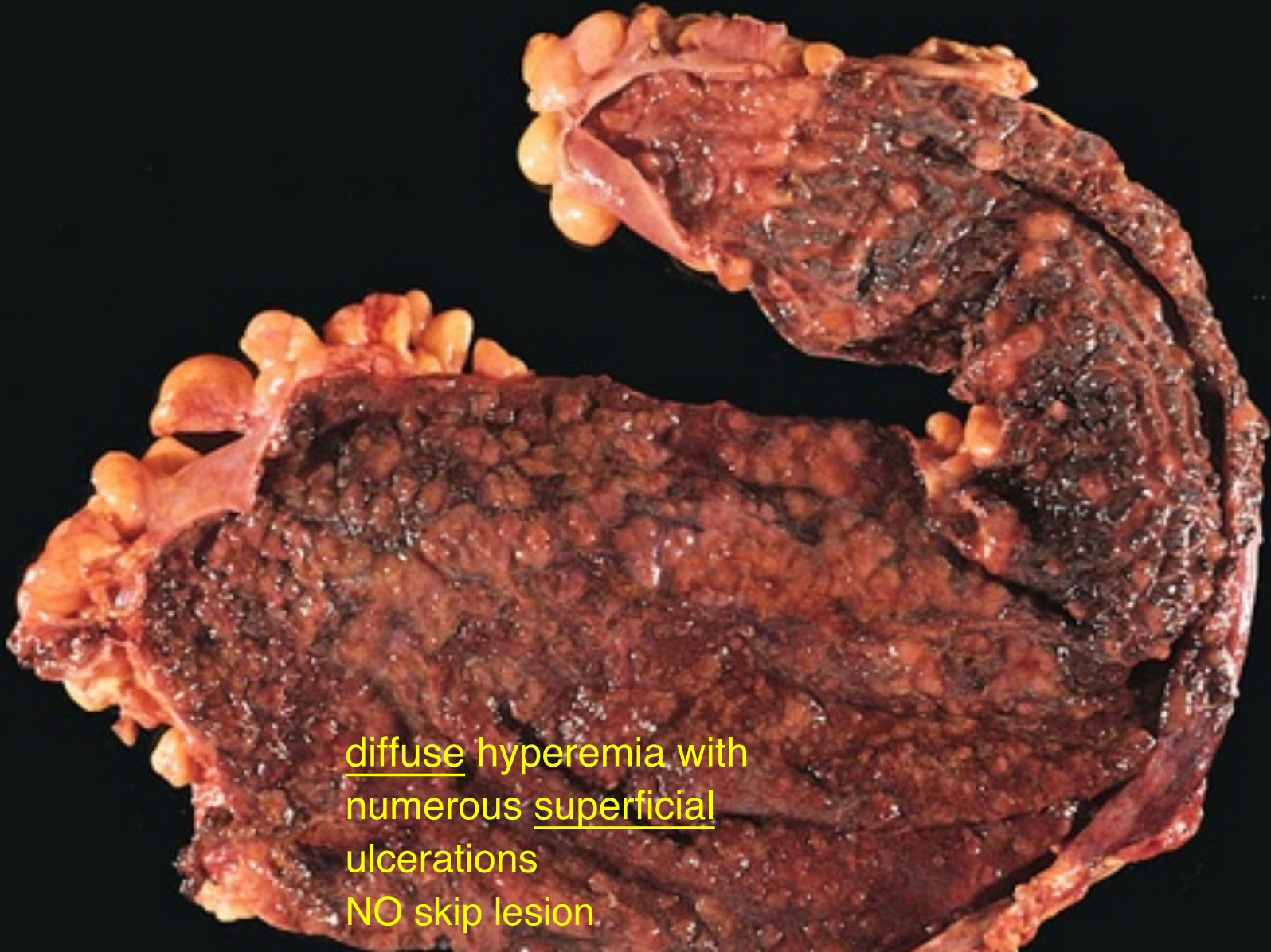


# Ulcerative Colitis

## Gross Appearance

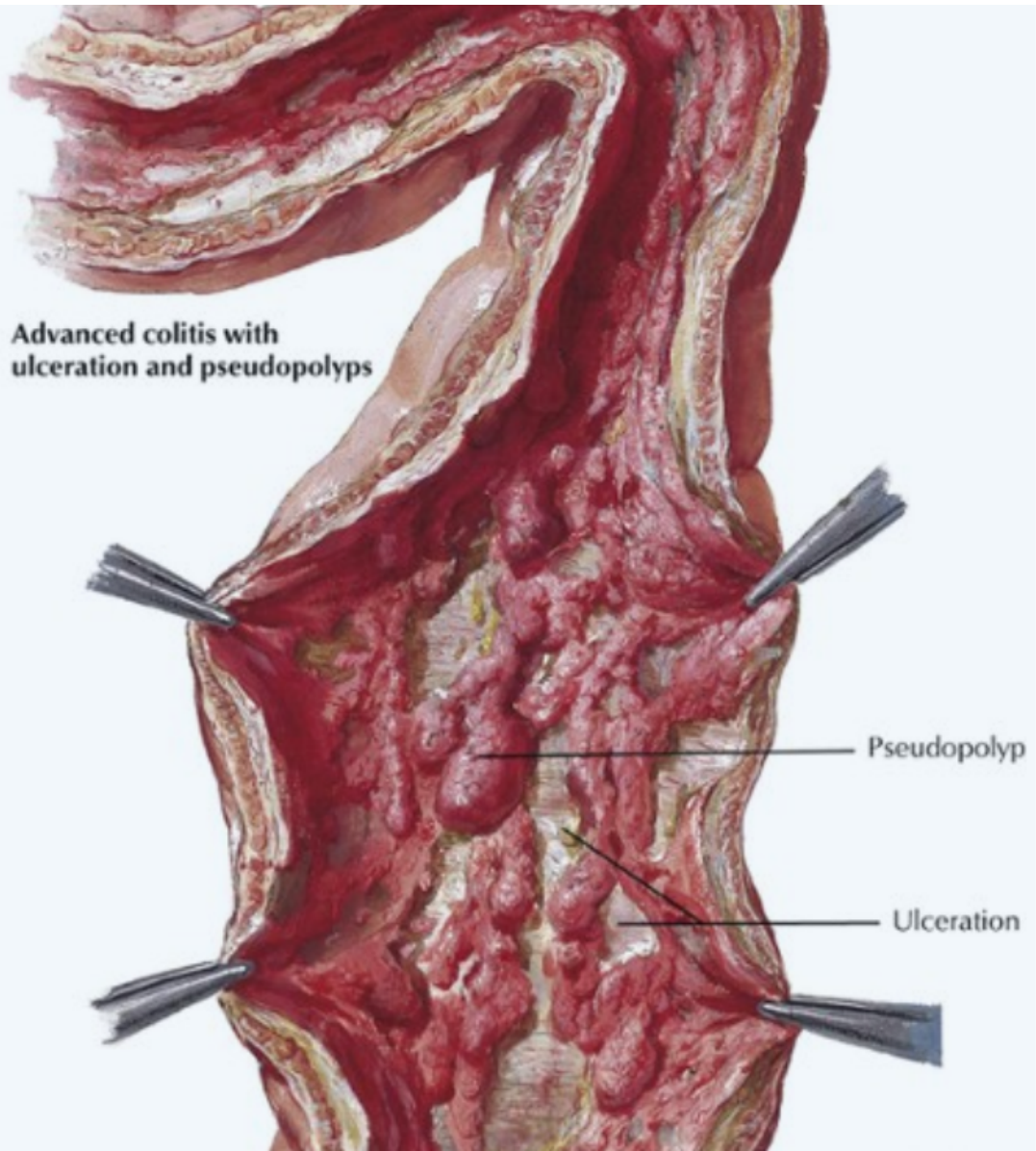
- Involves mainly the mucosa (diffuse hyperemia with numerous superficial ulcerations in the acute phase.
- The regenerated or nonulcerated mucosa may appear polypoid (inflammatory pseudopolyps) in contrast with the atrophic areas or ulcers.





diffuse hyperemia with  
numerous superficial  
ulcerations  
NO skip lesion.

**Advanced colitis with  
ulceration and pseudopolyps**



Pseudopolyp

Ulceration

# Ulcerative Colitis

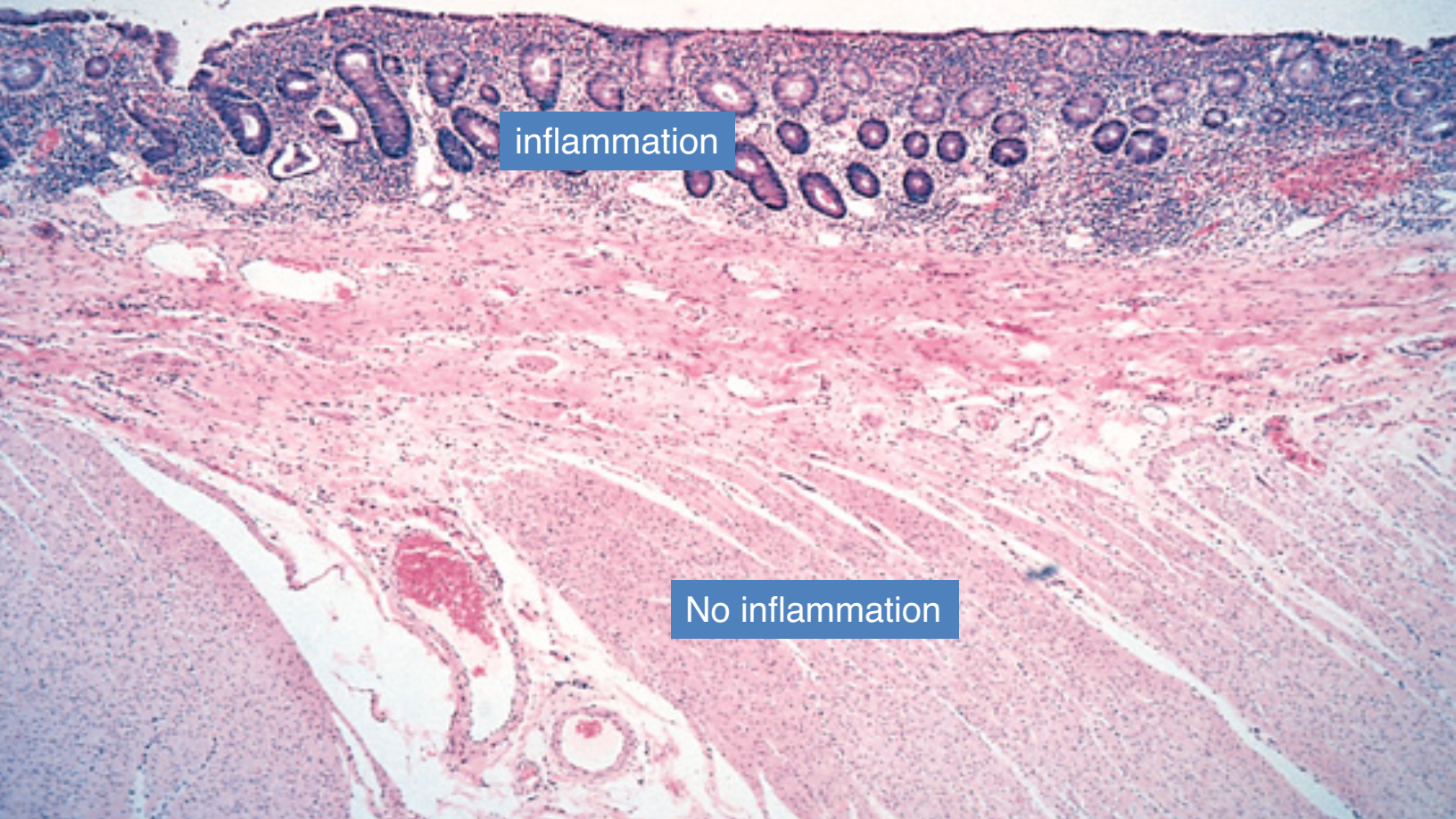
- Microscopic Appearance
- The inflammation is usually restricted to the mucosa.
- In the active phase....neutrophils (Cryptitis, crypt abscess)
- In the chronic phase.....crypt atrophy and distortion
- Active inflammation correlates well with the severity of symptoms.



The inflammation is usually restricted only to the mucosa.

inflammation

No inflammation







Crypt abscess

dysplasia

# Ulcerative Colitis

## Clinical findings

- Recurrent left-sided abdominal cramping with bloody diarrhea and mucus
- Fever, tenesmus, weight loss
- Toxic megacolon (up to 10% of patients). Mortality rate 50%.
- Extra-gastrointestinal: primary sclerosing cholangitis (UC > CD), erythema nodosum, iritis/uveitis (CD > UC), pyoderma gangrenosum, HLA-B27 positive arthritis.
- p-ANCA antibodies >45% of cases

# Ulcerative Colitis

- **Extraintestinal manifestations**

1. Arthritis
2. Uveitis
3. Skin lesions (pyoderma gangrenosum),
4. Sclerosing cholangitis (fibrosis around bile ducts), leading to obstructive jaundice.

# Ulcerative Colitis

- **Complications**

- **Acute phase**

1. Severe bleeding
2. Toxic megacolon (dilation of the colon, with functional obstruction)

- **Chronic ulcerative colitis**

- ✓ Increase risk of developing colon carcinoma.
- ✓ The presence of high-grade dysplasia in a mucosal biopsy imposes a high risk of cancer and is an indication for colectomy.



# Ulcerative Colitis

# Crohn's disease

Colon only

Diffuse involvement of mucosa

Superficial ulcers

Mucosal inflammation only

No

No

No

No

Common

more common (10%)

Pseudopolyps

Thin wall Dilated lumen

Moderate

Haemorrhage

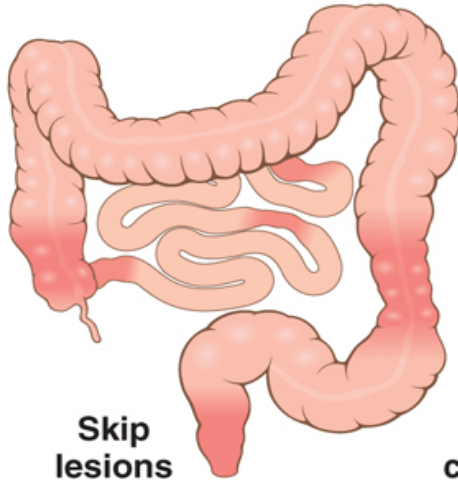
Electrolyte loss

Toxic megacolon

Thickened wall narrow lumen

Deep wall

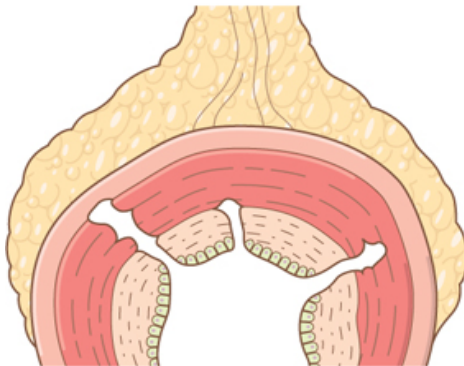
Ulcerative Colitis	Crohn's disease	
Colon only	Any part of the GIT	Site
Diffuse involvement of mucosa	Skip areas of normal mucosa	Pattern
Superficial ulcers	Deep ulcers ( fissure )	Depth of the ulcer
Mucosal inflammation only	Transmural inflammation	Extent of inflammation
No	Yes	Fistula formation
No	Yes	Creeping mesenteric fat
No	Yes	Fibrous thickening of wall
No	Yes	Granulomas
Common	rare	Dysplasia
more common (10%)	rare	Carcinoma
Pseudopolyps	Cobblestone	Mucosal appearances
Thin wall Dilated lumen	Thickened wall Narrow lumen	Bowel wall
Moderate	Marked	Lymphoid reaction
Haemorrhage Electrolyte loss Toxic megacolon Systemic effects	Short gut syndrome Fistula formation Bowel perforation Stricture formation	Complications
No	Common	Recurrence after surgery



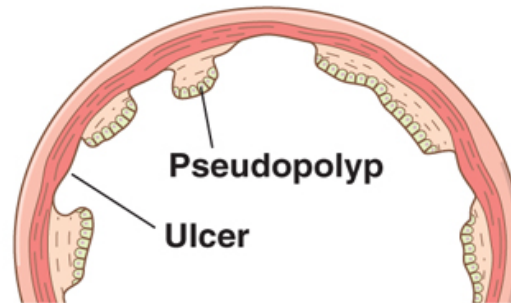
**Skip lesions**



**Continuous colonic involvement, beginning in rectum**



**Transmural inflammation  
Ulcerations  
Fissures**



**Pseudopolyp**

**Ulcer**

# Inflammatory bowel diseases

MATCH

1. Colon only
2. Diffuse involvement of mucosa
3. Superficial ulcers
4. Any part of the GIT
5. Skip areas of normal mucosa
6. Mucosal inflammation only
7. Crypt distortion
8. Fistula formation
9. Rectal involvement
10. Transmural inflammation
11. Granulomas
12. Deep ulcers (fissure)
13. Dysplasia is common
14. Carcinoma is more common (10%)

A. Crohn's disease

B. Ulcerative Colitis