Intestinal pathology, part 1

Manar Hajeer, MD, FRCPath

University of Jordan, School of medicine

Diseases of the intestines

- Intestinal obstruction
- Vascular disorders
- Malabsorptive diseases and infections
- Inflammatory intestinal disease.
- Polyps and neoplastic diseases

Intestinal obstruction

Mechanical obstruction:

Intussusception
Hernias.
Adhesions.
Volvulus

Tumors.
Diverticulitis
Infarction

Non-mechanical obstruction

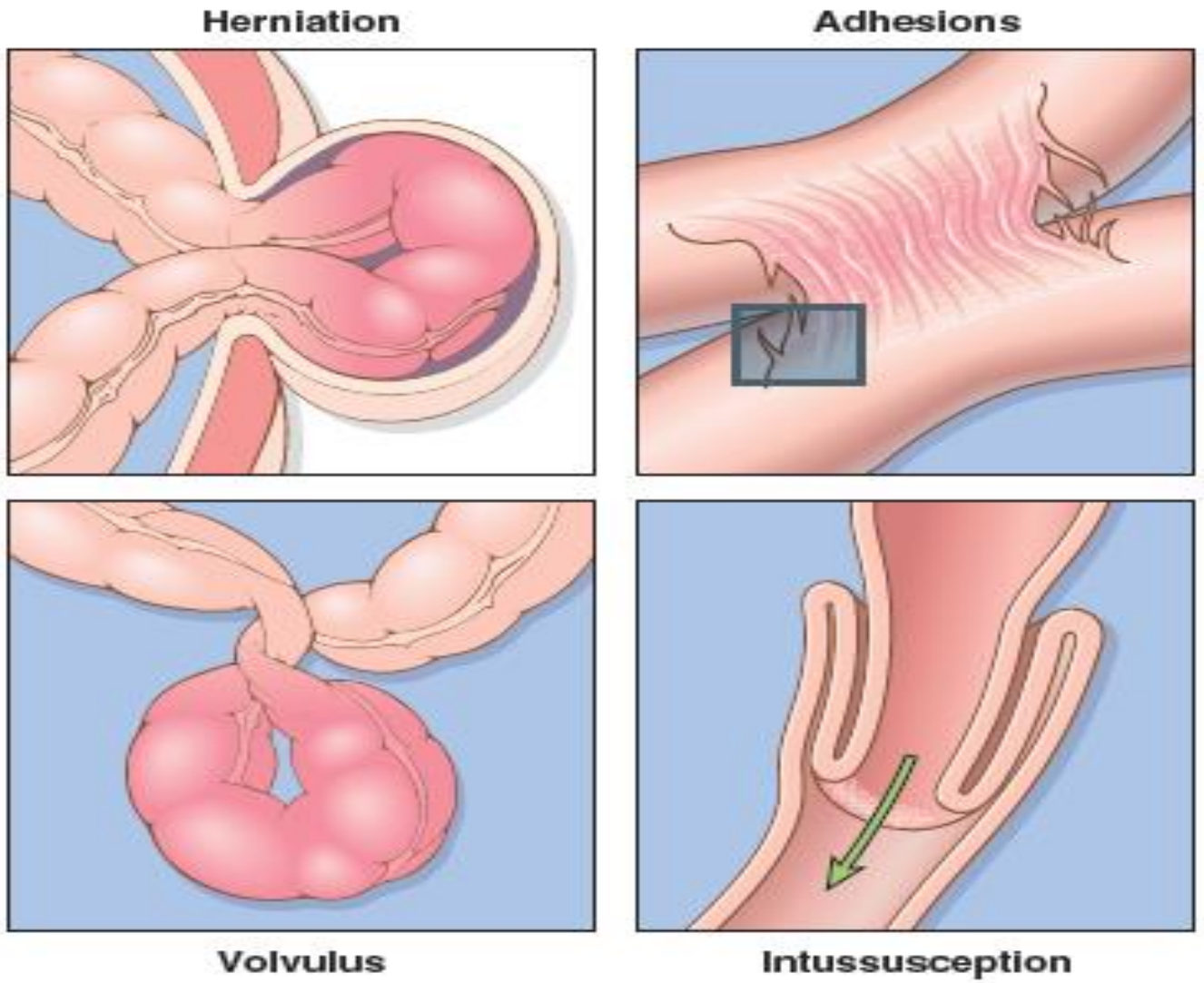
Hurschsprung disease
Neurological disorders.
Drugs….etc

Clinical picture of intestinal obstruction.

- Abdominal pain
- Distention
- Vomiting
- Constipation.

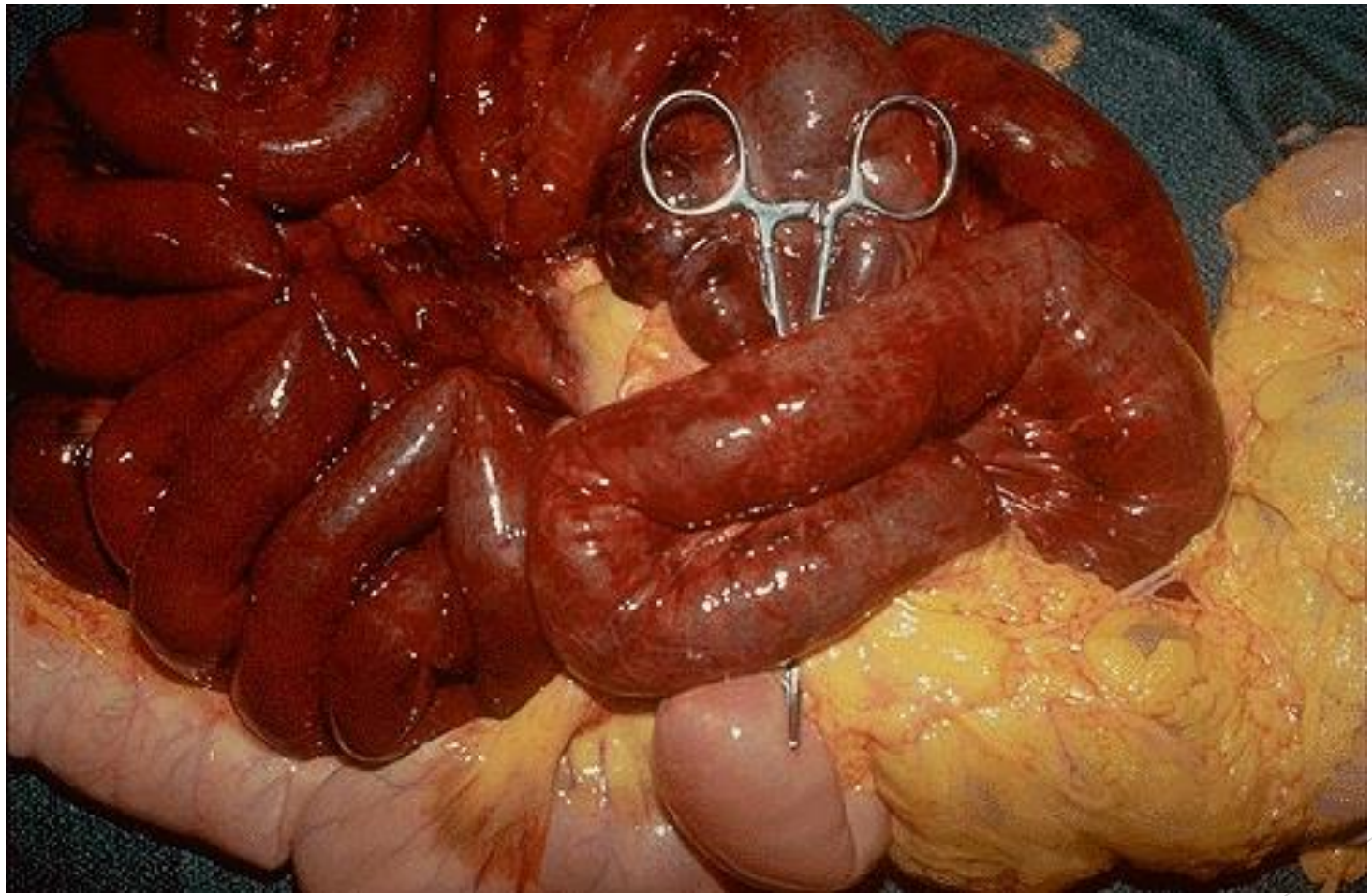
- Acute or chronic.

80% of mechanical obstructions



Robbins Basic Pathology 11th edition

Bowel infarction



Intussusception

- Segment of the intestine constricted by peristalsis, telescopes into the immediately distal segment.
- Once trapped, invaginated segment is propelled by peristalsis, and pulls mesentery with it.
- **Most common cause of intestinal obstruction in children younger than 2 years of age**.
- Untreated progresses to obstruction and infarction.

Causes of intussusception

- **Idiopathic in most cases.**
- **Other causes:**
- Peyer patches hyperplasia (rotavirus vaccine, viral infections)
- Meckles diverticulum (ileum)

- Old children & adults: Intraluminal mass or tumors

Clinical features:

- **Abdominal** swelling
- **Vomiting**
- Passing stools mixed with blood and **mucus (currant jelly stool)**
- **Pain.**

Management

- Contrast enemas (diagnostic and therapeutic) in uncomplicated idiopathic cases.
- Surgery if complicated by infarction or if masses are the leading point.

Meckel's diverticulum

- The most common congenital anomaly of the GI tract
- Incomplete obliteration of omphalomesenteric duct
- True diverticulum.

- **Remember (rule of 2):**
- About 2% of people have them;
- Located 2 feet from the ileocecal valve.
- 2 inches in length.
- 2 types of heterotopic mucosa (gastric or pancreatic).
- Most common cause of lower GI bleeding before age of 2.

Meckel's diverticulum

Clinical presentation

- Can be asymptomatic and discovered incidentally.
- Ulceration, lower GI bleeding or perforation from ectopic gastric mucosa.
- Bowel obstruction due to the intussusception, volvulus or adhesive band.

- Can be confused with acute appendicitis.

Hirschsprung Disease

- Congenital defect in colonic innervations
- Congenital aganglionic megacolon
- More common in males
- More severe in females
- Risk increase in siblings.

- **Typical presentation:**

- Neonatal failure to pass meconium
- Later: Obstructive constipation.

Pathogenesis

- **During embryogenesis:** disrupted migration of neural crest cells from cecum to rectum.
- **Aganglionosis: Distal intestinal segment lacks both: Meissner submucosal plexus and the Auerbach (myenteric) plexus**.
- Failure of coordinated peristaltic contractions.

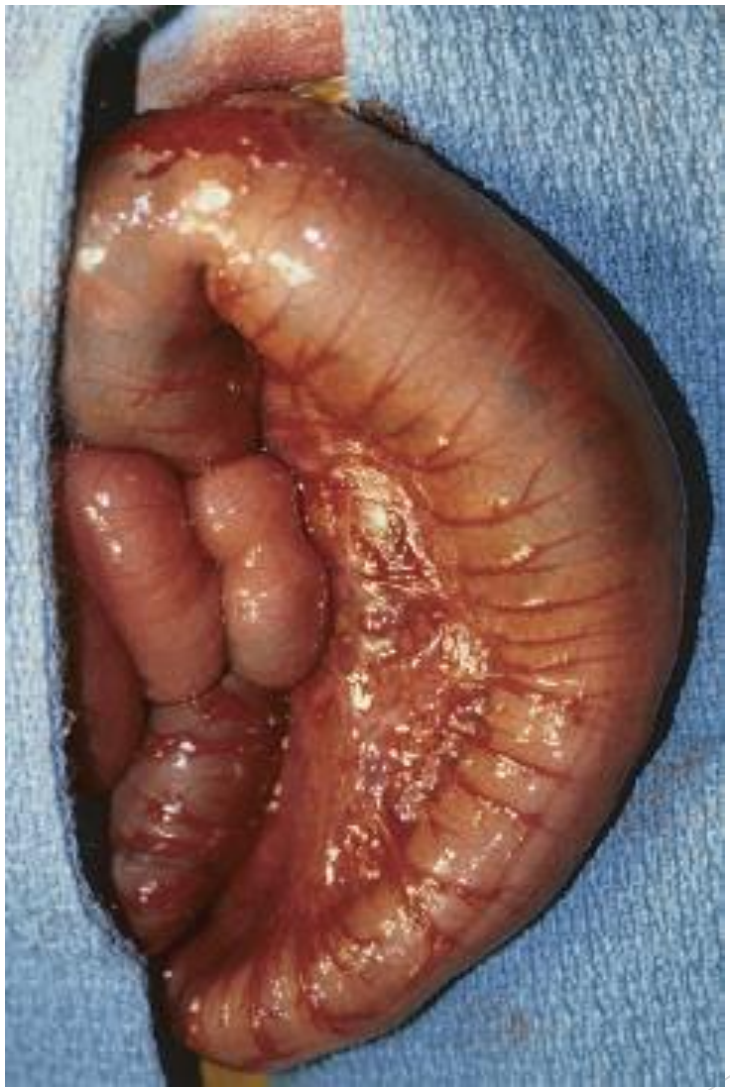
- RET Mutations: in familial cases and 15% of sporadic.
- Other genes and environmental factors play role.
- More in Down syndrome.

Morphology

- Rectum always involved, Most cases in rectosigmoid
- Extent is variable.

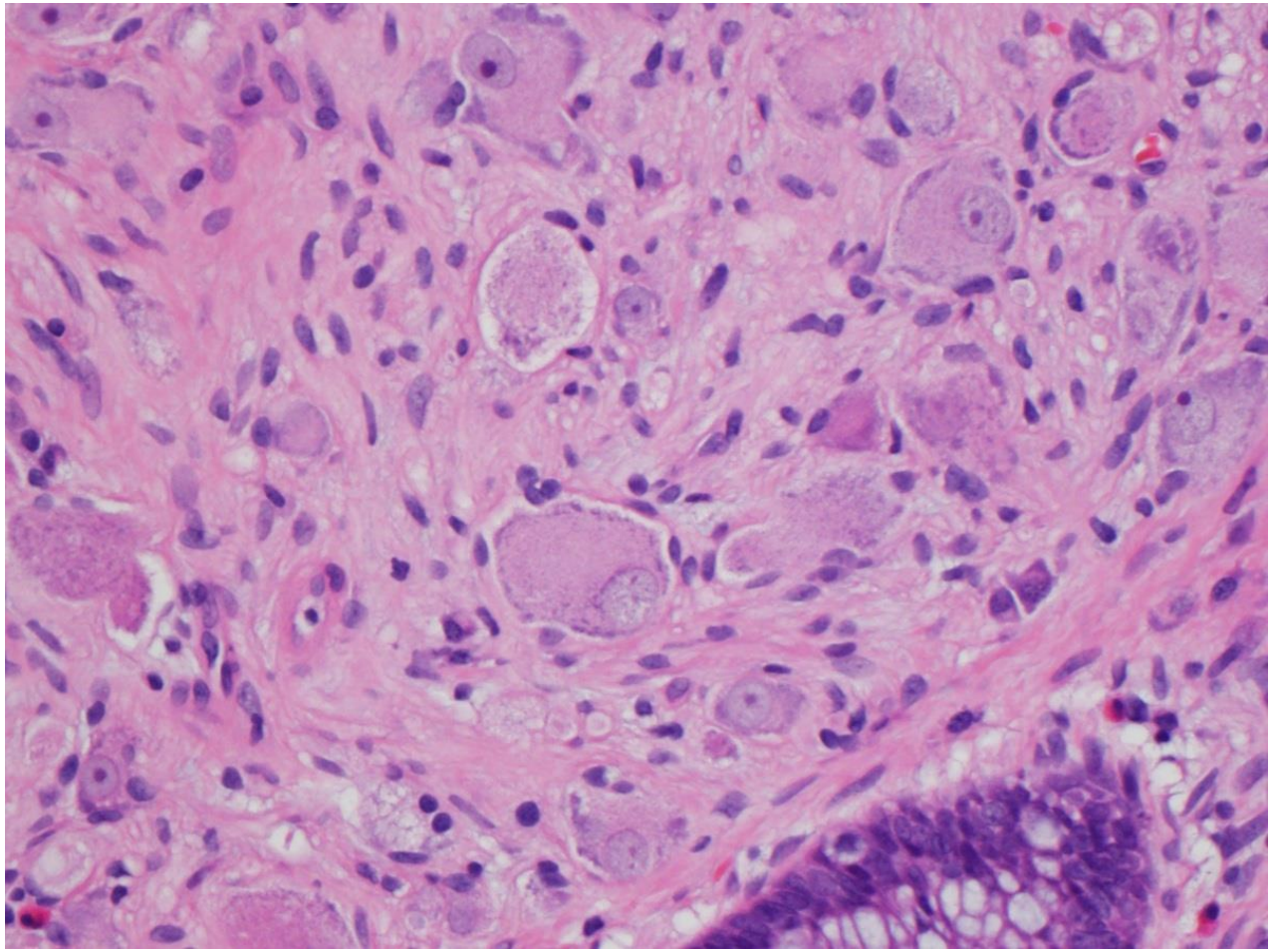
- Aganglionic region normal or contracted
- Proximal normal segment progressively dilated.
- **BIOPSY to confirm absence of ganglion cells.**

- **Diagnostic workup: barium enema, biopsy.**



Robbins Basic Pathology 11th edition

ganglion cells



http://www.pathologyoutlines.com

Complications

- Enterocolitis
- Fluid and electrolyte disturbances
- Perforation
- Peritonitis

- **Treatment:**
- Surgical resection of aganglionic segment and anastomosis of normal segments.

VASCULAR DISORDERS OF BOWEL

- Ischemic Bowel Disease
- Angiodysplasia.
- Hemorrhoids

Angiodysplasia.

- Malformed submucosal and mucosal blood vessels.
- Most often in cecum and right colon.
- 6^{th} decade of life.
- Less than 1% of adult population.
- 20% of cases of lower GI bleeding.
- Blood is bright red in color.

Hemorrhoids

- Dilated anal and perianal collateral vessels that connect the portal and caval venous systems.

- **Predisposing factors:**
- Constipation and straining
- Venous stasis of pregnancy,
- Portal hypertension.

- External (below anorectal line, inferior hemorrhoidal plexus) and internal (above anorectal line, superior hemorrhoidal plexus).

- **Morphology:**
- Thin -walled, dilated, submucosal vessels beneath anal or rectal mucosa.

- **Symptoms:**
- Bleeding (bright red), pain due to thrombosis and inflammation

- **Treatment:**
- Sclerotherapy, rubber band ligation, infrared coagulation. Hemorrhoidectomy.

DIARRHEAL DISEASE

- Diarrhea: increase in stool mass, frequency or fluidity.
- Dysentery: painful , bloody, small volume diarrhea.
- Secretory, osmotic, malabsorptive, exudative.
- **Malabsorptive Diarrhea**
- Pancreatic insuffciency.
- **Celiac disease**
- Crohn disease
- **Cystic Fibrosis**
- **Lactase (Disaccharidase) Deficiency**
- **Abetalipoproteinemia**
- **Infectious Enterocolitis**
- **Ischemia.**
- **Inflammatory bowel diseases…..**

Malabsorptive Diarrhea

- **Chronic.**
- Defective absorption of fats, fat- and water-soluble vitamins, proteins, carbohydrates, electrolytes, minerals and water
- **Hallmark is** : steatorrhea. (excessive fat, bulky, frothy, yellow, greasy stool)

Malabsorptive diarrhea
Defect in one of the following:

- **Intraluminal digestion.**
- **Terminal digestion.**
- **Transepithelial transport.**
- **Lymphatic transport.**

Manifestations:

- Weight loss, anorexia,
- Flatus, abdominal distention,
- Borborygmi (intestinal noise), Muscle wasting
- Anemia and mucositis (iron, pyridoxine (VB6), folate, or vitamin B12 deficiency)
- Bleeding (vitamin K deficiency)
- Osteopenia and tetany (calcium, magnesium, or vitamin D deficiency)
- Neuropathy (vitamin A or B12 deficiency)
- Skin and endocrine disorders.

Cystic Fibrosis

- Mutations in cystic fibrosis transmembrane conductance regulator (CFTR)
- Defects in ion transport across intestinal and pancreatic epithelium.
- Thick viscous secretions.
- Mucus plugs in pancreatic ducts >>> pancreatic insufficiency (80% of patients)
- Meconium ileus in neonates.
- Defect in intraluminal digestion.

Celiac Disease

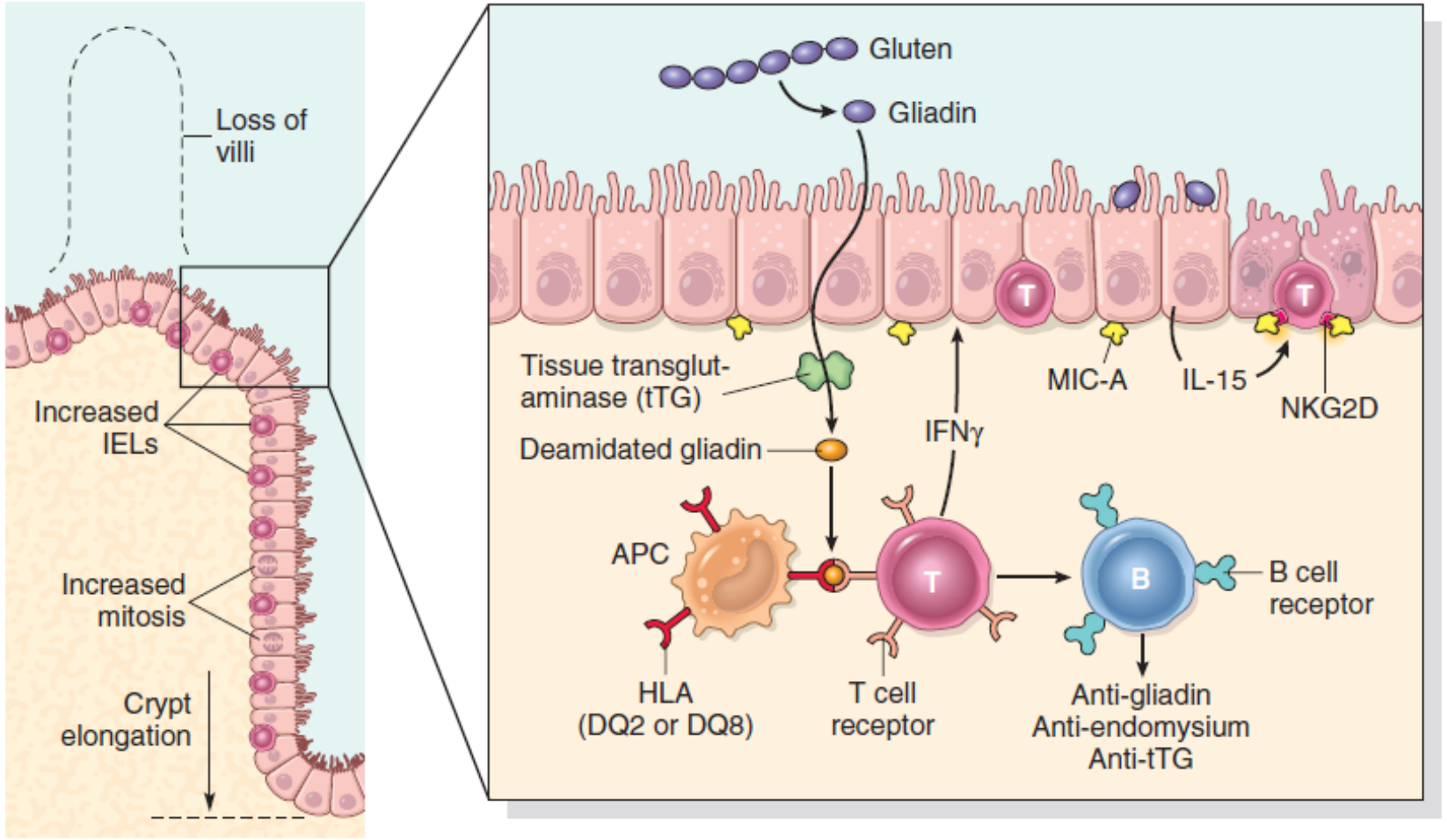
- *Gluten sensitive enteropathy*
- Immune mediated enteropathy
- Wheat, rye or barley.
- Genetically predisposition, HLA-DQ2 or HLA-DQ8.
- Treatment: gluten free diet.

- Association with: type 1 diabetes, thyroiditis, and Sjogren syndrome

Pathogenesis

- Gluten >>> gliadin >>deamidated by TTG>> react with HLA-DQ2 or HLA-DQ8 on antigen-presenting cells >>> CD4+ T cells activation >>> cytokines >>> tissue damage>> B cell activation >> antibodies

- Serology:
- Anti- tissue transglutaminase antibodies
- Anti-gliadin antibodies.
- Anti -endomysial antibodies



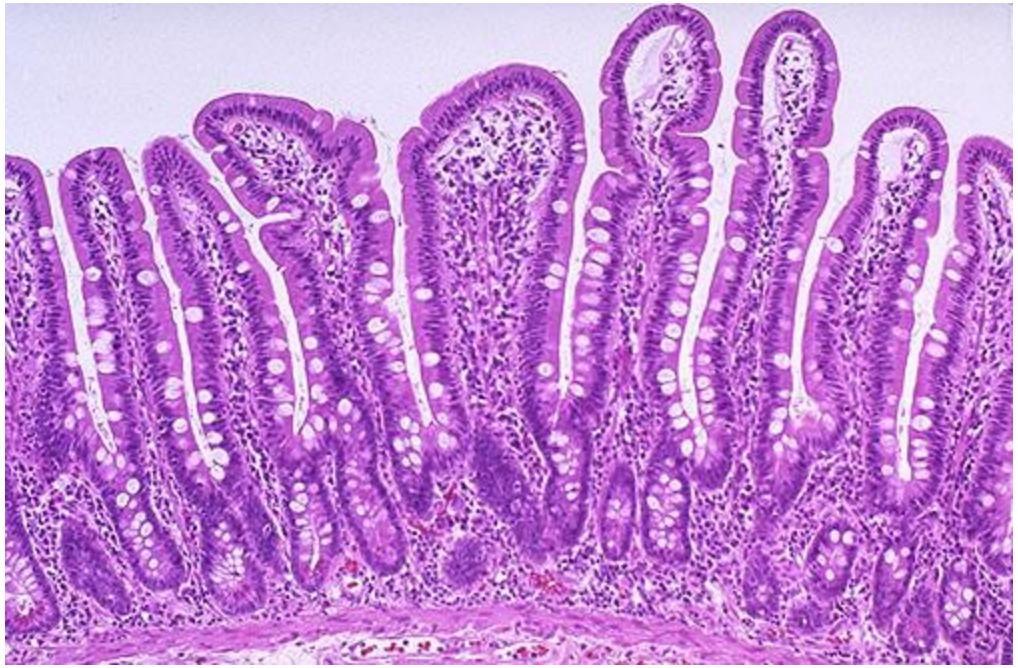
Robbins Basic Pathology 10th edition

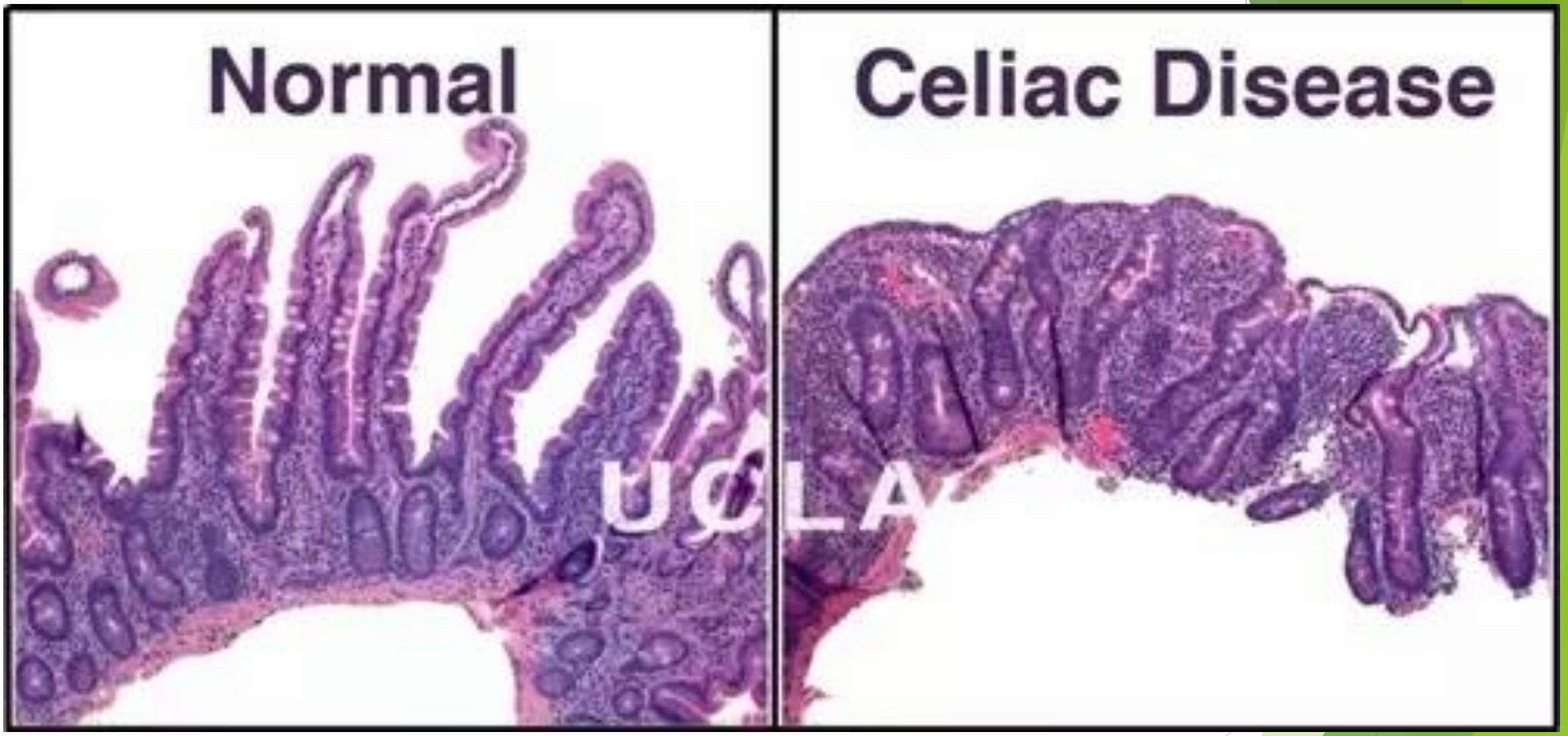
MORPHOLOGY

- Second portion of the duodenum or proximal jejunum.
- **Triad**: intraepithelial lymphocytosis (CD8+ T cells), crypt hyperplasia, and villous atrophy.
- Lamina propria: lymphocytes, plasma cells, eosinophils…….
- IEL & villous atrophy are not pathognomonic, seen in viral enteritis.

- Diagnosis: Clinical, histologic and serologic correlation.

Normal intestine

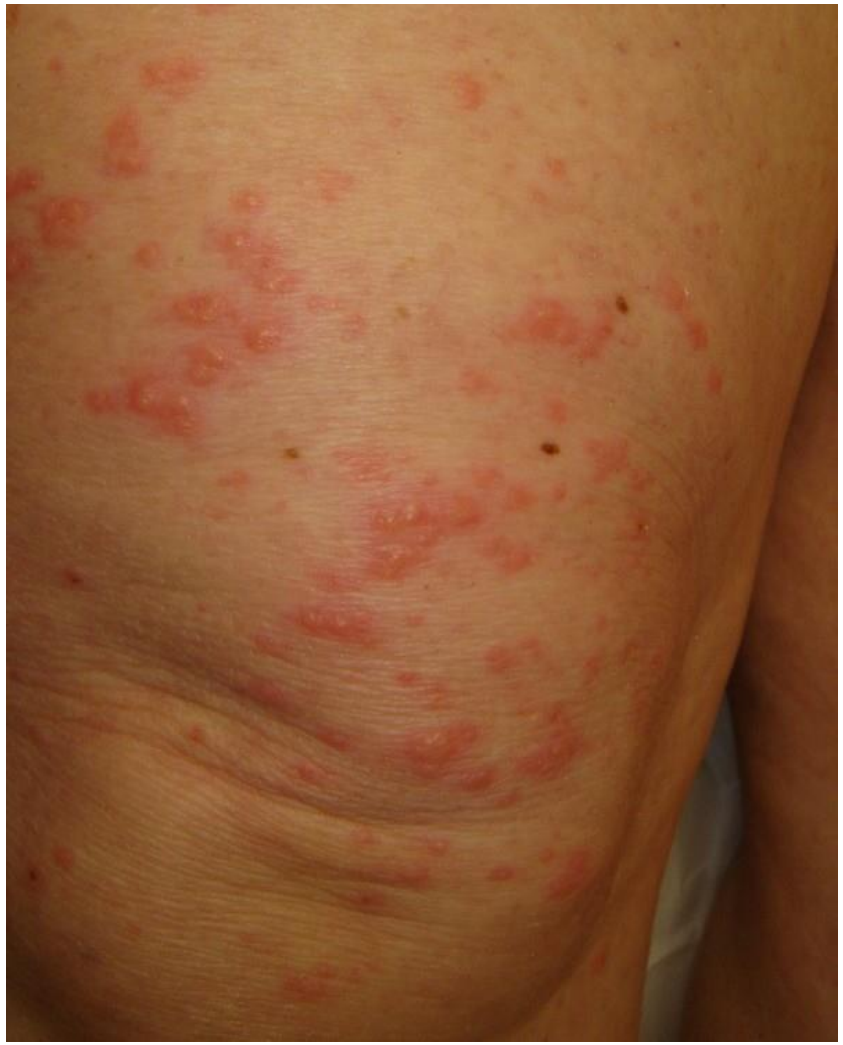



Normal
Celiac Disease
UCLA

Clinical Features

- **Children 6-24 months : classical or non classical symptoms**
- **Classica**l: Irritability, abdominal distention, anorexia, diarrhea, failure to thrive, weight loss, or muscle wasting
- **Non-classical:** abdominal pain, nausea, vomiting, bloating, or constipation.
- Blistering skin lesion, **dermatitis herpetiformis**, in 10% of Pnts.

Dermatitis herpetiformis.



- Adults (30-60 years)
- Anemia: iron deficiency
- B12 and folate deficiency: less common.
- Diarrhea , bloating, and fatigue.
- Missed diagnosis: Silent celiac (positive serology and biopsy but asymptomatic).

- Increased risk of enteropathy associated T cell lymphoma & Small intestinal adenocarcinoma.

Diagnosis:

- **Non invasive serologic tests:**
- **Most sensitive:**
- Anti tissue transglutaminase antibody, IgA
- Anti deamidated gliadin antibodies, IgA & IgG

- **Most specific, but less sensitive**
- Antiendomysial antibody.

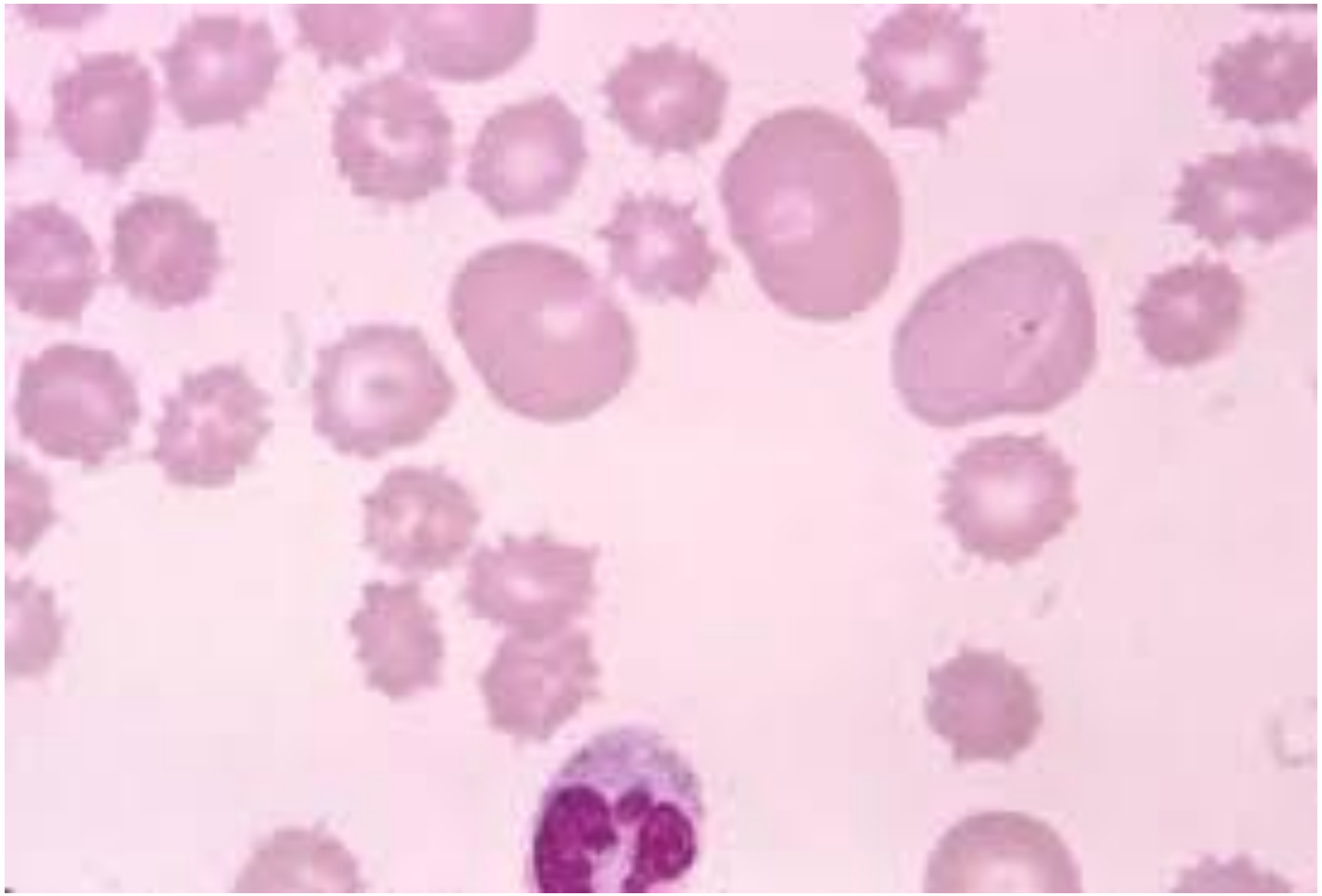
- **Invasive tests: small bowel biopsy.**

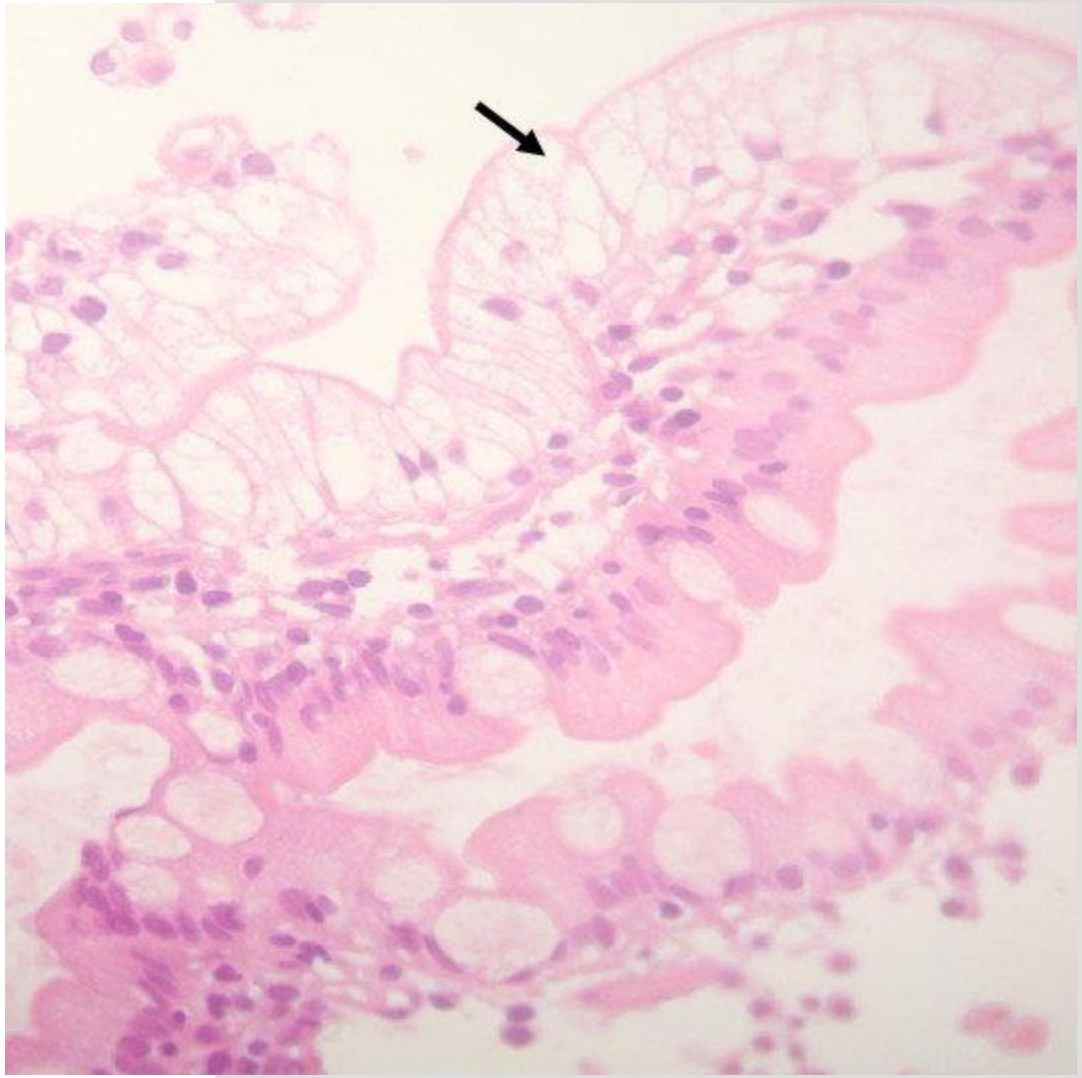
Lactase (Disaccharidase) Deficiency

- Osmotic diarrhea
- Lactose remains in the gut lumen.
- Lactase found at apical brush border membrane
- Normal biopsy findings.
- Two types:
- ***Congenital*** *: AR, genetic mutation, rare,* explosive diarrhea, watery, frothy stools & abdominal distention, after milk ingestion
- ***Acquired*** *: very common*, downregulation of gene, after weaning. Affects 2/3 of worlds population (50% of USA population).
- **Transient**: caused by injury after infectious or inflammatory insults (reversible)

Abetalipoproteinemia

- Autosomal recessive, rare.
- Inability of enterocytes to secrete triglyceride-rich chylomicrons.
- Lack of absorption (Transepithelial transport defect of lipoproteins, FAs and fat-soluble vitamins).
- Infants' w/ failure to thrive, diarrhea, and steatorrhea
- Vitamin K deficiency, skeletal CNS and retinal abnormalities.
- Spur cells in peripheral blood.
- Monoglycerides and triglycerides accumulate in epithelial cells.





Micrograph showing enterocytes with a clear cytoplasm (due to lipid accumulation) characteristic of abetalipoproteinemia.