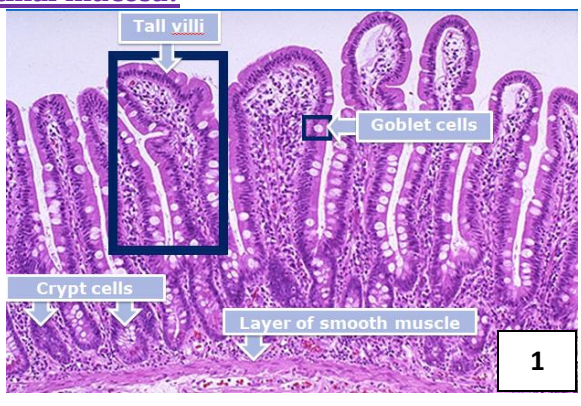
Unit V – Problem 5 – Pathology: Malabsorption and Diarrhea

- **Define malabsorption.**
  - It is a general term used to describe a number of clinical conditions in which one or more important nutrients are inadequately absorbed by the gastrointestinal tract.
- **Malabsorption can result from:**
  - Pancreatic disease (chronic pancreatitis).
  - Biochemical disorders (e.g. lactase or sucrose-isomaltase deficiency).
  - Small bowel diseases (e.g. celiac disease, extensive surgical resection, lymphatic obstruction and blind loop syndrome).
- **Pathophysiologically, malabsorption is divided into:**
  - **Intraluminal cause:**
    - ✓ Impaired hydrolysis and solubilization of the nutrients in small intestine due to deficiency of pancreatic enzymes (lipase, amylase). Notice that deficiency of bile salts results in protein and fat malabsorption. Enzymatic deficiency can be:
      - ❖ *Congenital.*
      - ❖ *Acquired*: such as
        - ➢ Chronic pancreatitis.
        - ➢ Cystic fibrosis.
        - ➢ Resection of pancreatic cancer.
      - ❖ *Chronic liver disease.*
      - ❖ *Cholestasis*: it is a condition in which the bile cannot move from liver to the duodenum.
  - **Intestinal cause:**
    - ✓ Abnormalities of small intestine mucosa.
    - ✓ It can be:
      - ❖ *Congenital*: lactase deficiency resulting in malabsorption of lactose.
      - ❖ *Acquired*: celiac disease, crohn's disease and infective enteritis.
  - **Lymphatic transport to liver:**
    - ✓ Lymphatic obstruction leads to fat malabsorption. Conditions in which there is lymphatic obstruction:
      - ❖ Intestinal lymphangiectasia (lymphs are dilated!).
      - ❖ Tuberculous enteritis.
      - ❖ Intestinal lymphoma.
- **Investigations done for malabsorption:**
  - Biochemical tests.
  - Radiological investigations.
  - **Histopathology plays an important role in identifying intestinal mucosal abnormalities:**
    - ✓ Endoscopic biopsy: duodenal biopsy.
    - ✓ Crosby or Watsone capsule: jejuna biopsy.
- **Image (1) shows histology of normal intestinal mucosa:**
  - **Normal histological ratio:**
    - ✓ Crypt height = 1 mm
    - ✓ Villi height = 5 mm
    - ✓ So, the normal ratio is 1:5



- **Histological findings in malabsorption:**
  - **Most important abnormality**: villous atrophy → there are two patterns:
    - ✓ Villous atrophy-crypt hyperplasia (most common). The ratio becomes 1:1 instead of 1:5 (see image-2).
    - ✓ Villous atrophy-crypt hypoplasia (uncommon).

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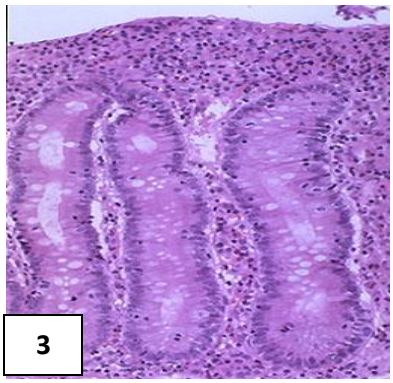
- **Celiac disease:**
  - It is an autoimmune-mediated intolerance of gliadin (wheat) leading to malabsorption and steatorrhea.
  - Associated with HLA-DQ2, HLA-DQ8 and northern European descent.
  - **Findings include (see image-3):**
    - ✓ Anti-gliadin antibodies.
    - ✓ Blunting of villi; crypt hyperplasia.
    - ✓ Lymphocytes in the lamina propria.
  - Affects distal duodenum and/or proximal jejunum.
  - Serum levels of tissue transglutaminase antibodies are used for diagnosis.
  - Associated with dermatitis herpetiformis.
  - **Treatment**: gluten-free diet.



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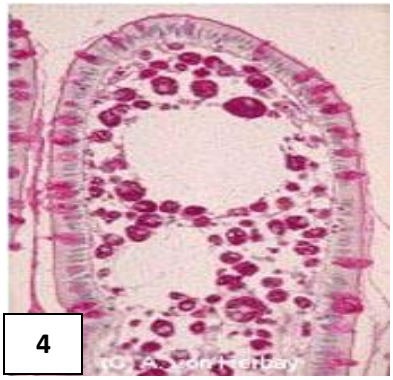
- **Tropical sprue:**
  - Similar findings as celiac disease (affects small bowel), but responds to antibiotics.
  - Patients develop tropical diarrhea.
  - **Histopathology**: villous atrophy-crypt hyperplasia.
- **Whipple disease:**
  - Infection with Tropheryma whipplei (gram-positive becateria).
  - **Characterized by**: PAS (+) foamy macrophages in intestinal lamina propria (see image-4).
  - **Symptoms:**
    - ✓ Cardiac symptoms.
    - ✓ Arthralgia.
    - ✓ Neurologic symptoms.



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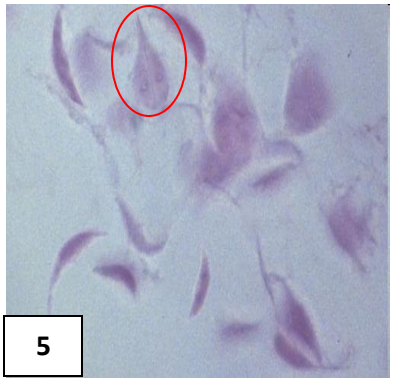
- **Parasitic infestation:**
  - Giardia lamblia, a flagellate protozoan, has a leaf-like configuration with two prominent nuclei (see image-5).
  - It is found in the luminal mucous, adherent to the mucosal surface.



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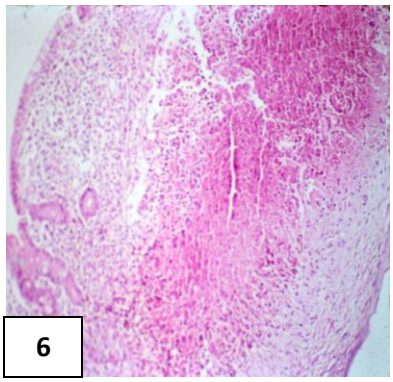
- **Uncommon causes of malabsorption include the following:**
  - Esosinophilic enteritis (see image-6).
  - Amyloidosis.
  - Immunodeficiency syndromes (AIDS): leads to infection with Cryptosporidiosis, Myobacterium avium and Cytomegalovirus.
  - Lymphoma.



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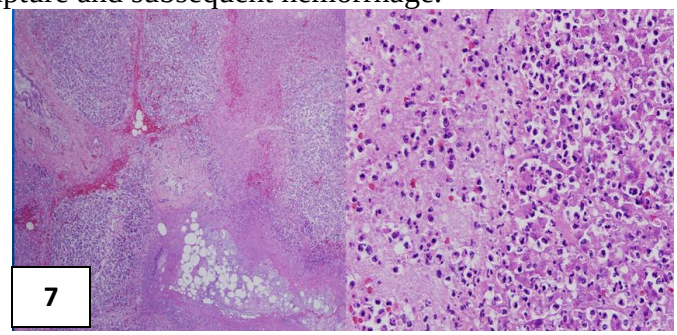
- **Acute pancreatitis (see image-7):**
  - **Autodigestion of pancreas by pancreatic enzymes.**
  - **Causes (GET SMASHED):**
    - ✓ G: Gallstones.
    - ✓ E: Ethanol.
    - ✓ T: Trauma.
    - ✓ S: Steroids.
    - ✓ M: Mumps.
    - ✓ A: Autoimmune disease.
    - ✓ S: Scorpion sting.
    - ✓ H: Hypercalcemia/ Hypertriglyceridemia (> 1000 mg/dL).
    - ✓ E: ERCP (Endoscopic Retrograde Cholangio-Pancreatography).
    - ✓ D: Drugs (e.g. sulfa drugs).
  - **Clinical presentation:**
    - ✓ Epigastric abdominal pain radiating to the back.
    - ✓ Anorexia and nausea.
  - **Laboratory investigations:**
    - ✓ ↑ amylase and lipase (higher specificity).
  - **Resulting in:**
    - ✓ Diffuse fat necrosis.
    - ✓ Hypocalcemia (Ca^{2+} collects in pancreatic calcium soap deposits).
    - ✓ Pseudocyst formation.
    - ✓ Hemorrhage.
  - **Complications:**
    - ✓ Pancreatic pseudocyst (lined by granulation tissue, not epithelium!). There is a risk of rupture and subsequent hemorrhage.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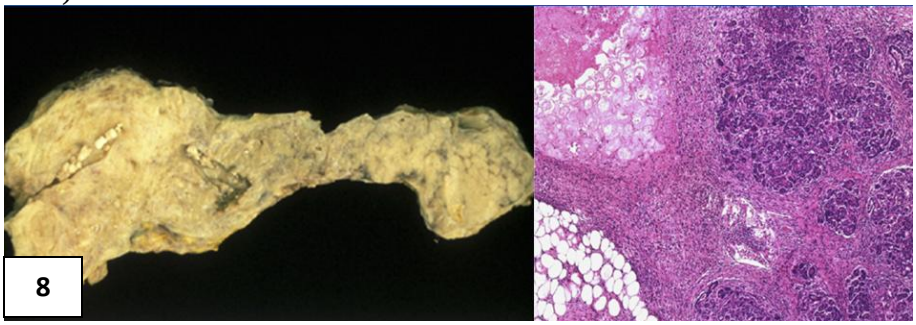
- **Chronic pancreatitis (see image-8):**
  - Chronic inflammation, atrophy and calcification of the pancreas.
  - Major cause is alcohol abuse (other cases are idiopathic!).
  - **Can lead to:**
    - ✓ Pancreatic insufficiency → steatorrhea, fat-soluble vitamin deficiency, diabetes mellitus and ↑ risk of pancreatic adenocarcinoma.
  - Amylase and lipase may or may not be elevated (almost always elevated in acute pancreatitis!).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