MALABSORPTION SYNDROME

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MALABSORPTION

Inability of the intestine to absorb nutrients adequately into the bloodstream.

Impairment can be of single or multiple nutrients depending on the abnormality.

ABSORPTION PHYSIOLOGY

The main purpose of the gastrointestinal tract is to digests and absorbs nutrients (fat, carbohydrate, and protein) micronutrients (vitamins and trace minerals) water, and electrolytes.

MECHANISMS AND CAUSES OF MALABSORPTION SYNDROME

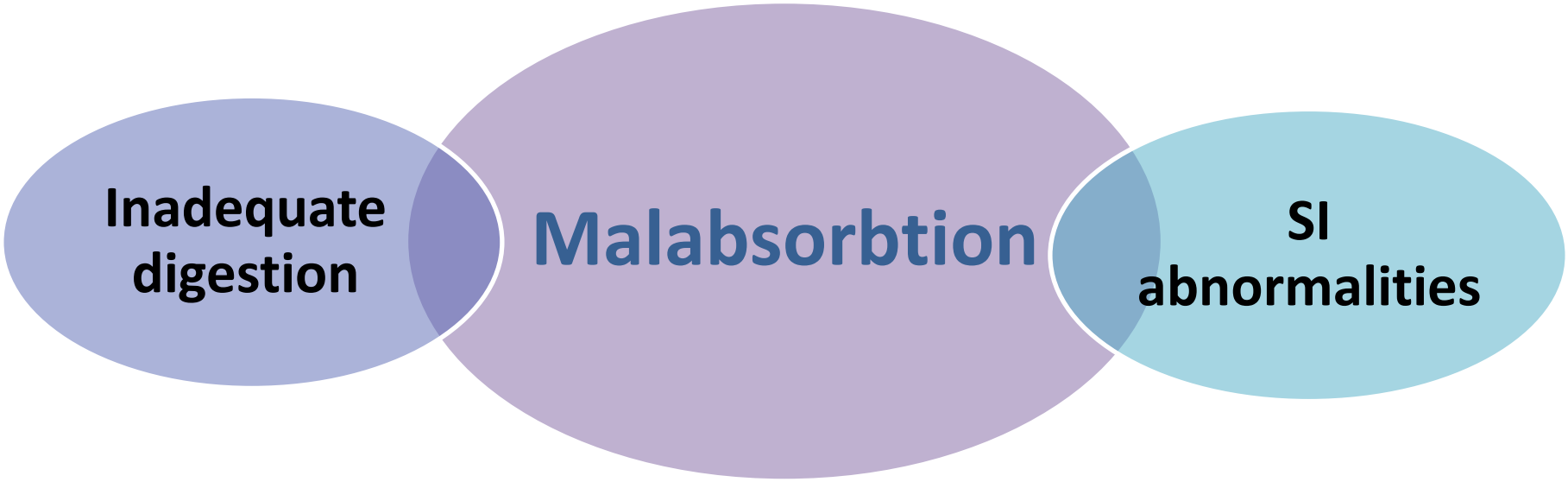
- **Inadequate digestion**
  - Postgastrectomy
  - Deficiency of pancreatic lipase
  - Chronic pancreatitis
  - Cystic fibrosis
  - Pancreatic resection
  - Zollinger-Ellison syndrome
- **Deficient bile salt**
  - Obstructive jaundice
  - Bacterial overgrowth
  - Stasis in blind loops, diverti
  - Fistulas
  - Hypomotility states (dia
  - Terminal ileal resection
  - Crohns' disease
  - Precipitation of bile salts (neomycin)

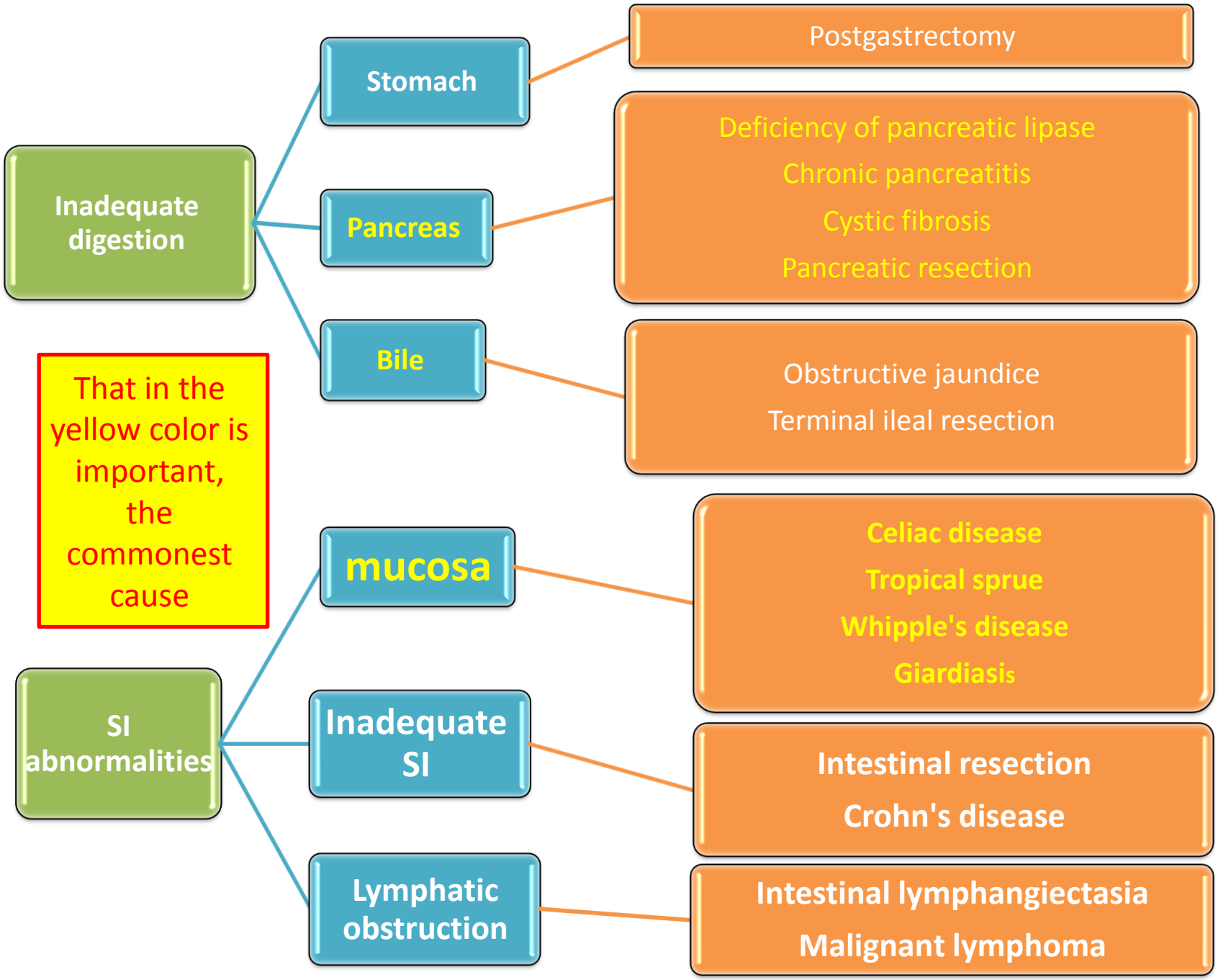
Many causes

- **Primary mucosal abnormalities**
  - Celiac disease
  - Tropi prue
  - W ease
  - teritis
  - proteinemia
  - asis
- **Inadequate small intestine**
  - ntestinal resection
  - Crohn's disease
  - Mesenteric vascular disease with infarction
  - Jejunoileal bypass
- **Lymphatic obstruction**
  - Intestinal lymphangiectasia
  - Malignant lymphoma
  - Macroglobulinemia

You do not need to memorize all, just read it

PATHOPHYSIOLOGY

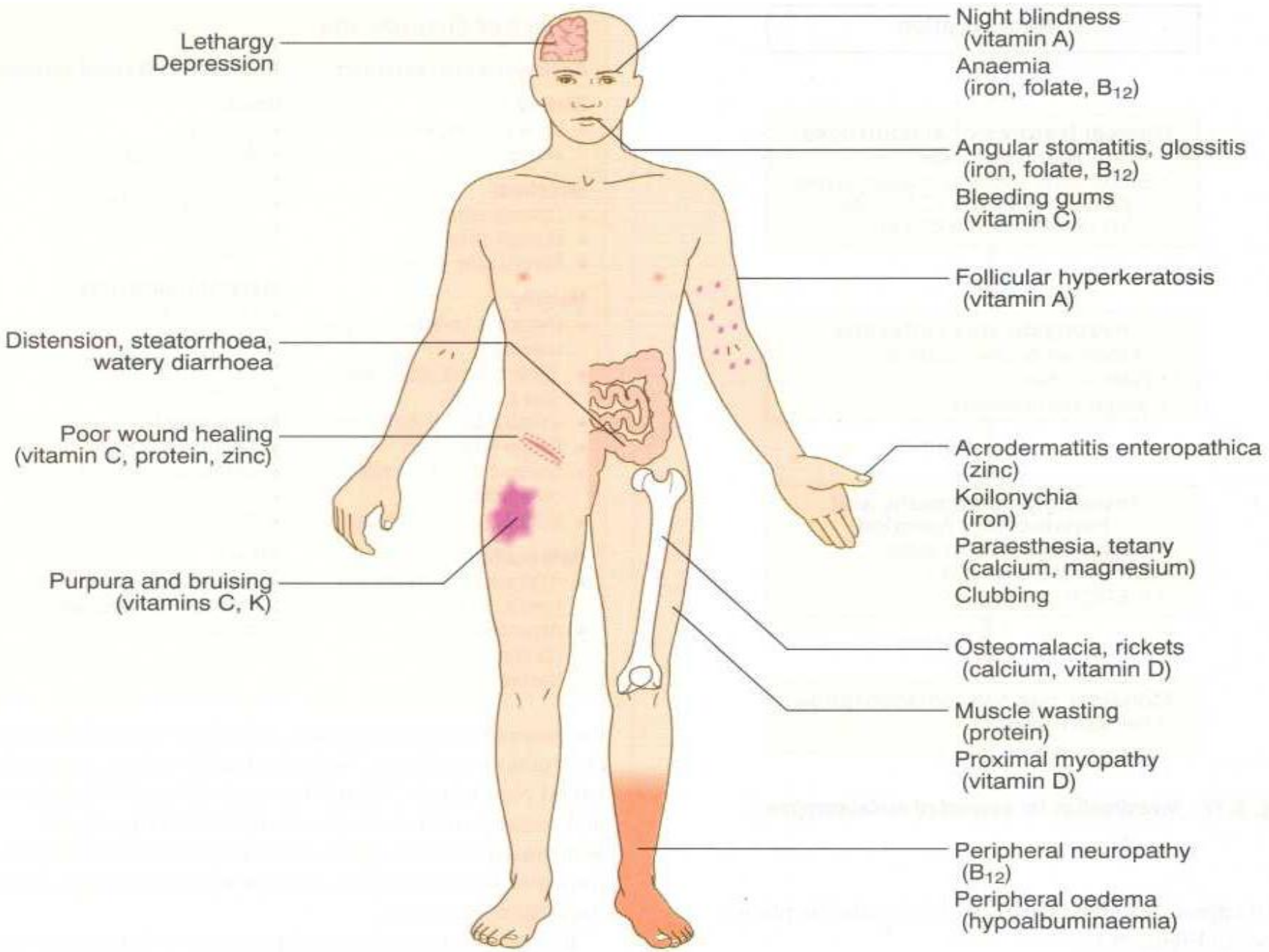



Inadequate digestion
Stomach
Postgastrectomy
Pancreas
Deficiency of pancreatic lipase
Chronic pancreatitis
Cystic fibrosis
Pancreatic resection
Bile
Obstructive jaundice
Terminal ileal resection
That in the yellow color is important, the commonest cause
SI abnormalities
mucosa
Celiac disease
Tropical sprue
Whipple's disease
Giardiasis
Inadequate SI
Intestinal resection
Crohn's disease
Lymphatic obstruction
Intestinal lymphangiectasia
Malignant lymphoma

MALABSORPTION SYNDROME

Clinical features

- There is increased fecal excretion of fat (steatorrhea) and the systemic effects of deficiency of vitamins, minerals, protein and carbohydrates.
- Steatorrhea: Is passage of soft, yellowish, greasy stools containing an increased amount of fat.
- Growth retardation, failure to thrive in children
- Weight loss despite increased oral intake of nutrients.


Lethargy
Depression
Night blindness
(vitamin A)
Anaemia
(iron, folate, B_{12})
Angular stomatitis, glossitis
(iron, folate, B_{12})
Bleeding gums
(vitamin C)
Follicular hyperkeratosis
(vitamin A)
Distension, steatorrhoea,
watery diarrhoea
Poor wound healing
(vitamin C, protein, zinc)
Acrodermatitis enteropathica
(zinc)
Koilonychia
(iron)
Paraesthesia, tetany
(calcium, magnesium)
Clubbing
Purpura and bruising
(vitamins C, K)
Osteomalacia, rickets
(calcium, vitamin D)
Muscle wasting
(protein)
Proximal myopathy
(vitamin D)
Peripheral neuropathy
(B_{12})
Peripheral oedema
(hypoalbuminaemia)

MALABSORPTION SYNDROME

Clinical features

Depend on the deficient nutrient

If Deficient	Will Cause
Protein	Swelling or oedema
B_{12}, folic acid and iron deficiency	Anemia (fatigue and weakness)
vitamin D, calcium	Muscle cramp Osteomalacia and osteoporosis
vitamin K and other coagulation factor	Bleeding tendencies

MALABSORPTION SYNDROME

Clinical features

- **Malabosortion affect many organs:**

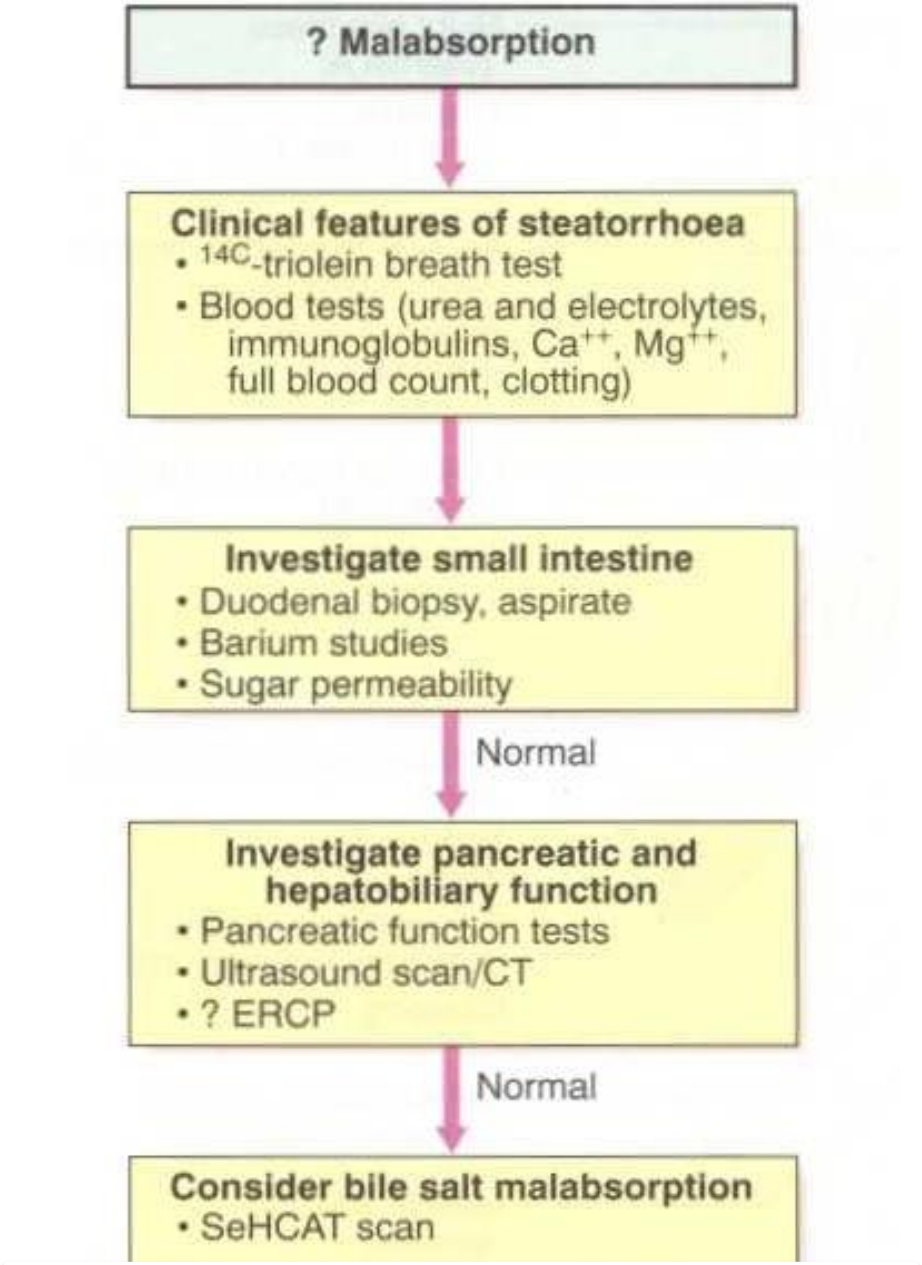
- Hematopiotic system → **anemia**
- Musculoskeletal system → **osteopenia, Muscle cramp**
- Endocrine system → **amenorrhea, infertility, hyperparathyridism**
- Skin→ **purpura , dermatitis hyperkeratosis**
- Nervous system → **neuropathy**

DIAGNOSIS

- **There is no specific test for malabsorption.**

Investigation is guided by symptoms and signs.

1. **Fecal fat study to diagnose steatorrhoea**
2. **Blood tests**
3. **Stool studies**
4. **Endoscopy (Biopsy of small Bowel)**



23-Seleno-25-homo-tauro-cholate scan

Malabsorption Syndrome

1. CELIAC DISEASE
2. LACTOSE INTOLERANCE

1-Celiac disease

– An immune reaction to a protien **[gluten] present in** wheat .

* (specifically to gliadin)

[There are two main groups of proteins in gluten, called the gliadins and the glutenins]

– Usually diagnosed in childhood – mid adult.

– Patients have raised antibodies to gluten autoantibodies

– Highly specific association with :

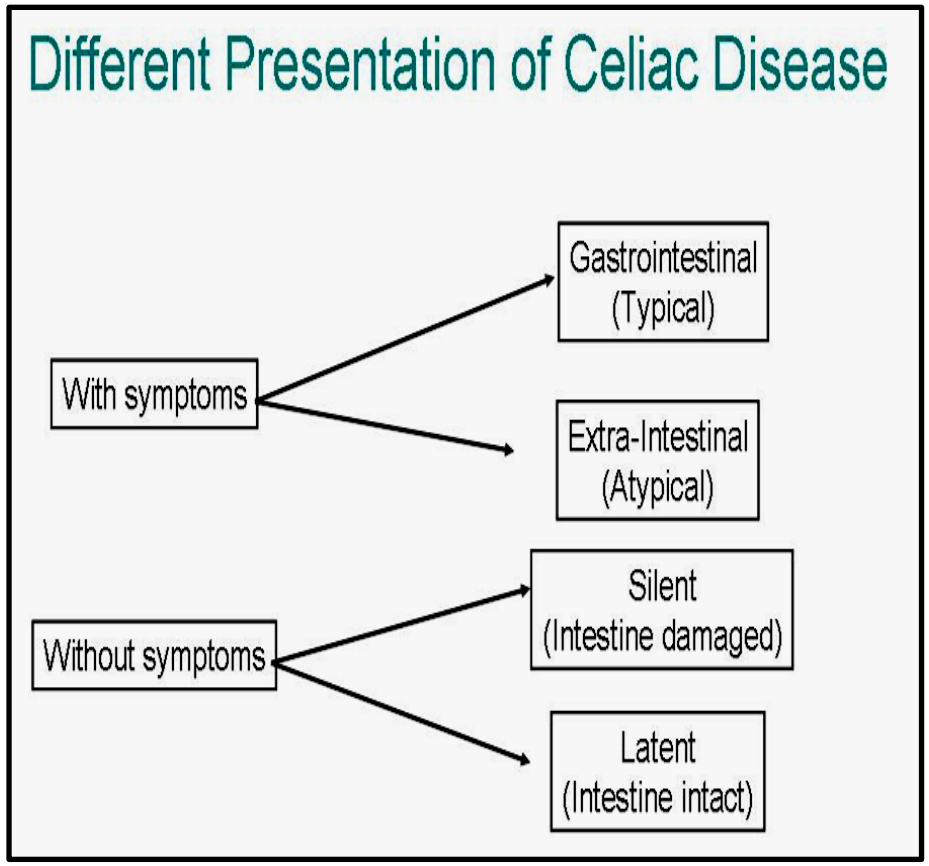
(most of celiac patients have these alleles which increase the risk of having the disease)

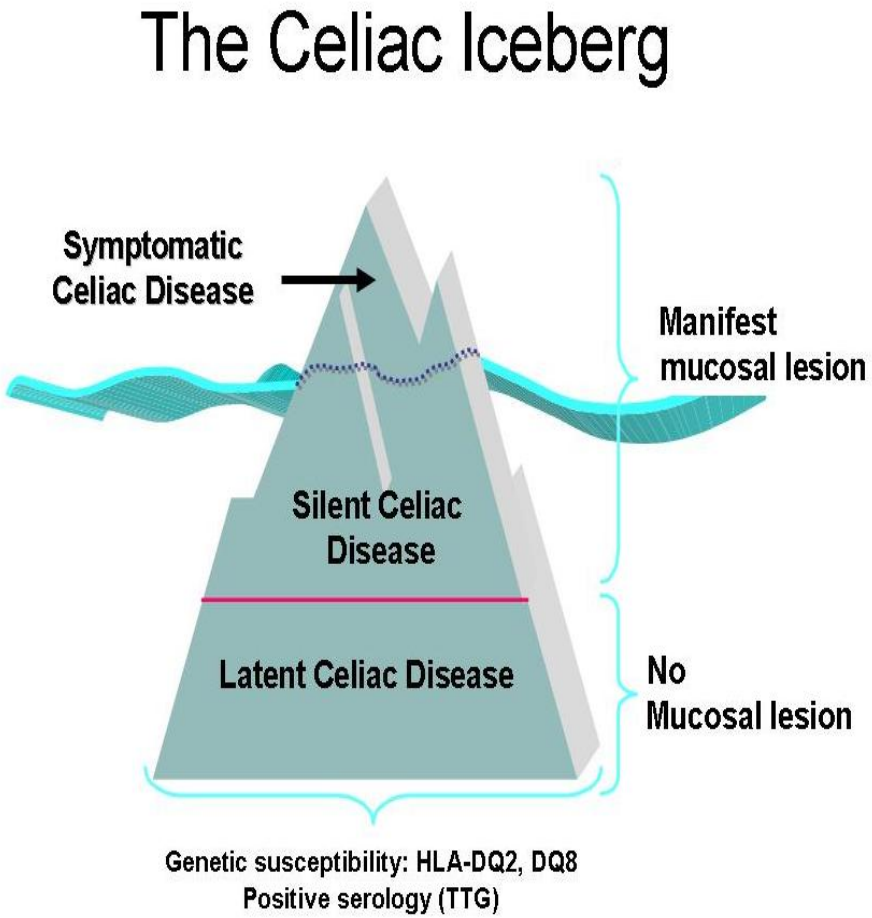
1- Class II haplotypes of HLA **DQ2** (haplotypes DR-17 or DR5/7)

2- To a lesser extent, **DQ8** (haplotype DR-4).

Clinical features

Celiac disease can mimic the symptoms of more common problems and be misdiagnosed as Irritable Bowel Syndrome (IBS).





Clinical features

Typical presentation :

GI symptoms that characteristically appear at age 9-24 months.

[Diarrhea – abdominal pain –cramping-bloatedness]

Symptoms begin at various times after the introduction of foods that contain gluten.

Atypical presentation:

Extra-intestinal symptoms

[Weight loss – abnormal bleeding – anemia – osteoporosis & osteopenia]

A relationship between the age of onset and the type of presentation;

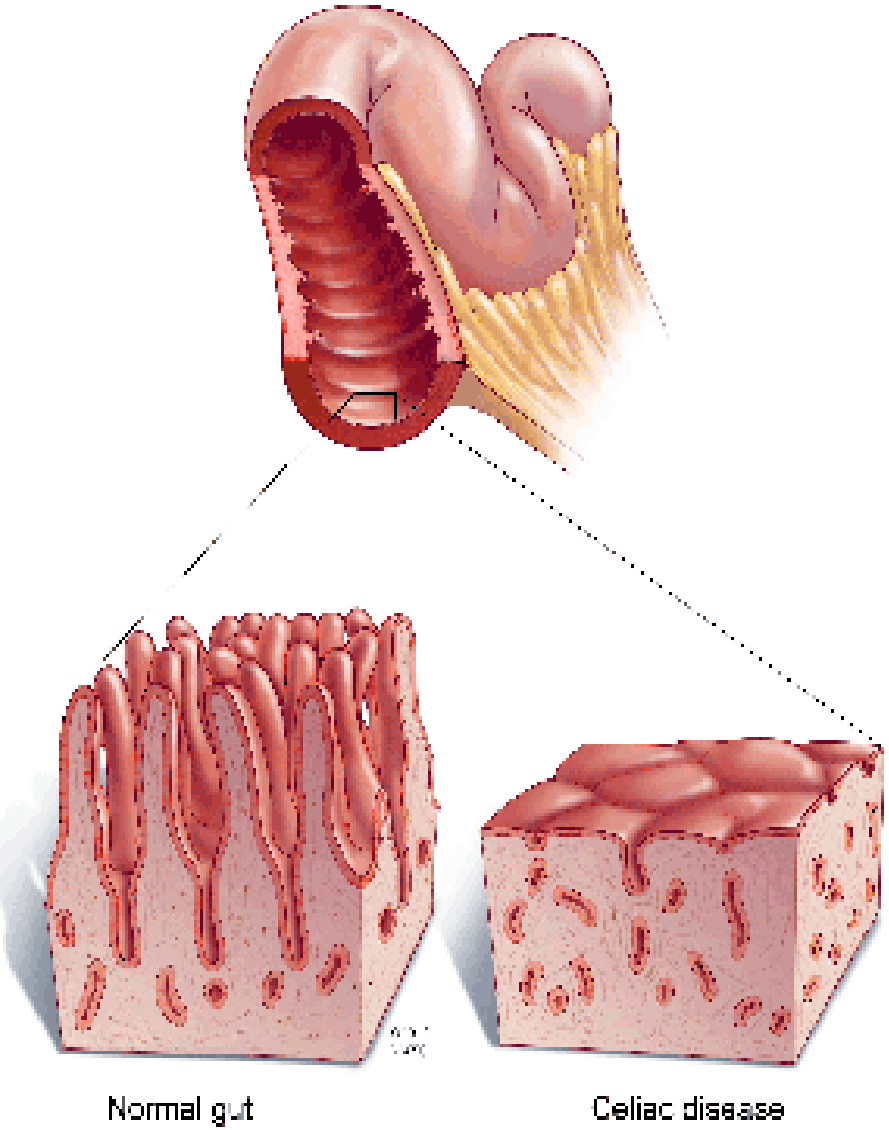
Infants and toddlers → GI symptoms and failure to thrive [low rate of increase in the weight]

Childhood→ minor GI symptoms, inadequate rate of weight gain.

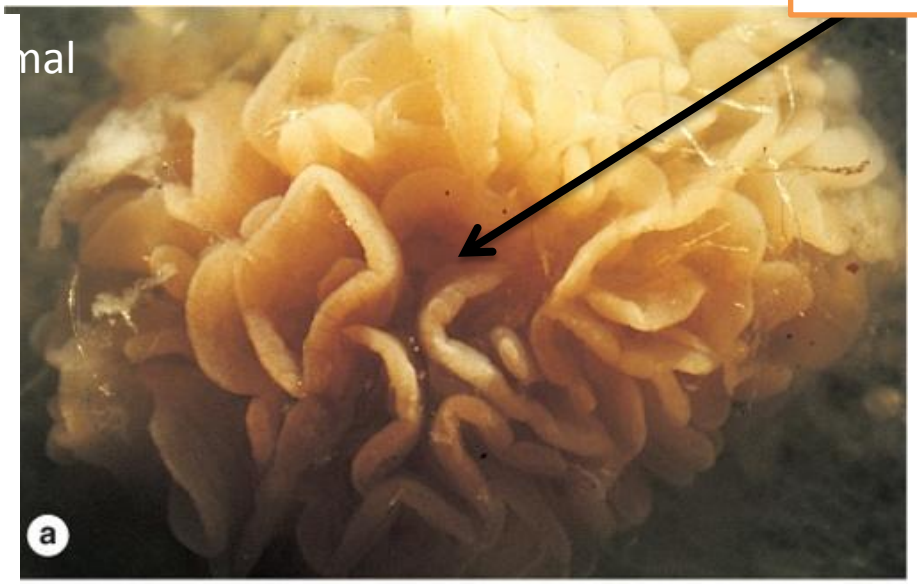
Young adults → ***anemia*** is the most common form of presentation.

Adults and elderly→ GI symptoms are more prevalent

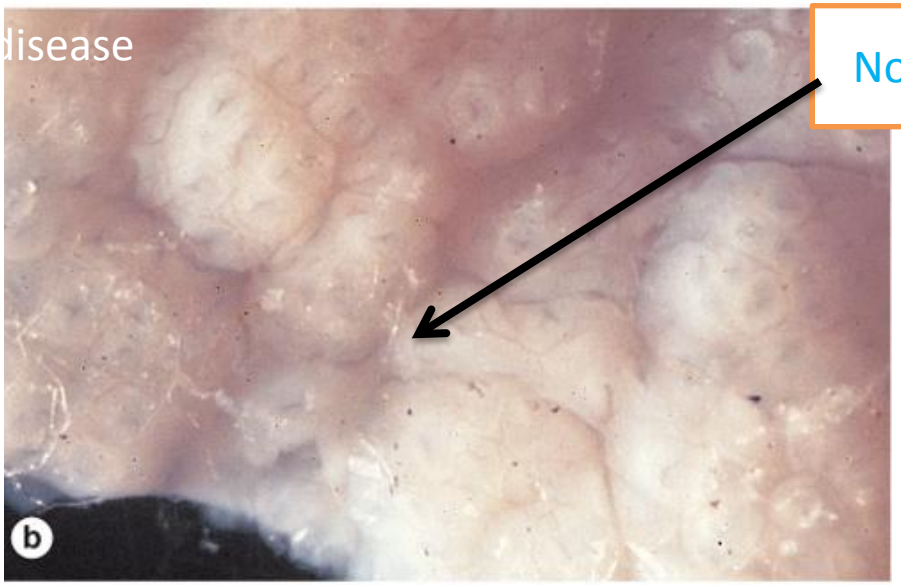
Endoscopy



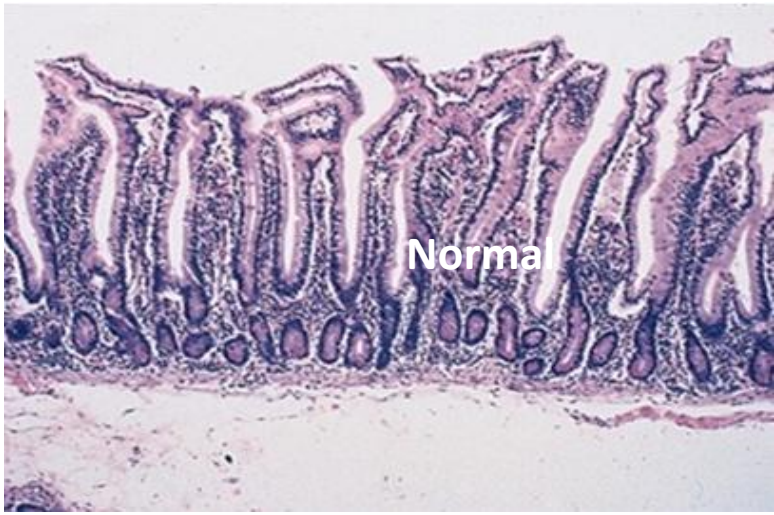
Normal villi



No villi



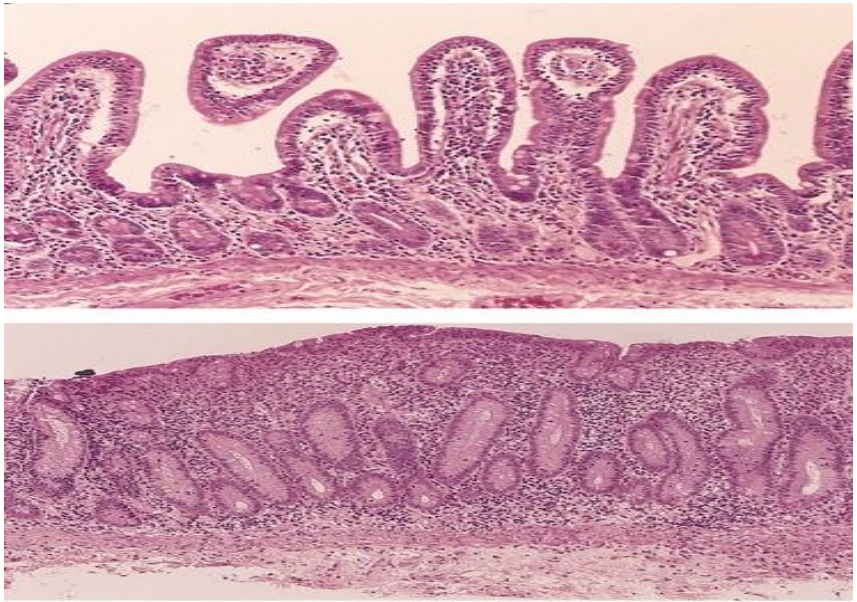
Morphology



Histology

Mucosa is flattened with marked villous atrophy.

Lamina propria: increase in ***chronic inflammatory cells***.



2 different patients' morphologies with celiac disease

Diagnosis

[Clinical documentations of malabsorption]

- ***Blood tests:***

Specific antibody blood tests are used to diagnose patients with CD

- ***Biopsy :***

taking biopsy samples of the small bowel demonstrate **villous atrophy**.

Treatment

Gluten free diet for life improve symptoms →

Reversible condition → **villi back to normal**

Improvement of symptom and mucosal histology on gluten withdrawal from diet.

wheat, barley, flour

Other grains, such as rice and corn flour, do not have such an effect.

Complications

(are due to malabsorption)

1- Osteopenia - osteoporosis

2-Infertility in women

3- Short stature- delayed puberty-anemia,

4-Malignancies:

*intestinal T-cell lymphoma]

*10 to 15% risk of developing GI lymphoma.

2. LACTOSE INTOLERANCE

inability or insufficient ability to digest lactOse [a sugar found in milk and milk products]

Caused by a deficiency of the enzyme lactase [which is produced by the cells lining the small intestine]

Pathophysiology

Lactose → (At the brush border of enterocytes; lactase) → glucose + galactose

Lactose Intolerance

Low or absent activity of the enzyme lactase

Inherited lactase deficiency•

1-Congenital lactase deficiency

inherit a gene from their parents that makes it likely they will develop primary lactase deficiency

extremely rare

2-Childhood-onset and adult-onset lactase deficiency

Genetically programmed progressive loss of the activity of the small intestinal enzyme lactase.

common

primary

Acquired lactase deficiency•

Transient
due to intestinal mucosal injury by an infectious, allergic, or inflammatory process

•Many intestinal diseases cause secondary reversible lactase deficiency, including viral gastroenteritis, celiac disease, giardiasis, and bacterial overgrowth.

Gastroenteritis:
Infectious diarrhea, particularly viral gastroenteritis in younger children, may damage the intestinal mucosa enough to *reduce the quantity of the lactase enzyme.*

secondary

Clinical presentation

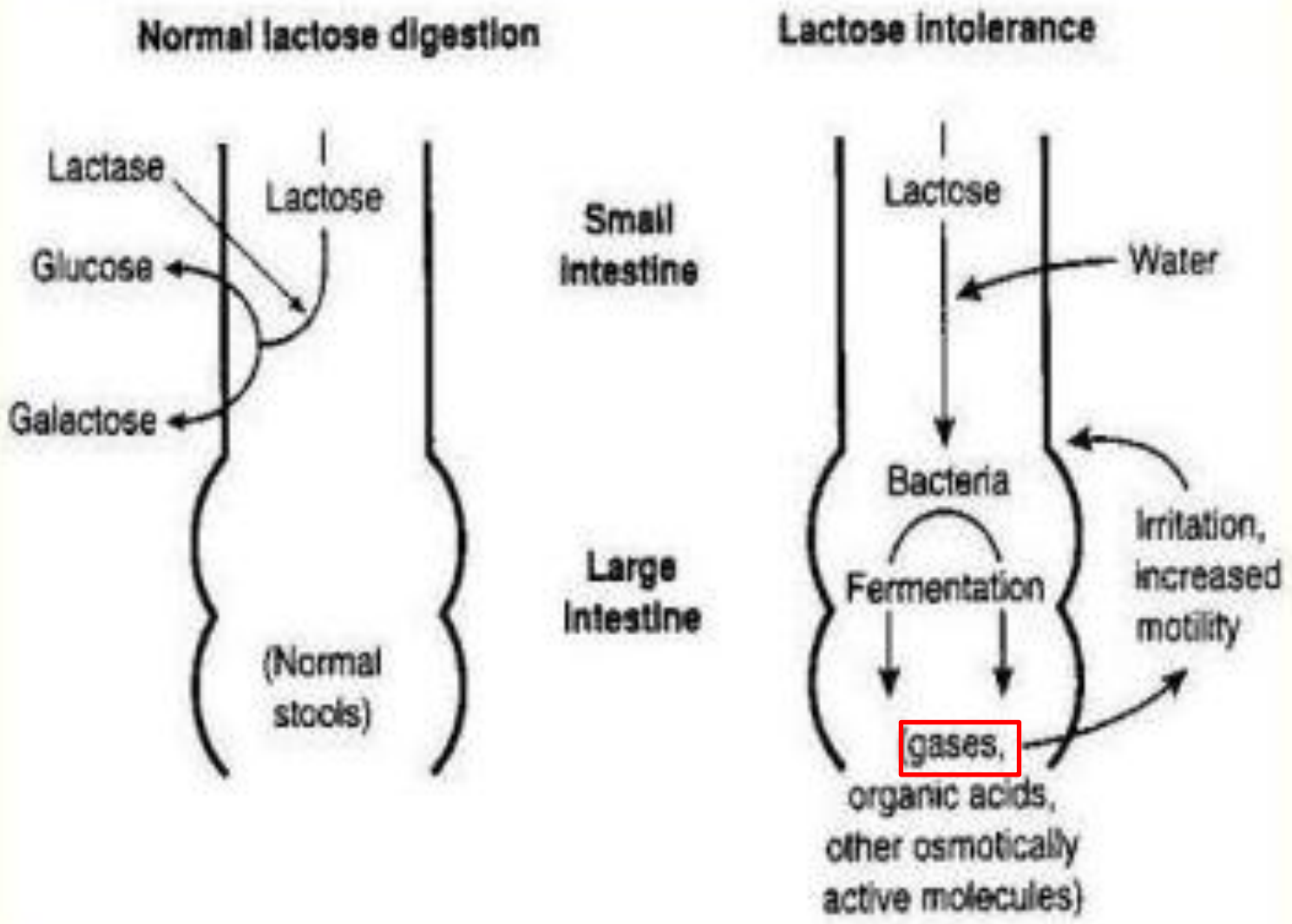
Bloating
Abdominal discomfort
meteorism, and flatulence
[1 hour to a few hours after ingestion of milk products]

* meteorism gaseous distension of the stomach or intestine
* flatulence :generating excessive gas in the alimentary canal

Stool characteristics:

Loose, watery, acidic stool often with excessive flatus
associated with urgency that occurs a few hours after the ingestion of lactose-containing substances is typical.

Lactose Intolerance



Lactose Intolerance

Deficiency/absence of the enzyme lactase in the brush border of the intestinal mucosa → maldigestion and malabsorption of lactose

→ Unabsorbed lactose draws water in the intestinal lumen

- In the colon, lactose is metabolized by **bacteria** to organic acid, CO_2 and H_2. [acid is an irritant and exerts an osmotic effect]

- Causes diarrhea, gaseousness, bloating and abdominal cramps

Diagnosis

- the doctor may first recommend **eliminating all milk and milk products** from the person's diet for a short time to see if the symptoms resolve

- **Hydrogen breath test :**

The person drinks a lactose-loaded beverage and then the breath is analyzed at regular intervals to measure the amount of hydrogen.

Normally, very little hydrogen is detectable in the breath, but undigested lactose produces high levels of hydrogen.

- **Genetic testing.**