
بسم الله الرحمن الرحيم

Celiac disease in children

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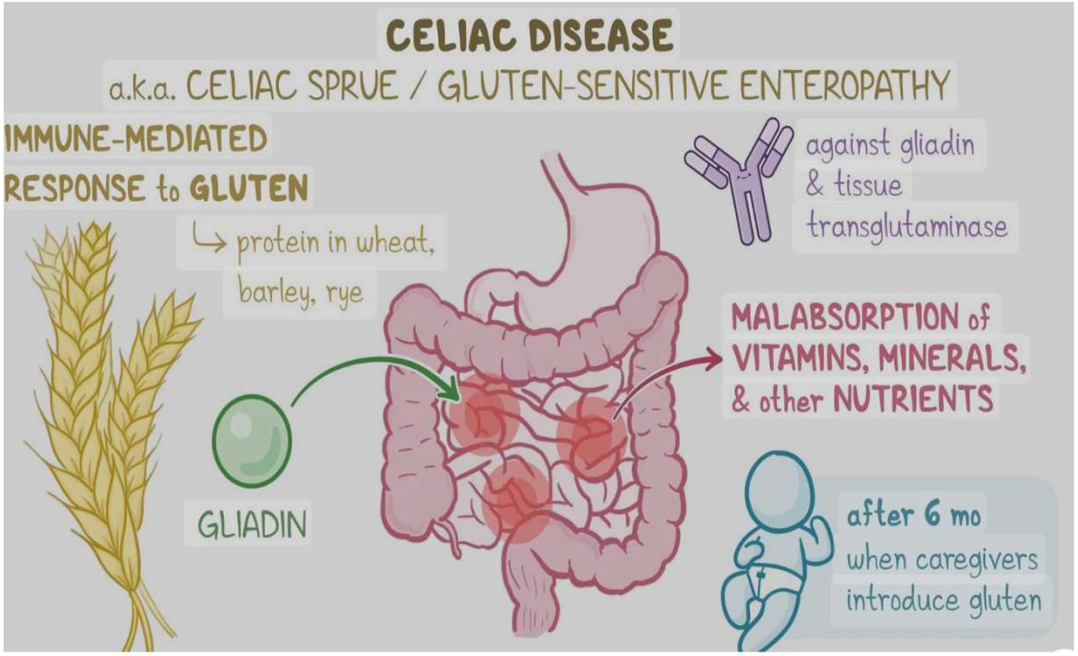
Introduction

- Common autoimmune disease
- Immune-mediated response is driven by dietary gluten in genetically predisposed individuals



High-risk groups

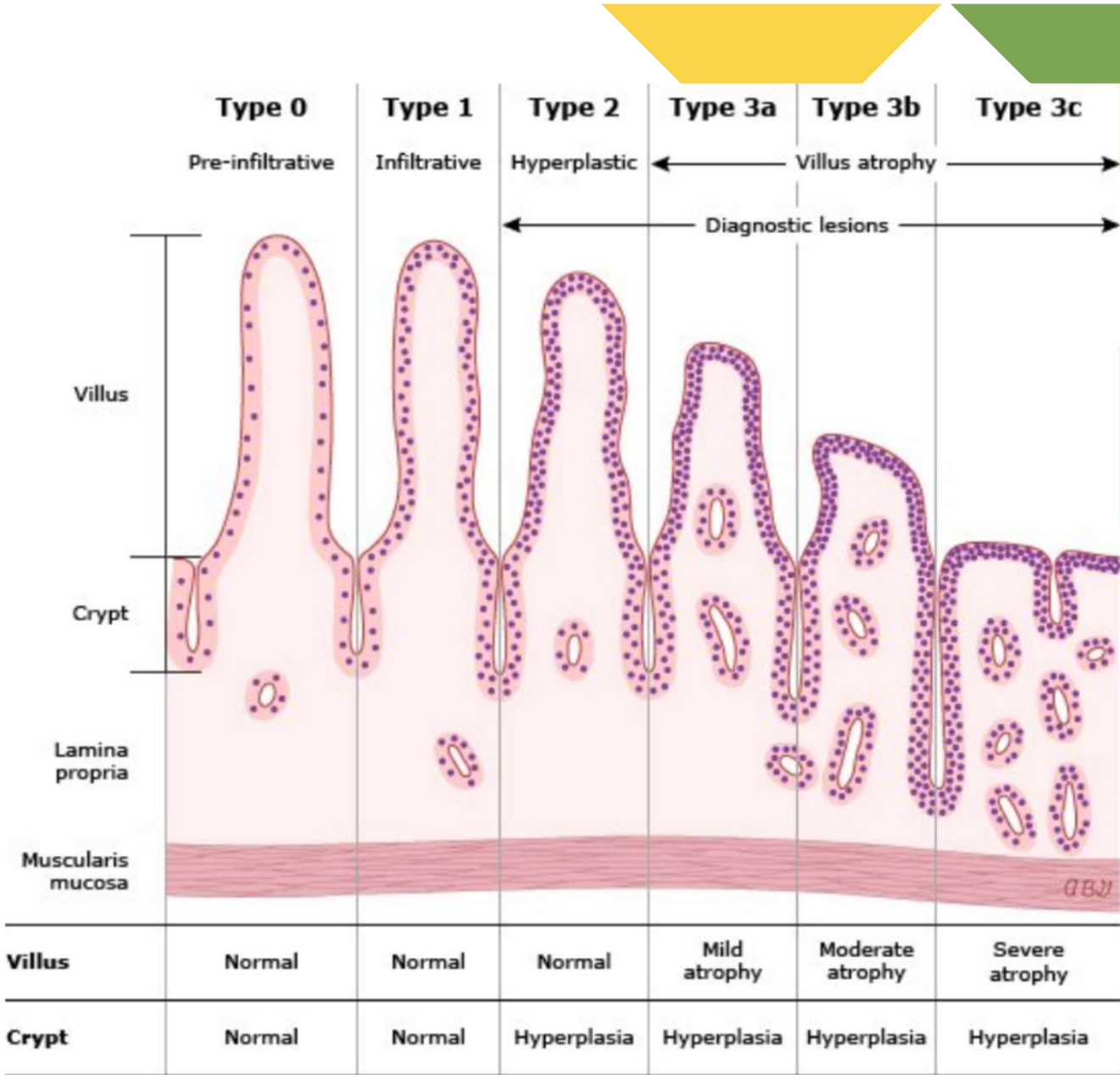
- First- and second-degree relatives of individuals with celiac disease
- Autoimmune disorders/immunodeficiency:
  - Type 1 diabetes
  - Autoimmune thyroiditis
  - Juvenile idiopathic arthritis
  - Autoimmune liver disease
  - Selective IgA deficiency
- Genetic syndromes:
  - Down syndrome
  - Turner syndrome
  - Williams syndrome

PATHOGENESIS AND RISK FACTORS

- Inappropriate immune reaction to dietary gluten and related proteins
- Avoidance of dietary gluten: turned "off" the autoimmune response
- The common grains that contain the triggering proteins:

PATHOGENESIS

- Mucosal inflammation of the proximal small intestine, with crypt hyperplasia and villous atrophy
- Malabsorption and gastrointestinal symptoms



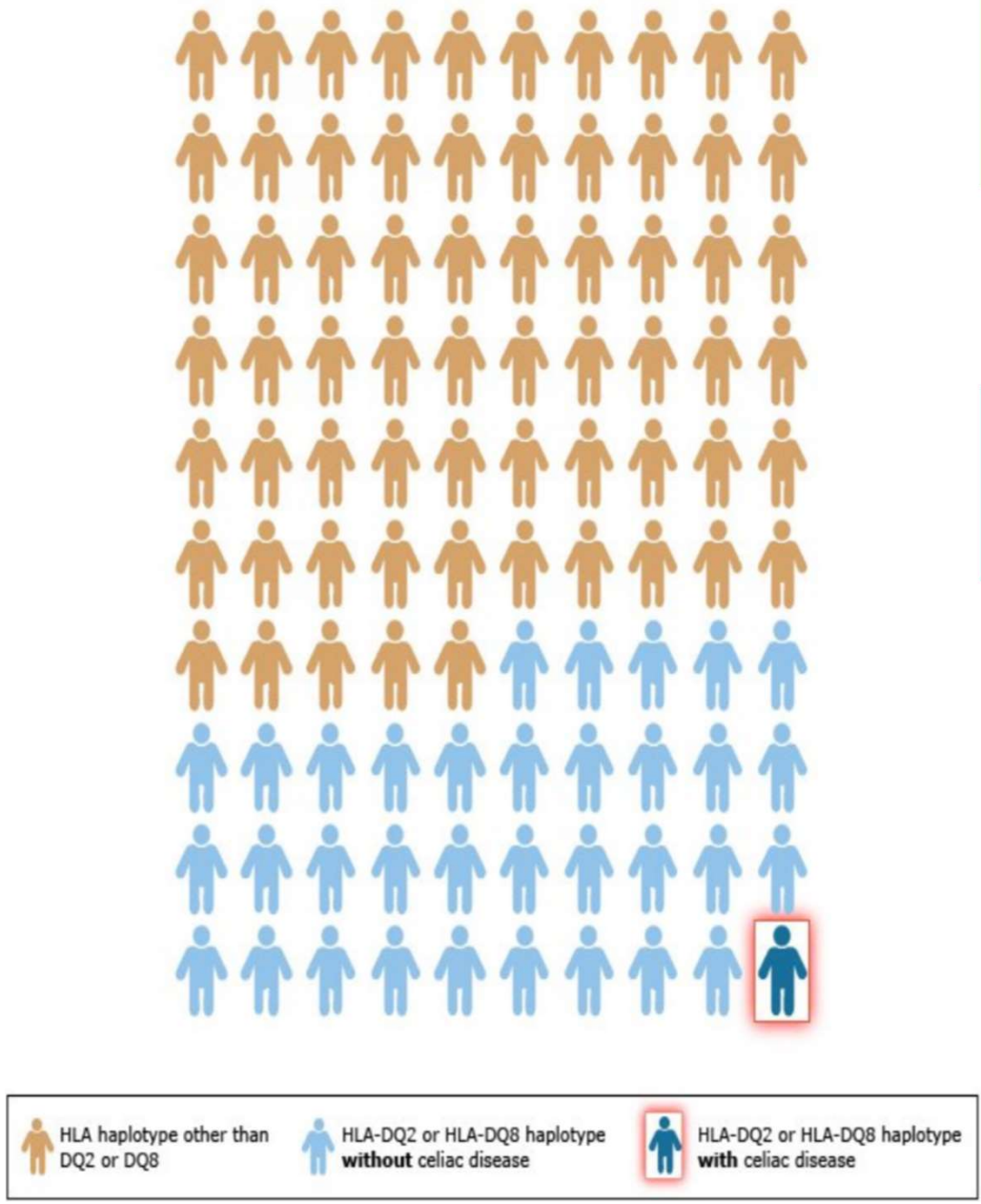
	Type 0	Type 1	Type 2	Type 3a	Type 3b	Type 3c
Villus	Normal	Normal	Normal	Mild atrophy	Moderate atrophy	Severe atrophy
Crypt	Normal	Normal	Hyperplasia	Hyperplasia	Hyperplasia	Hyperplasia

Genetic factors

Frequent intrafamilial occurrence

Strong association with HLA DQ۲ and/or DQ۸

- ۹۵ percent of individuals with celiac disease have HLA DQ۲ and/or DQ۸
- ۹۰ percent will have DQ۲
- ۵ percent will have DQ۸



Feeding practices in infancy and early childhood

Timing of gluten introduction

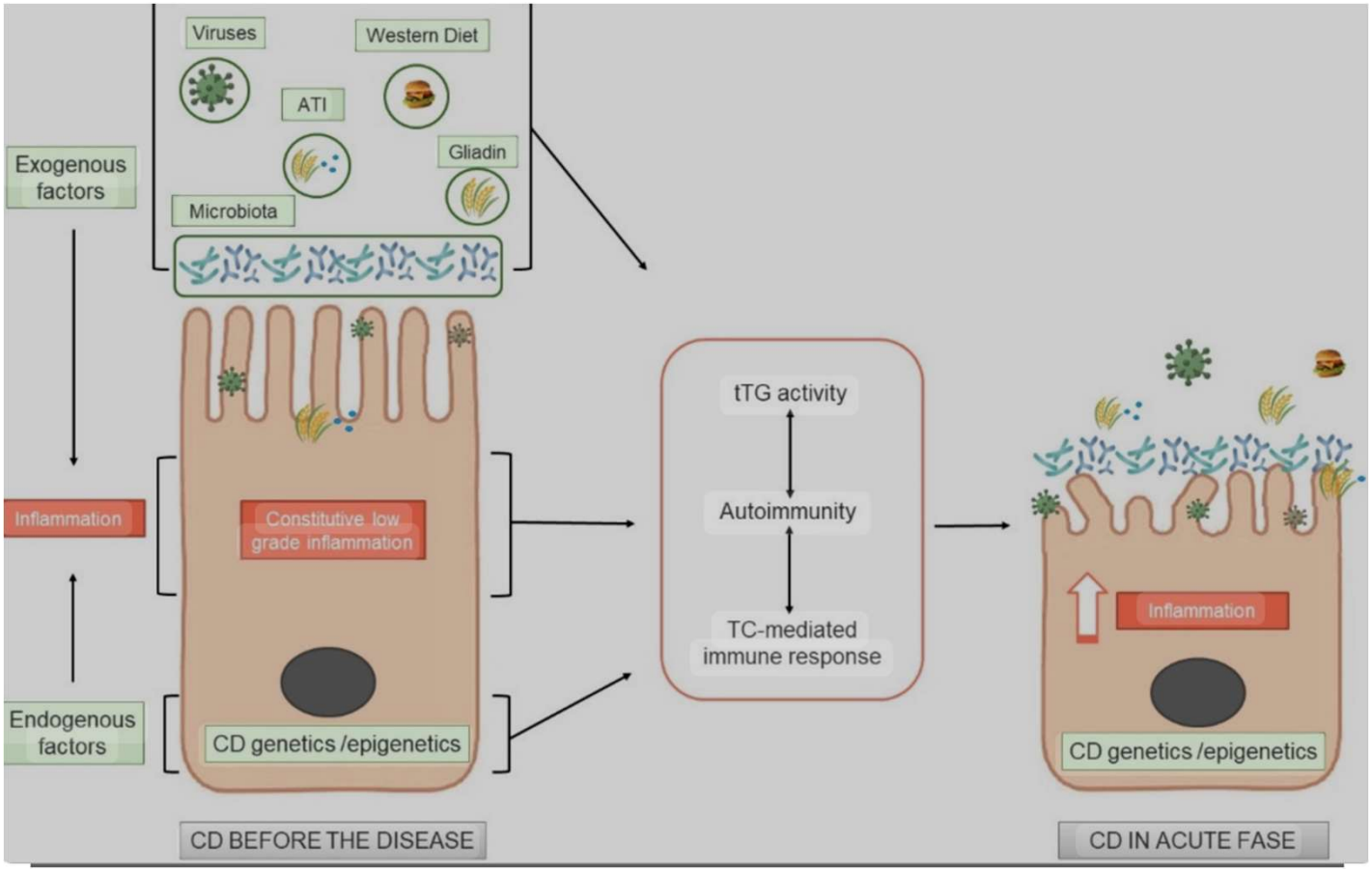
Does not appear to affect celiac disease risk

Quantity of gluten exposure

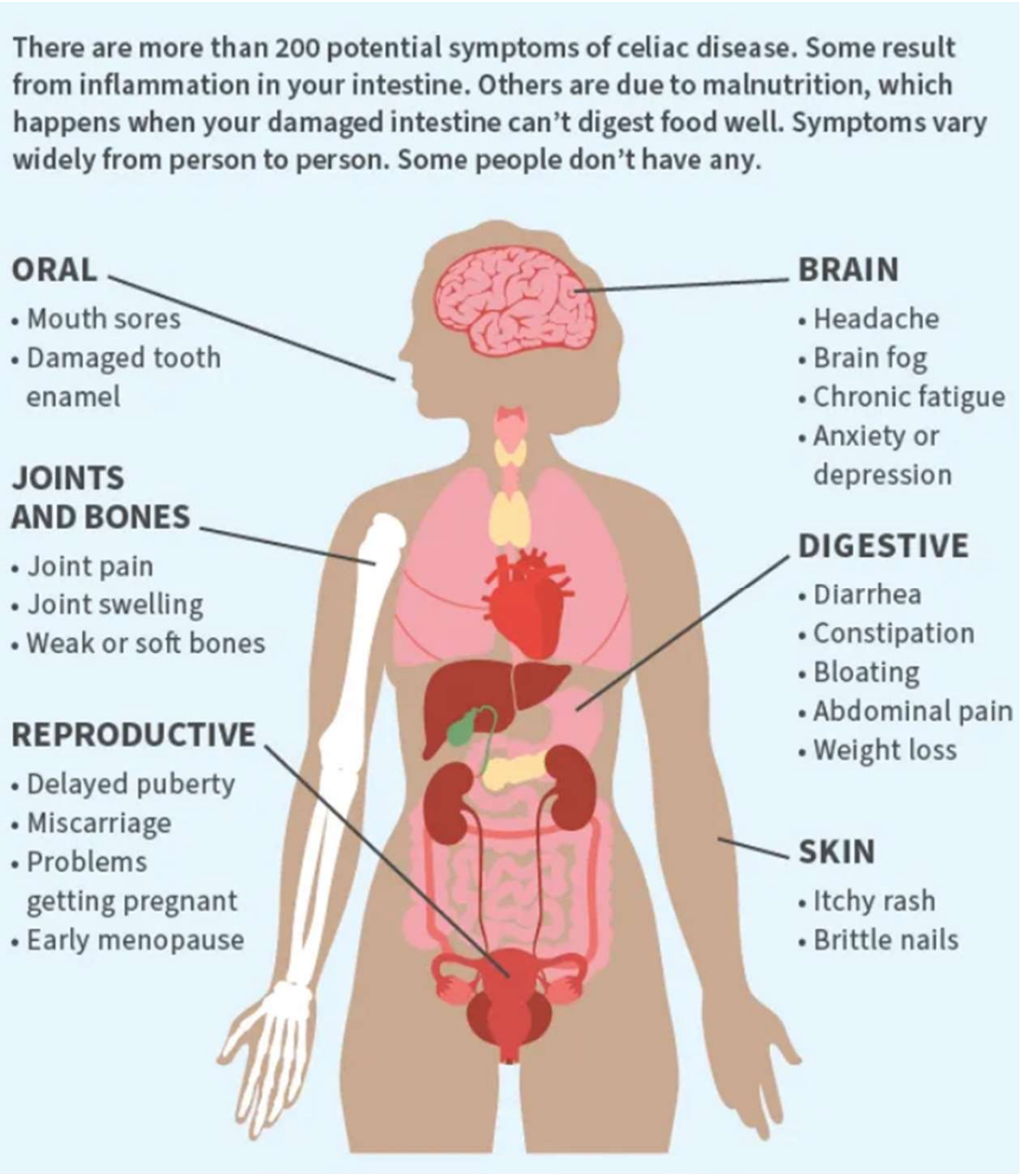
Plays a role?

Feeding recommendations should continue to follow standard pediatric guidelines set by each governing body.

- Prior intestinal infections (rotavirus or enterovirus)
- Exposure to antibiotics



Additional trigger factors



CLINICAL MANIFESTATIONS

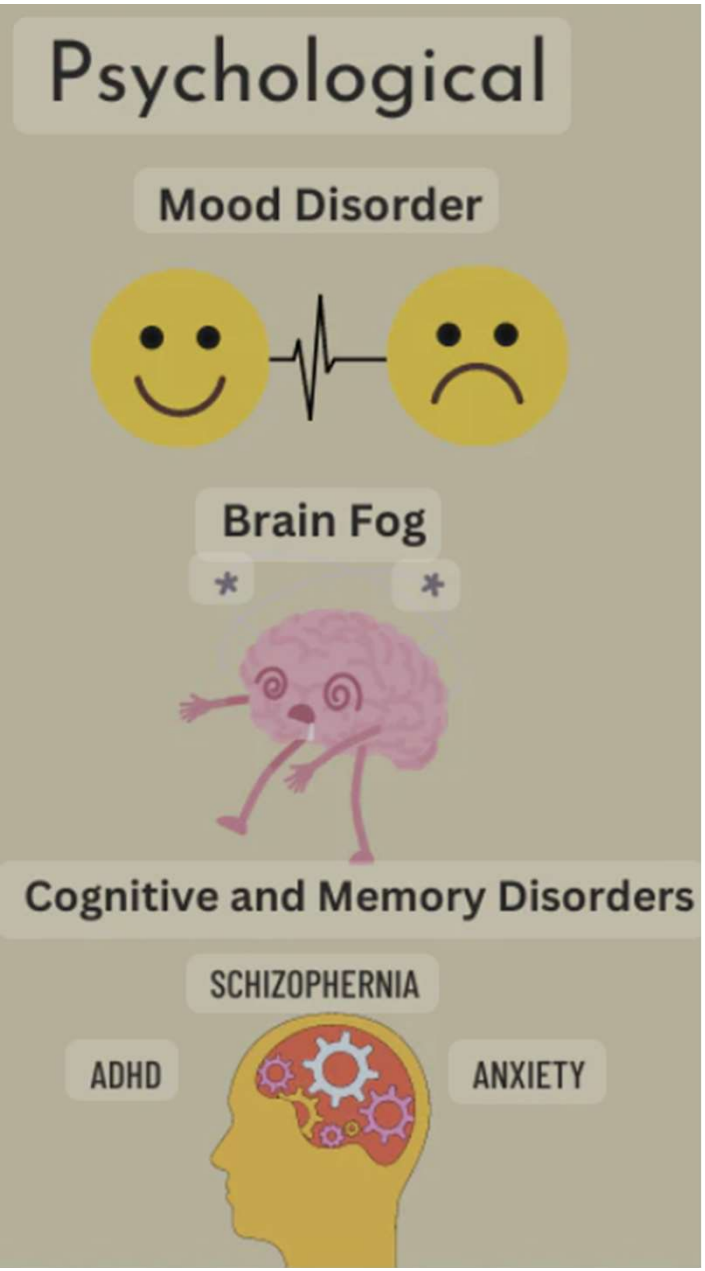
Classical gastrointestinal symptoms

- Chronic diarrhea: bulky and foul-smelling
- Anorexia
- Abdominal distension and pain
- Failure to thrive or weight loss
- Vomiting
- Paradoxically, either diarrhea (۶۴%) or constipation (۸ %)
- Delayed diagnosis : severe malnutrition

Non-gastrointestinal manifestations

Growth and development

- Delayed linear growth
- Even in the absence of significant gastrointestinal symptoms
- Depend on disease severity and/or duration
- Menstrual abnormalities such as delayed menarche, infertility and early menopause



- Behavioral, psychologic and neurologic symptoms

- Anxiety, Depression, Aggressive behavior, Eating or Sleep problems
- Peripheral polyneuropathy
- ADHD; Autism spectrum disorder; Intellectual disability

➢ Due to:

- Specific micronutrient deficiencies
- Autoimmune mechanisms

Liver disease

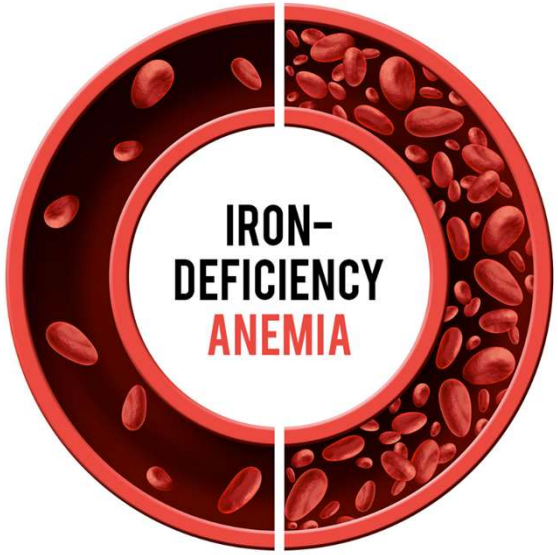
١. Aminotransferase elevations

٢. Increased risks for a broad spectrum of liver diseases:

- Acute hepatitis
- Primary biliary cholangitis
- Autoimmune hepatitis

Iron deficiency

- Correlated with severity of mucosal injury
- Testing for celiac disease is indicated in children with iron deficiency anemia who have no other clear reason for the deficiency.



Dermatitis herpetiformis

- ✓ Itchy papulo-vesicular eruption
- ✓ Location: symmetrically on the extensor surfaces, occasionally, within the mouth
- ✓ DDX: atopic dermatitis, scabies, or linear IgA dermatosis
- ✓ Treatment:
  - Medications such as dapsone
  - Skin lesions usually will not resolve without gluten withdrawal

Dental enamel defects

- Involving the secondary dentition
- Symmetrically distributed and detectable in all four quadrants of the dentition
- Cream, yellow, or brown opacities; loss of enamel glaze; horizontal grooves; or shallow pits
- Incisors are most affected
- Immunologic mechanisms not malabsorption of nutrients such as calcium

Metabolic bone disease

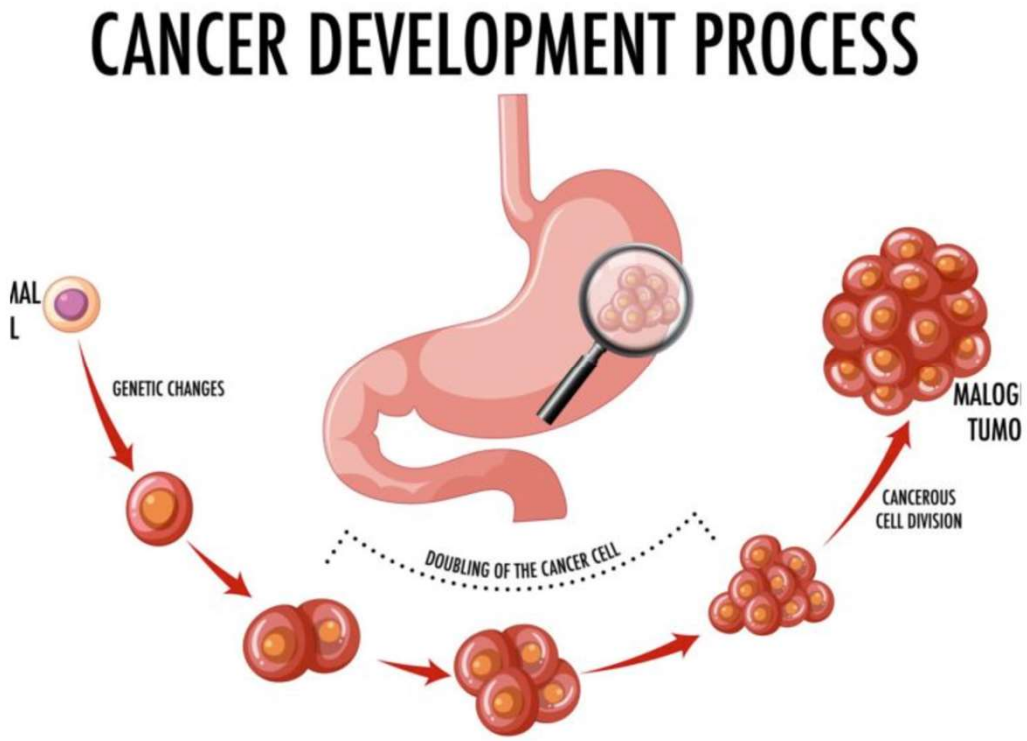
- ✓ Bone loss (usually osteomalacia) in patients without gastrointestinal symptoms
- ✓ Secondary hyperparathyroidism that is probably caused by vitamin D deficiency
- ✓ Lower BMI at diagnosis → higher risk of metabolic bone disease

Subclinical disease

- Fatigue
- Anemia (usually due to iron deficiency)
- Attenuated growth
- Otherwise, unexplained elevations in serum aminotransferases
- Or no symptoms at all

Risk of malignancy

- Non-Hodgkin lymphoma and gastrointestinal cancers
- The risk for malignancy is reduced by long-term treatment with a gluten-free diet



Diagnosis

INDICATIONS FOR TESTING:

١. Symptomatic Patients

٢. Members of high-risk groups regardless of symptoms

INITIAL SEROLOGIC TESTING

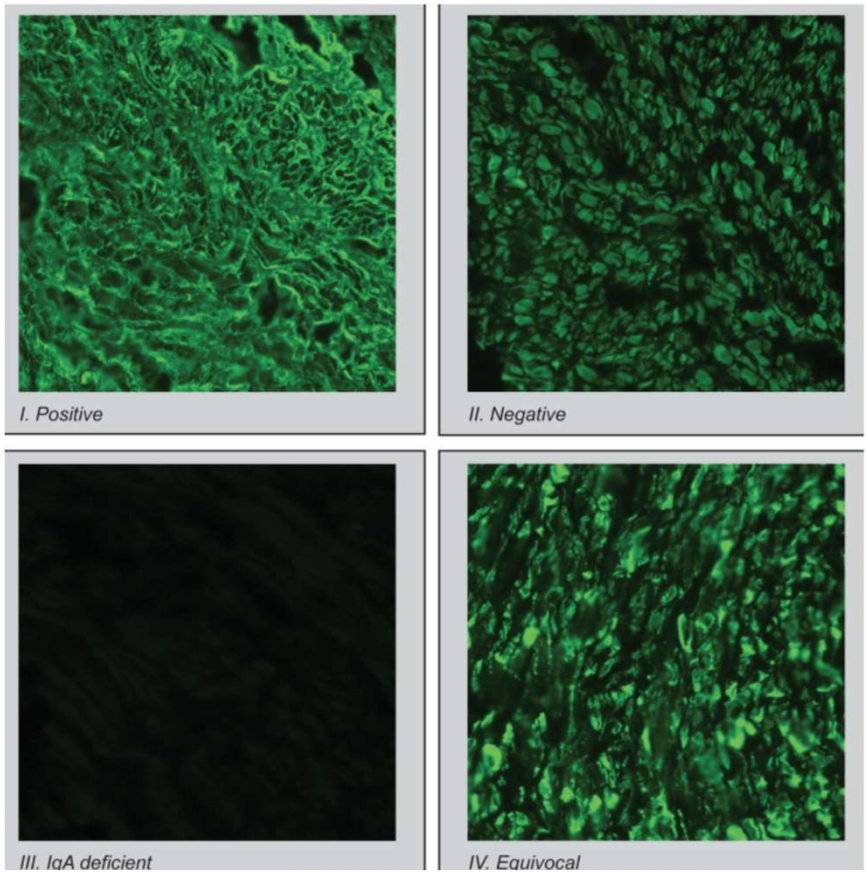
- Tested while on a gluten-containing diet
- IgA antibodies against tissue transglutaminase (tTG-IgA) with Total IgA

A. Clearly elevated : ≥٣ times ULN = endoscopy

B. Mildly elevated : between ١ and ٣ times the ULN= endoscopy if the patient has clinically significant symptoms

C. Normal : within the normal range = active celiac disease is unlikely

- For patients who are members of a high-risk group: repeat the test in approximately three years, or earlier if symptoms develop



Other tests

EMA

- second-line test
- in patients with equivocal results of tTG-IgA, including asymptomatic members of a high-risk group

Deamidated gliadin peptide (DGP)

- particularly useful for young children

Special populations

Children younger than two years

- tTG-IgA is the best initial test for IgA-sufficient children
- High clinical suspicion and negative tTG-IgA: DGP-IgG

Immunoglobulin A deficiency

- IgG antibodies to tTG
- DGP-IgG

Patients already on a gluten-free diet

- Gluten-free diet for more than two weeks prior to testing
- First : tTG-IgA and total IgA
  - ➢ Positive result is valid and suggests celiac disease
  - ➢ Negative: ?

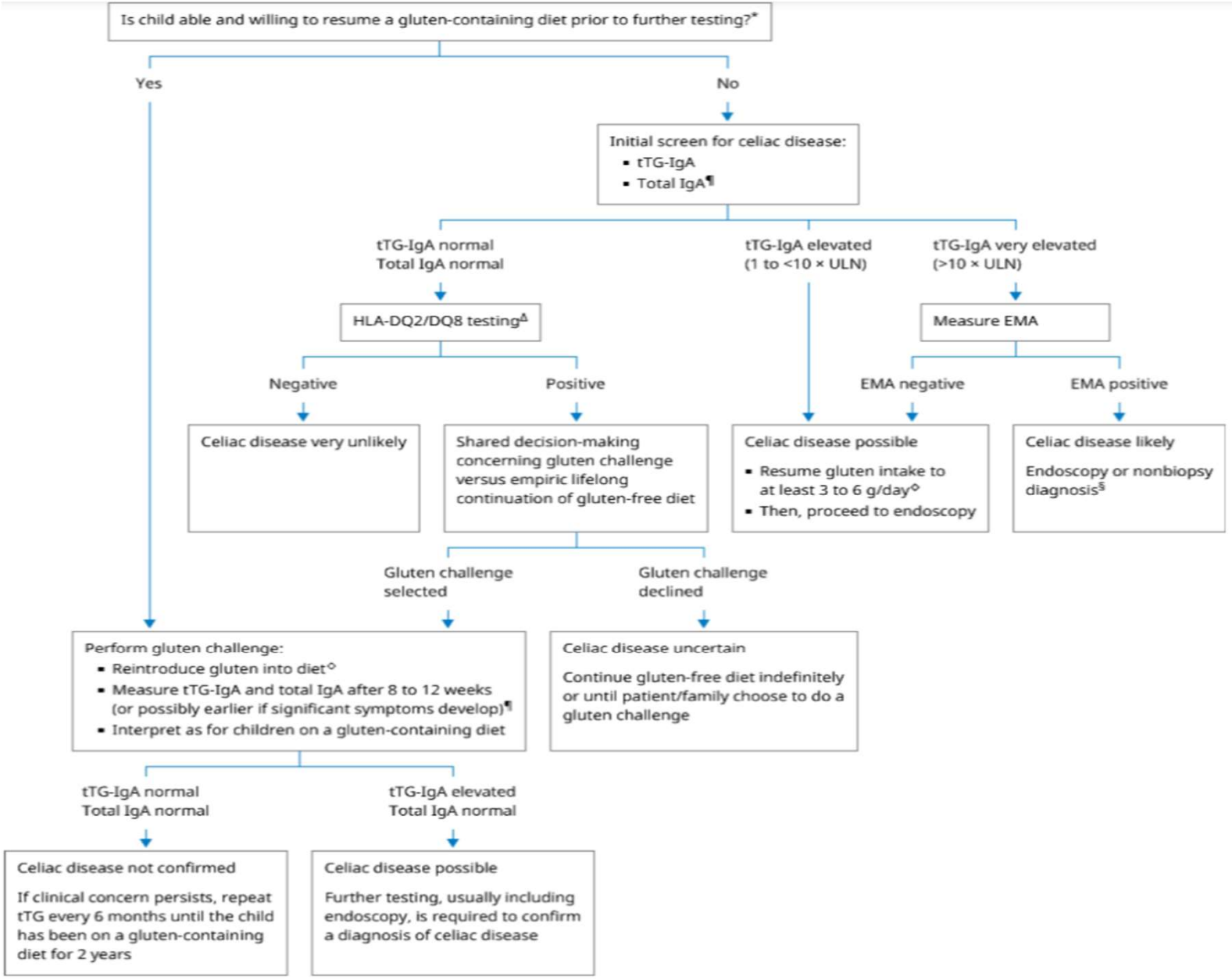
- A formal gluten rechallenge with at least ٣ to ٦ g gluten daily for ١٢ weeks or longer
    - Earlier testing can be considered if the child has significant symptoms
    - A gluten challenge may not be appropriate for young children (eg, <٥ years) or those with severe symptom

❑ HLA testing

١. Negative test: celiac disease is essentially excluded

٢. Positive for HLA-DQ٢/DQ٨, a gluten challenge is still needed to make a definitive diagnosis of celiac disease

Evaluation for celiac disease in a child who is already on a gluten-free diet for >۲ weeks



OVERVIEW OF MANAGEMENT

C – Consultation with a skilled dietitian

E – Education about the disease

L – Lifelong adherence to a gluten-free diet

I – Identification and treatment of nutritional deficiencies

A – Access to an advocacy group and/or health behavior support

C – Continuous long-term follow-up by a multidisciplinary team

WHOM TO TREAT

- Confirmed diagnosis of celiac disease
- Dermatitis herpetiformis confirmed by skin biopsy, with or without associated pathology of the small intestinal mucosa

Potential celiac disease

- Positive serologic test but normal small bowel biopsy
- At an increased risk for celiac disease
- Management decisions
    ١. presence of symptoms
    ٢. patient preference

- Truly asymptomatic:
  - Gluten-free diet is not necessary
  - Monitored with repeat serology and repeat small intestinal biopsy if symptoms develop or if there is higher suspicion of active disease over time
- Symptoms that might be caused by celiac disease
  - Trial of a gluten-free diet, then monitor the response of symptoms and antibody tests

- Lifelong elimination of gluten in the diet
- Read labels on prepared foods and condiments carefully
- Additives such as stabilizers or emulsifiers that may contain gluten

DIETARY MANAGEMENT

Safe Foods

- Corn
- Rice
- Buckwheat
- Potatoes
- Soybean
- Tapioca flours

Oats:

- Uncontaminated by the other three grains, appear to be safely tolerated by most people with celiac disease
- Tolerance varies among patients and depends on the quantity of oats consumed

Medications:

- Contain minimal gluten and do not need to be avoided.

Other dietary counseling

- Nutritional and caloric deficiencies
- Secondary lactose intolerance
- Gluten-free diet may be low in fiber
- Bone loss due to vitamin D deficiency
- laboratory evaluation for iron deficiency anemia

MONITORING THE RESPONSE TO A GLUTEN-FREE DIET

- Antibody levels will decline on a gluten-free diet but may remain abnormal for up to two years
- Measure levels at three to six months after the start of treatment, then at approximately six month-intervals until normalized
- Measure levels approximately annually to monitor adherence to the gluten-free diet
- Significant rise in antibody levels may indicate that the individual is ingesting gluten

Monitoring of nutrition and autoimmune disease

Screening test	At diagnosis of celiac disease	Follow-up*
Height, weight, and BMI	**Yes**	**Yes**
tTG-IgA antibodies	**Yes**	**Yes**
CBC	**Yes**	Yes
Ferritin, iron, TIBC	**Yes**	PRN
Vitamin D	Yes	PRN
Calcium, phosphorus, alkaline phosphatase, PTH	PRN	PRN
DXA	PRN	PRN[¶]
Folate	PRN	PRN
Other vitamins, zinc, and trace elements	PRN	PRN
ALT, AST	Yes	PRN
Diabetes screening (serum glucose, A1C, symptom counseling)	PRN	PRN
TSH[Δ]	**Yes**	Yes
HBsAb	PRN[◊]	PRN

Risk of Leaving **Celiac Disease Untreated**

01
Depression

02
Nervous System Disorders

03
Malabsorption and Brittle Bones

04
Cancers in the Digestive System

05
Infertility

06
Lactose Intolerance

Gluten Freely™

THANK YOU