

FOLATE (FOLIC ACID) DEFICIENCY ANEMIA

Definition:

Anemia caused by folate deficiency, leading to impaired DNA synthesis and megaloblastic changes in rapidly dividing cells.



Causes / Risk Factors

1. Dietary deficiency

- Folate is widely present in foods but destroyed by 10-15 min of cooking
- High-risk groups: poor diet, elderly, food insecurity

2. Increased metabolic demand

- Pregnancy
- Chronic hemolytic anemia (e.g., sickle cell disease)


3. Malabsorption / metabolism defects

- Celiac disease, environmental enteropathy → impaired jejunal absorption
 - Drugs: phenytoin (absorption), methotrexate (metabolism)
 - Polyglutamate → monoglutamate conversion inhibited by acidic foods & legumes
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Pathogenesis

- Folate → tetrahydrofolate (THF) → accepts/donates one-carbon units
- Required for dTMP synthesis → DNA replication
- Folate deficiency → ↓ dTMP → blocked DNA replication → megaloblastic anemia
- Rapidly dividing cells affected:
 - Hematopoietic precursors → anemia, pancytopenia
 - GI mucosa → sore tongue, diarrhea

 Note: Methotrexate inhibits dihydrofolate reductase
→ prevents THF formation → mimics folate deficiency

Clinical Features

- Insidious onset → weakness, fatigue
 - Mucosal symptoms: sore tongue, GI discomfort
 - Neurologic symptoms: absent (unlike B12 deficiency)
 - Anemia is typically macrocytic with hypersegmented neutrophils
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Diagnosis

1. Peripheral blood smear / bone marrow → megaloblastic changes
2. Serum & RBC folate measurement
 - ↓ folate confirms deficiency
 - Distinguishes from vitamin B12 deficiency (which has neurologic involvement)



Mnemonic for Folate Deficiency Risk Factors:

“FOLATE”

- Food poor / Food insecurity
- Older age
- Liver disease / alcohol use
- Anemia (chronic hemolysis)
- Tea / drugs interfering with absorption (phenytoin, methotrexate)
- Extra demand (pregnancy)

-> The End <-