

Vitamin B₁₂

Cobalamin

Source → Animal foods like Kidney, liver, heart, muscle, meat, fish, egg, cheese

Absorption - Vitamin-B₁₂

↓
Released by Duff cells breaks it

↓
Binds to IF by parietal cells

↓
A Terminal ileum absorption in

the enterocytes with Intrinsic Cobalamin II

↓
Blood & liver

Storage - liver - 2mg, other areas - 2mg.

Function → In Methyl cobalamin → ↓ Homocysteine

In Adenosyl cobalamin → ↓ Methylmalonic acid

2) Cell maturation and Maintenance of Nervous system

Vitamin B₉ (Folic acid) Glutamic acid.

Source → Vegetable food (leafy greens, citrus, oranges)

Absorption → Polyglutamate → Monoglutamate

↓
Absorbed in the jejunum

↓
Blood & liver

Storage → liver and other areas

Function → Impaired Cell Division.

- Neural Tube formation (closure of anterior and posterior neuropore).

- ↓ Homocysteine

→ Formation of dTMP

Megaloblastic anemia

Etiology

Vitamin B₁₂ Deficiency

1) Decreased intake - Vegetarians & child breast

2) Decreased absorption -

i) Pernicious anemia

- Organ specific autoimmune disorder causing atrophy of gastric mucosa $\rightarrow$ loss of parietal cells $\rightarrow$ $\downarrow$ Intrinsic factor
- usually associated with other autoimmune disease like Graves disease, Hashimoto thyroiditis, Vitiligo, Addison's disease

- ^{IgA} Antibodies against Intrinsic factor and Parietal cells

$\downarrow$
Difficult in Absorption of Vit B₁₂

- 25 in 1,00,000 person are affected

- without IF only 1% of Vitamin B₁₂ is absorbed

Investigation $\rightarrow$ Schilling test $\rightarrow$ Radiative labeled

Isotopes of Vitamin B₁₂ absorption given orally before and after IF given

ii) Chronic Disease

Enterocytes in Terminal ileum decrease

$\downarrow$
No Binding of this with Intrinsic factor

iii) Gastric Bypass Surgery $\rightarrow$ Total Gastrectomy
Partial

iv) Small Bowel Pathology

- Blind loop Syndrome (Bacterial Overgrowth)
- Hypogammaglobulinemia, Celiac disease
- Fish Tapeworm

Vitamin B₁₂

Etiology

- 1) Decreased Intake: Low intake of vegetables -
- 2) Decreased absorption:
 - ↳ ↑ Alcohol consumption
 - ↳ Bowel pathology? celiac disease, Blind loop syndrome
 - ↳ Drugs
- 3) ↑ Demand: During pregnancy used up quickly.

Clinical Features

1) Immature RBC

↓
Macrocytic RBC

↓
Destroyed by spleen (hemolysis)

↓
Bone Marrow produces
Megaloblast (Pernicious)

2) Mucous epithelial damage

↓
Slow healing (stem cell maturation)

↓
Colitis

3) ↑ Homocysteine → Homocystinuria

↓
In Blood → Fomr atherosclerosis

↓
Heart attack

↓
Stroke

Folate
~~Vitamin B₁₂~~

Neural Tube defects

1) Anterior - Anencephaly

Absence of brain & skull

2) Posterior → Spina Bifida

~~Folate~~

Vitamin B₁₂

Peripheral nerve → paresthesia

↓ Reflexes

Spinal Cord → Subacute
degeneration of cord

Cerebrum → Dementia, optic
atrophy.

Autonomic neuropathy

Investigations

1) Blood $\rightarrow$ $\downarrow$ HB,
 $\downarrow$ RBC,
 $\downarrow$ WBC
 $\downarrow$ Platelets.

$\uparrow$ MCV

$\uparrow$ Ferritin.

$\uparrow$ LDH $\rightarrow$ Hemolysis.

2) $\downarrow$ smear $\rightarrow$ Macrocytic Hyp. Anemia -
Poikilocytosis.

Red cell fragmentation.

Neutrophil Hypersegmentation.

3) $\uparrow$ Homocysteine & $\uparrow$ Methylmalonic acid
Vitamin B₁₂

- $\downarrow$ Vitamin B₁₂

- Antibody against IF & Parietal Cells.

- Endoscopy $\rightarrow$ to neglect pathology

- Schilling test $\rightarrow$ Radioactive Vitamin B₁₂.

Folate $\rightarrow$ Pregnancy,

Management:

- Folate Supplementation & Vitamin B₁₂.