

# Dr Imad Aboukhamis

## Ph-D France



- Pernicious anemia

# Gastroenterology



- Organ specific

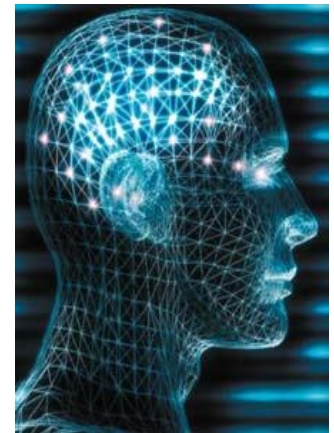
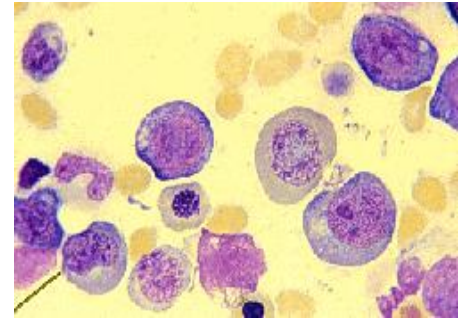
- Hashimoto's Thyroiditis
- Celiac disease
- **Pernicious anemia**
- Goodpasture's syndrome
- All Liver Diseases

- Systemic

- Rheumatoid arthritis
- Systemic Lupus erythematosus (SLE)
- Antiphospholipid syndrome (APS)
- Wegener's granulomatosis

# Pernicious Anemia - Symptoms

1. **Megaloblastic anaemia**  
Reduced cell proliferation due to impaired DNA synthesis
2. **Anaemia-dependent symptoms**  
fatigue, rapid heart rate, shortness of breath
3. **Neurologic symptoms**  
symmetric paresthesias
4. **Neuropsychiatric symptoms**  
depression, weakness of memory



# Gastroenterology



## • Pernicious Anemia

- Pernicious anemia is the most common cause of vitamin B12 deficiency
- Impaired Resorption of vitamin B12 is caused by:
  - Antibodies against Parietal cells (PCA)
  - Antibodies against Intrinsic Factor
- **Elevated** serum concentration of methylmalonic acid and homocysteine

Prevalence in Europe  
0,1 – 0,2 %

Occurrence mostly  
after  
Fourth decade

# Intrinsic Factor

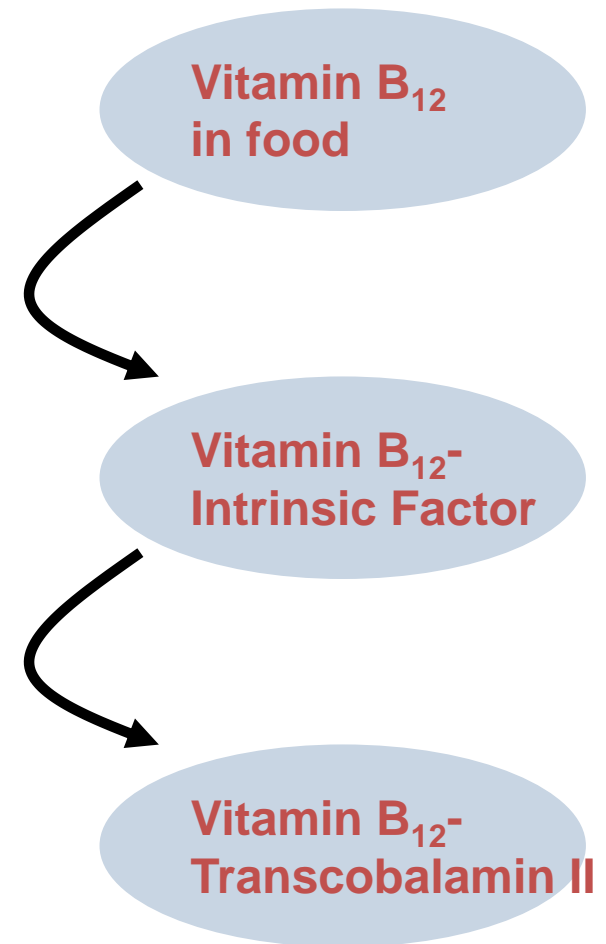
- Glycoprotein
- pH-optimum at  $\text{pH} < 3.0$
- Intrinsic Factor is **exclusively** produced by parietal cells
- Intrinsic Factor **binds** vitamin B<sub>12</sub>  
1 molecule IF binds 1 molecule vitamin B<sub>12</sub>

# biological function



## • Intrinsic Factor -

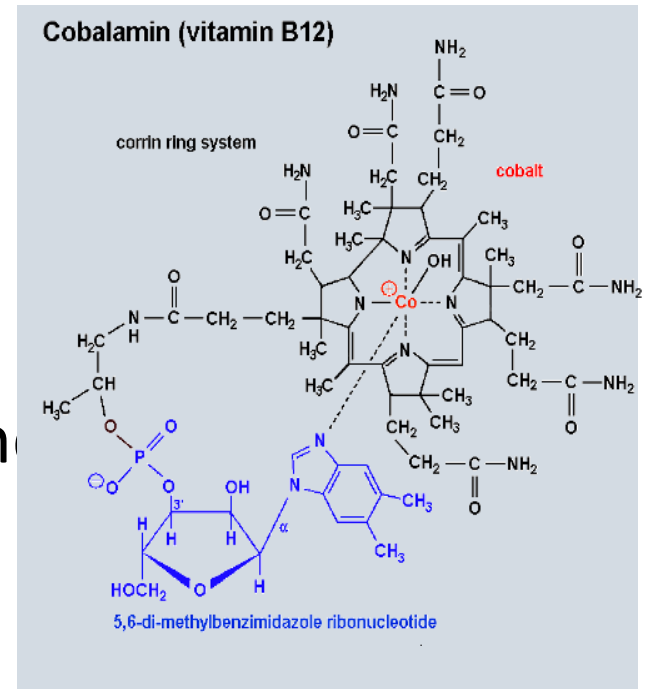
- Resorption of vitamin B<sub>12</sub> from food
- Intrinsic Factor is **produced** by the parietal cells in the gastric mucosa
- Intrinsic Factor **binds** vitamin B<sub>12</sub>
- Vitamin B<sub>12</sub>-Intrinsic Factor-complexes are **resorbed** in the jejunum **الصائم** by specific receptors
- Vitamin B<sub>12</sub> is **transported** by transcobalamin II to the target tissues



# Vitamin B<sub>12</sub>



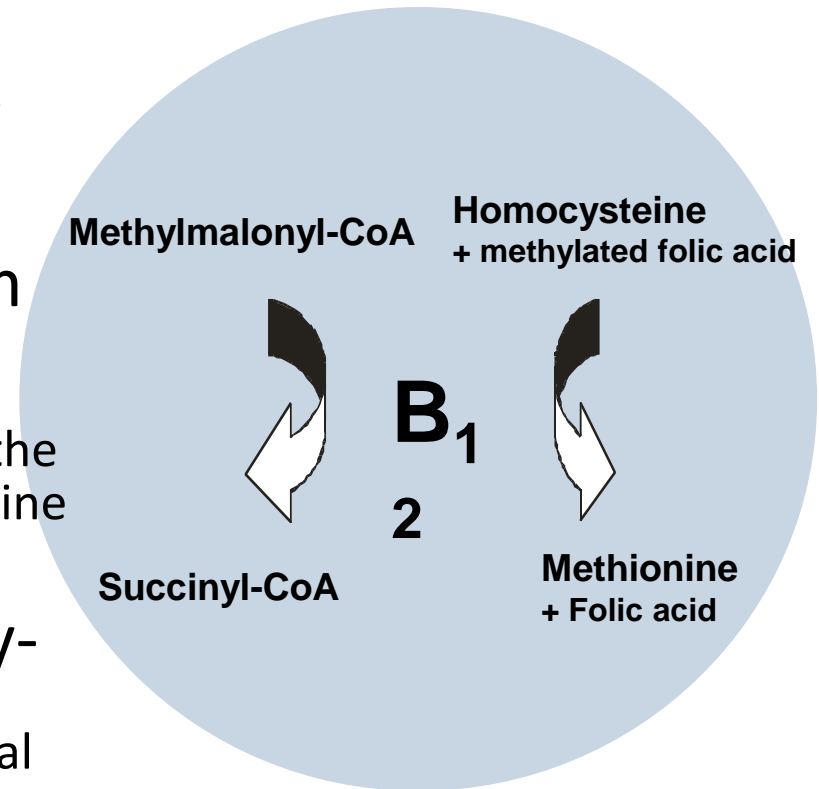
- corrin-ring
- **various** attached side groups
- central **cobalt** ion
- mainly contained in meat, milk and eggs
- daily **consumption** استهلاك 1-3  $\mu\text{g}$
- impervious to cellular plasma membranes
- Intrinsic factor, transcobalamin II



# Vitamin B<sub>12</sub> - Function



1. Vitamin B<sub>12</sub> is a coenzyme  
there are only two enzymes in mammals  
that contain vitamin B<sub>12</sub> as a cofactor
2. Methionine synthesis from  
Homocysteine  
Homocysteine methyltransferase;  
Important for the regeneration of the  
folate pool and synthesis of methionine
3. Turnover of Methylmalonyl-  
CoA to Succinyl-CoA  
Methylmalonyl-CoA Mutase; Essential  
for degradation of unsaturated  
fatty acids





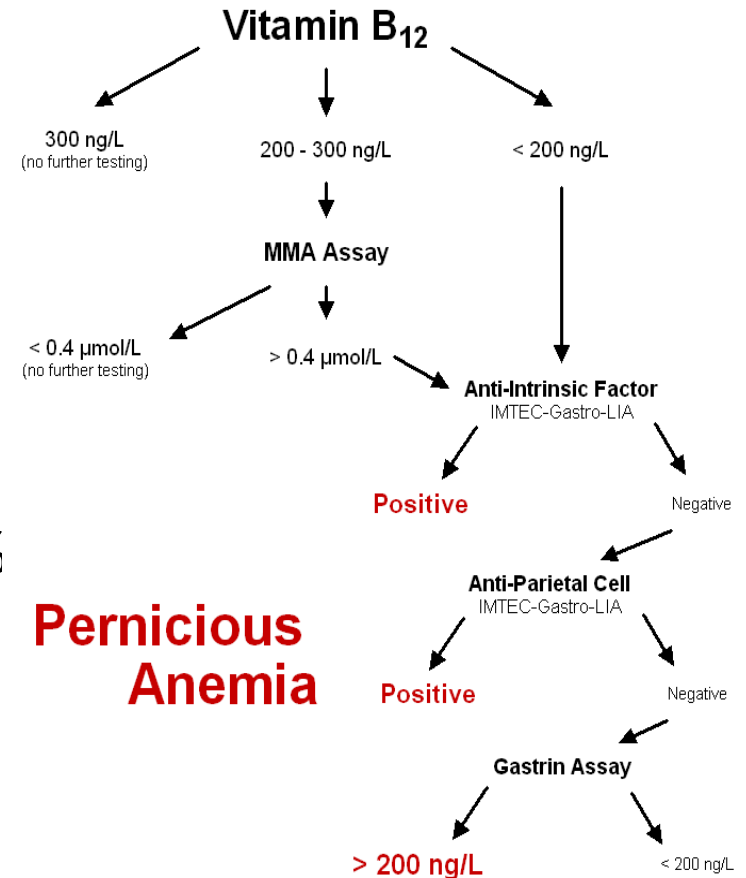
# Why are laboratory tests important ?



1. Undiagnosed subclinical
2. pernicious anemia is common
3. in elderly persons كبار السن
4. Widespread واسع الانتشار use of folate supplementation masks the hematologic manifestations of pernicious anemia and therefore produce neurologic disease without the warning of megaloblastic anemia.

# Laboratory Diagnosis

1. Serum vitamin B<sub>12</sub>-concentration < 200 ng/L
2. Serum methylmalonic acid (MMA) concentration > 0.4 μmol/L
3. Anti-Parietal Cell Antibodies (PCA) Sensitivity 85%; Prevalence 5 – 10%
4. Anti-Intrinsic Factor Antibodies Sensitivity: 50%; Specificity 100%



# Gastro-LIA

- Comfortable and reliable موثوق differential diagnosis for the diagnosis of **celiac** disease, **pernicious** anemia and differentiation of **Crohn's** disease and **ulcerative** colitis التهاب القولون التقرحي
- Designed for laboratories with **low** to medium turn-over

