Macrocytic Anaemia

Salwa Hindawi
Associate Professor in Haematology & Transfusion Medicine
Director of Blood Transfusion Services

causes of macrocytosis

- Megaloblastic anaemia
  - Raised MCV with megaloblastic changes in the bone marrow
  - Vitamin B12 deficiency
  - Folate deficiency
  - Myelodysplasia

More causes of macrocytosis

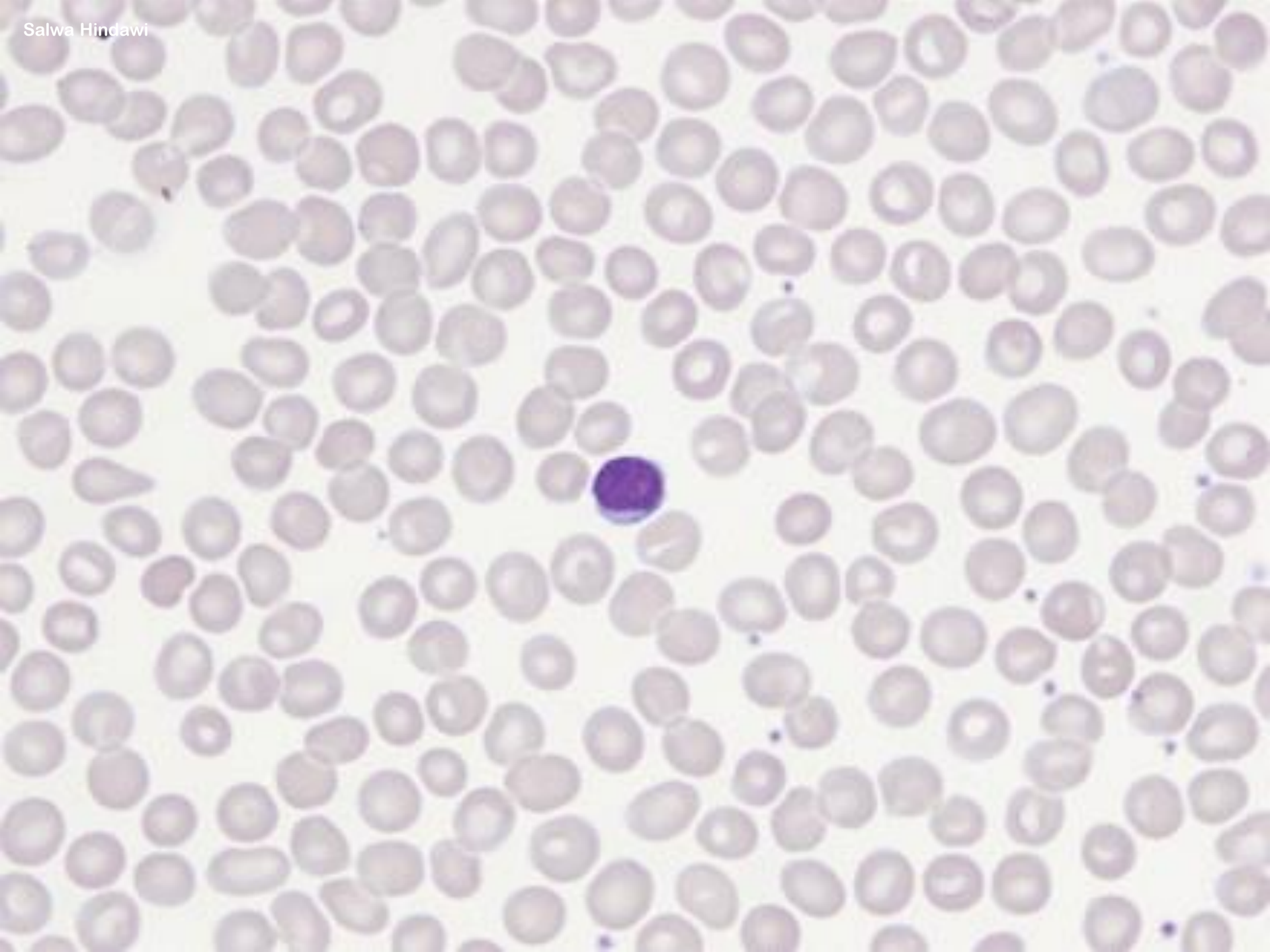
- Liver disease
- Alcohol excess
- Hypothyroidism
- Aplastic anaemia
- Cytotoxic drugs

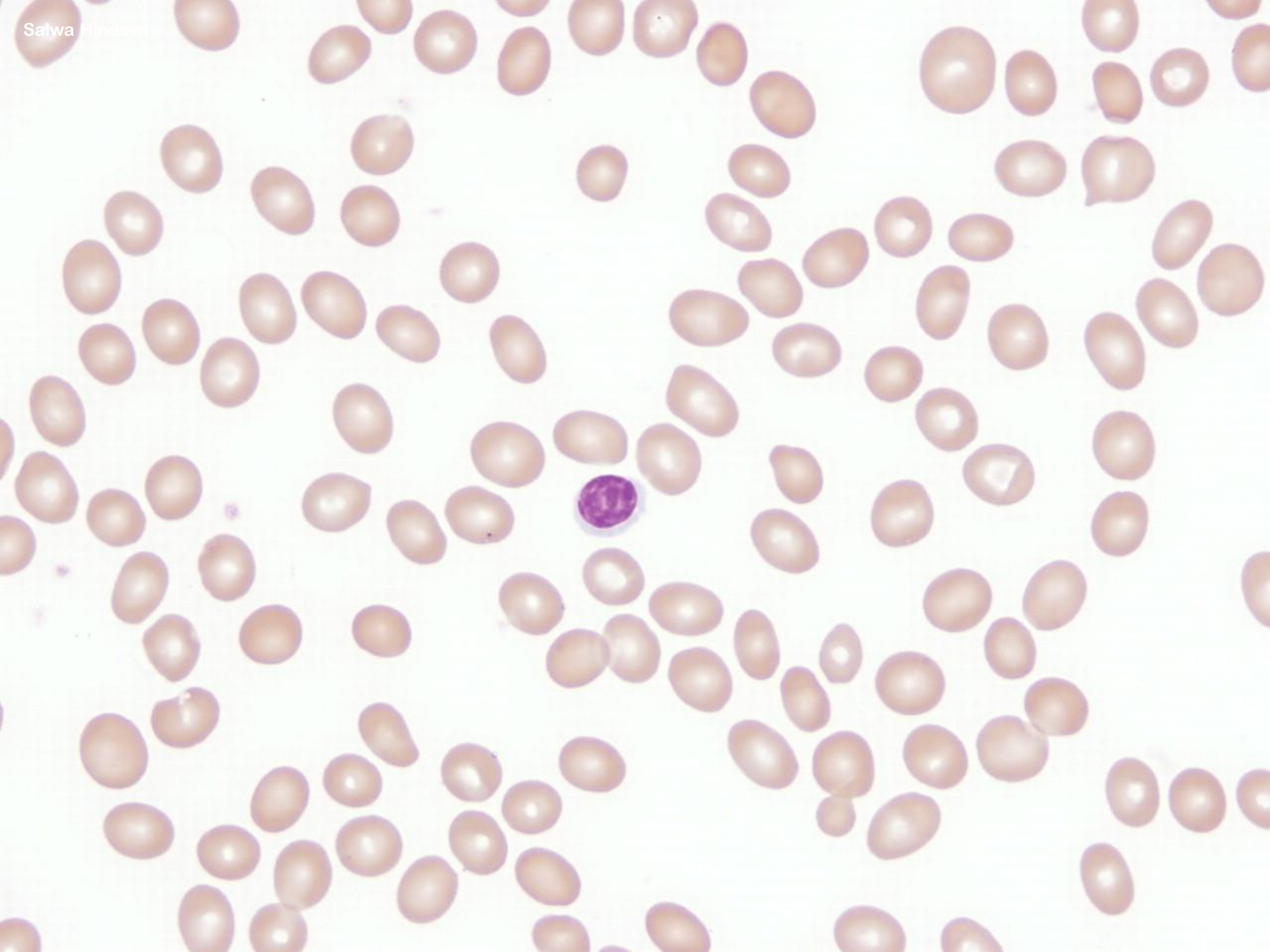
What details are important in the clinical history?

- Diet
- Symptoms of malabsorption / weight loss
- Pregnancy
- Vitamin supplements
- Family history of anaemia or autoimmune disorders
- Thyroid disease
- Alcohol intake

What investigations should be performed?

- CBC, Blood film & Reticulocyte count
- B12, Folate, Ferritin
- Liver function tests
- Thyroid function tests
- Coeliac screen
- Intrinsic factor and parietal cell antibodies
- ?Bone marrow – only if above normal





Vitamin B12

- Sources – liver meat fish and dairy products
- Daily intake 3-30 microgram
- Adult daily requirement 1-2 microgram
- Body stores 3-5 mg in the liver (2-4 yr supply)
- Important for pyrimidine synthesis in the production of DNA

Salwa Hindawi

Vitamin B12 absorption

- B12 attaches to intrinsic factor (IF) in the stomach
- IF – a glycoprotein secreted by the parietal cells
- B12/IF passes to the terminal ileum where absorption takes place

Causes of B12 deficiency

- Strict vegetarianism
- Malabsorption
  - Pernicious anaemia
  - Gastrectomy
  - Coeliac disease
  - Disease involving the terminal ileum Resection
    - Crohn’s disease

Pernicious anaemia

- Autoimmune disease
- Gastric atrophy
- Anti parietal antibodies 90%
- Anti intrinsic factor antibodies 70%
- Often associated with other autoimmune disorders

B12 deficiency – clinical features

- Related to anaemia
- Neurological
  - Peripheral neuropathy
  - Loss of vibration and position sense
  - Demyelination of the cord
  - Irreversible

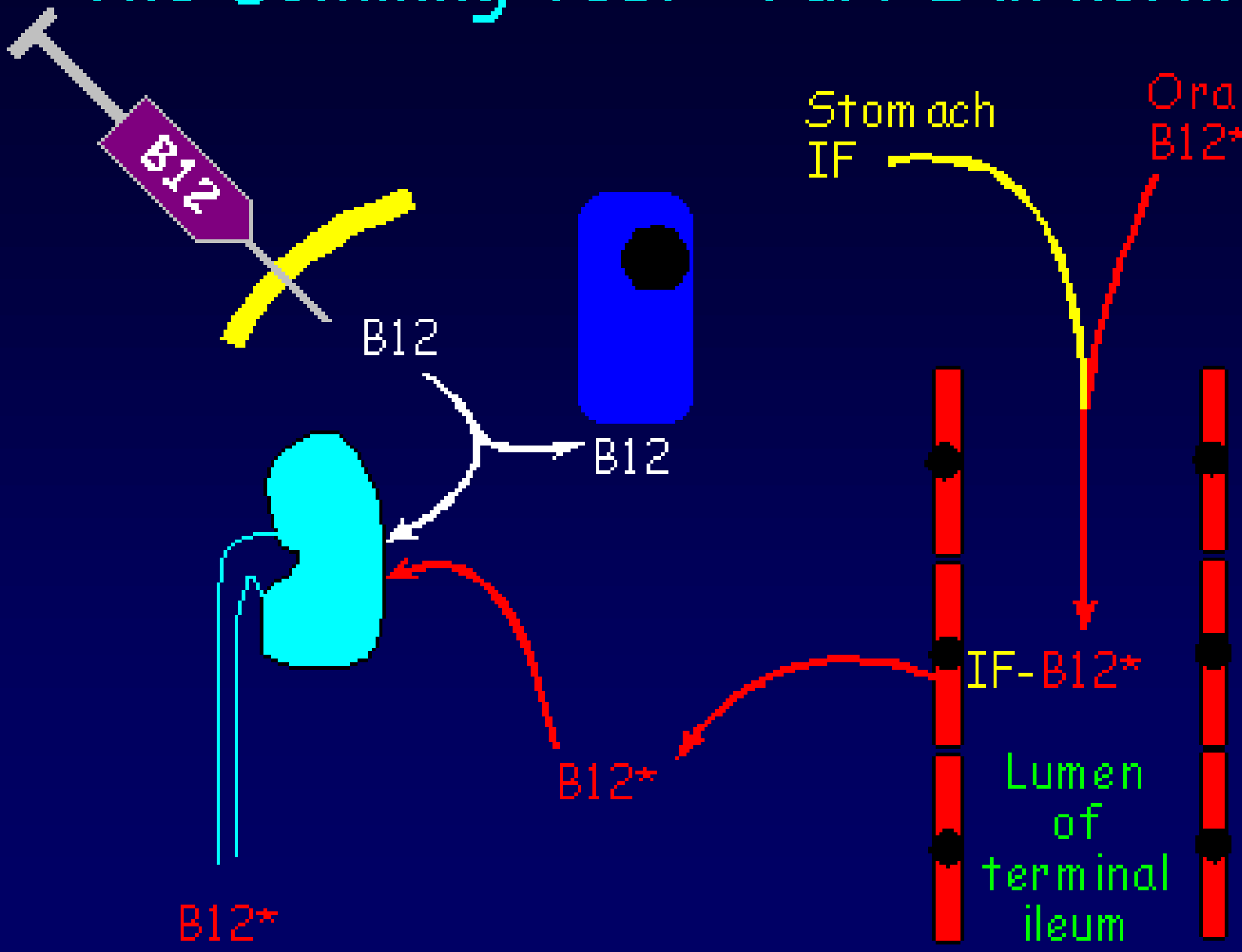
Salwa Hindawi

Pernicious Anaemia Diagnosis

- B12 levels
- IF/Parietal cell antibodies
- Bone marrow
- Schilling test
  - Saturate B12 stores IM
  - Give PO radiolabelled B12
  - Measure amount of radioactivity in urine
  - Give radiolabelled B12 + IF

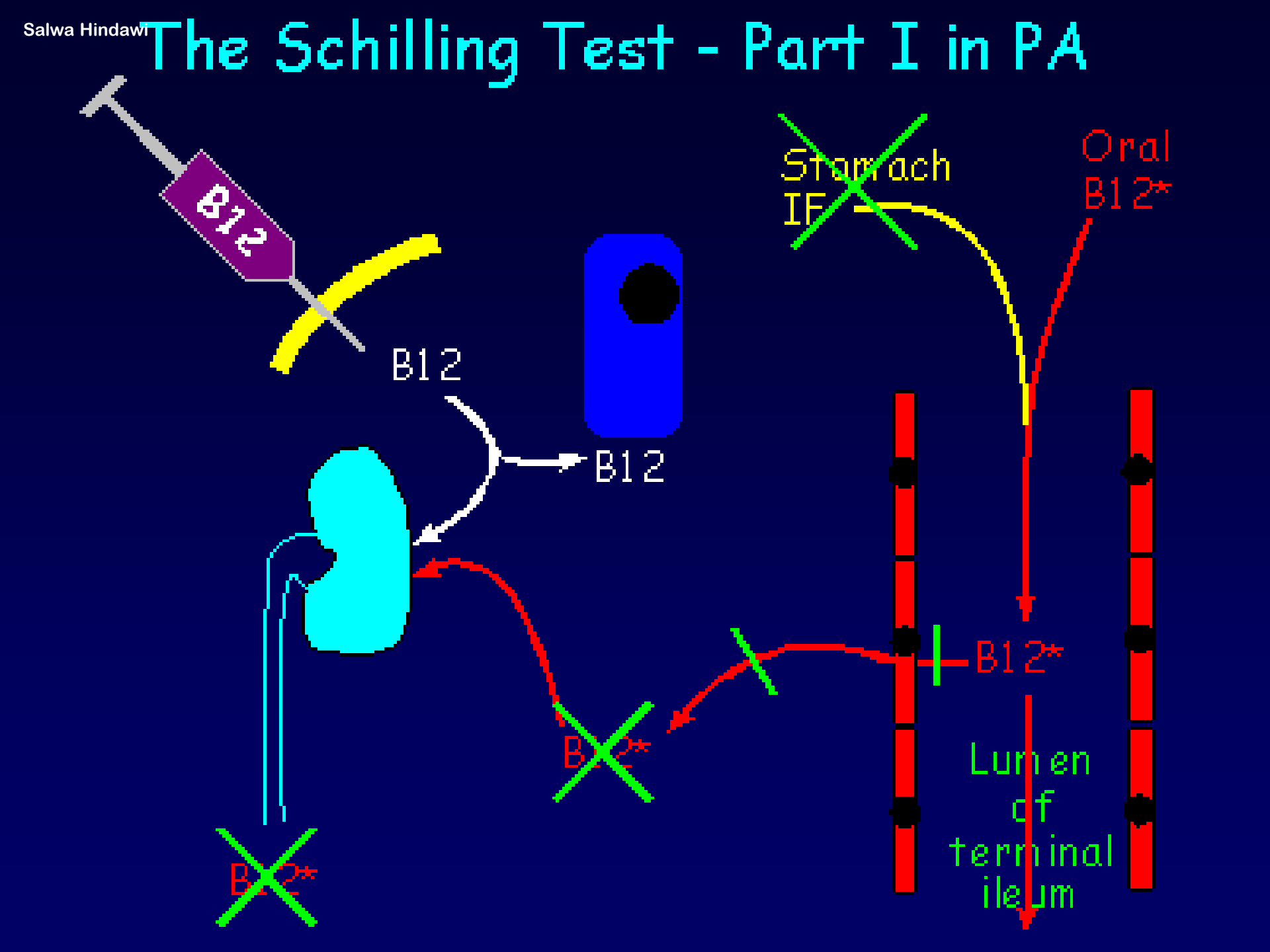
Salwa Hindawi

The Schilling Test - Part I in normal

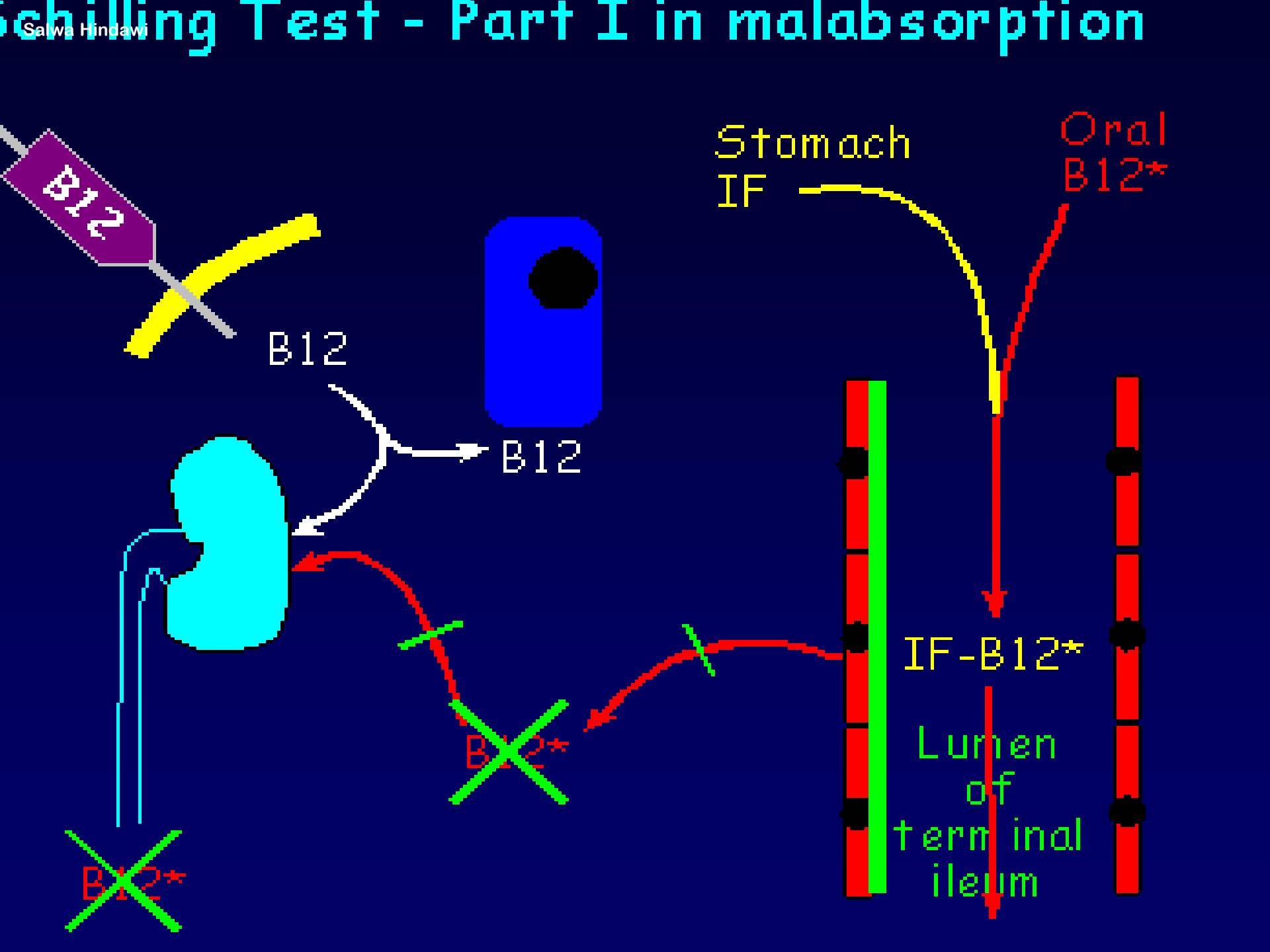


Salwa Hindawi

The Schilling Test - Part I in PA

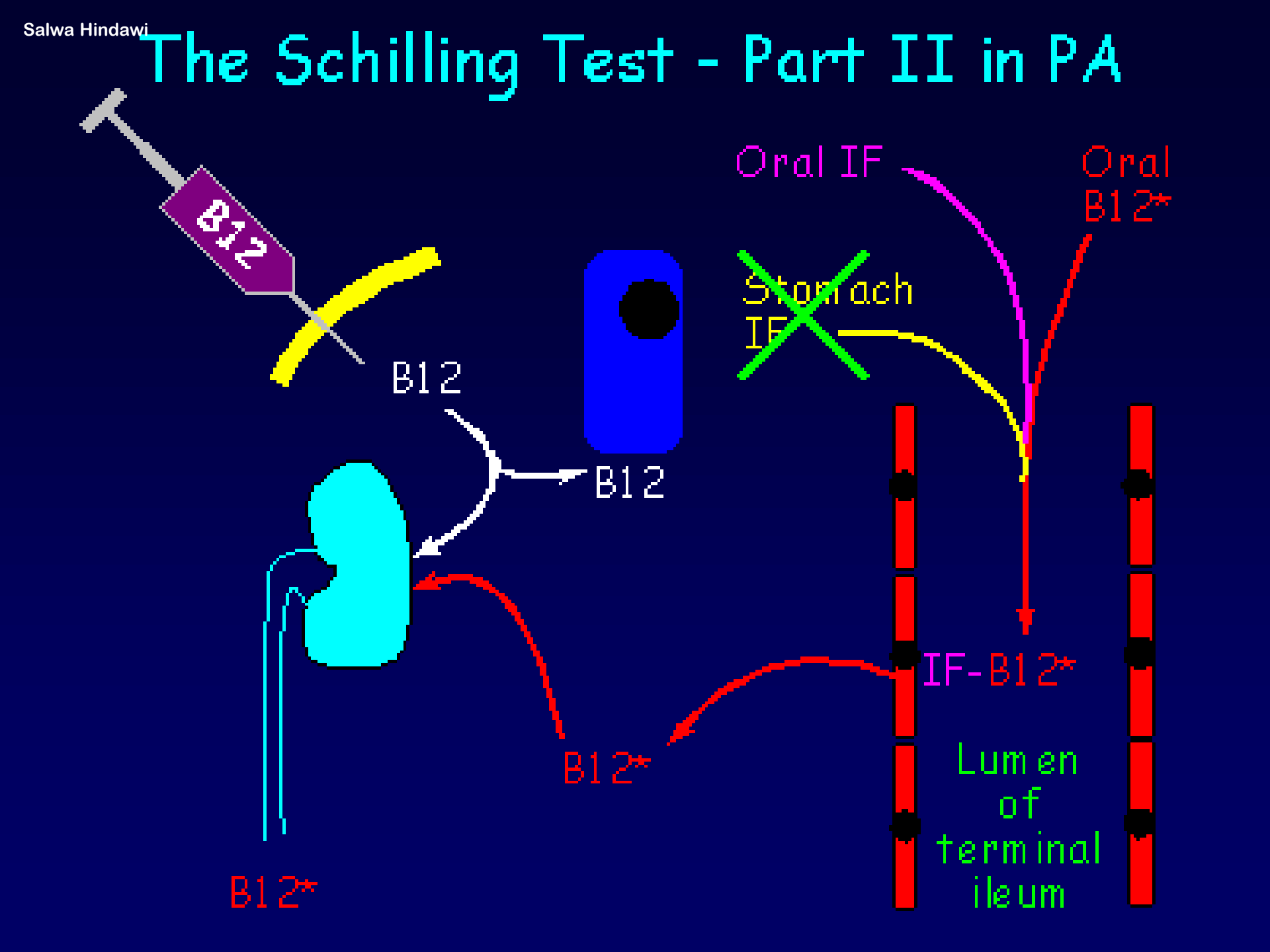


Schilling Test - Part I in malabsorption



Salwa Hindawi

The Schilling Test - Part II in PA



Folate

- Dietary sources- eggs, green vegetables, liver, nuts
- Absorbed in the jejumun
- Daily intake 600-700microgram
- Daily requirement 100 microgram
- Stored in the liver (4-6 months supply)
- Important in DNA synthesis

Causes of folate deficiency

- Dietary – infancy and old age
- Malabsorption – coeliac disease
- Increased utilisation – pregancy, lactation, haemolytic anaemia
- Antifolate drugs – methotrexate, anticonvulsants

Management

- Replace what's missing
  - Folic acid, Vitamin B_{12}
  - If severe and symptomatic blood transfusion
- Address underlying cause

Management

- Lifelong replacement with B12 usually required
- IM Hydroxocobalamin 1000 microgram every 3 months

Management of folate deficiency

- Treat underlying cause
- Correct folate levels : oral folic acid 5-15mg daily
- Prophylactic folate to at risk groups eg pregnancy, congenital haemolytic anaemias

Salwa Hindawi