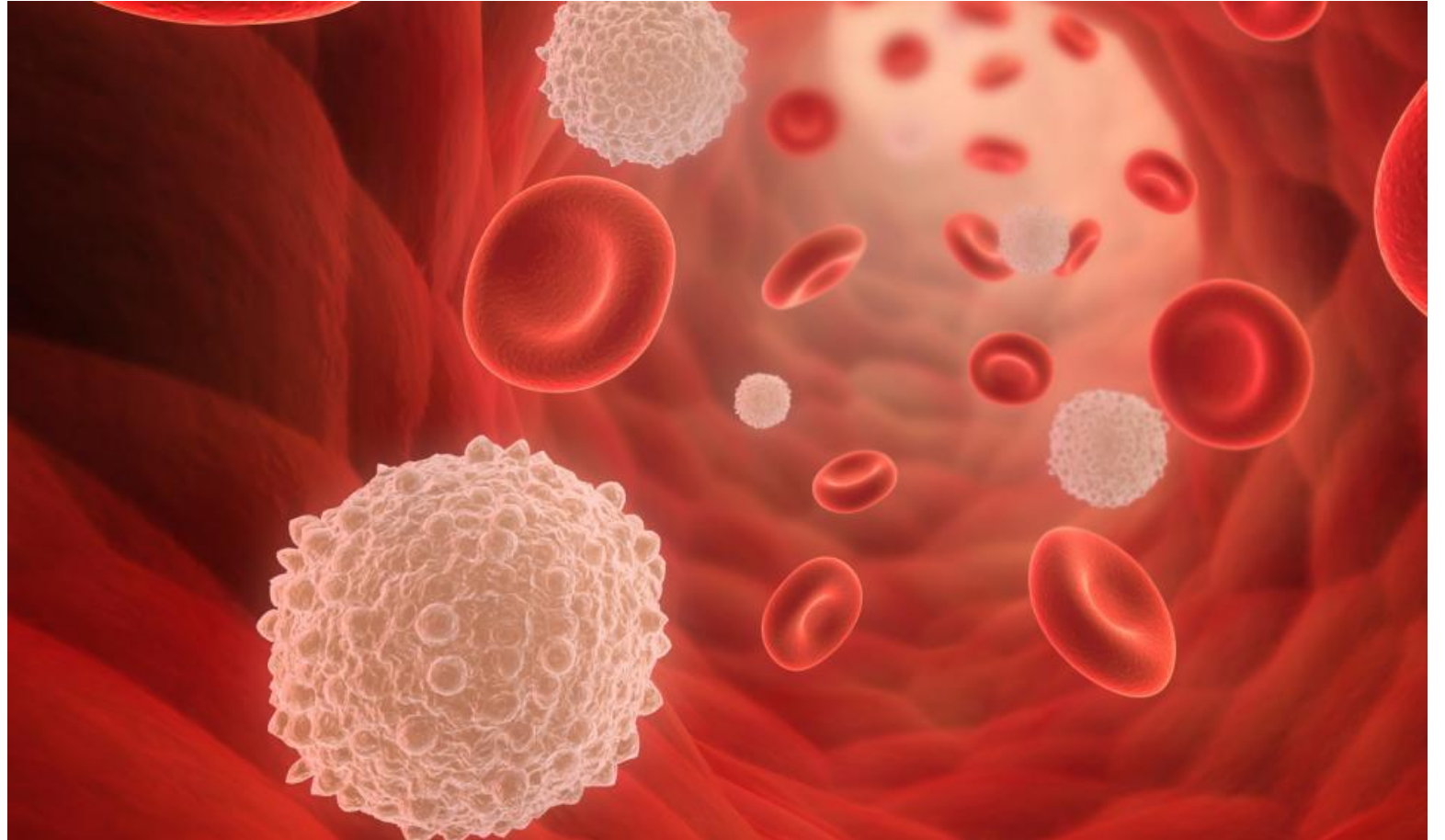


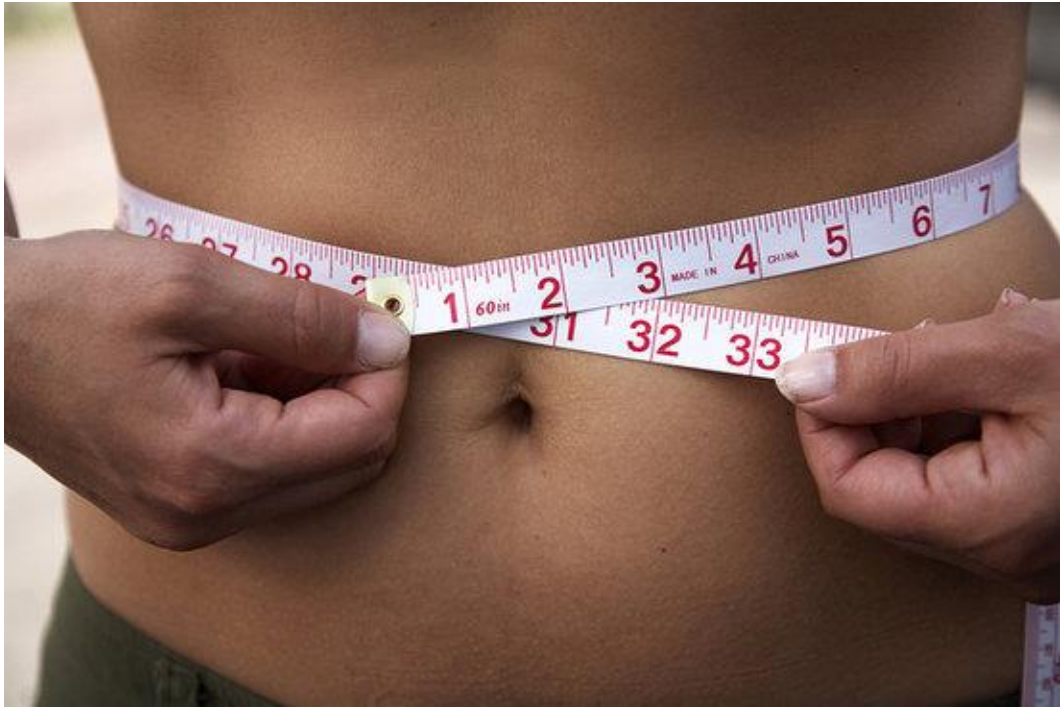
BIM –Batch 26

Lecture No : 03



- Normal erythropoiesis
- Definition of anaemia
- Classification of anaemia





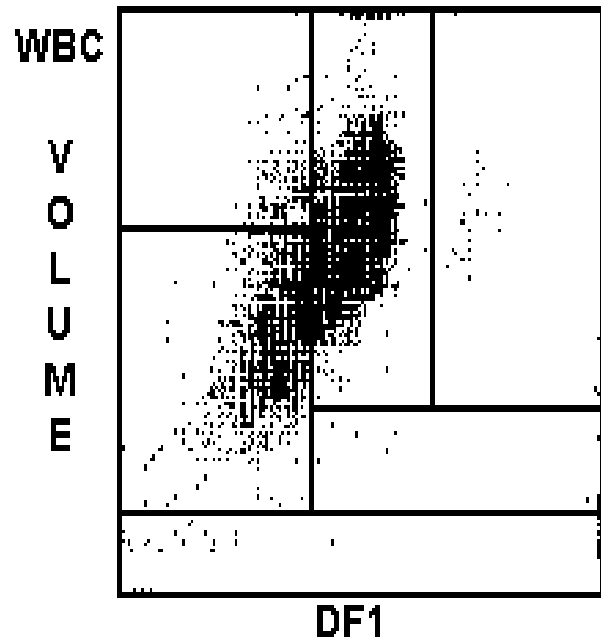
wiseGEEK

Macrocytic anaemia



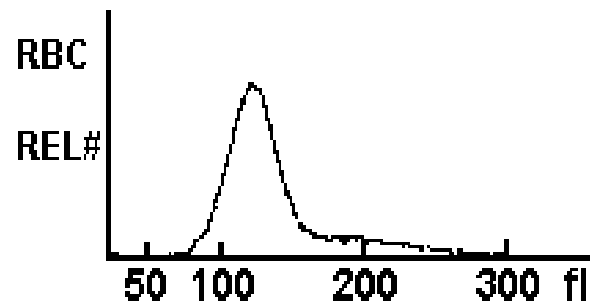
Dr Durga Moratuwagama

How do we know the RBC s are macrocytic?

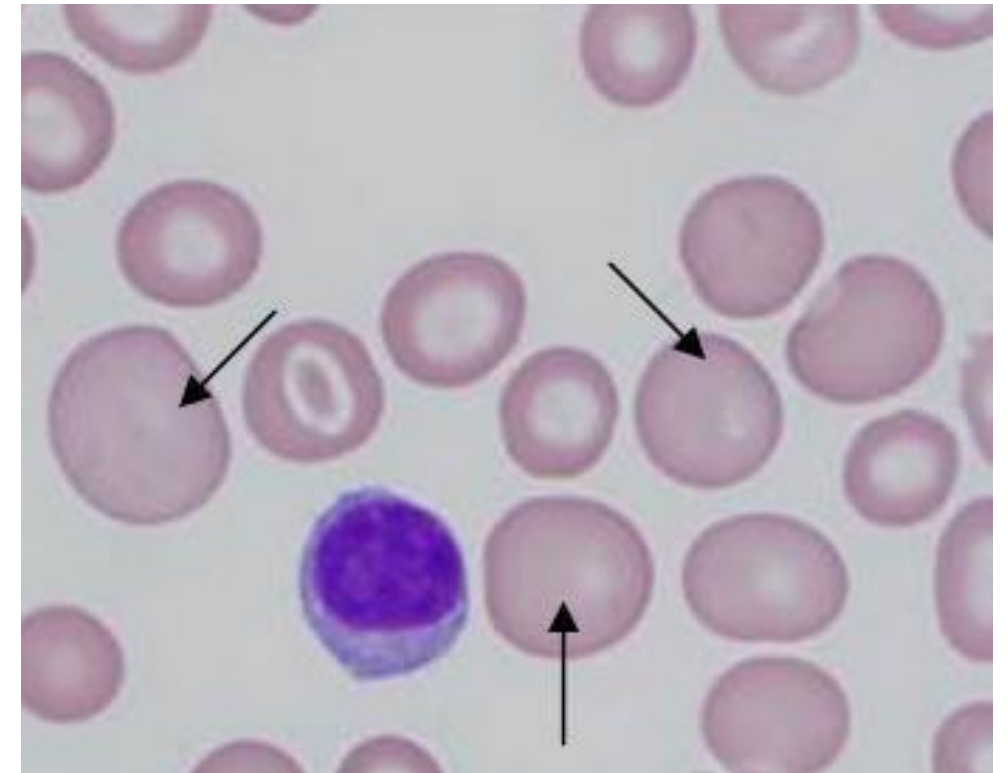


WBC	12.1	H		
	%		#	
NE	71.1	H	8.5	H
LY	15.9	L	1.9	
MO	3.3		0.5	
EO	0.5	L	0.1	
BA	8.7	H	1.1	H

RBC	2.69	L
HGB	10.6	L
HCT	31.6	L
MCV	117.6	H
MCH	39.6	H
MCHC	33.7	
RDW	14.1	



PLT	578	H
MPV	7.2	L



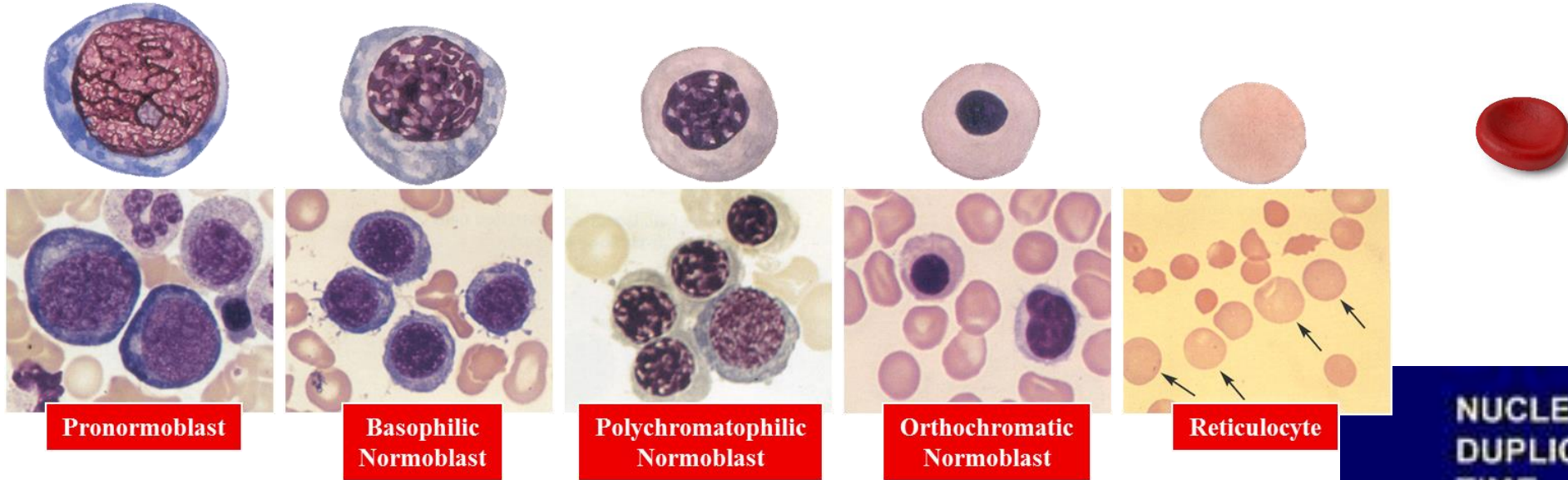
Macrocytosis-MCV>UN

- Spurious



- True
- Megaloblastic
- Non megaloblastic

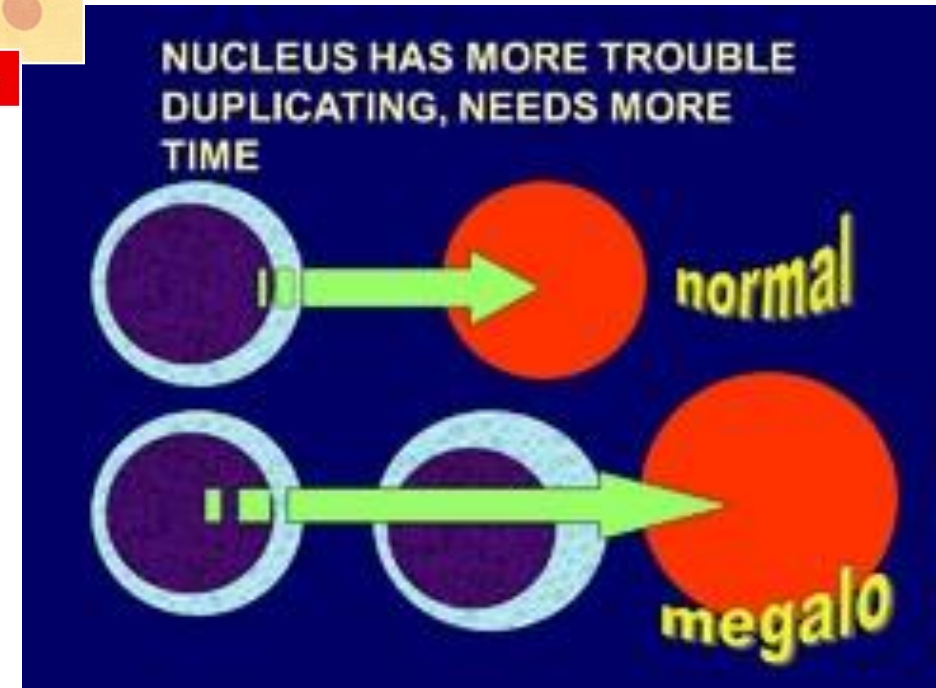
Megaloblastic anaemia



Abnormal DNA synthesis

Delayed nuclear development (larger cells)

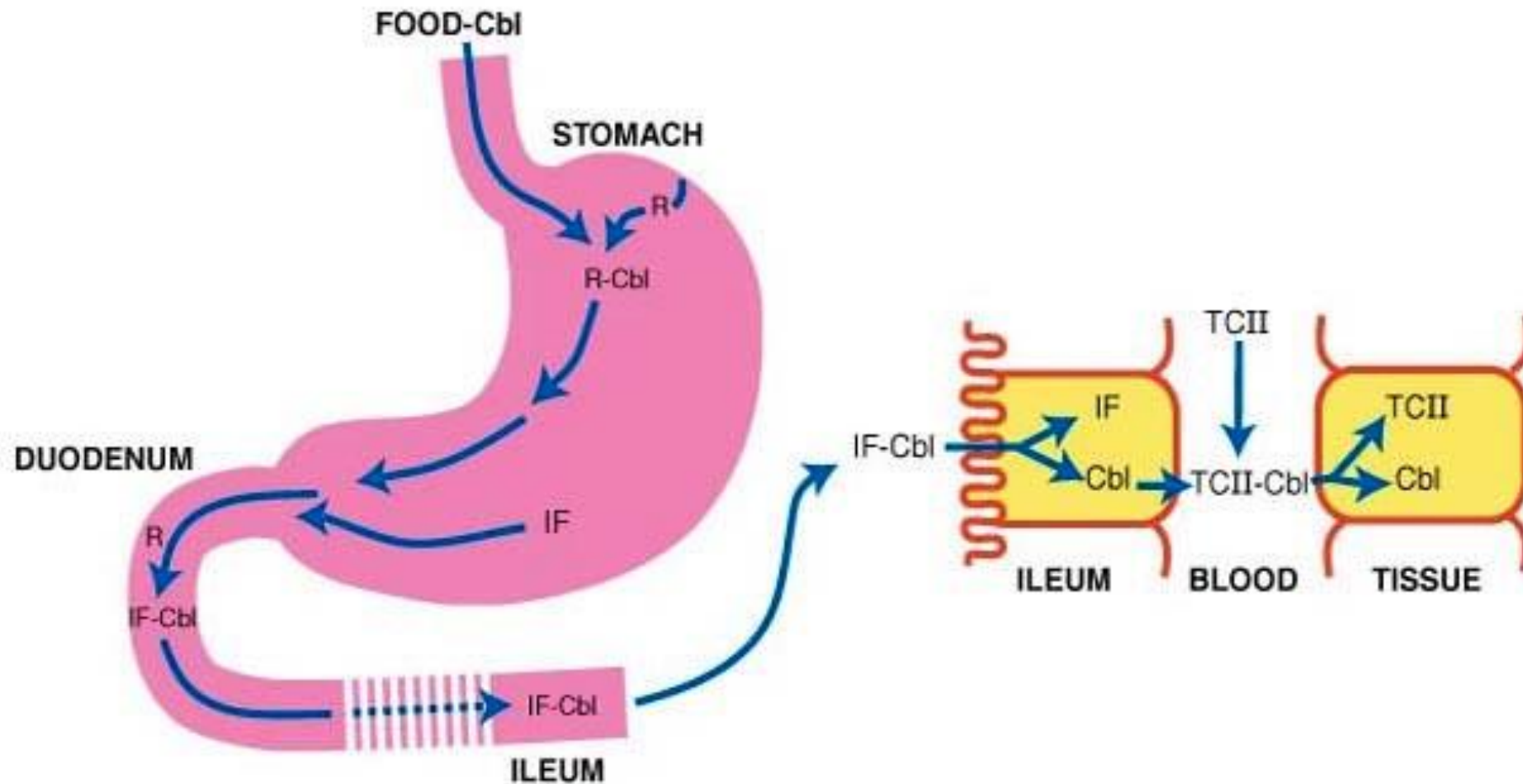
- 'Nuclear cytoplasmic asynchrony'
- usually due to vitamin B₁₂ or folate deficiencies



Vit B12 & folate

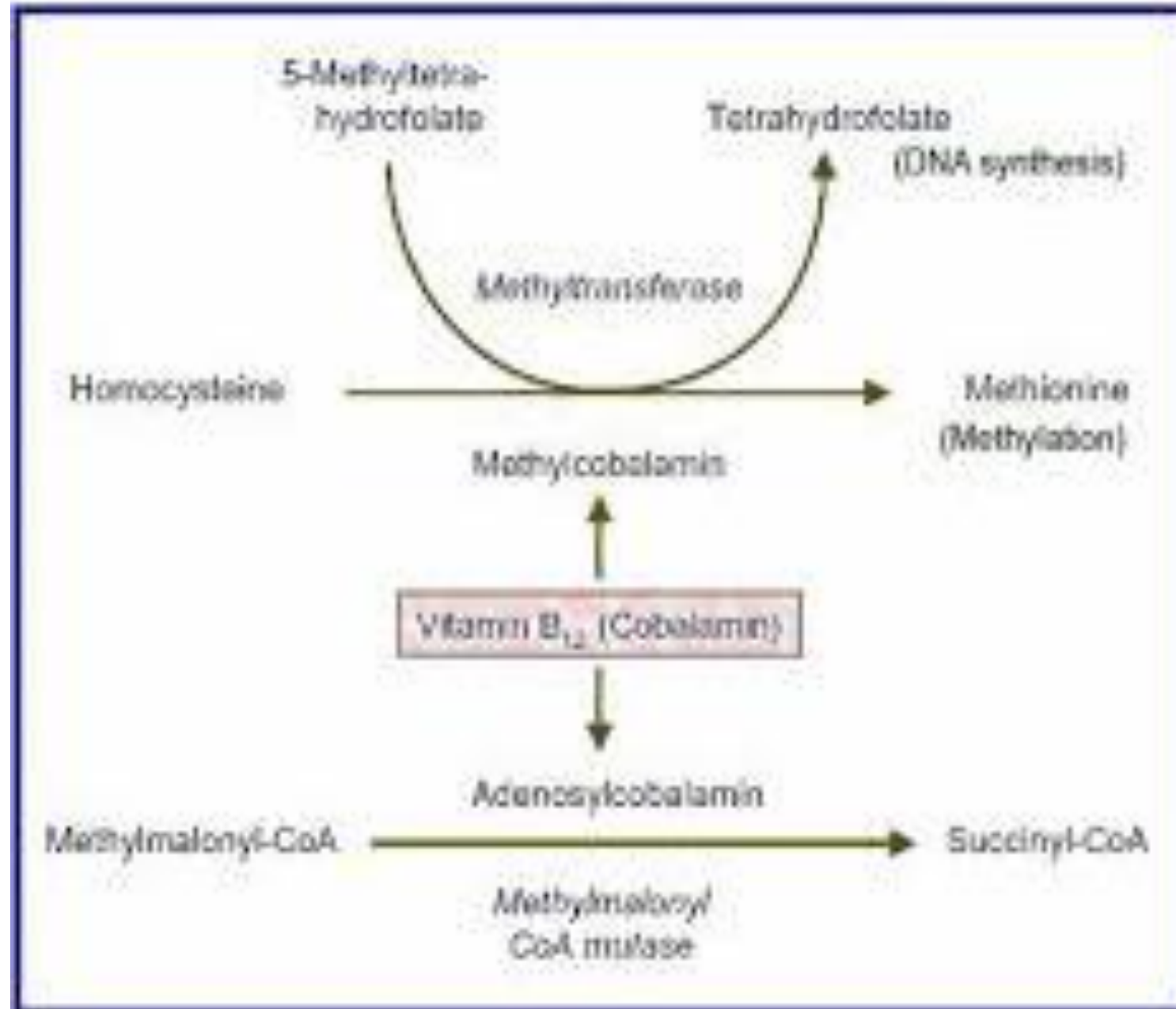
- Absorption
- Transport
- Biochemical function

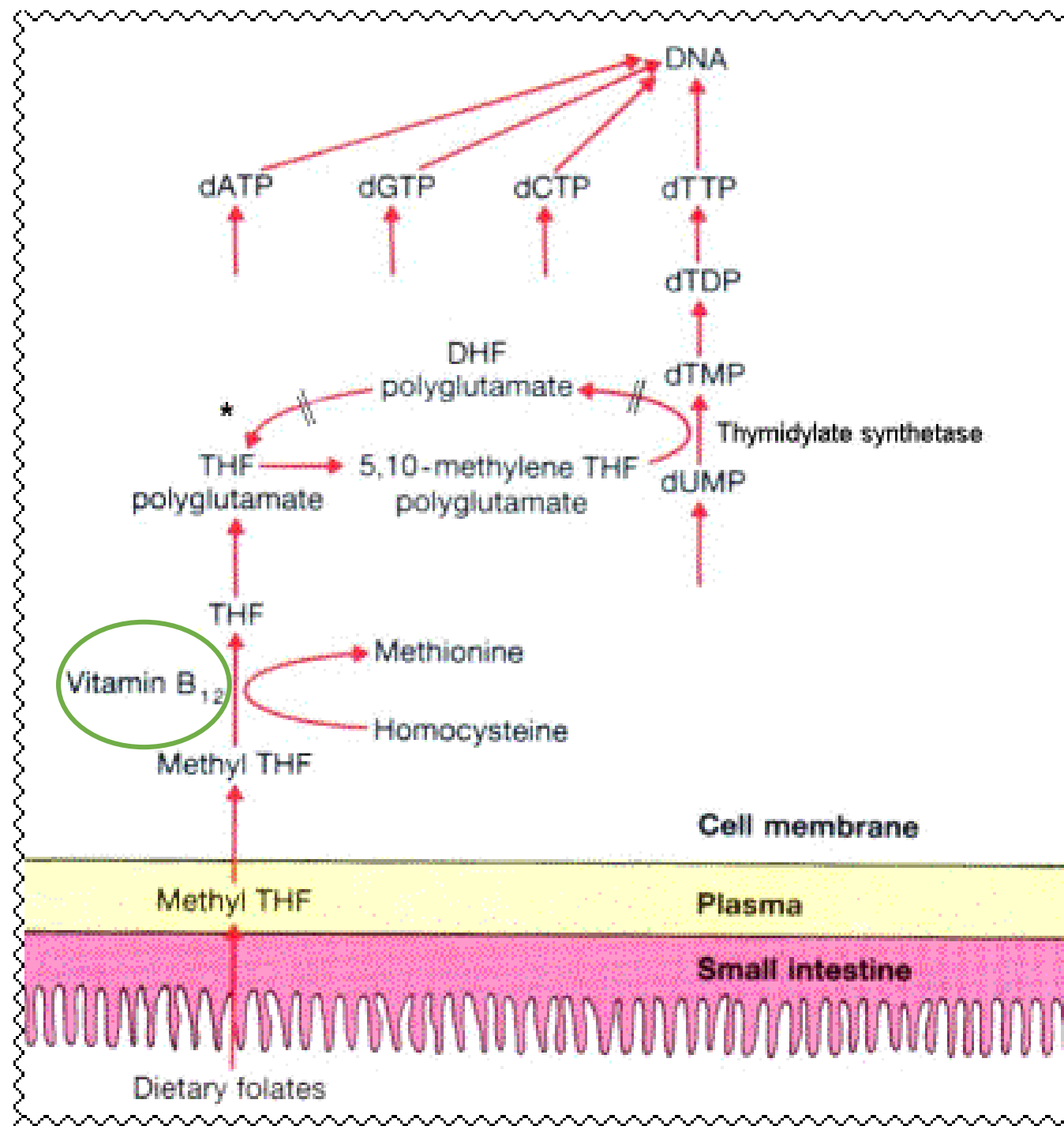
B12 absorption & transport



Biochemical function

- 2 Biochemical reactions





Vit B12 & folate deficiency

- Causes
- Clinical features
- Laboratory findings
- Treatment



Causes of B12 deficiency

- Inadequate intake-Vegetarian
- Decreased absorption

Gastric- PA, Gastrectomy, congenital IF def

Intestinal-intestinal stagnant loop xn

Chronic tropical sprue

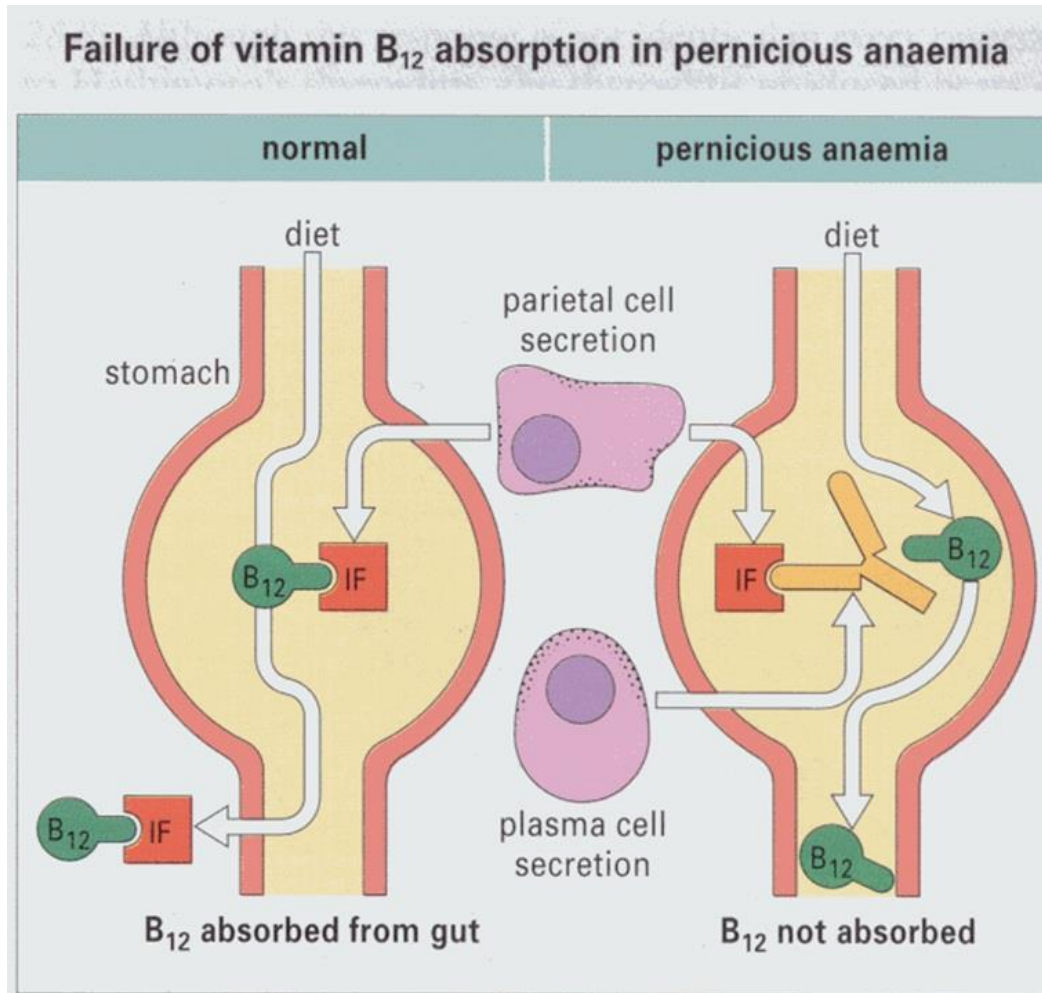
Illeal resection/Crohns disease

Fish tape worm

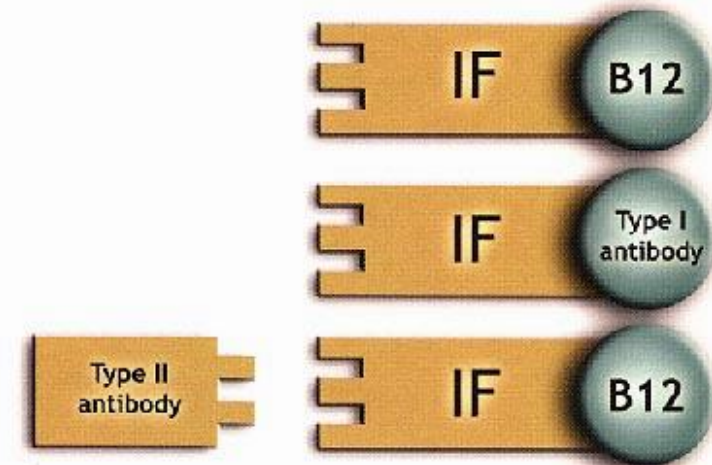


Body has stores adequate for 2 years.

Pernicious Anaemia



Antibodies
90%-parietal
cell ab
50%-IF ab-more
specific
Type1-
Type 11-

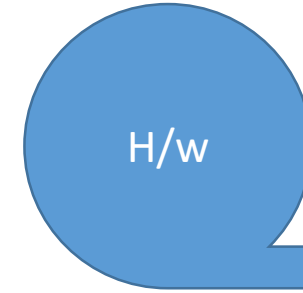


Pernicious Anaemia-Clinical Associations



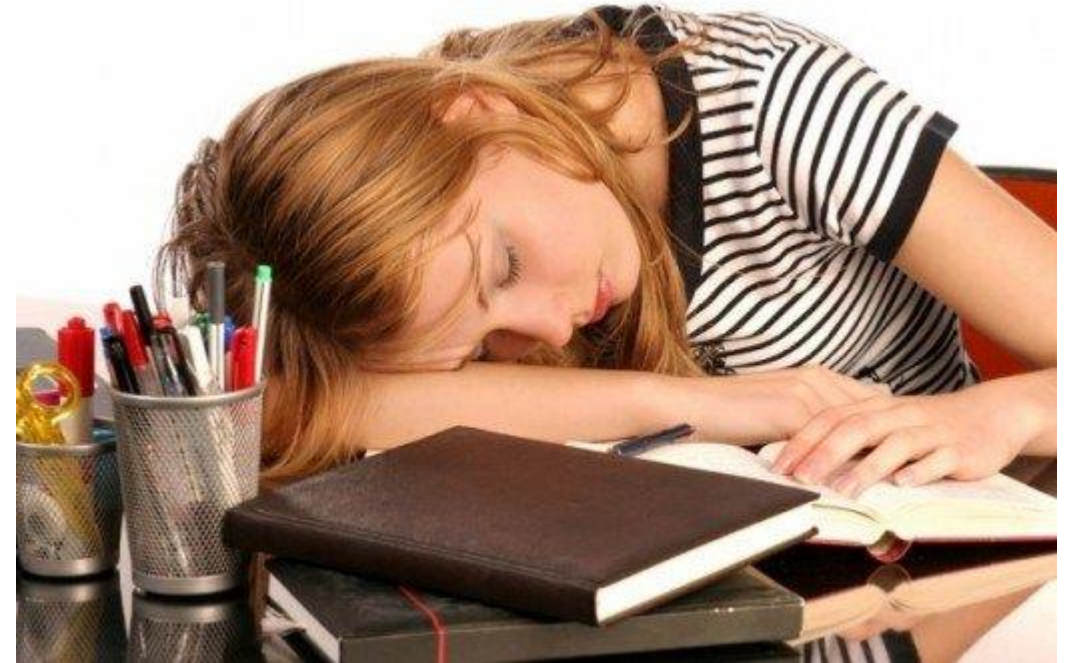
Folate deficiency causes

- Nutritional
- Malabsorption
- Excess utilization-physiological/pathological
- Excess urinary folate loss
- **Drugs**
- Mixed



Clinical features of megaloblastic anaemia

- Symptoms & signs of anaemia
- Mild jaundice
- Glossitis
- Angular stomatitis
- Purpura
- Pigmentation
- Neuropathy



Mild jaundice



Glossitis & Angular stomatitis

Angular stomatitis



Beefy red and painful



Pigmentation



Post treatment reversal of hyper pigmentation after 12 weeks of vitamin B12 supplementation

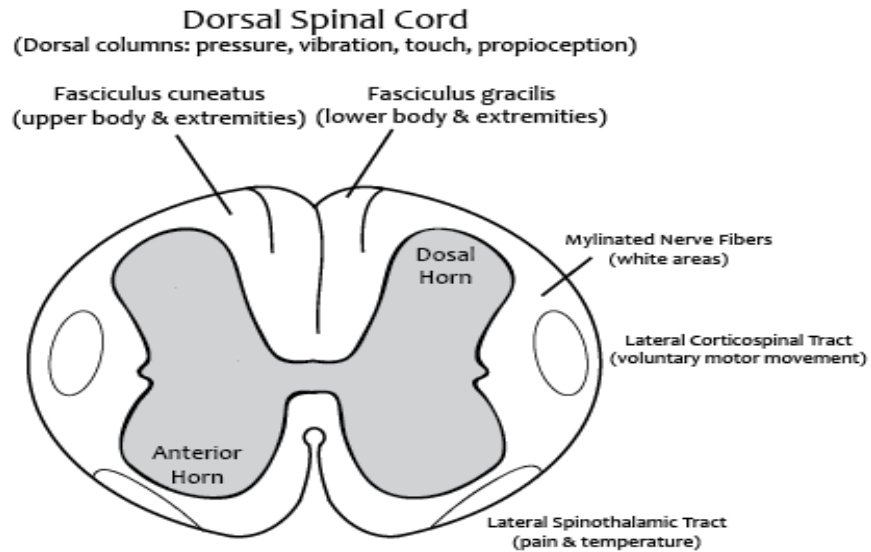
Purpura



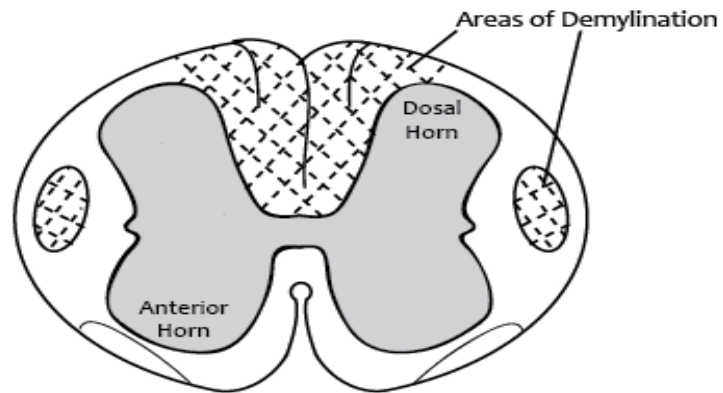
Vit B12 Neuropathy

- Peripheral sensory nerves
- Spinal cord
- Posterior column-diminished vibration and proprioception
- Lateral column-
- LL>UL rarely-Optic atrophy, psychiatric manifestations
- Increased S adenosyl homocysteine and reduced level of S adenosyl methionine → **defective myelination**

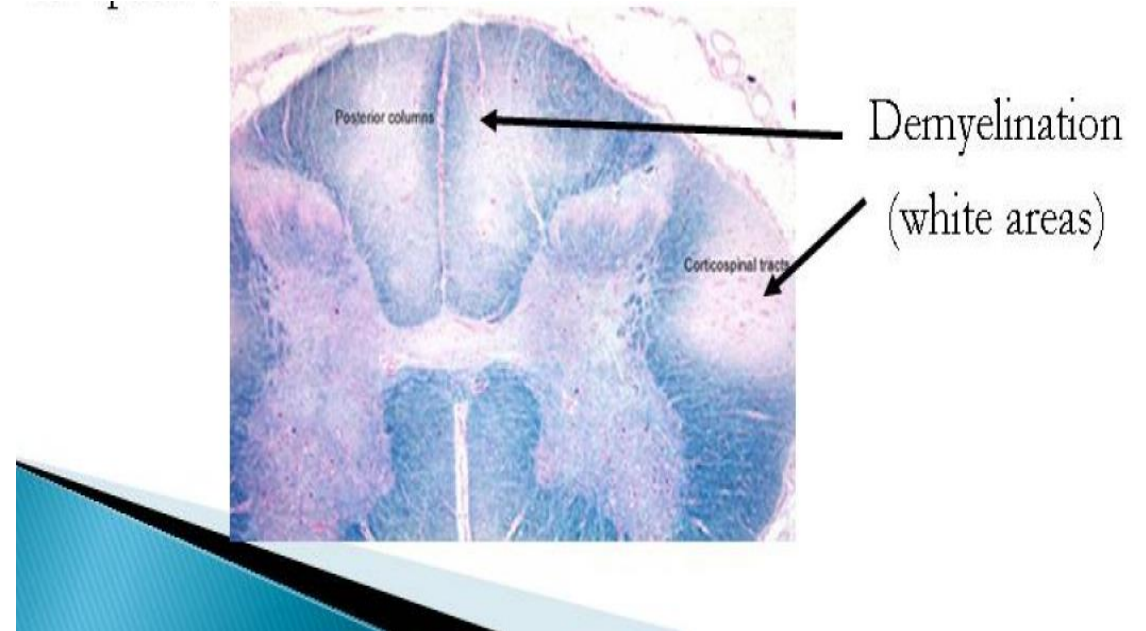
Neuropathy



Ventral Spinal Cord
Normal Spinal Cord with Adequate B12



Spinal Cord in B12 Deficiency



Neural tube defects



Other effects

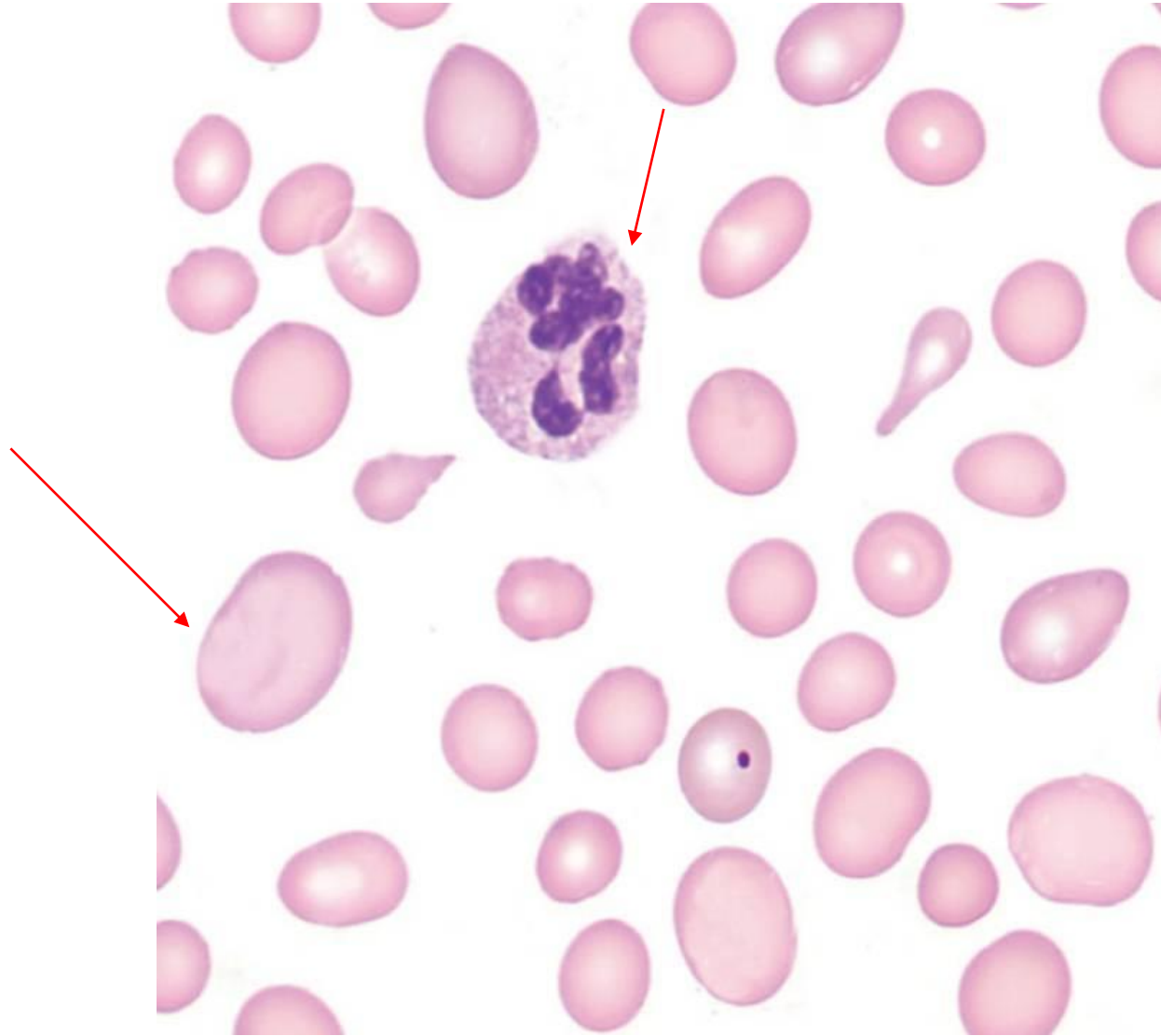


Laboratory findings

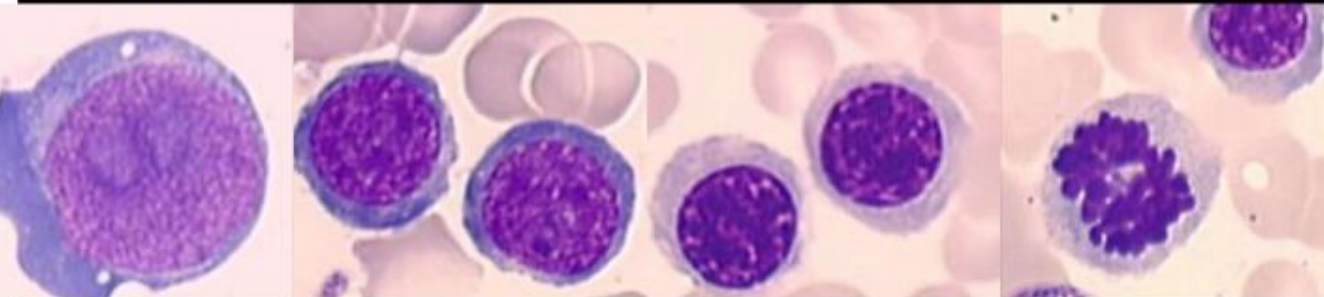
- FBC-Anaemia/Pancytopenia
- Blood picture-Oval macrocytes/HSN
- Retic count-Low
- Bone marrow biopsy-Megaloblasts/Giant MM
- Unconjugated bilirubin-high
- LDH-High
- Vitamin levels



Blood film



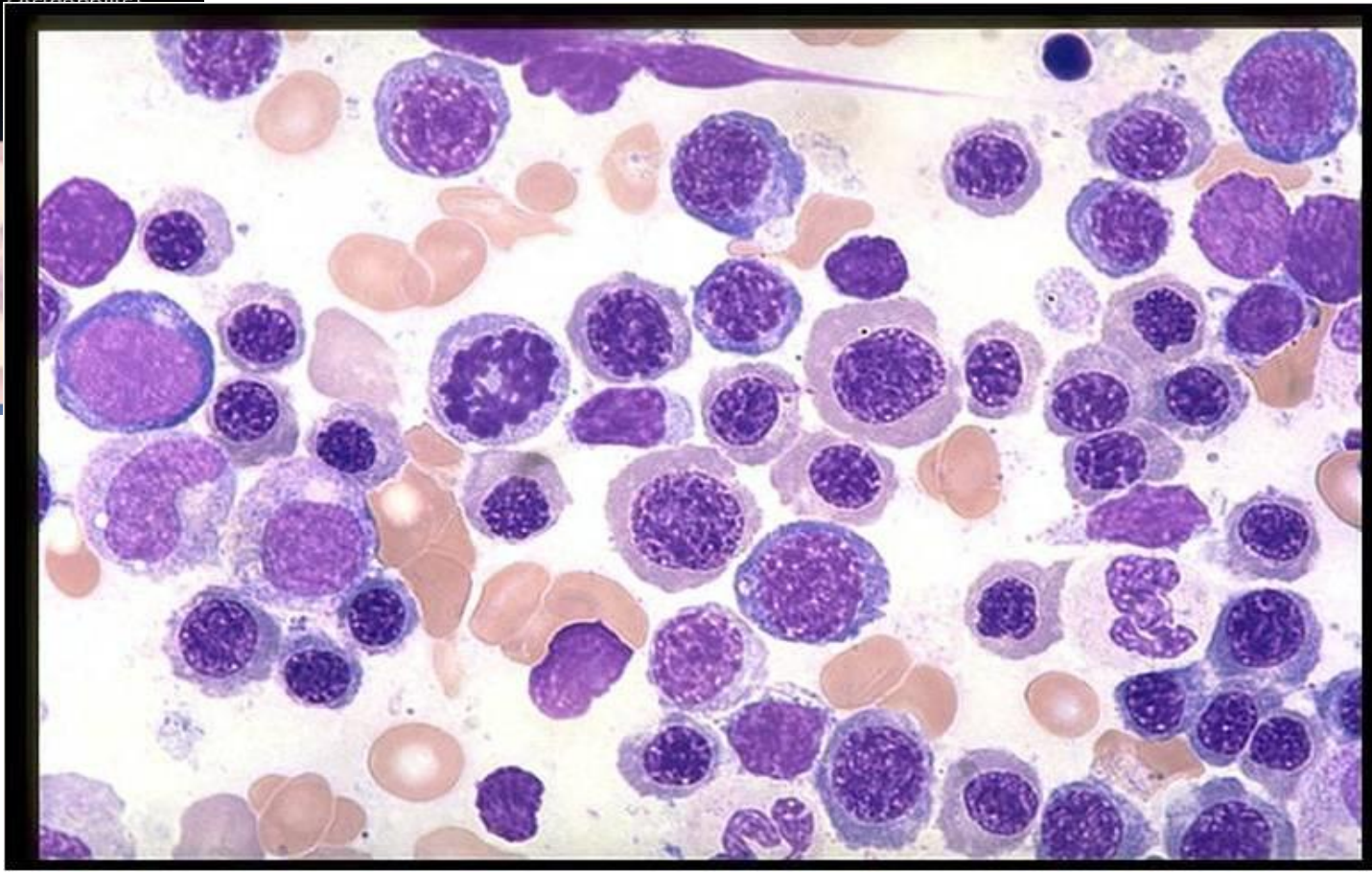
Proerythroblast or pronormoblast	Basophilic erythroblast or Early Normoblast	Polychromatophilic (or intermediate) Erythroblast or Normoblast	Dividing Polychromatophilic Erythroblast or Normoblast
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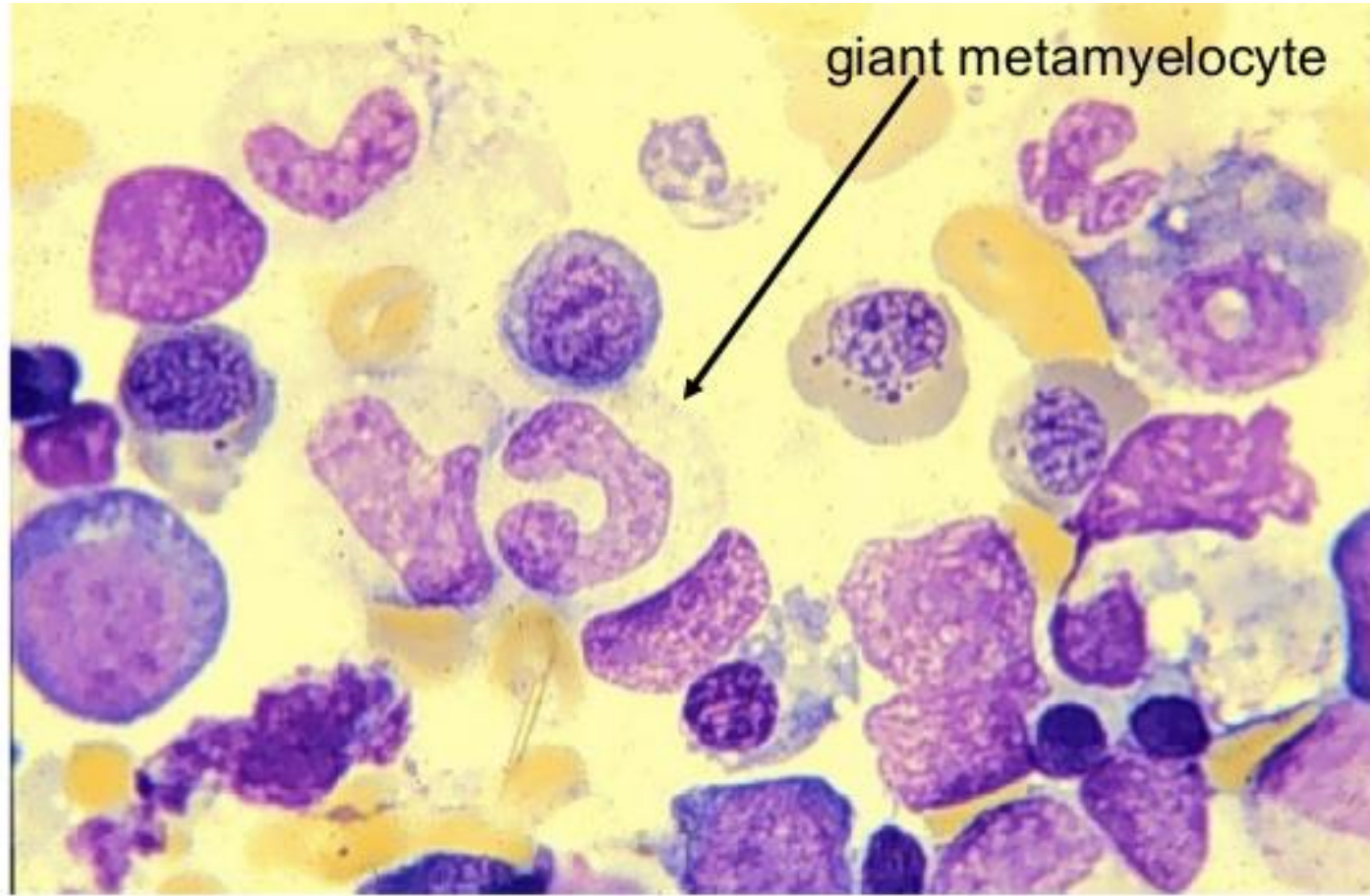


Reticulocyte (brilliant cresyl blue dye) ¹	Reticulocyte	Orthochromatic erythroblast Extruding Nucleus	Orthochromatic (Acidophile)
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Orthochromatic
(Acidophile)





Diagnosis of B12/Folate Deficiency

Test	Vit B12 deficiency	Folate deficiency
Serum B12	Low	Normal/Borderline
Serum Folate	Normal/Raised	Low
Red cell folate	Normal/Low	Low

Tests for cause of vitamin B12/Folate deficiency

B12 deficiency-History

- Absorption tests-not done now
- Serum gastrin
- IF/Parietal cell ab
- Endoscopy

Folate deficiency-History

- Tests for intestinal malabsorption
- Anti-transglutaminase and endomyseal ab
- Duodenal biopsy

Treatment

- Correct the underlying cause
- B12/folate administration
- **Folate should not be given alone** unless B12 deficiency has been excluded
- Observe for hypokalaemia –B12 therapy
- Observe for heart Failure-elderly having blood TX



- Hydroxocobalamin
- IM
- 1000 μ g EOD 6doses
- Maintenance 1000 μ g 3 monthly
- Prophylactic-gastrectomy, ileal resection

- Folic acid
- Oral
- 1mg/daily
- 4 m
- Maintenance-depends on underlying diseases
ex:chronic haemolytic anaemias
- Prophylaxis-Pregnancy/Prematurity



Response to treatment

- Feels better within 24-48h
- Marrow normomblastic in 48h
- Hb-2-3g/dl; 2weekly
- WBC/Platelet-Normal in 7-10d
- Giant MM-12d
- Peripheral neuropathy-Partial response
- Spinal cord damage-Irreversible



Macrocytosis

- Spurious
- True
 - Megaloblastic
 - **Non megaloblastic**

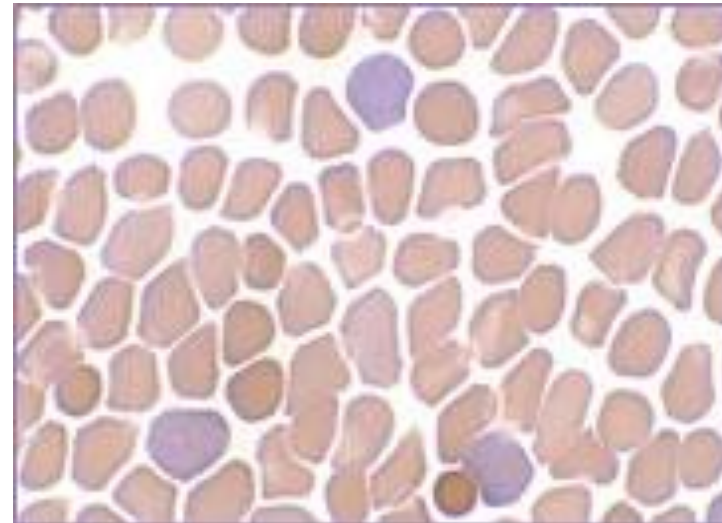
Non megaloblastic macrocytosis

Pathological

- Alcohol
- Liver disease
- Hypothyroidism
- MDS
- AA
- MM

Physiological

- Neonate
- Pregnancy
- D1 Neonatal blood film



Round macrocytes

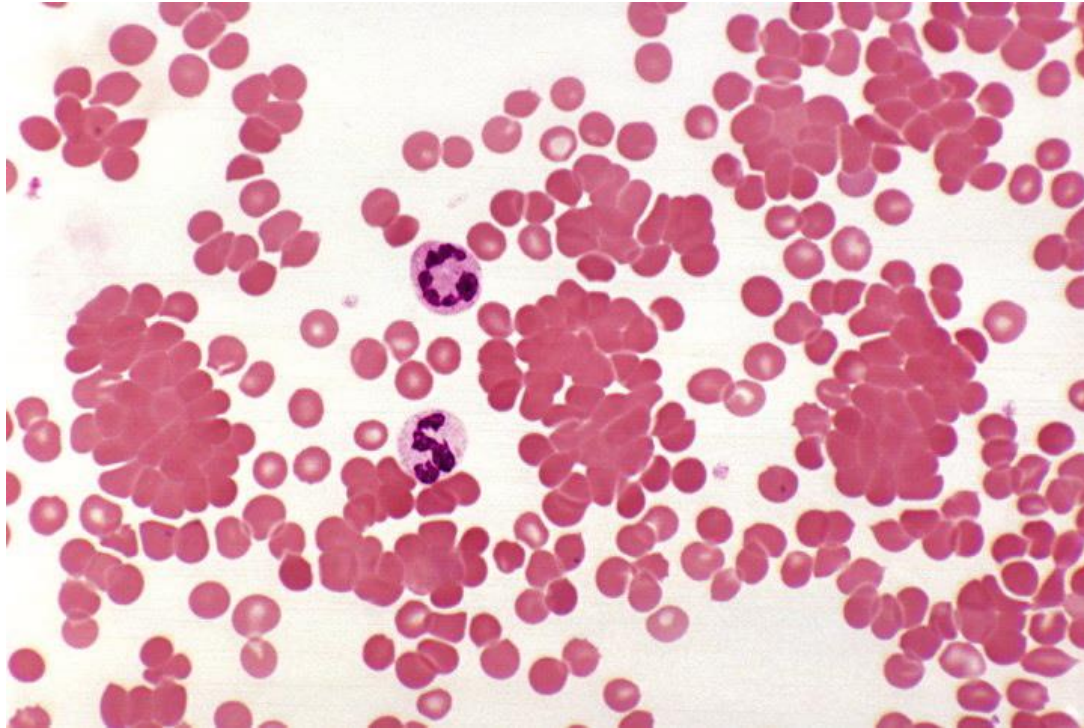


Macrocytosis

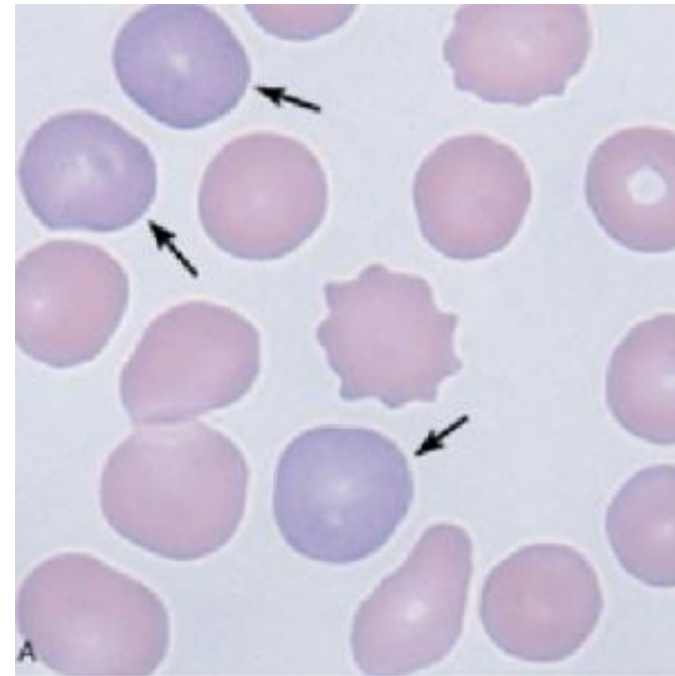
- **Spurious**
 - Reticulocytosis
 - Red cell agglutination
 - Rouleaux formation
- True
 - Megaloblastic
 - Non megaloblastic

Spurious macrocytosis

Red cell agglutination



Polychromatic cells



Macrocytic anaemia

- At the end of this lecture student should be able to:
- List the causes of macrocytosis
- Describe absorption, transport and biochemical function of Vit B12/Folate
- List the causes of B12/Folate deficiency
- Identify the clinical features of B12/Folate deficiency
- Describe the investigations and expected findings in B12/Folate deficiency
- Describe the principles of management



- 60 year old man presented with tiredness. His Hb is 9g/dl.MCV is 110fl.

What are the differential diagnosis

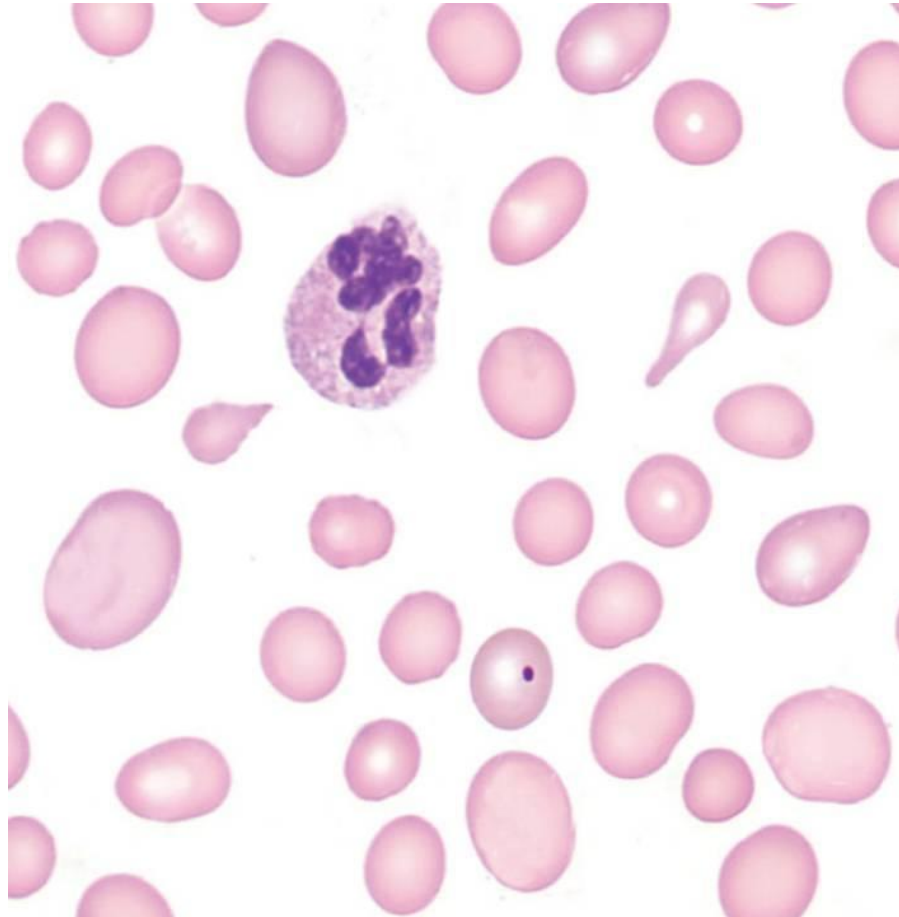
- B12/folate deficiency
- Liver disease
- Hypothyroidism
- Iron deficiency
- Anaemia of chronic disease.

- 60 year old man presented with tiredness. His Hb is 9g/dl. MCV is 110fl.WBC- 1.5×10^3 /L,Platelet-80,000/cumm

What are the differential diagnoses?

- B12/folate deficiency
- Liver disease
- Hypothyroidism
- Multiple myeloma
- Aplastic anaemia.

This is his blood picture.
What is the most likely diagnosis?



Thank you

