

جامعة الانبار

كلية : الصيدلة

قسم : فرع الادوية والسموم

اسم المادة باللغة العربية: فسلجة عملي

اسم المدة باللغة الإنكليزية: **physiology lab.**

المرحلة: الثانية

التدريسي: م.م. مروة شكيب ذنون

عنوان المحاضرة باللغة العربية: مؤشرات كريات الدم الحمراء

عنوان المحاضرة باللغة الإنكليزية: Erythrocyte Indices

محتوى المحاضرة Erythrocyte Indices

(MCV, MCH, MCHC)

Anemia

• Anemia (shortage of RBC Synthesis or excess loss) have different causes , site of insult and different BM response & morphological changes .

Anemia is a reduction in red blood cell measurements (Parameters)

- RBC count : part of CBC
- Hemoglobin : concentration in g/dL
- Hematocrit : volume % of red cells

Clinical features :

Asymptomatic.

- Weakness & Fatigue
- Dyspnoea : Shortness of breath
- Pallor Of skin
- Low blood pressure
- Rapid or irregular heartbeat
- Cold hands and feet
- Dizziness or Impaired cognition
- Reduced immunity -more prone to infections

RBC Synthesis, Maturation & Breakdown

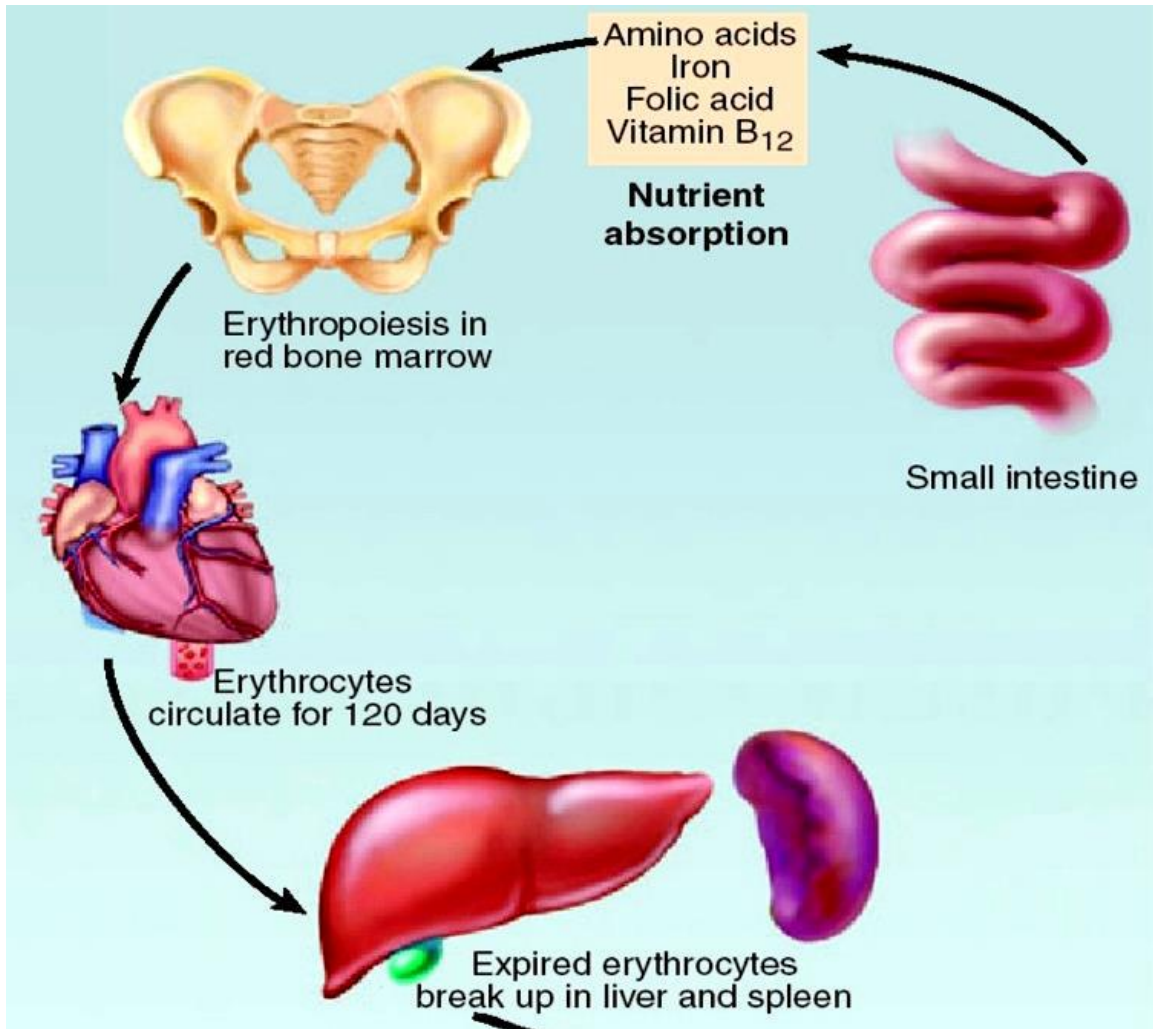
Bone marrow synthesis under renal stimulation-GIT assistance (Stomach & Small Intestine & Liver)-**spleen** ends this journey .

BM shows different level of RBC maturation form with different cell size & Hb amount .

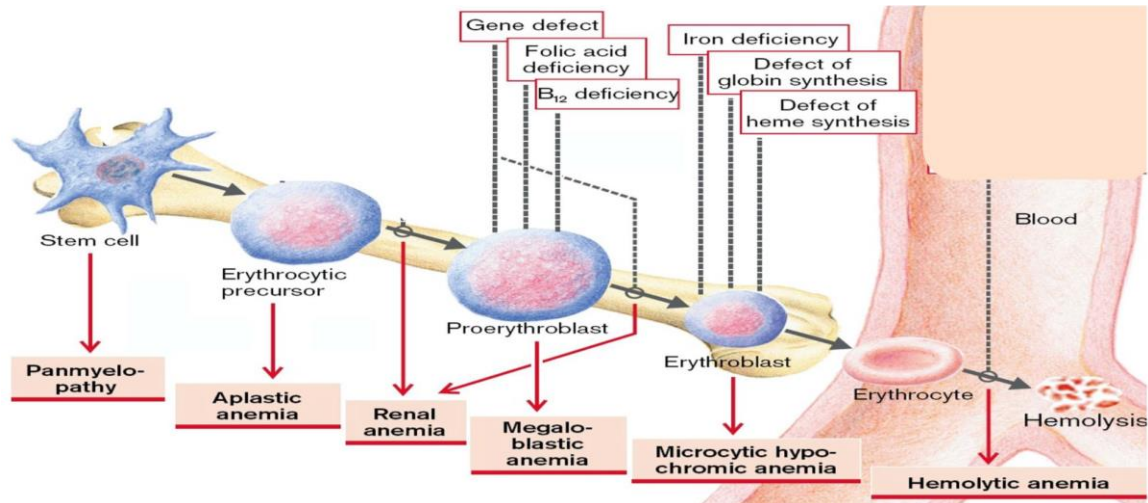
Genetic problem may affect Hb protein types , cell shape , cell volume.

RBC is highly affected by body emergencies like **blood and fluid losses** and **other organ hyper or hypofunctional state** that affect the **RBC maturation** speed, shapes and efficiency(**Thyroid , Liver and spleen**).

RBC Synthesis, Maturation & Breakdown



RBC Synthesis & maturation had many intervening Co-factors & Shows different shape & colour leads to different morphological changes.



RBC Morphological Changes in anemia ;

•1. Microcytic hypochromic

•2. Macrocytic hypochromic

•3. Normocytic normochromic

•This classification is more relevant clinically In anemiadiagnosis

•Determine the suggested site of insult in coordination with the history and physical finding and other adjuvant tests of other organs .

•This can be represented by Red Blood Cell Indices

Red Blood Cells Indices

□ Since RBC count, PCV and Hb amount will not show enough information of many types of anemia. amathematical correlation between themdeveloped to show;

□ MCV= RBC Volume (normal , micro or macro)

□ **MCH and MCHC = Hb content and concentration;**
(Hypochromic or normochromic)

□ **These parameters are Called (Red Blood Cells Indices)**

MCHC exceed the saturation limit of 36?

□ **The value of MCHC cannot exceed 36% because the Hb synthesizing and concentrating machinery does not have the capacity to saturate the cell beyond this limit.**

Other Laboratory and Clinical Tests
determining the cause of anemia

1. Haematological indices.

2. Colour Index (CI)

= Hb (% of normal) / RBCs count (% of normal) = 0.9-1.1.

3. Schilling test: to determine the causes B₁₂ deficiency:

4. Figlu test: for folic acid estimation;

Anemia Morphology Classification

1. Normocytic normochromic anaemias. normal MCV and normal MCHC

□ **Acute post-haemorrhagic anaemia, Haemolytic anaemias and Aplastic anaemias.**

2. Microcytic hypochromic anaemias. reduced MCV and reduced MCHC

□ **Iron deficiency anaemia, Chronic post-haemorrhagic anaemia and Thalassaemia.**

3. Macrocytic hypochromic anaemia. increased MCV and normal MCHC

□ **Megaloblastic anaemia (pernicious anaemia) due to deficiency of vitamin B₁₂ and Megaloblastic anaemia due to deficiency of folic acid.**

Which absolute corpuscular value is most useful?

MCHC is the most reliable and useful value for the following two reasons:-

- 1. It does not take RBC count into consideration for its calculation. MCH and MCV, on the other hand, both depend on the RBC count which has a high degree of error of ± 15 percent.**
- 2. MCHC tells us the actual Hb concentration in red cells only and not in whole blood**