

## ANEMIA

Def:- clinical conditions in which  $O_2$  carrying capacity of blood is reduced.

- RBC less than 4 million/ $\mu L$
- Hb less than 12 gm/dL
- PCV (packed cell volume) < 45%

Mild anemia = Hb (8-12)

Moderate = Hb (5-8)

Severe = Hb (<5 gm/dL)

\* Heart fails when Hb  $\rightarrow$  < 2 gm/dL

Classification:-

- Haemorrhagic  $\rightarrow$ 
  - Acute: (Sudden blood loss)
  - Chronic: (slow loss due to peptic ulcer, menstruation etc.)

• Dietary  $\rightarrow$  Due to Fe, vitamins and proteins deficiency.

• Dyshaemopoiesis  $\rightarrow$  results in Aplastic Anemia.

(Abnormal haemo-  
poiesis)

$\downarrow$   
All types of blood cells  $\downarrow$   $\rightarrow$  A rare condition in which the blood stops producing enough new blood cells. Aplastic anaemia develops as a result of bone marrow damage. The damage may be present at birth or occur after exposure to radiation, chemotherapy, some drugs or infection.

Diagnosis:- Bone marrow biopsy.

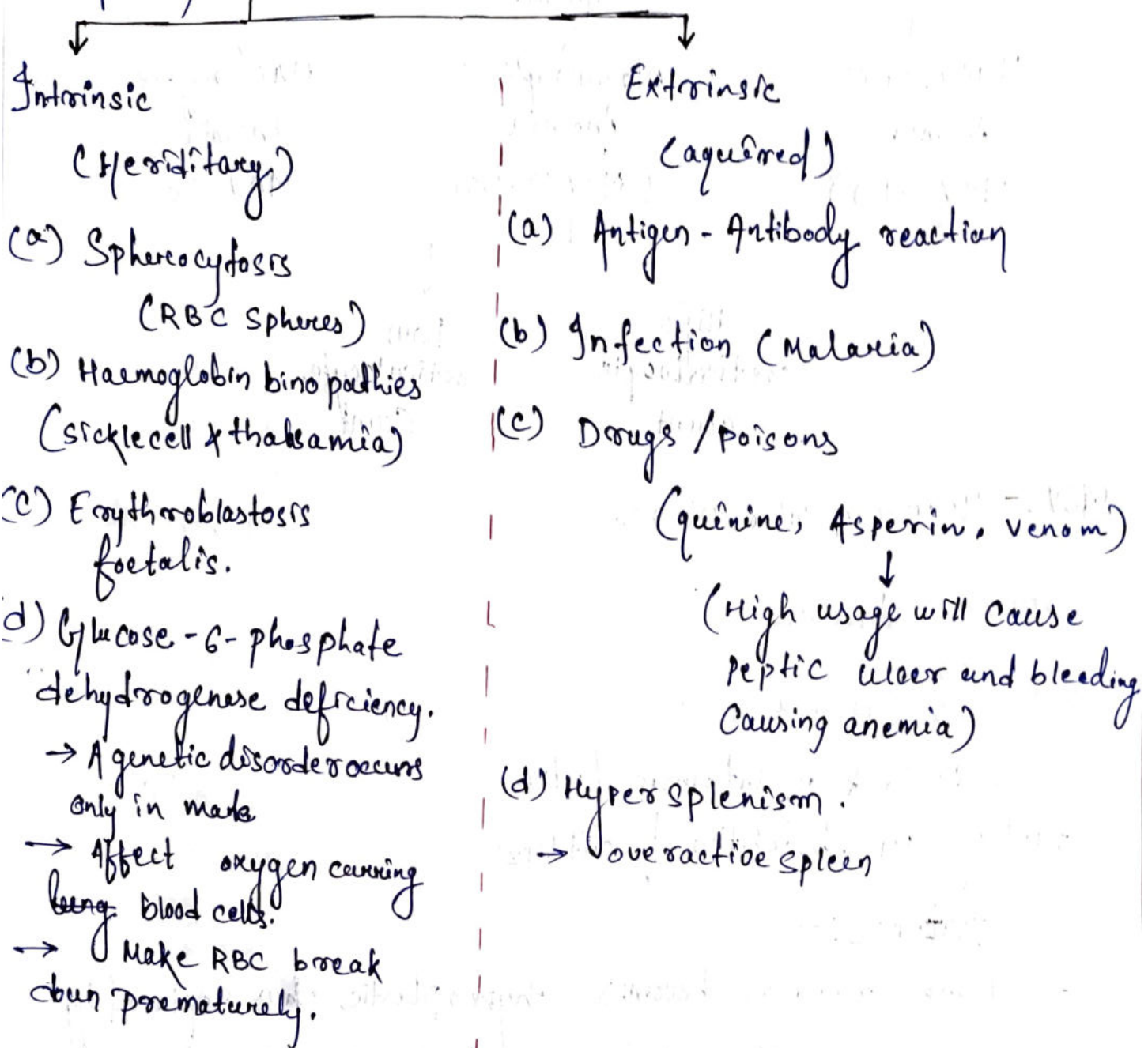
Normal:- 30-70% blood stem cells.

Aplastic Anemia:- gone and replaced by fat.

Treatments:- Immunosuppressive drug, chemotherapy, global haemopoietic stem cell transplantation

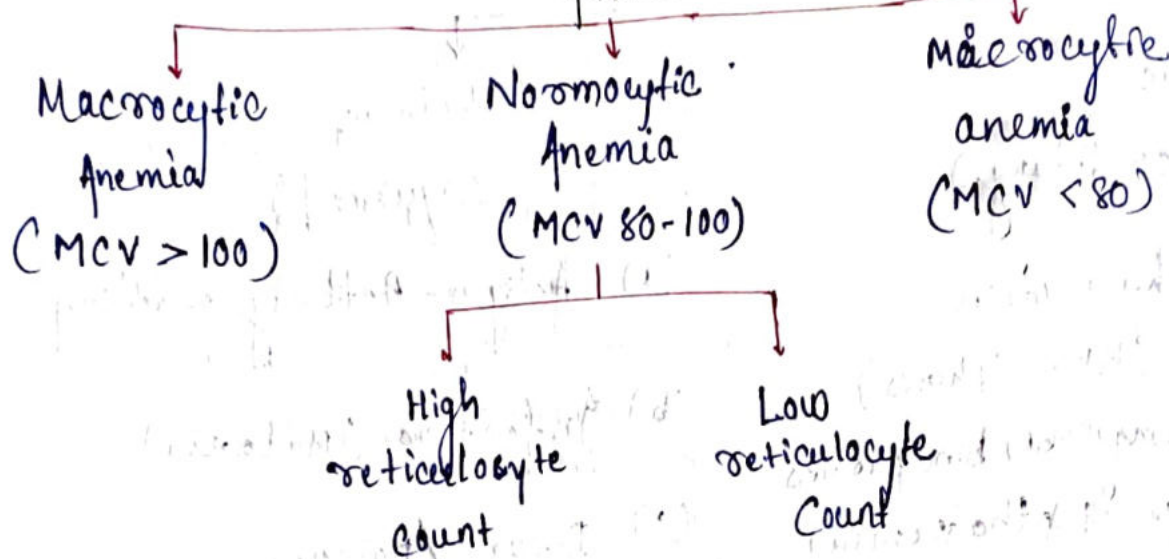


## Hemolytic anemia:- Excessive destruction of RBC



## Wintrobe's Classification of Anemia:-

|            | Normochromic<br>→ Hb                                                                                | Hypochromic                          |
|------------|-----------------------------------------------------------------------------------------------------|--------------------------------------|
| Normocytic | (i) After acute hemorrhage.<br>(ii) All hemolytic anemia, ex. Thalassemia.<br>(iii) Aplastic anemia | (i) After chronic hemorrhage.        |
| Macrocytic | All megaloblastic anemia due to def. of vit B <sub>12</sub> , folic acid or introinsic factor.      | (i) Secondary to liver disease.      |
| Microcytic | Chronic infections                                                                                  | (i) Iron def. Anemia<br>Thalassemia. |



**MCV :-** Mean Corpuscular volume.

**Pernicious Anaemia**

or  
**Addison's Anaemia :-**

- Due to lack of intrinsic factor.
- failure in absorption of vit B<sub>12</sub>.

**features :-**

→ Bone marrow becomes hyperplastic & replaced by

(1) 70% of proerythroblasts and early normoblasts.

(2) 30% intermediate & late normoblasts.

\* overactivity of bone marrow is megablastic hyperplasia.

**RBC → Macrocytic normochromic.**

(a) count : < 1 million/Hc

(b) Hb : < 12 gm/dL

(c) diameter : 8.2  $\mu$ m

(d) MCV : 95-16  $\mu$ L (Normal 78-99)

(mean capsular hb)

(f) MCHC  $\rightarrow$  Normal ( $35 \pm 3\%$ )

(g) RBC nucleated showing anisocytosis (RBC unequal size) and poikilocytosis (RBC - irregular, oval)

(h) Reticulocytes  $\rightarrow$   $\uparrow$  5% (1%) normal.

(i) Hemolytic jaundice

$\rightarrow$  WBC & platelets  $\downarrow$

$\rightarrow$  Demyelination of white fibres of spinal cord. Subacute combined degeneration of spinal cord. (Lichtheim's disease)

$\rightarrow$  Urinary excretion of Vit B<sub>12</sub> decreases because of poor absorption.

$\rightarrow$  Plasma Conct. of Vit B<sub>12</sub> dec. to  $\frac{1}{10}$  of normal (normal = 300-400 pg/mL)

$\rightarrow$  Vit B<sub>12</sub> excretion in faeces increases of 90%. (normal = 30-40%)

**Folic acid deficiency anemia:-**

$\rightarrow$  folic acid deficiency produces megaloblastic anemia

**Causes:-**

(1) Less dietary intake

(2) poor absorption

(3) Inc. demand (pregnancy)

(4) Anti foliate drugs (anti cancer drugs)

**Iron deficiency anemia:-**

Commonest in India.

**Causes:-**

(1)  $\downarrow$  intake - milk fed infants

(2) Inc. loss (haemorrhage)

(3)  $\uparrow$  demand (infancy, pregnancy, menstruation)

(4) Defective coination.

Features:-

(a) RBC- Microcytic hypochromic

(i) count ↓

(ii) MCV, MCH, MCHC ↓

(iii) life span normal

(iv) shows anisocytosis (RBC unequal size)

poikilocytosis (variation in cells shapes)

poikilocytes may oval, teardrop-shaped or irregular (contracted)

(b) Bone marrow → Normoblastic hyperplasia

(c) WBC & platelets → Normal count.