

ERYTHROPOIESIS

Outline :-

- ✓ SITE
- ✓ STAGES
- ✓ REGULATION

RBC ⇒

- * Shape → Circular, Biconcave, Non-nucleated
- * Diameter → $7.3 \mu\text{m}$ ($6.5 - 8.8 \mu\text{m}$)
- * Count → Birth = 6-7 million/ μL

Adult Male = 5-6 million/ μL

Adult Female = 4.5-5.5 million/ μL

- * Life span → 120 days
- * Site of destruction → Tissue macrophage system [aka RES]

* Source of energy → Glucose metabolism only. [uses cytoplasmic enzymes]

VARIATIONS ⇒

- 1) Anisocytosis :-
Variation in size of RBCs
- 2) Poikilocytosis :-
Variation in shape of RBCs
- 3) Spherocytosis :-
Spherical RBCs
- 4) Anemia :- \downarrow RBC / \downarrow Hemoglobin
(< 4 million per μL) ($< 12 \text{ gm/dl}$)
- 5) Polycythemia :- \uparrow RBC (> 6 million/ μL)

Haemopoiesis :- Development of Blood cells (RBC, WBC, platelets)



- Erythropoiesis :- Development of RBC
- Leucopoiesis :- Development of WBC
- Megakaryocytopoiesis :- Development of platelets

ERYTHROPOIESIS

SITE :-

* In Intrauterine life :-

- Yolk sac (upto 3 months of fetal life)
- Liver & Spleen (after 3 months of fetal life)
- Bone marrow (after 6 months of fetal life)

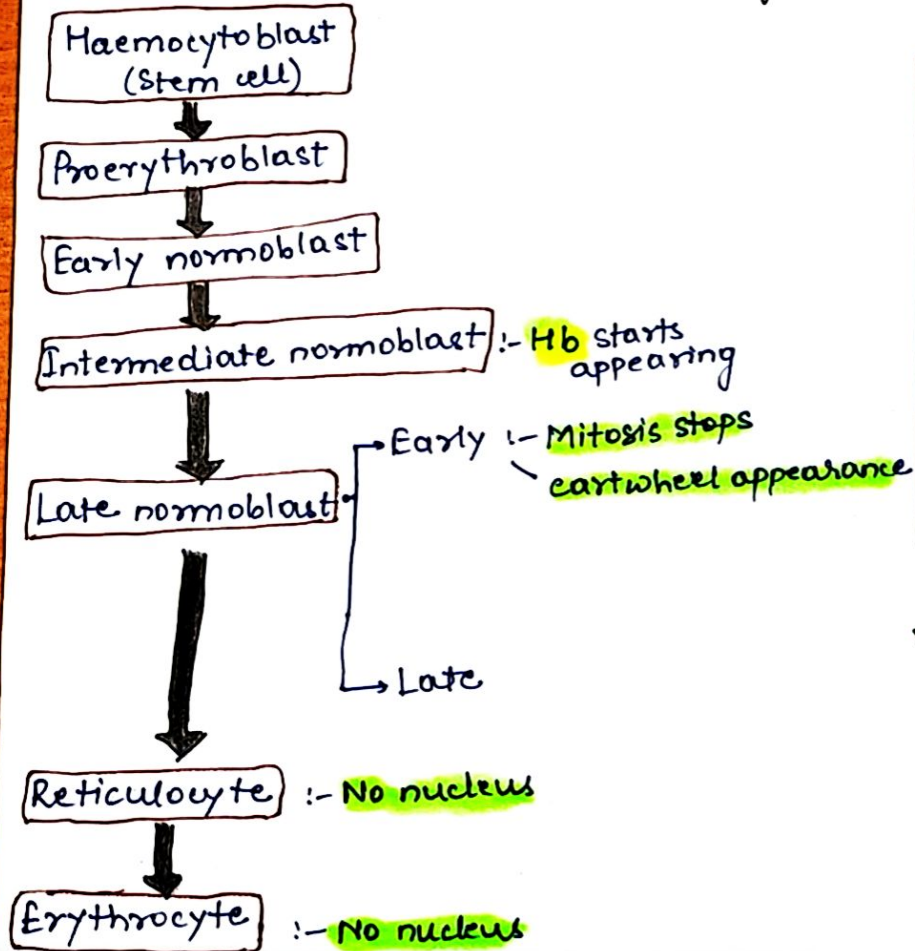
* In children :-

- All bones with red marrow (mainly)
- Liver & Spleen

* In adults

- Ends of long bones → Humerus, Femur
- Flat bones → Skull, Sternum, vertebrae, ribs, pelvis etc...

STAGES of Erythropoiesis [7-9 days]



- ① Cell size ↓
- ② Cytoplasm ↑
Nucleus ↓
- ③ Hemoglobin ↑
- ④ Mitosis ↓
- ⑤ Staining reaction of cytoplasm
{ Deep Basophilic
↓
Polychromatophilic
↓
Acidophilic }
(d/t ↓ RNA)

REGULATION of Erythropoiesis

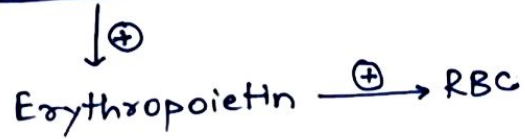
General factors

- Hypoxia
- Hormones

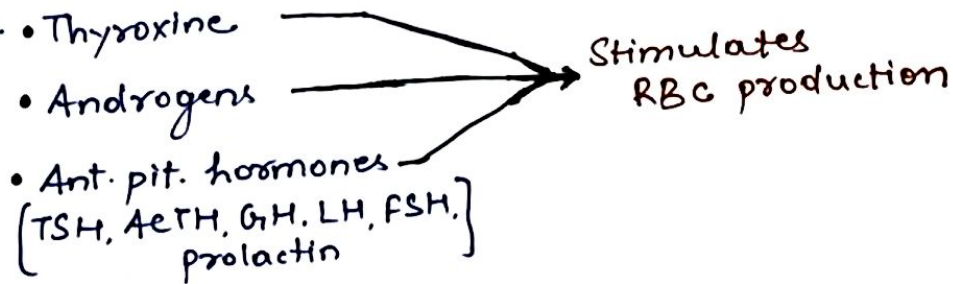
Special Maturation factors

- Dietary factors
- Castle's Intrinsic factor
- Extrinsic factor

* Hypoxia :- Lack of O_2 at tissue level



* Hormones :-



• Estrogen \rightarrow ↓ RBC production

REGULATION of Erythropoiesis

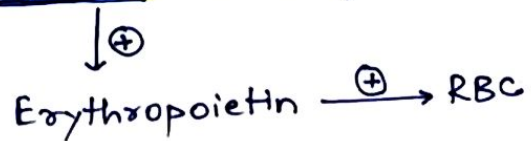
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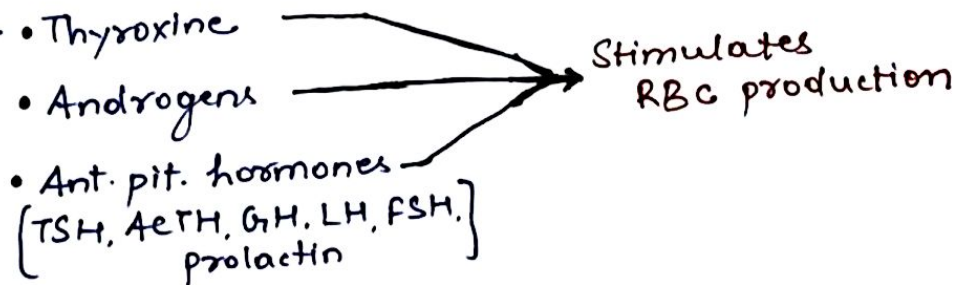
Special Maturation factors

- Dietary factors
- Castle's intrinsic factor
- Extrinsic factor

* Hypoxia :- Lack of O_2 at tissue level



* Hormones :-



• Estrogen \rightarrow ↓ RBC production

* Dietary factors :-

- Iron & Folic acid
- Mn, Cu, Co, Ni
- Calcium
- Vit C, Vit B₁₂
- Proteins

} → For maturation of RBC

* Castles intrinsic factor :-

- produced by parietal (oxyntic) cells
- Helps in Vit. B₁₂ absorption

} → For maturation of RBC

* Extrinsic factor :- Vit. B₁₂, folic acid } → For maturation of RBC