Factors affecting Erythropoiesis and Hb synthesis

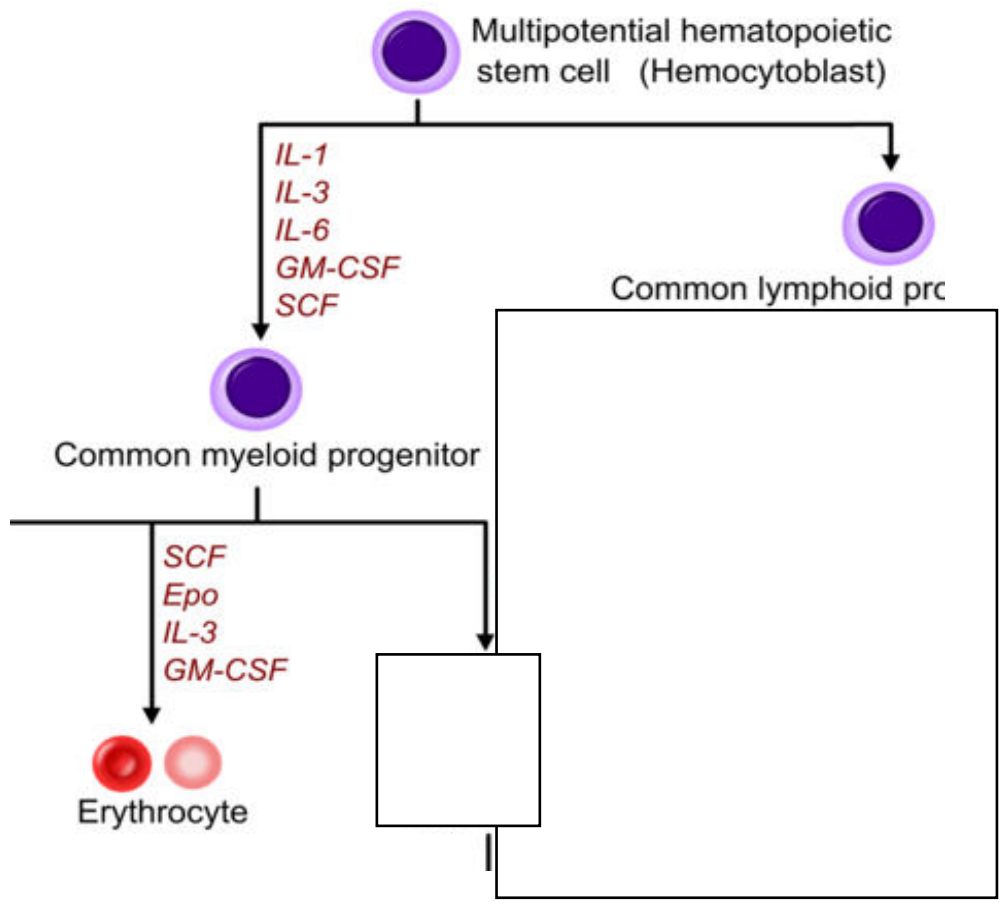
Learning Objectives

- Factors affecting erythropoiesis
- Hemoglobin synthesis

Factors regulating Erythropoiesis

Φ Growth or Developmental Factors
Φ Nutritional Factors
Φ Hormonal Factors
Φ Healthy Liver and Bone marrow

Hemopoietic Growth Factors - cytokines



Hemopoietic Growth Factors-EPO (Erythropoietin)

A glycoprotein hormone (mw 34000 d) and a cytokine (protein signaling molecule)
for
erythrocyte precursors in the bone marrow.

90% from the kidney
10% form the liver

Nutritional Factors regulating Erythropoiesis

A) Proteins:

B) Minerals:

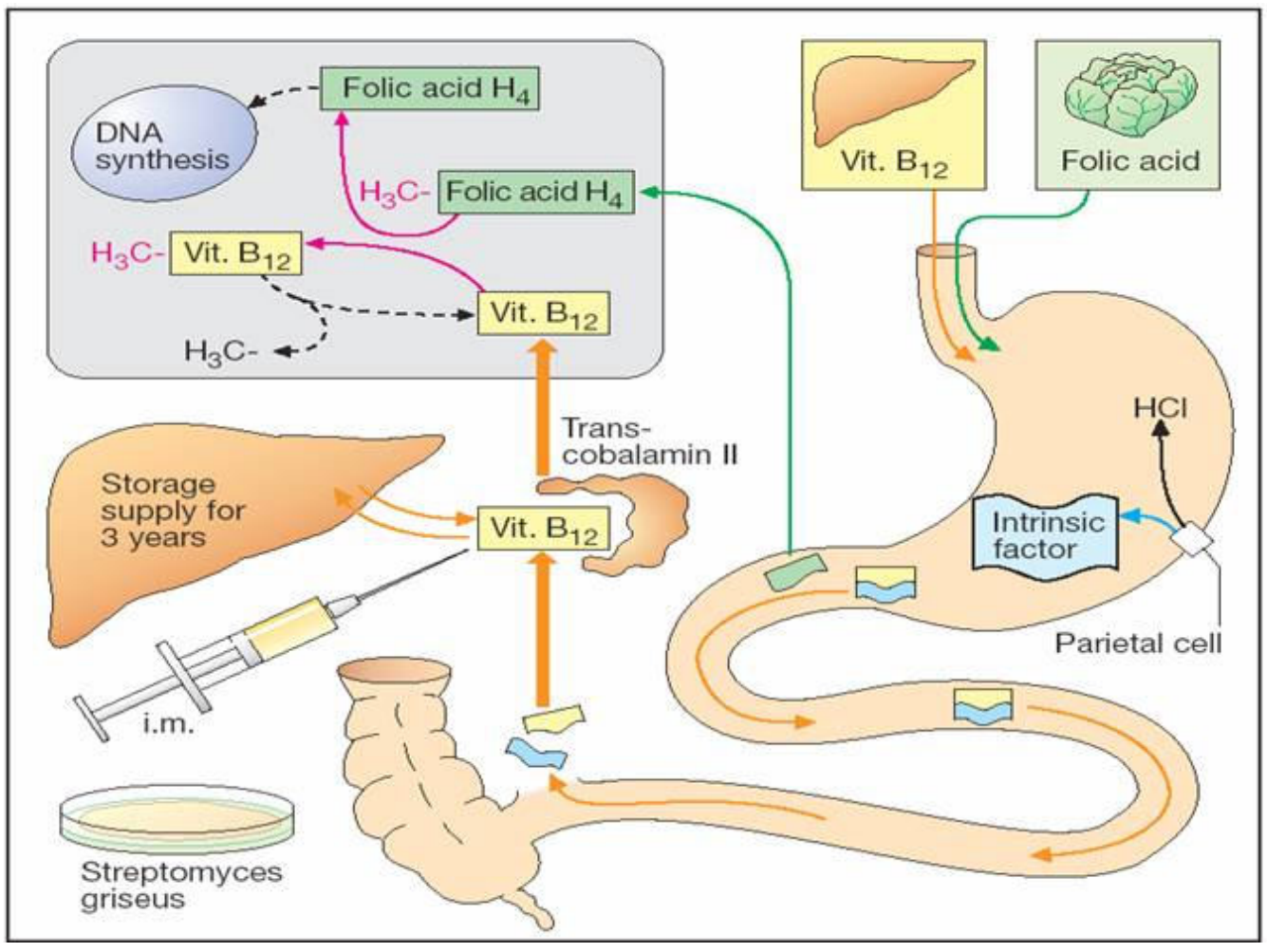
Iron (Fe^{++})

2. Copper (Cu^{++})

3. Cobalt (Co)

Nutritional Factors regulating Erythropoiesis

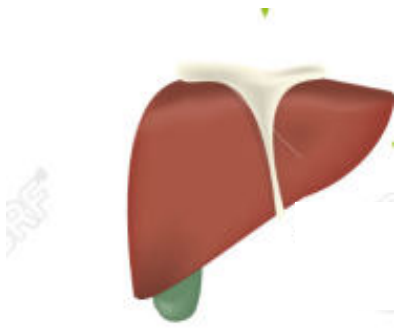
C) Vitamins:



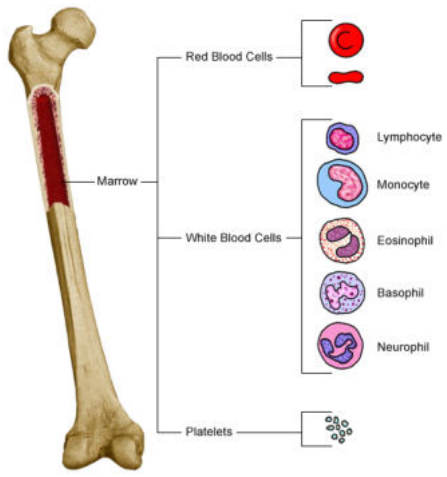
Hormonal Factors regulating Erythropoiesis

- **Thyroid**
- **Cortisol**
- **Androgens**

Regulation of Erythropoiesis - Liver and Bone marrow



- Liver
- Bone marrow



Hemoglobin

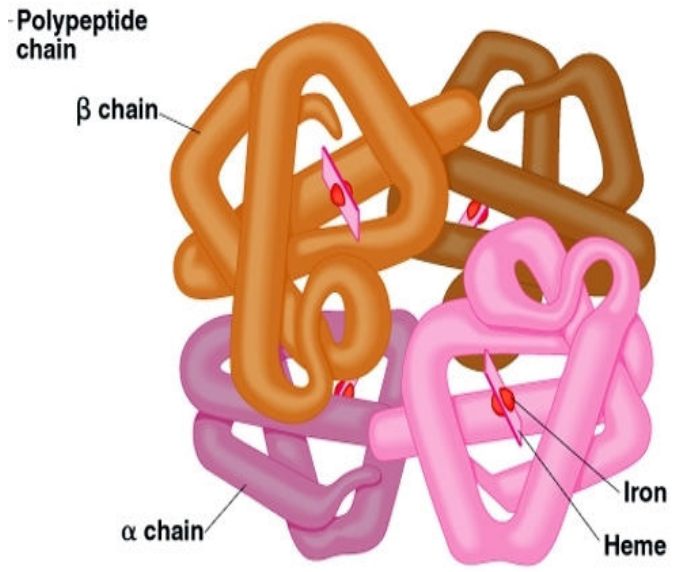
The hemoglobin is pigmented globular protein structure

Hemoglobin

Structure

Consists of 4 Subunits-

▪ Heme group ▪ Globin chain



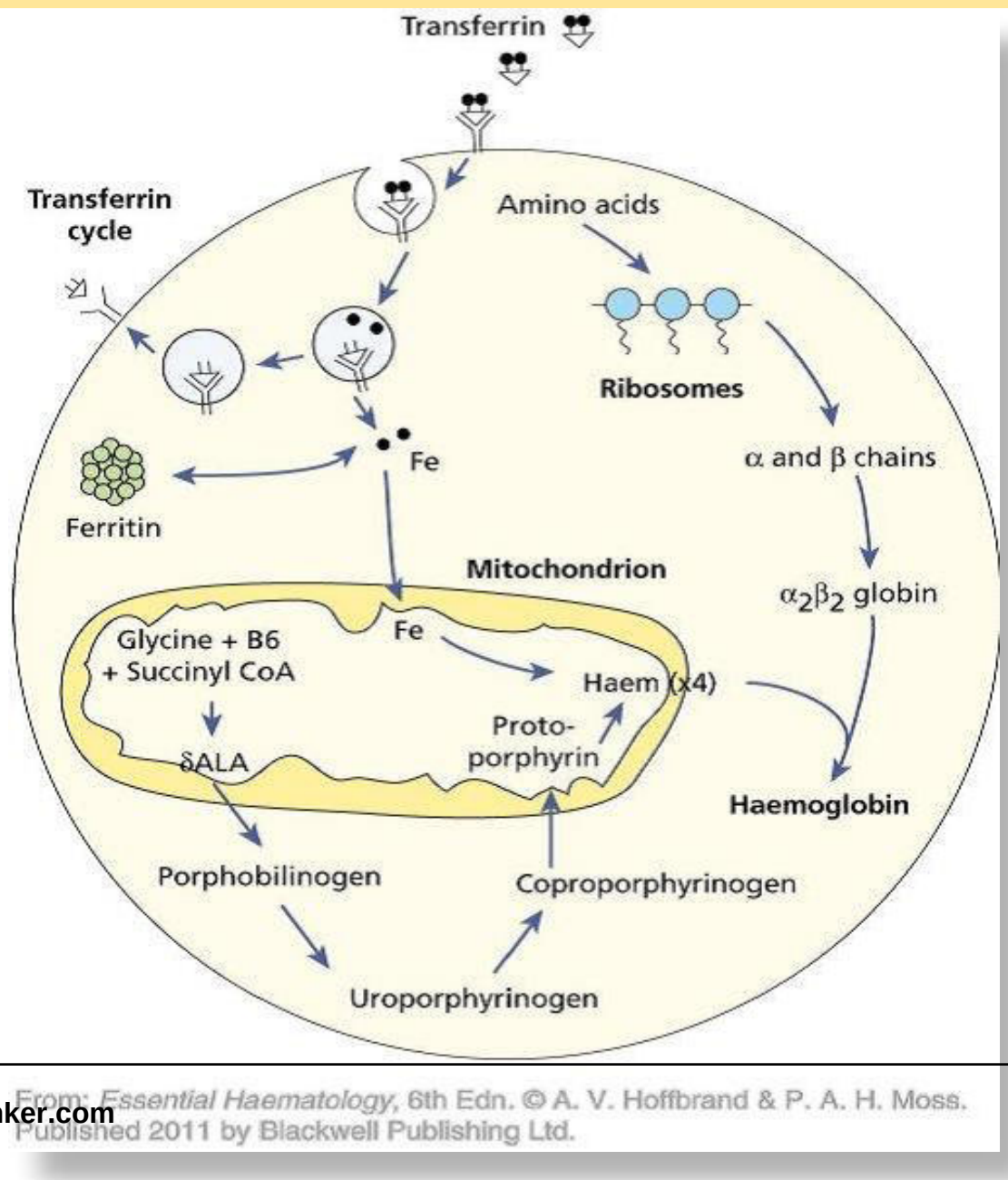
(b) Hemoglobin

Function

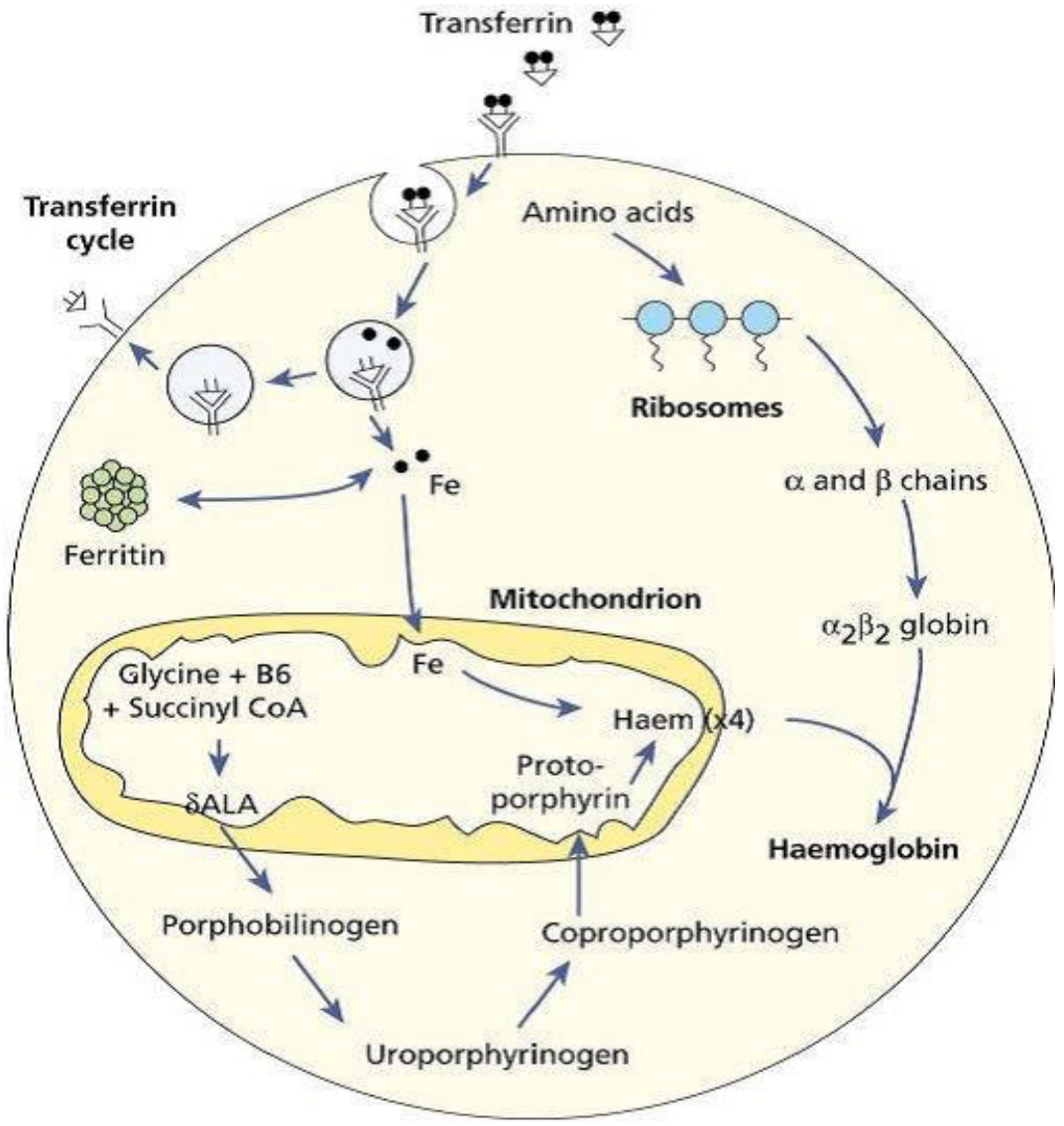
Hemoglobin Synthesis

Heme synthesis starts in Mitochondria of normoblast with the condensation of

<u>Glycine</u> and **<u>Succinyl Coenzyme A</u>**



Hemoglobin Synthesis



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Self Assessment

Which is **not true** for free Hb in blood-
a) it increase the blood viscosity
b) increase the osmotic/oncotic pressure
c) it can be lost by kidneys in urine
d) it damages the liver

Normal reticulocyte count at birth is-
a)1-2%
b)<1%
c)5-10%
d)2-6%

Erythropoietin is secreted from-
a)Kidney
b)Liver
c)tissue macrophage
d)spleen

life span of foetal RBC - a)120 days b)120 weeks c) 80 days d) 80 weeks