Department of Dentistry

Second Class

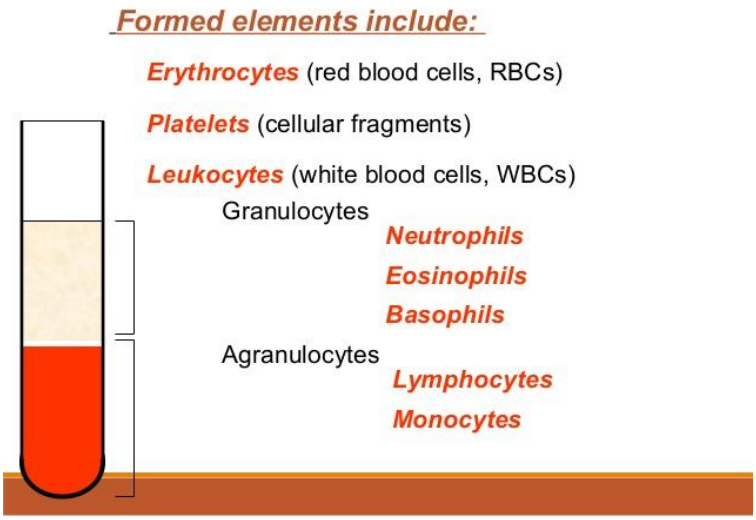
General Histology

Lec: 5

Dr.Lec. Fatima

Hematology

Hematopoiesis (Blood cell formation)



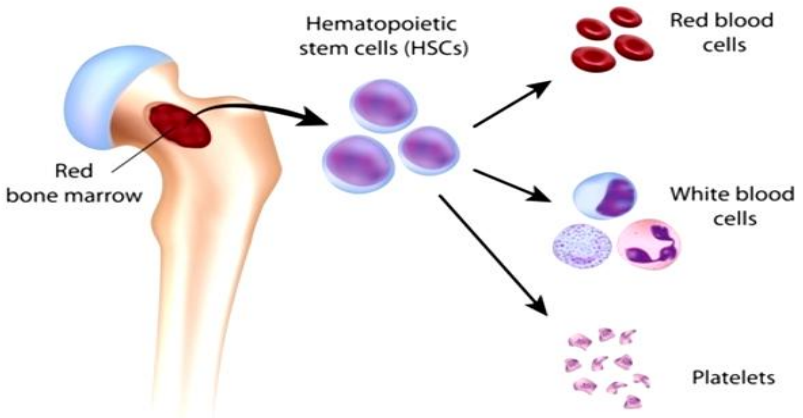
Hematopoietic cells described by:

Peripheral blood cells ⟶ produced in the bone marrow.

Their precursors are referred as ⟶ (hematopoietic stem cells)

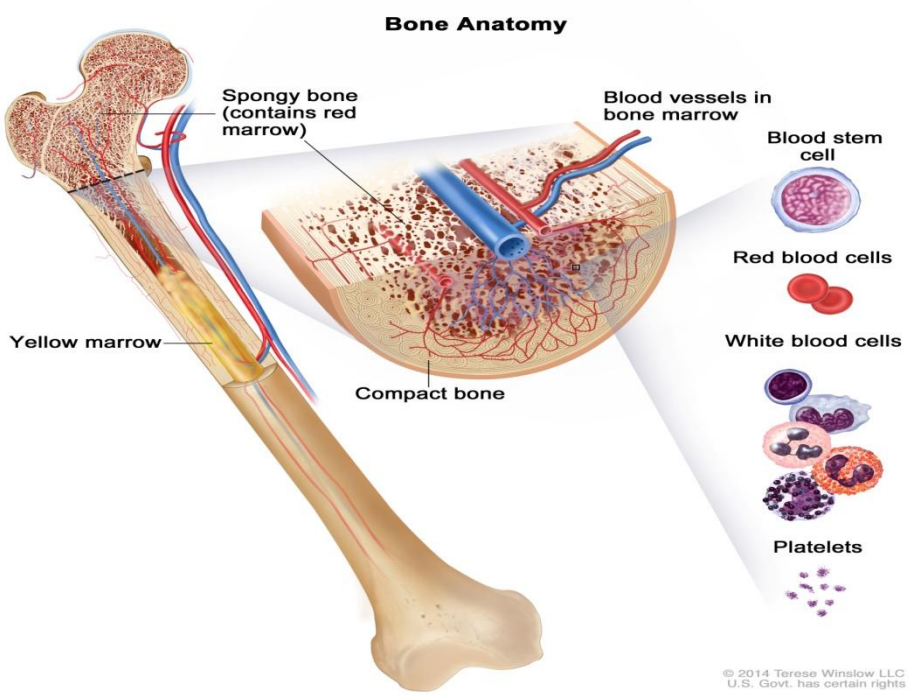
Significant function of hematopoietic cells is the production of mature end cells.

Haematopoiesis is the process which all mature blood cells are produced.



Bone Marrow

Bone marrow is found in the **medullary canals** of long bones and in the cavities of **cancellous bones** (spongy bone)





Two types of bone marrow have been described:

Red bone marrow:

It is produced by the presence of blood and blood-forming cells.

Yellow bone marrow: it is produced by the presence of a great number of adipose cells.

- **In newborns**, all bone marrow is red and is therefore active in the production of blood cells.
- **As the child grows**, most of the bone marrow changes gradually in to yellow variety.
- **Under certain condition**, such as severe bleeding or hypoxia, yellow bone marrow is replaced by red bone marrow.

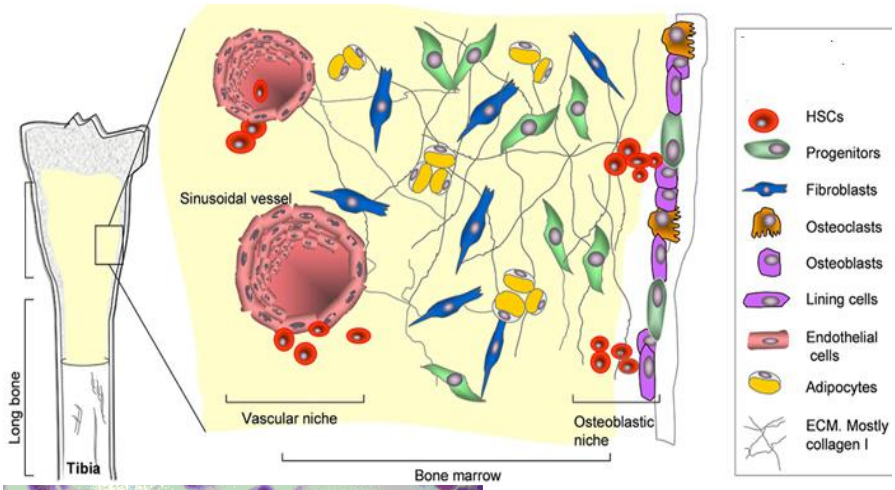
Red bone marrow

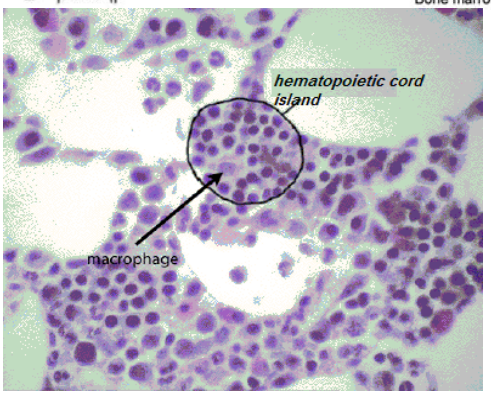
Red bone marrow is composed of a **stroma**, **hematopoietic cords (island)** , and **sinusoidal capillaries**. The red bone marrow is a network of **reticular connective tissue** that borders on wide blood capillaries called blood sinusoids due to discontinuous of endothelial cell layer. As hemocytoblasts mature, they migrate through the thin walls of the sinusoids to enter the blood.

The **stroma** is a three dimensional meshwork of reticular cells and a delicate web of reticular fibers containing hematopoietic cells and macrophages. The stroma of bone marrow contains collagen and proteoglycans.

The **islands** of hematopoietic cells are composed of blood cells in various stages of maturation as well as macrophages.

Macrophages regulate hemapoietic cell differentiation and maturation, transmit iron to developing erythroblasts tobe utilized in the synthesis of the heme portion of hemoglobin.





Site of hematopoiesis:

First few weeks (pregnant) are yolk sac.

6 week to 6 month (pregnant) is liver and spleen

7 month (gestation) and throughout life-bone marrow.

Infancy- all bone marrow is hematopoietic.

Childhood – progressive fatty replacement of bone marrow.

Adulthood hematopoietic marrow is femurs and humerus.