

- Mid-term Assignment
- Course Title Hematology
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- Program BS MLT 2<sup>nd</sup> section (A)
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#### Section A

- 1) None of them
- 2) None of them
- 3) All of the Above
- 4) 4.7 to 7.1 million
- 5) Thrombocytopenia
- 6) Red Bone Marrow
- 7) Myeloid Tissue
- 8) polycythemia
- 9) Both A and B
- 10) None of Them

#### Section B

- Q:No 1 Enlist characteristics of Blood
- Answer:- 1 Became red when gain oxygen
- 2 Carbonated blood have Dark /red purplish color
- 3 normal PH of blood 7.35 to 7.45
- 4 In comparison of body Temperature blood are warm
- 5 in adult health parson have 5-6 liter blood
- 6 make about 87 of total body weight
  
- Q No 2 Briefly Explain hematopoiesis .
  
- Answer :- Hematopoiesis is synthesis of blood constituents. These component are made of hematopoietic stem cells. In a normal person. About 10-10 blood cells are newly formed in order to keep stable state levels in the peripheral circulation system .
  
- Process

- Hematopoietic stem cells
- HSC remain in bone medulla and have the ability to form various mature blood cells and tissue also. They also act as a self-renewing cell when they show differentiation. Some of the cells like existing HSC, to protect from destroying of levels of HSC. The process is known as Asymmetric division. The other daughter of HSC recognize any of the different pathways that direct to the manufacture of one or more than one definite types of blood cells. But cannot renew themselves.
- Cells types
- All blood cells are separated into three types.
- Red blood cells ( erythrocytes ) are the oxygen carrier cells. erythrocytes are functional in nature and are unrestricted into the blood. The number reticulocyte, undeveloped red blood cells. Gives an estimate of the time of erythropoiesis.
- Lymphocytes are the keystone of the adaptive immunity. They originate from general lymphoid progenitors. The lymphoid ancestry is composed of T-Cells, B-Cells and natural killer cells. This is called lymphocytes
- Cell of the myeloid lineage. which consist of megakaryocytes macrophages granulocytes are derive from common myeloid progenitors and are involved in such diverse roles as innate immunity and blood clotting This is myelopoiesis.
- Granulopoiesis ( or granulocytogenesis ) is hematopoiesis of granulocytes, apart from mast cells which are granulocytes but with an extra medullar maturation .
- Megakaryocytogenesis is hematopoiesis of granulocytes .
- Terminology
- Between 1948 and 1950 the group for explanation of the Nomenclature of cell and disease of the blood and blood forming organ issued report on the classification of blood cells .An summary of the terminology is shown below. From earliest to final stage in of development.
- [ root ] blast
- Pro [ root ]cyte
- [root ]cyte
- Meta [root ]cyte
- Mature cell name

- Location
- In emergent embryos blood development occur in combined of blood cell in the yolk sac called blood island. As growth process blood formation occur in the spleen liver and lymph nodes. When bone marrow develop, it finally assumes the task of forming nearly all of the blood cells for the enter orgasm. However, maturation action and some explosion of lymphoid cell occur in the spleen thymus and lymph nodes . in kids in adult it occur of the lengthy bones such as the femur and tibia. It occur mostly in the pelvis, cranium vertebrae and sternum.
- Maturation
- As a stem cell mature it undergo in gene expression that bound the cell types to it can turn into and moves it closer to a exact kind ( cellular differentiation ). These changes can often be track by monitoring the occurrence of proteins on the face of the cell . Each consecutive change move the cell nearer to the final cell type and further restriction its possible to became a different cell type.
- Cell fate determination
- Two model for hematopoiesis have been planned. Determinism and stochastic theory. For the stem cells and other undifferentiated blood cells in the bone marrow. The resolve is generally explain by the determinism speculation of hematopoiesis, saying that colony inspiring factor and other factor of the hematopoietic microenvironment decide the cells to follow a certain pathway of cell differentiation
- Growth
- Red and white blood cells manufacture is synchronized with great accuracy. The proliferation and self-renewal of these cells depend on growth factor.
- Myeloid-based model
- For a decade now the confirmation is growing that HSC maturation follow a myeloid based model instead of the classical school book dichotomy model , the HSC first generates a common myeloid -erythroid progenitor ( CMEN) and a common lymphoid progenitor (CLP) . The CLP produces only T or B cells. The myeloid-based progenitor (CMLP) Which generate T and B cell progenitor through a bi potential myeloid -T progenitor and a myeloid -B progenitor stage
- Q No 3: Write down a comprehensive note on bone marrow.
- Answer :- Introduction of bone :- Bone marrow is specialized Tissue having Nutrients rich mainly pried in sternum ,chest bone and hips
- Types

- 1 yellow marrow and red .
- 2. Much amount of fat cell present in yellow then red .
- Types of bone marrow

( A) Red Bone Marrow all RBC and platelets in human adult are synthesis in bone marrow of body.

- 3. Almost product 60-70% of the lymphocytes the start life in the red bone and from second structure or formation In lymphocytes tissue consist thymus lymph node and spleen
- Red bones marrow play Important role obligation of existing RBC Along with spleen and liver .

- Yellow bone marrow
- YBM specific function is to act an a storage for fats which Give Give help in sustained and maintain specific environment for function of bone
- In seven bed loss fever or other condition It act as a red bone marrow
- It is present in center cavities of long bone swround bye layer of red marrow.

- 4 component of bone marrow.
- Not help in directed Hematopoiesis
- Consist of yellow bone marrow and some time stromal cell found in RBM

- 5 stromal cell of bone marrow
- 1 fibroblast
- 2 microphage
- 3 adipocytes
- 4 osteoblast
- 5 Endoblast cell

- 1 function of bone marrow
- Vessels of blood act as a barrier to stop removing of immature RBC from marrow
- Membrane protein is present in aquaporin which help attach to and Blood vessel .

- 2 Mesenchymal stem cell
- Known as multi potent stem cell that differentiate into many different cell. E g .chondrocytes myocytes adipocytes beta pancreatic islets

- 3 lymphatic Roles

- RBC is a key compound of lymphatic system ,That form lymphocytes from immature Hematopoietic progenitor cell
- Bone marrow and thymus constitute primary lymphoid tissue involved in early selection of lymphocytes

• Q NO: 4 Describe different sites of hematopoiesis in fetus , Infants and adult.

- Answer :- 0-2 month ( yolk sac )
- 2-7 month (liver spleen )
- 5-9 month (bone marrow )
- Infants.  
Bone marrow (practically all bones )

Adult

- Vertebrae, ribs , sternum, skull, sacrum and pelvis proximal ends of femur
- In adult hematopoiesis of red blood cells and platelets occurs primarily in the bone marrow. In infants an children, it may also continue in the spleen and liver
- In children hematopoiesis occur in all area of bone. In adult, it just occurs in Adults occur in center bone.

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