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**Program. B.S (MLT)**

**Semester. 2nd**

**Section. A**

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**Course title. Hematology**

 **“Section A"**

 **Chose the correct answers:**

1. **None of these.**
2. **None of these.**
3. **All of the above.**
4. **4.7 to 6.1 million cells p (cells/mcl).**
5. **Thrombocytopenia.**
6. **Red bone marrow.**
7. **Myeloid tissue.**
8. **Polycythemia.**
9. **Liver and kidney both.**
10. **Non of them.**

 **“SECTION B”**

**Q1:-Enlist characteristics of blood:**

**Ans:-**Characteristics of blood is given below:

* Blood is a fluid(liquid) tissue.
* Freely flowing but dense and there is more viscosity than water.
* It’s colour is depend upon hemoglobin.
* The bright red hemoglobin is oxygenated.
* The darken red/purplish is deoxygenated.
* The range of pH of blood is 7.35 to 7.45 (alkaline slightly).
* Warmer than body temperature 100.4F.
* Volume in adult male 5-6 liters.
* In adult female 4-5liters.
* The weight of blood in body 8%.

**Q2:-Briefly explain hematopoieses:**

**Ans:-*HEMATOPOIESES*:-**

***Hematopoiese*** is the production of all types of blblood cell’s including development of blood cells, formation of blood cells and the differentiation of blood cells.

* It’s occurring during in the fetus in the yolk sac,
* During development occurring in the liver,
* And after development it’s occurring in the bone marrow.

***DEVELOPMENT*** ***OF*** ***HEMATOPOIESES*** ***SYSTEM*** ***IN*** ***EMBRYONIC*** ***PHASE***:-

* In the first 2 weeks of embryonic stage the clusters of mesenchymal, mesoder cell expand and proliferate.
* The development of vascular channels and primitive embryonic circulatory system is formed there.
* Proliferation of early hematopoietic cells.
* Differentiation of hematopoietic precursor.

***FETAL* *HEMATOPOIESES* (*10th* *weeks* *of* *gestation*)**

* Liver and spleen is the two major sites till entire 2nd trimester.
* Proliferation of early hematopoietic cells.
* Differentiation of hematopoietic precursor.
* The site is change to bone cavities when it shift to 3rd trimester.

***AFTER* *BIRTH*:-**

* By birth the medullary cavity contributed to provide the mature hematopoietic cells.
* In other organs of reticoendothelial cell system the pluripotential cells remain in rest.

**Q3:-Write a comprehensive note on bone marrow:**

**Ans:- *BONE* *MARROW*:-**  ***Bone* *marrow*** is a semi-solid (soft) tissue which is present in spongy and in the large bone (hollow) such as hip and thigh bones.

***Types* *of* *bone* *marrow*:-**

There are two types of bone marrow,

1:Red bone marrow which is also known as myeloid tissue.

2:Yellow bone marrow (fatty tissue).

Both types of bone marrow are highly vascular and enriched with cacapillaries and numerous blood vessels.

***Red* *bone* *marrow*(*myeloid* *tissue*):-**

* The production of Red blood cells (RBCs)and platelets is occurring in the red bone marrow.
* About 60-70% lymphocytes are formed and resting there in the red bone marrow and become fully formed to lymphatic tissue including thymus,spleen,and lymph nodes.

***Yellow* *bone* *marrow*:-**

* It is for the purpose of storing the fats to maintain the correct environment for bone to function.
* Tend to be locating in the central cavity of long bone,where surround a layer of red bone marrow with long terbiculae.

***FOR* *GENERAL* *INFORMATION*:-**

* During the birth there are all bone marrow is red bone marrow(myeloid tissue)
* With growth the bone marrow is slowly converting to yellow bone marrow.
* In the adults there are half bone marrow is Red and the half is Yellow bone marrow.

***Function* *of* *bone* *marrow*:-**

***As* *lymphatic*:-**

* Red bone marrow play a very important role in the lymphatic system.
* Red bone marrow is one of the primary lymphatic organ that generates the lymphocytes from immature hematopoietic progenitor cells.
* The bone marrow and the thymus both are the primary lymphoid tissues and it’s involved in the production and the selection of lymphocytes.

***FUNCTION* *AS* *A* *BARRIER*:-**

* The a quaphorine and glycophorine are needed to attach and for the passing of blood vessels endothelial.
* Hematopoietic stem cell can pass the bone marrow barrier.

 ***FUNCTION* *AS* *MESENCHYMAL* *STEM* *CELL*:-**

* The stroma of the bone marrow contain mesenchymal stem cells which is also known as marrow stromal cell.
* MSCs have been shown for the differentiation among the osteoblast, osteocytes, monocytes, adipocytes and beta-pancreatic islets cells.

***CHANGES* *IN* *BONE* *MARROW*:-**

The following disease are the cause of changes in bone marrow:

* **Anemia,**
* **Polycythemia,**
* **Clotting defects,**
* **Leukemia,**
* **Recurrent infections,**
* **Hyper-cogulable conditions.**

**Q4:-Describe different sites of hematopoieses in fetus,infants and adults:**

**Ans:-*Sites* *of* *hematopoieses*:-**

|  |  |  |
| --- | --- | --- |
| **Fetus** | **Infants** | **Adults** |
| 0-2 months in (yalk sac),2-7 months in spleen and liver,5-9 months in bone marrow. | In bone marrow (practically in all bones) | In ribs, sternum,skull, sacrum, pelvis,vertebrae and in the proximal end of femur . |