**Hematology**

**Mid-Term Assignment (Spring-2020)**

**(BS-MLT 2nd Sec-A)**



**Submitted by**

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**Submitted to**

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**Section “A”**

1. The most commonly ordered blood test
2. Urine R/E
3. T3
4. T4
5. Hmglb
6. **None of them**
7. When a person has been diagnosed with a disease known to affect blood cells, a \_\_\_ will often be ordered on a regular basis to monitor their condition
8. Urine R/E
9. T3
10. T4
11. Hmglb
12. **None of them.**
13. The cells that are part of the body's defense system against infections and cancer and also play a role in allergies and inflammation.
14. Neutrophil.
15. Lymphocyte.
16. Eosinophil.
17. Monocyte.
18. **All of the above.**
19. Normal RBC range in Male:
20. **4.7 to 6.1 million cells p (cells/mcL).**
21. 4.2 to 5.4 million cells/mcL .
22. 6.7 to 6.1 million cells p (cells/mcL)
23. 9.7 to 6.1 million cells p (cells/mcL)
24. Low Platelets concentration is.
25. **Thrombocytopenia.**
26. Thrombocytosis.
27. Thrombocytopathy.
28. Leukopenia.
29. Also known as myeloid tissue.
30. **Red BM.**
31. White BM.
32. Yellow BM.
33. Greenish fatty tissue.
34. All red blood cells and platelets in humans adults are formed in\_\_\_\_\_\_\_\_\_\_\_\_.
35. Yellow BM.
36. White BM.
37. Greenish fatty acids.
38. **Myeloid tissue.**
39. Increase in Red Blood Cells.
40. Anemia.
41. **Polycythemia.**
42. Leukemia.
43. Clotting defects.
44. Thrombopoietin is a glycoprotein hormone produced mainly by\_\_\_
45. Liver.
46. Kidney.
47. **Both a and b.**
48. Brain.
49. life span of RBCs is\_\_\_\_\_
50. 2 Months.
51. 3 Months.
52. 6 Months.
53. **None of them.**

**Section “B”**

**Q1. Enlist characteristics of blood?**

**Characteristics of blood:**

1. Blood is specialized type of liquid connective tissue.
2. Blood is red in color. The red color of blood is due to hemoglobin.
3. Blood PH: 7.35---------7.45.
4. Normal blood volume in adult male is 5L-------6L.
5. Normal blood volume in adult female is 4L-------6L.
6. Blood contain 55% plasma and 45% Formed elements.
7. Movement of nutrients and hormones in to different parts of body is only through blood. In other words the blood is provide the path for nutrients and hormones propagation in to different parts of body.
8. The regulation of temperature is maintain by blood.
9. Normally the blood weight is the 8% of the body weight.
10. Blood carries oxygen from lungs to body, and carries carbon dioxide from body to outside of the body.

**Q2. Briefly explain hematopoiesis.**

**Hematopoiesis:**

Hematopoiesis is the name suggested, “Hemato” refers to the blood and “Poiesis” refers to the formation, so Hematopoiesis refers to the making of blood cells , they occurs mainly in bone marrow, And this is particularly in adults. The major three blood cell are formed by the process hematopoiesis, RBC carry oxygen from lungs and carbon dioxide carryout from the body. WBC is fighting with infection. And platelets is responsible for clotting of blood and their formational cell called hematopoietic stem cell. That stem cell are renew themselves. Hematopoiesis is classified in to three groups. Which is below.

1. Erythropoiesis.
2. Leukopoiesis.
3. Thrombopoiesis.
4. **Erythropoiesis:**

Erythropoiesis is the name suggested, “Erythro” refers to the Erythrocytes (RBC) and “Poiesis” refers to the formation. So Erythropoiesis refers to the formation of Erythrocytes (RBC). Erythropoiesis is consist of different stages. Which is below.

1. Pluripotent stem cell.
2. Multipotent Stem cell.
3. CFU Erthroide.
4. Pro-normoblast.
5. Basophilic (Early) normoblast.
6. Polychromatic (Intermidiate) normoblast.
7. Orthochromatic (Late) normoblast.
8. Reticulocyte.
9. Mature RBC.

1. **Leukopoiesis:**

Leukopoiesis is the name suggested, “Leuko” refers to Leukocyte (WBC) and “Poiesis” refers to the formation. So Leukopoiesis means the formation of Leukocyte (WBC).

WBC are divided into two main groups

1. Granulocyte
2. A granulocyte

Granulocyte consist of

1. Neutrophil
2. Esonophil
3. Basophil

A granulocyte consist of

1. Lymphocyte
2. Monocyte
3. **Thrombopoiesis :**

the word Thrombopoiesis is the combination of two words thrombo + poiesis. The word thrombo mean “platelets” and poiesis means “formation. Now it is the process of platelets formation, the process of platelets formation occurs in bone marrow. There are different stages of platelets formation following are the stages

1. Megakaryoblast
2. Pro-Megakaryoblast
3. Megakaryocyte
4. Platelet

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**Q3. Write down a comprehensive note on bone marrow?**

**Answer: Bone marrow:**

Bone marrow is soft, spongy and gelatinous tissue, which is located in the some bone of the body, including hollow bones like “Hip bone” and “Thigh”. That contain mesenchymal and hematopoietic stem cell, which is form the blood cells. Both types of bone marrow contain high quantity of vessels and capillaries. Totally all bone marrow are red in time of birth, in high amount of that bone marrow is converting to yellow bone marrow, during with the passage of time, about half of bone marrow is red and half of bone marrow is yellow in adult human body.

In first two months of fetus they are located in the “Yolk sac”, after that they are located in spleen and liver till seven month of fetus and after that they are located in bone marrow till nine month of fetus. After the birth bone marrow is located particularly in all bone of the body….. In adult bone marrow is located in the all flat bone and proximal ends of the femur.

There are two types of bone marrow.

1. Red bone marrow.
2. Yellow bone marrow.

**Red bone marrow:**

Red bone marrow play main role in blood formation process (Hematopoiesis). That produce all RBC and platelet in human adults, and formed many type of blood cell. Red bone marrow also play role in the reduction of old red blood cells, obliteration along with liver and spleen. Red bone marrow also known as myeloid tissue.

**Yellow bone marrow:**

Yellow bone marrow contains much higher quantity of fat cells. Their main purpose is fat store. The yellow bone marrow can convert to red bone marrow in high blood loss and in some fevers. They are located in the central cavities of long bones. Yellow bone marrow is also known as fatty tissue.

**Components of bone marrow:**

There are several components which combine together form bone marrow. Bone marrow composed of hematopoietic cells, marrow adipose tissue and supportive stromal cells. According to the study approximately it is 5% of total body weight.

1. Hematopoietic component

It is the combination of different components. It is the main functional component of bone marrow. Progenitor cells mature in blood and lymphoid cell which is the main part of hematopoietic. White blood cells, red blood cell and platelets are produce by hematopoietic stem cells.

Following are the cellular constitution

1. Myelopoietic cells
2. Erythropoietic cells
3. Some other cell type
4. Stroma

It is involved indirectly in hematopoiesis in which it providing the micro environment which influence the function and differentiation of hematopoiesis of stem cells. It is differ constitution which combine together and form stroma cell. The following are the main components

1. Macrophages
2. Fibroblast
3. Adipocytes
4. Osteoblast
5. Osteoclast
6. Endothelial cell

**Function of bone marrow:**

There are several function of bone marrow. the following are some major function in body.

1. Producing red blood cell
2. Store fat
3. Sources of food
4. Store different minerals such as calcium and phosphate
5. Source of producing platelet
6. White blood cells producing

**Q2. Describe different sites of hematopoiesis in fetus, infants and adults?**

**Hematopoiesis:**

Hematopoiesis is the name suggested, “Hemato” refers to the blood and “Poiesis” refers to the formation, so Hematopoiesis refers to the making of blood cells. The major three blood cell are formed by the process hematopoiesis, RBC carry oxygen from lungs and carbon dioxide carryout from the body. WBC is fighting with infection. And platelets is responsible for clotting of blood and their formational cell called hematopoietic stem cell. That stem cell are renew themselves.

**Sites of Hematopoiesis:**

**In fetus:**

00------02 months in fetus, Hematopoiesis proceed in yolk sac.

02------07 months in fetus, Hematopoiesis proceed in liver and spleen.

05------09 months in fetus, Hematopoiesis proceed in bone marrow.

**In Infants:**

In infant, Hematopoiesis proceed in all bones of the body.

**Adults:**

In adults, Hematopoiesis proceed in all irregular hollow bones and also in the ends of the femur.