**IQRA NATIONAL UNIVERSITY**

**DEPARTMENT OF ALLIED HEALTH SCIENCES**

**Final -Term Examination (Spring-202)**

**Course Title: Hematology (MLT 2nd semester) Instructor: Adnan Ahmad**

**Time: 6 hours Max Marks: 50**

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**Note:**

* **Attempt All(five) questions from this section, all questions carry equal marks.**
* **Use only Blue / Black Ink other than diagrams**
* **Answer Briefly and to the point, avoid un-necessary details**
* **Possession of Mobile Phones is strictly prohibited**
* **Every question must be attempted within one single page of two sided specified in answer book**

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**Q:1**Discus developmental stages of erythropoiesis.

Answer No 1:

Erythropoiesis

( Erythtro means Red and Poiesis means to Make) is The process which produces Red Blood Cells. ( Erythrocytes) which is the development from erythropoietic stem cell to mature red blood cells.

In the Process of red blood corpuscle maturation, a cell undergoes a series of differentiations.

Developmental Stages Of Erythropoiesis.

1. Proerythroblast.

CFU-E stands out in the primary bone marrow, the oldest known red Blood cells .The Preload is a very large cell15 to 20 Hm in diameter that has a deep basophilic compartment. The part of Haemoglobin is present in the cell, but its amount is too small to be detected by standard staining techniques.

2. Basophophic erythropoietin.

This cell is smaller than the prefabricated and averages 22;00 in diameter. The nucleus shows a rough network of dense heterochromatins. Haemoglobin increase in volume but is still masked by cytoplasmic basophilia.

3. Orthochronatophilic Erythropoietin.

Cells formed from polysaccharide filaments of erythropoietin. It has a dense core and its extra approach to the colour of ripe Red cells. It separates in the lattice when the core is pulled out

4. Policromatophilic Erythropoietin.

Many Physiologically normoblast levels, the cytoplasm beings to produce Haemoglobin and as a result the colour beings to change from deep basophillia to a certain blue/ grey color.The Cell Continues too decrease in size while the chromatin becomes much more mixed and in Volume.

5. Reticulocytes.

Reticulocytes are unripe erythrocytes. Their cytoplasm shows sensitive lattices when collared with special colouring agents such as blue. Some Mitochondria and some free Ribosome.

The Ribosome RNA is responsible for the peripheral elements of the Cytoplasm. The Maturation period is from24 to 48 hours. During this period the remnants of the Golgi device, Ribosomes,centers, and most mitochondria are lost to convert Red blood Cells .and Under Normal Conditions, Reticulocytes cells are 0.5 to 2 % of Red Blood Cells.

**Q:2** Enlist common causes of poor blood filam(blood smear).

Answer No 2.

Common Causes Of Poor Blood Filam(blood Smera).

1. Drop of Blood too large or too small.
2. Spreader slide pushed across the slide in a jerky manner.
3. Failure in keep the entire edge of the spreader slide against the slide while making the smear.
4. Irregular Spread with ridges and long tail: edges of spreader dirty or chipped dusty slide.
5. Holes in film – Slide Contaminated with fat or grease and air bubbles.
6. Cellular degenerative changes.
7. Failure to push to spreader slide completely across the slide.
8. Failure to keep the Spreader Slide at a 30% angle with the slide.

**Q:3.**Briefly explain Granulupoiesis in detail.

Answer No 3.

Granulpupoiesis:

Granulpuopiesis is defined as the Formation of blood Granulocytes typically in the bone marrow called Granulpoiesis.Granulpoiesis is a part of Hematopoiesis also referred to as polymorph nuclear lymphocyte, is a type of WBC that has multi lobed nuclei, usually containing three lobes and has a significant amount of cytoplasmic Granules within the cell.

Granulopoiesis takes place in the bone marrow.

Types of Granulpoiesis.

1. Steady state Granulopoises.

Granulopoiesis is a term used to describe the normal daily Production of granules. Granulocytes are short lived cells(6 to 8 hours in duration). With high cell tumover. Number Of Granulated Cells Produced daily varies between 5 and 10 x 10. The master regulator of steady state granulopoiesis is C/EBPα. It restricts the cell cycle of immature cells by inhibition of CDK2 and CDK4 and promotes granulocytic differentiation. Steady state production of granulocytes is activated after the engulfment of apoptotic granulocytes by tissue macrophages.

1. Emergency Granulopoiesis.

Stable Granulopoiesis has reached a program called Emergency Granulopoiesis after severe damage to the body , usually a bacterial infection. The Shift in the plan is due to transition from C/EBP increase the production of Granules, Contributing to the rapid progression of cell cycle myelosensors, there by generating a sufficient number of new granules to fight stroke.

**Q:4** What Is iron deficiency Anemia? Also discuss its causes.

Answer No 4.

Iron Deficiency Anemia.

Anaemia usually refers to a condition in which our blood has a lower than normal number of red blood cells.

Iron is an essential mineral that is needed to from haemoglobin, an oxygen carrying protein inside Red blood cells.

Iron Deficiency Anaemia is a condition in which the body lack enough Red Blood Cell to transport oxygen rich blood to body tissues.

Causes of Iron Deficiency

1. Increased needs.
2. Adolescence (Growth)
3. Menstruation.
4. Pregnancy.
5. Lactation.
6. Cancer.
7. Insufficient intake.
8. Vegan diet.
9. Limited diet(cabbage soup)
10. Malnutrition.
11. Decreased absorption.
12. High gastric Ph.
13. Gastric/ Bariatric surgery.
14. Vitamin C deficiency.

**Q:5**.Classify anemia on the basis of morphology with examples.

Answer No 5.

Red Blood Cells morphology is another system for classifying anaemia. There are three basic divisions within the Morphologic Classification System.

1. Microcytic Anemia.
2. Iron Deficiency.
3. Thalassemia.
4. Slideroblastic anemia.
5. Anemia of chronic diseases.(Severe Cases).
6. Normocytic Anemia.
7. Anemia of Chronic disease (most cases).
8. Iron deficiency(early).
9. Combined nutritional deficiencies(iron+folate or cobalamine).
10. Marrow Failure.
11. Hypothyroidism.
12. Macrocytic Anemia.
13. Megaloblastic anemia (folate or cobalamine deficiency.)
14. Hemolytic anemia (reticulocytosis).
15. Liver disease.
16. Hypothyroidism.
17. Myelodysplasia.

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The End………