NAME : ITIZAZ HASSAN

ID : 16662

ASSIGNMENT : FINAL TERM

DEPARTMENT : BS MLT

DATE :24/06/2020

QNO1:

Discus developmental stages of erythropoiesis.

ANSWER:

Erythropoiesis :

It is the process which produces red blood cells, which is the development from erythropoietic stem cell to mature red blood cell. It is stimulated by decreased CO2 in circulation, which is detected by the kidneys, which then secret the hormones erythropoietic.

SITES OF ERYTHROPOIESIS :

3 sites of erythropoiesis during intrauterine life.

- **Mesoblastic : The middle germinal layer of an early embryo, consisting of undifferentiated cell destined to become the mesoderm.**
  (1st 3 month). It developed in the yolk sac

- **Hepatic : (Entry 1 of 2): It is related to, affecting, associated with, supplying or draining the liver a hepatic complaint hepatic arteries hepatic.**
  It developed (after 3 months) in the (Liver and spleen).

- **Myeloid : It is related to, or resembling bone marrow.**
  It developed (3rd trimester) in the (bone marrow).

STAGES OF ERYTHROPOIESIS :

1. **Proerythroblast.**
2. **Basophillic erythroblast or Early normoblast.**
3. **Polychromatophillic erythroblast or intermediate normoblast**
4. **Orthochromatic erythroblast or Late normoblast.**
5. **Reticulocyte.**

1:Proerythroblast ::

- **It is the earliest of four stages in development of normoblast, In histology it is very difficult to distinguish it from the other blast cells. The cytoplasm is blue in an H and E stain indicating that it is Basophillic.**
- **It is the earliest erythroid element.**

- **It has Basophillic cytoplasm with a perinuclear halo.**
- **In this stage cytoplasm bulges to form (Ear shaped) process. And also in this stage nuclear chromatin is not homogeneous and nucleolus is seen.**

2: Basophillic erythroblast or Early normoblast :

- **It is a nucleated precursor in the erythrocytic series, preceding the Polychromatophillic erythroblast and following the Proerythroblast; the cytoplasm is Basophillic, the nucleus is large with clumped chromatic, and the nucleoli has disappeared called also Basophillic normoblast.**
- **Early normoblast is smaller than Proerythroblast.**
- **In this stage nuclear chromatin show sharp contrast between light and dark areas.**
- **Cytoplasm is Basophillic reflecting protein and RNA contents.**

3: Polychromatophillic erythroblast or intermediate normoblast :

- **In this the cytoplasm has begun to produce hemoglobin and as a result, the color starts to shift from deep basophilic to state blue r grey shades. The cell continues to slowly shrink in size while the chromatin becomes much more knotted and clumped. The spoke_like pattern of the chromatin accentuates the nuclear membrane and the nuclear pores.**
- **Polychromasia means having many colors.**
- **In this stage nucleus mature and condensed.**
- **Cytoplasm has a gray hue derived from hemoglobin.**

4: Orthochromatic erythroblast or Late normoblast :

- **The final stage of the nucleated immature erythrocyte, before nuclear loss. Typically the cytoplasm is described as acidophilic, but it still shows a faint polychromatic link.**
- **In this stage the nucleus has shrunk and become darker and the growing concentration of hemoglobin turns the cytoplasm Pink.**
- **Acidophilic erythroblast which is the last precursor with a nucleus.**
- **Nucleus is compact and situated near the membrane.**
- **Cytoplasm is like mature red cell, reflecting a high hemoglobin content.**

5:Reticulocyte:

- **Reticulocyte are newly produced relatively immature red blood cell.**
- **A Reticulocyte count helps to determine the number or percentage of Reticulocyte in blood is a reflection of recent bone marrow function or activity.**
- **Red blood cell are produced in the bone marrow forming (hematopoietic) stem cells differentiate and develop eventually forming Reticulocytes and becoming mature RBC.**
- **Young erythrocytes with granular or reticular filamentous structures.**
- **Make up 0.5 to 2 percent of erythrocytes.**
- **Vital staining required to make this visible.**
- **Reticulocytosis seen following hemolysis or acute blood loss.**

QNO2:: Enlist common causes of poor blood film (blood smear).

ANSWER:: Blood film or blood smear is a thin layer of blood smeared on glass microscope slide and then stain in such a way as to allow the various blood cell to examine microscopically. Blood film are examined in the investigation of hematological disorders and are routinely employed to look for blood parasites such as those of malaria and filariasis.

CAUSES OF BLOOD FILM:: The preferred and most reliable diagnosis of malaria is microscopic examine of blood film because each of the four major parasites species has distinguishing characteristics.

- **Two sort if blood film are traditionally used.**

1:Thin film:: It is usually similar to usual blood films and allows species identification, because the parasite appearance is the best preserved in the preparation.

2Thickfl film:: It allow the microscopist to screen a large volume of blood and are about eleven times more sensitive than the thin film, so picking up low level of infection is easier on the thick film, but the appearance of the parasites is much more distorted and therefore distinguishing between the different species can be more difficult.

QNO3: Briefly explain Granulupoiesis in detail.

ANSWER::

- **Granulupoiesis or granulocytopoiesis is a part of haematopoiesis that leads to the production of granulocytes. A granulocytes also referred to as polymorphonuclear lymphocyte, is a type of white blood cell that has multi lobed nuclei, usually containing three lobes, and has a significant amount if cytoplasmic granules with in the cell.**
- **Granulupoiesis takes place in the bone marrow.**
- **It leads to the production of three types of mature granulocytes neutrophils, (most abundant, making up to 60% of all white blood cells),eosinophils(up to 4) and basophils (up to 1%).**
- **Even though haematopoiesis is usually presented in a form of hierarchically organized haematopoietic tree, it is becoming evident, that the cells are gradually progressing from one type to another, while remaining flexible and forming landscape.**

STAGES OF GRANULUPOIESIS::

There are two stages of Granulupoiesis.

1. **Steady state Granulupoiesis.**
2. **Emergency Granulupoiesis.**

1:: Steady state Granulupoiesis ::

- **It is term used to describe the normal daily production of granulocytes. Granulocytes are short lived cells (their lifespan is between 6 and 8 hours) with a high cell turnover. The number of granulocytes produced every day is between 5 and 10 x 10 power 10.**
- **The master regulator of steady state Granulupoiesis is C/EBP alpha . It restricts the cell cycle of immature cell by inhibition if CDK2 and CDK4 and promotes granulocytic differentiation.**
- **Steady state production of granulocytes is activated after the engulfment of apoptotic granulocytes by tissue macrophages.**

2:: Emergency Granulupoiesis ::

- **Steady state Granulupoiesis is switched to a program termed emergency Granulupoiesis after a major insult to the organism, usually a bacterial infection. The switch of the program is mediated by switch from C/EBP alpha to C/EBP beta, the main transcription regulator of emergency Granulupoiesis of C/EBP beta enhances the production of granulocytes by promoting progression of the cell cycle of myeloid progenitors at accelerated rate, therefore generating sufficient amount of new granulocytes to fight the insult.**

QNO4::What is iron deficiency anemia? Also discuss its causes.

ANSWER ::Anemia is a decrease in the total amount of blood of red blood cell or hemoglobin in the body, or lowered ability of the blood to carry oxygen.

TYPES OF ANEMIA:: The are six types of anemia.

- **Iron deficiency anemia.**
- **Nutritional anemia.**
- **Hemolytic anemia.**
- **Category anemia.**
- **Microcytic anemia.**
- **Claudication.**

1:: IRON DEFICIENCY ANEMIA ::

- **It is caused by lack of iron. Anemia is defined as a decrease in the number of RBC or the amounts of hemoglobin in the blood. When onset is slow, symptoms are often vague such as feeling tired, weak, short of breath, or having decreased ability to exercise.**
- **Anemia that comes on quickly often has more sever symptoms, including confusion, feeling like one is going pass out or increase thirst.**
- **Anemia is typically significant before a person becomes noticeable pale.**
- **Children with iron deficiency anemia may have problems with growth and development.**

CAUSES OF IRON DEFICIENCY ANEMIA ::

- **It is caused by blood loss, insufficient dietary intake, or poor absorption of iron from food.**
- **Sources of blood loss can include heavy periods, childbirth, uterine fibroids.**
- **Gastrointestinal e. g stomach ulcers, colon cancer and urinary tract bleeding.**
- **Peptic ulcers, oesophageal varies, aspirin ingestion, partial gastrectomy, carcinoma of the stomach, hookworm, angiodysplasia, colitis piles, diverticulosis, Rarely, haematuria, haemoglobinuria, pulmonary haemosiderosis, self inflicted blood loss.**
- **Poor absorption of iron from food may occur as a result of an intestinal disorder such as inflammatory bowel disease or celiac disease or surgery such as a gastric bypass.**
- **HIV/AIDS increase the risk of iron deficiency anemia.**

QNO5::Classification of anemia on the basis of morphology with example.

ANSWER ::CLASSIFICATION OF ANEMIA::

1: Macrocytic Anemia :: In this type of anemia individual RBCs are larger than normal, but the amount of hemoglobin in each cell is usually below normal. Absolute values show increased MCV with usually normal MCH/MCHC.

EXAMPLES ::

- **Megalobastic anemia.**
- **Aplastic anemia.**
- **Haemolytic anemia.**
- **Liver disease.**
- **Myxoedema.**
- **Hypopituitarism.**
- **Pregnancy.**
- **Alcoholism.**

2: Normocytic Normochronic Anemia :: In the type of anemia although the hemoglobin concentration in the blood is reduced, the individual RBCs appears normal and absolute values are also within normal limits.

EXAMPLES ::

- **Acute blood loss.**
- **Leukemia.**
- **Bone marrow infiltration.**
- **Chronic renal failure.**
- **Chronic infection (chronic disorder).**

3: Microcytic Hypochromic Anemia :: In this type of anemia individual RBCs are smaller in size than normal and contain a subnormal amount of hemoglobin.

All absolute values (MCV, MCH, and MCHC) are below normal.

Examples ::

- **Iron deficiency.**
- **Thalassemia.**
- **Sideroblastic anemia.**
- **Anemia of chronic disorder.**

(THANK YOU)
(THE END)