

DENTAL SEC B PHYSIOLOGY, 2ND SEMESTER

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Attempt all questions. Every question carry 10 marks.

Q1. Write the functions and composition of blood?

Answer :

Function of blood:

Blood has three main functions: transport, protection and regulation.

Transport

Blood transports the following substances:

Gases, namely oxygen (O₂) and carbon dioxide (CO₂), between the lungs and rest of the body

Nutrients from the digestive tract and storage sites to the rest of the body

Waste products to be detoxified or removed by the liver and kidneys

Hormones from the glands in which they are produced to their target cells

Heat to the skin so as to help regulate body temperature

Protection

Blood has several roles in inflammation:

Leukocytes, or white blood cells, destroy invading microorganisms and cancer cells

Antibodies and other proteins destroy pathogenic substances

Platelet factors initiate blood clotting and help minimise blood loss

Regulation

Blood helps regulate:

pH by interacting with acids and bases

Water balance by transferring water to and from tissues .

Composition of blood

Blood is classified as a connective tissue and consists of two main components:

Plasma, which is a clear extracellular fluid

Formed elements, which are made up of the blood cells and platelets

The formed elements are so named because they are enclosed in a plasma membrane and have a definite structure and shape. All formed elements are cells except for the platelets, which are tiny fragments of bone marrow cells.

Formed elements are:

Erythrocytes, also known as red blood cells (RBCs)

Leukocytes, also known as white blood cells (WBCs)

Platelets.

Q2. What is erythrocyte, erythropoiesis, erythrocytosis and erythropenia?

Answer:

Erythrocyte:

A type of blood cell that is made in the bone marrow and found in the blood. Erythrocytes contain a protein called hemoglobin, which carries oxygen from the lungs to all parts of the body.

Erythropoiesis :

The formation of red blood cells in blood-forming tissue. In the early development of a fetus, erythropoiesis takes place in the yolk sac, spleen, and liver.

Erythrocytosis :

Erythrocytosis is defined as an increase in red blood cell (RBC) mass, usually absolute, and is also associated with an increased hematocrit (HCT) and hemoglobin concentration. Although some use the term polycythemia interchangeably with erythrocytosis, the two are not synonymous.

Erythropenia :

a reduction in the number of red blood cells (erythrocytes) in the blood. This usually, but not invariably, occurs in anaemia.

Q3. What is platelets and write about clotting mechanism and its all steps?

Answer :

Platelets : also called thrombocytes are a component of blood whose function is to react bleeding from blood vessel injury by clumping , thereby initiating a blood clot .

Structure: platelets have no cell nucleus, They are fragments of cytoplasm that are derived from the megakaryocytes of the bone marrow, which then enter the circulation.

* Circulating unactivated platelets are biconvex discoid (lens-shaped) structures 2-3 μm in diameter.

Life span

10 days

Function: stop bleeding

Maintain hemostasis

Clotting mechanism

Clotting mechanisms.

Coagulation/ clotting means blood changed from liquid to gel.

Steps of mechanism (adhesion)

1: injury to the blood vessel.

2: Endothelium lining the vessel damaged.

3: Blood comes into space under endothelium.

4: underlying collagen exposed to circulating platelets.

5: platelets binds with surface receptors of collagen and adhere tightly .

6: This is adhesion .

Activation :

1 : platelets change shape

1: Activated platelets adhere tightly at injury sites .

Aggregation :

1: platelets connect to each other through receptor bridges .

2: platelets plug formed at injury site unless the interruption is physically too large .

Brain deposition .

1 : formation of platelet plug will ensue primary hemostasis .

2: Thus fibrin clot formed .

3: Now clot retractor and platelets inhibition .

Q4. Write a note on ABO system?

Answer :

ABO system

O 47%

A 41%

AB 9%

ABO 3%

ABO system

- By Dr.karl landstener 1900
- Inherited from parents
- Based on A and b antigen-Agglutinogens
- May have

Nether of them

One of them

Both of them

Agglutinogens and agglutinins

- Agglutinogens on surface of RBC
- Agglutinins in blood plasma
- Can cause blood transfusion reactions

Role of blood group in blood transfusion

- If mismatched then hemolysis
- Blood typing in manclalary.

Complications of blood transfusion with reference to ABO and RH incompatibility

Complications of blood transfusion with reference to ABO incompatibility

- Mismatched blood e.g anti-A plasma agglutinins expose to RBC with A

Agglutigen i-e blood group A transfused to blood group B

- Agglutinins have binding sites. Agglutinins attach themselves to RBC antigen agglutination hemolysis

- Acute hemolysis

- Jaundice

- Kidney shutdown.

Q5.(i) A person fell down from a tree and become unconscious, with bleeding from head, what will you do as a first aid?

(ii) you have to meet with your friend and you came to know he is covid positive, what precautionary measures will you take?