Topic: Blood Composition and Function

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- **Production of blood**
- **Haemopoiesis:**
- Haemopoiesis is the production of the formed elements of blood. Haemopoietic tissues refer to the tissues that produce blood. The earliest haemopoietic tissue to develop is the yolk sac.
- In the foetus, blood cells are produced by the bone marrow, liver, spleen and thymus. This change during and after birth. The liver stops producing blood cells around the time of birth, while the spleen stops producing them soon after birth but continues to produce lymphocytes for life.
- From infancy onwards, all formed elements are produced in the red bone marrow.

- **Functions of blood**
- Blood has three main functions: transport, protection and regulation.
- **Transport**
- Blood transports the following substances:
- Gases, namely oxygen (O_2) and carbon dioxide (CO_2), 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

- **Blood Grouping:**

- In 1900-1902, K. Landsteiner classified human blood into four groups A, B, AB and O. The cells of these groups contains corresponding antigens – A, B and AB except O.

- That is why O is donated to any of the groups and so is known as ***Universal donor*. AB** group is known as ***Universal recipient*** because it can receive A, B, AB, and O blood groups.

- **Rh factor:**

- It is a blood antigen discovered in 1940 by Landsteiner and A.S Weiner and played an important role during a blood transfusion. The Rh factor is an agglutinogen found in RBC of most people called Rh+. It was initially found in the rhesus monkey and later in man.

- People who do not have this antigen in their blood are called Rh-. The Rh- blood does not carry anti- Rh antibodies naturally but could synthesize them through blood transfusion of Rh+ blood.

- If Rh+ blood is transfused into an Rh- patient, the serum will produce anti-Rh agglutinin. If another dose of Rh+ blood is given, the anti-Rh agglutinin will cause clumping of RBC of the donor’s blood as soon as it enters the patient receiving it.

- **Erythroblastosis Foetalis:** If the father's blood is Rh+ and the mother's blood is Rh- then the child to be born dies at the pregnancy or short span of time after birth due to clumping of RBC of the donor’s blood by the anti-Rh agglutinin . Basically, this happens in the case of the second issue.