

THE BLOOD

Introduction

Blood is red fluid which fills the cardiovascular system i.e. heart and blood vessels. It is not ordinary body fluid but connective tissue where the intercellular substance is liquid called plasma. No interconnection and can move free.

Cell presents in blood are – Erythrocytes (RBC)
Leucocytes (WBC)
Thrombocytes (Platelets)

Plasma is an aqueous solution of different crystalloids and colloids

Whole blood – Cells 45% and Plasma 55%

Components of the Circulatory System : Heart , Blood and Blood Vessel

About 5 liters in male

In given person this amount is constant but varies from person to person according to body weight. Expressed in ml/kg of body weight . Normal adult – 70ml/kg

Plasma Straw colored, nonliving part of blood.

90% Water

Helps to regulate body temperature

Contains Electrolytes

Plasma transports blood cells, products of digestion and hormones throughout the body.

Blood plasma Consists of:

Water 90%

Plasma Proteins 6-8 %

Electrolytes (Na⁺ & Cl⁻) 1%

Other components:

Nutrients (e.g. Glucose and amino acids)

Hormones (e.g. Cortisol, thyroxine)

Wastes (e.g. Urea)

Blood gases (e.g. CO₂, O₂)

Cellular Elements of Blood. Red Blood Cells, White Blood Cells, Platelets

RBC'S (Erythrocytes) Shape - a biconcave disc with large surface area

Can change shape

No Nucleus / organelles

Contains hemoglobin

Primary Function = Transport oxygen from the lungs to the cells of the body & assist with CO₂ removal

Blood volume can calculated either from the plasma volume or from cell volume with help of their ratio in blood

i.e. – plasma : cell = 55:45

White Blood Cells: Fight infections

Large in size

Have a nucleus

Phagocyte

Types of WBC : agranulocytes and Granulocytes.

Agranulocytes : neutrophils, eosinophils, basophils.

Granulocytes : Lymphocytes and Monocytes.

Mechanism of Transport : HEMOGLOBIN , 4 Heme Molecules = 4 Oxygen Molecules

Oxygenated Hemoglobin = Bright Red (systemic)

Deoxygenated Hemoglobin = Blue (venous circulation)

Distributing various nutrient to all parts of body.

It helps process of excretion by transporting the waste material to the organ of excretion.

Maintain acid base balance in the body

Transport medium for various hormones, chemical, essential elements and drugs we take.

Carry heat away from the body core to periphery or hotter region to cooler region to maintain body temperature.

Store house for different material.

Role of haemostasis to prevent blood loss from injury.

Properties of blood

Alkaline fluid with pH 7.4

Red in colour

Peculiar blood like smell

Specific gravity is 1055 to 1060 at 15 degree celcius

Specific gravity increases with loss of blood and decreases with increase blood volume

Coagulation of blood is important property by which loss of blood is prevented from body.

Books:

Guyton and Hall textbook of medical physiology

Essentials of Medical Physiology