HEAMOPOETIC SYSTEM

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INTRODUCTION

- Blood is a connective tissue in fluid form.
- It is considered as the 'fluid of life' because it carries oxygen and carbon dioxide.
- It is known as 'fluid of growth' because it carries nutritive substances and hormones.
- The blood is also called the 'fluid of health' because it protects against the diseases and help in excretion of waste products and unwanted substances by the excretory organs like kidneys.

PROPERTIES OF BLOOD

1. Color

- Blood is red in color.
- Arterial blood is scarlet red because it contains more oxygen and venous blood is purple red because of more carbon dioxide.

2. Volume

- Average volume of blood in a normal adult is 5 L. In a newborn baby, the volume is 450 ml. In females, it is slightly less and is about 4.5 L.
- It is about 8% of the body weight in a normal young healthy adult.

3. Reaction and pH

- Blood is slightly alkaline and its pH in normal conditions is 7.4.

4. Specific gravity

- Specific gravity of total blood is 1.052 to 1.061

5. Viscosity

- Blood is five times more viscous than water. It is mainly due to red blood cells and plasma proteins.

COMPOSITION OF BLOOD

- Blood contains the blood cells which are called formed elements and the liquid portion known as plasma.

1. BLOOD CELLS

- Three types of cells are present in the blood:

i. Red blood cells or erythrocytes

ii. White blood cells or leukocytes

iii. Platelets or thrombocytes.

2. PLASMA

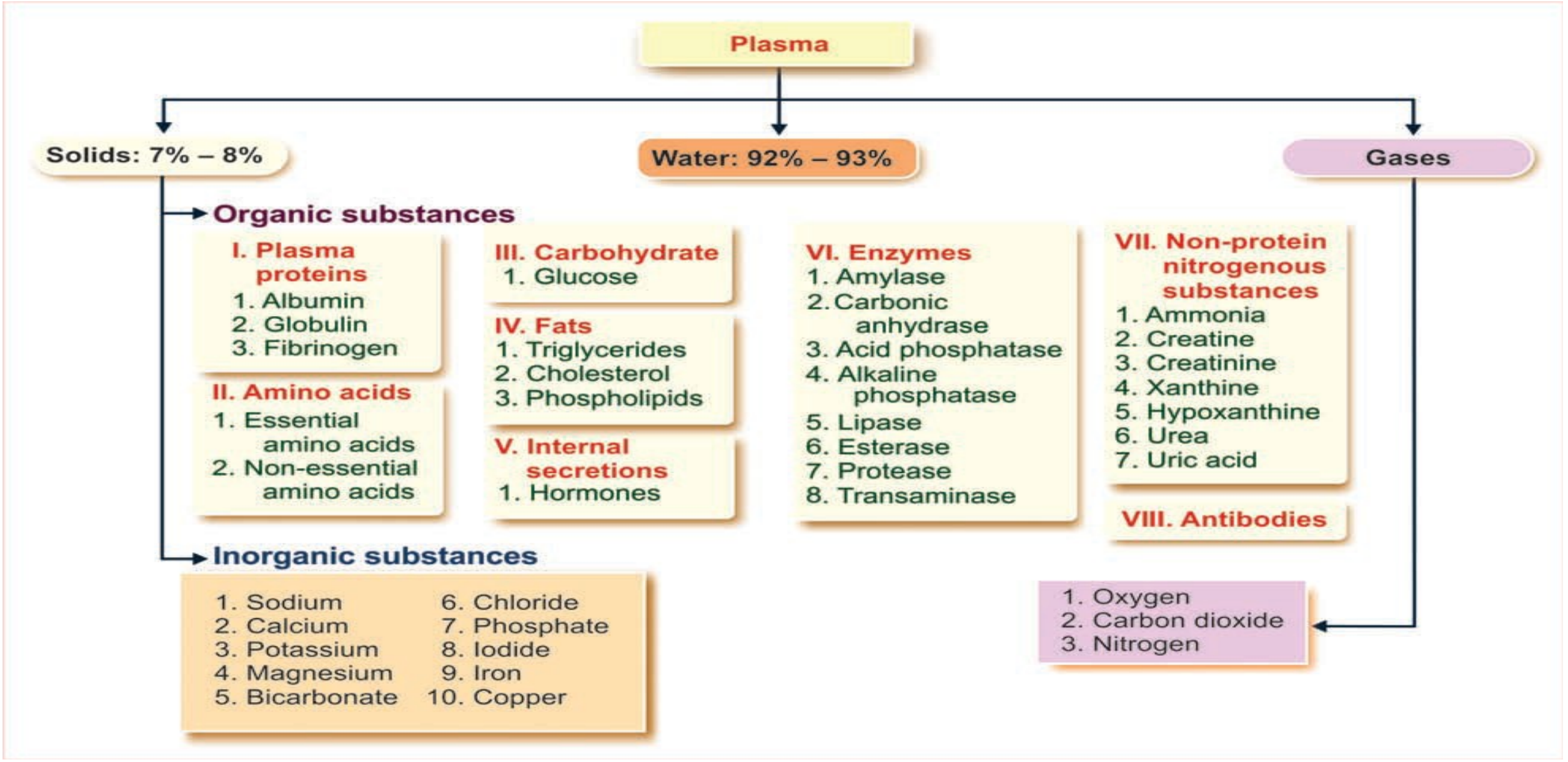
- Plasma is a straw-colored clear liquid part of blood.
- It contains 91% to 92% of water and 8% to 9% of solids.
- The solids are the organic and the inorganic substances.

BLOOD SERUM

- Serum is the clear straw-colored fluid that oozes from blood clot.
- Volume of the serum is almost the same as that of plasma (55%).
- It is different from plasma only by the absence of fibrinogen, i.e. serum contains all the other constituents of plasma except fibrinogen.
- Fibrinogen is absent in serum because it is converted into fibrin during blood clotting.

SERUM = PLASMA – FIBRINOGEN

COMPOSITION OF PLASMA



NORMAL VALUES OF SOME IMPORTANT SUBSTANCES IN BLOOD

Substance	Normal value
Glucose	100 to 120 mg/dL
Creatinine	0.5 to 1.5 mg/dL
Cholesterol	Up to 200 mg/dL
Plasma proteins	6.4 to 8.3 g/dL
Bilirubin	0.5 to 1.5 mg/dL
Iron	50 to 150 µg/dL
Copper	100 to 200 mg/dL
Calcium	9 to 11 mg/dL 4.5 to 5.5 mEq/L
Sodium	135 to 145 mEq/L
Potassium	3.5 to 5.0 mEq/L
Magnesium	1.5 to 2.0 mEq/L
Chloride	100 to 110 mEq/L
Bicarbonate	22 to 26 mEq/L

FUNCTIONS OF BLOOD

1. NUTRITIVE FUNCTION

- Nutritive substances like glucose, amino acids, lipids and vitamins carried by blood to different parts of the body for growth and production of energy

2. RESPIRATORY FUNCTION

- Transport of respiratory gases is done by the blood.
- It carries oxygen from alveoli of lungs to different tissues and carbon dioxide from tissues to alveoli.

3. EXCRETORY FUNCTION

- Waste products formed in the tissues are removed by blood and carried to the excretory organs like kidney, skin, liver, etc. for excretion.

4. TRANSPORT OF HORMONES AND ENZYMES

- Hormones which are secreted by endocrine glands are released directly into the blood. Which was transported by blood to their target organs/tissues.
- Blood also transports enzymes.

5. REGULATION OF WATER BALANCE

- Water content of the blood is freely interchangeable with interstitial fluid.
- This helps in the regulation of water content of the body.

6. REGULATION OF ACID-BASE BALANCE

- Plasma proteins and haemoglobin act as buffers and help in the regulation of acid-base balance.

7. REGULATION OF BODY TEMPERATURE

- Blood is responsible for maintaining the thermoregulatory mechanism in the body, i.e. the balance between heat loss and heat gain in the body.

8. STORAGE FUNCTION

- Water and some important substances like proteins, glucose, sodium and potassium are constantly required by the tissues.
- Blood serves as a readymade source for these substances.
- These substances are taken from blood during the conditions like starvation, fluid loss, electrolyte loss, etc.

9. DEFENSIVE FUNCTION

- Blood plays an important role in the defense of the body.
- The white blood cells are responsible for this function.
- Neutrophils and monocytes engulf the bacteria by phagocytosis.
- Lymphocytes are involved in development of immunity.
- Eosinophils are responsible for detoxification, disintegration and removal of foreign proteins.

THANK YOU