SAWA UNIVERSITY

Fundamentals of fluids detection and secretions

Types of body fluids

جامعة ساوة

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المرحلة الثانية

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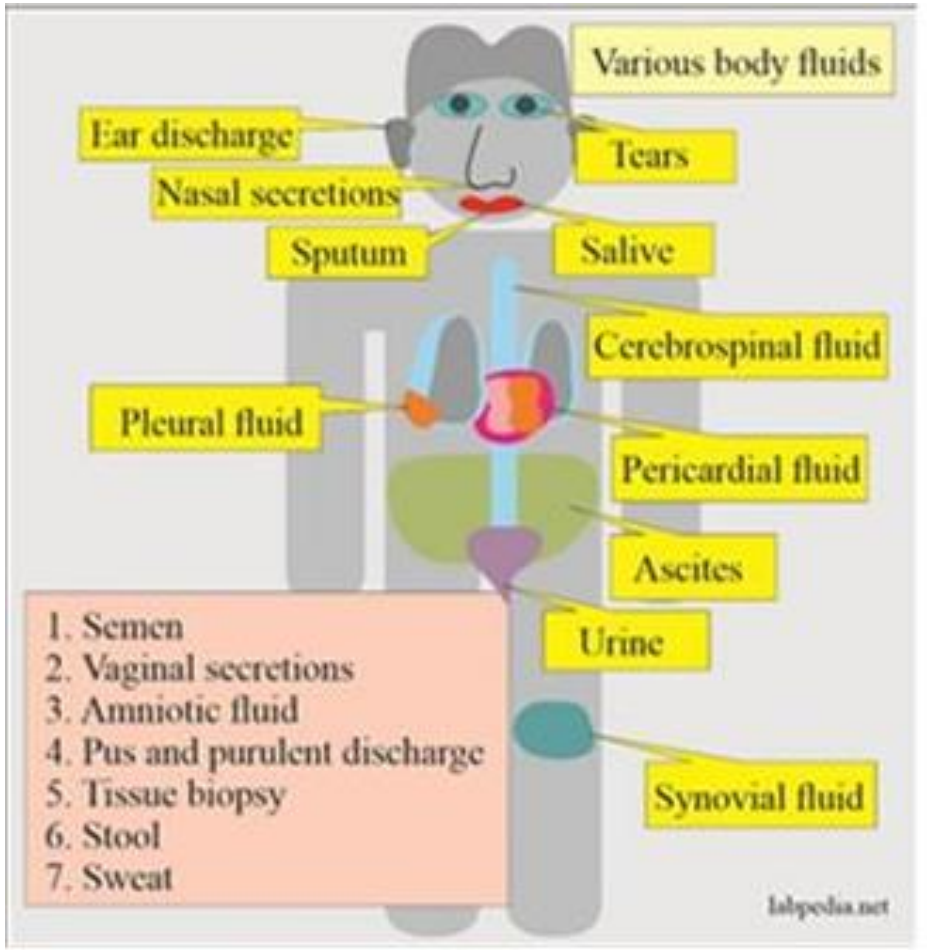
رقم المحاضرة 2

Types of body fluids

- Blood.
- Urine.
- Semen.
- Vaginal secretions.
- Cerebrospinal fluid.
- Synovial fluid, pleural fluid.
- Peritoneal fluid.
- Pericardial fluid.
- Amniotic fluid.
- Milk and tears



Composition of body fluids

Organic substances	Inorganic substances
• Glucose	• Sodium
• Amino acids	• Potassium
• Fatty acids	• Calcium
• Hormones	• Magnesium
• Enzymes	• Chloride
	• Phophate
	• Sulphate

DEHYDRATION

Decrease in water content of the body is known as dehydration.

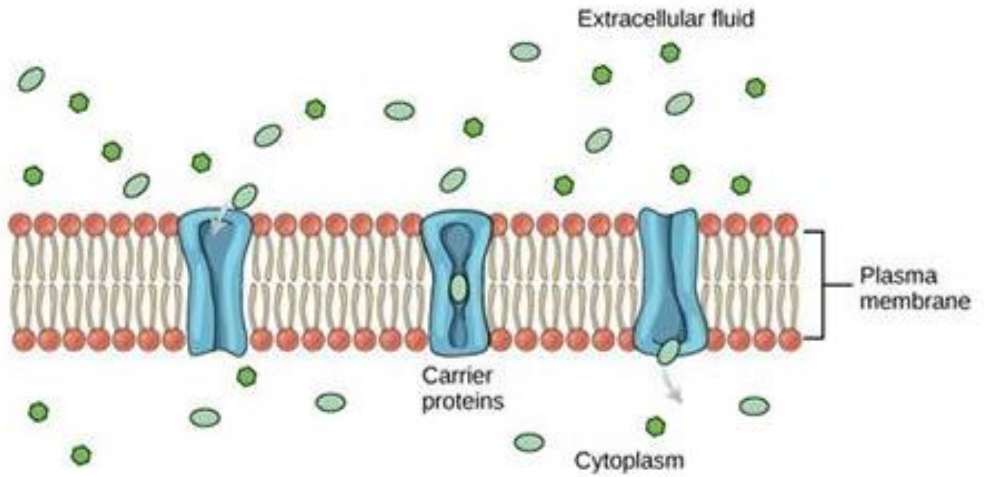
Classification Basically dehydration is of three types:

1. Mild dehydration when fluid loss is about 5% of total body fluids.
2. Moderate dehydration when fluid loss is about 10%.
3. Severe dehydration when fluid loss is about 15%. Causes:

- Severe diarrhea and vomiting.
- Excess water loss through urine.
- Insufficient intake of water.
- Excess sweating.
- Use of laxatives or diuretics.

Transport through Cell Membrane

Transport mechanism in the body is necessary for the supply of essential substances like nutrients, water, electrolytes, etc. to the tissues and to remove the unwanted substances like waste materials, carbon dioxide, etc. from the tissues.



Transport through Cell Membrane

BASIC MECHANISM OF TRANSPORT

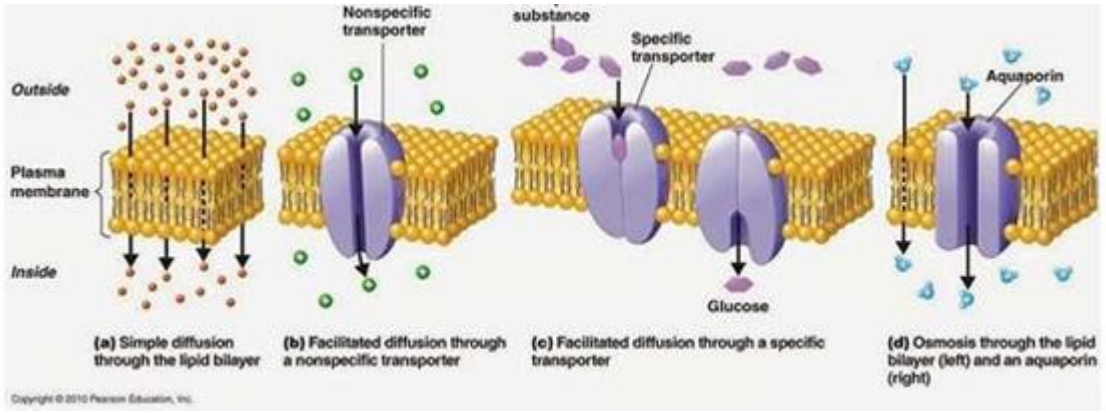
Two basic mechanisms for the transport of substances across the cell membrane are:

1. Passive mechanism
2. Active mechanism.

PASSIVE TRANSPORT

The transport of the substances along the concentration gradient or electrical gradient or both (electrochemical gradient) is called passive transport. Here, the substances move from the region of higher concentration to the region of lower concentration. It is also known as diffusion or downhill movement. It does not need energy. Diffusion or passive transport is of two types:

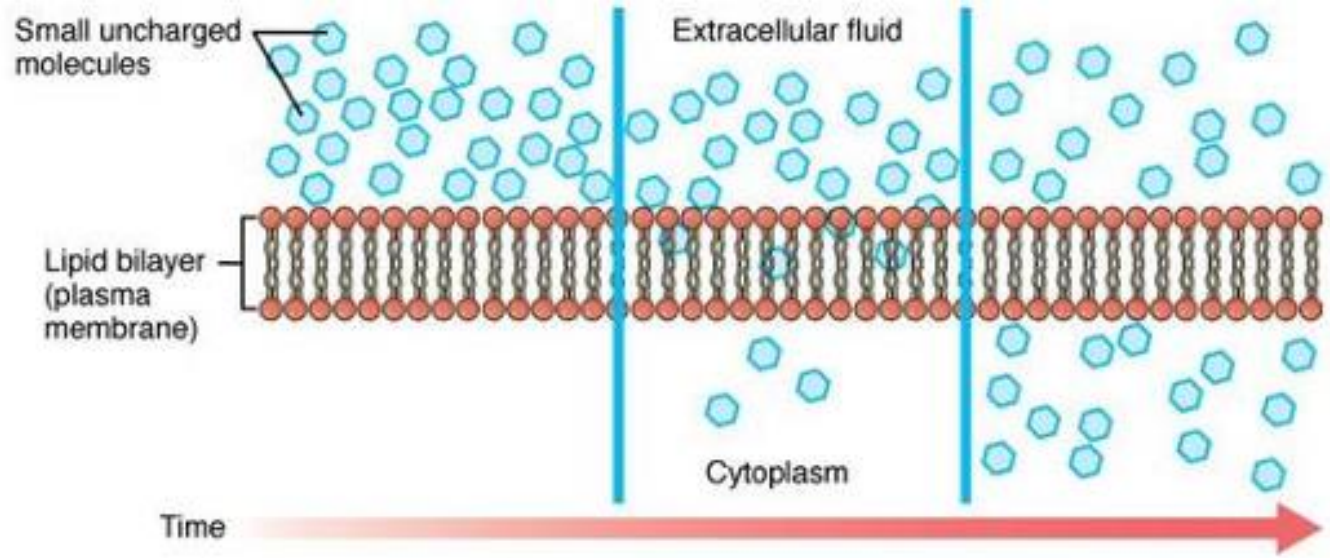
1. Simple diffusion
2. Facilitated diffusion.



SIMPLE DIFFUSION

Simple diffusion is of two types:

1. Simple diffusion through lipid layer.
2. Simple diffusion through protein layer.



Simple diffusion through lipid layer

SPECIAL TYPES OF PASSIVE TRANSPORT

In additions to diffusion there are some special types of passive transport.

1. Bulk flow 2. Filtration 3. Osmosis

1. Bulk Flow: The diffusion of large quantity of substances from a region of high pressure to the region of low pressure is known as bulk flow. Bulk flow is due to the pressure gradient of the substance across the cell membrane.

2. Filtration: The movement of water and solutes from an area of high hydrostatic pressure to an area of low hydrostatic pressure is called filtration. The hydrostatic pressure is developed by the weight of the fluid. Filtration process is seen at the arterial end of the capillaries where movement of fluid occurs along with dissolved substances from blood into the interstitial fluid.

2. Osmosis: Osmosis is the special type of diffusion. It is the movement of water or any other solvent from an area of lower concentration to an area of higher concentration through a semipermeable membrane. Osmosis is of two types:

- ✓ Endosmosis by which water moves into the cell.
- ✓ Exosmosis by which water moves outside the cell.

Osmosis: is the diffusion of water molecules across a selectively permeable membrane.

Differences between Diffusion, Osmosis and Active transport

Process	Movement of	Condition	Additional requirements
Diffusion	Molecules/ ions	High conc. to low conc.	Down a conc. gradient
Osmosis	Water molecules	High water potential to low water potential	Across a partially permeable membrane
Active transport	Particles of substances	Low conc. to high conc.	Against a conc. Gradient; Energy required

ACTIVE TRANSPORT

Movement of substances against the chemical or electrical or electrochemical gradient is called active transport. It is also called uphill transport. Active transport requires energy which is obtained mainly by breakdown of ATP. It also needs a carrier protein.

TYPES OF ACTIVE TRANSPORT

The active transport is of two types:

1. Primary active transport
2. Secondary active transport.

SPECIAL CATEGORIES OF ACTIVE TRANSPORT

In addition to primary and secondary active transport systems, some special categories of active transport systems also exist in the body. The special categories of active transport are:

I. Endocytosis II. Exocytosis III. Transcytosis.

- ENDOCYTOSIS:

Endocytosis is the transport mechanism by which the macromolecules enter the cell. The substances with larger molecules are called macromolecules and these cannot passthrough the cell membrane either by active or by passive transport mechanism. Such substances are transported into the cell by endocytosis.

- EXOCYTOSIS

Exocytosis is the process by which the substances are expelled from the cell. In this process, the substances are extruded from the cell without passing through the cell membrane. This is the reverse of endocytosis.

- TRANSCYTOSIS

Transcytosis is a transport mechanism in which an extracellular macromolecule enters through one side of a cell, migrates across cytoplasm of the cell and exits through the other side by means of exocytosis. Examples are movement of proteins and pathogens like HIV from capillary blood into interstitial fluid through endothelial cells of the capillary.

Any questions?

Thank You