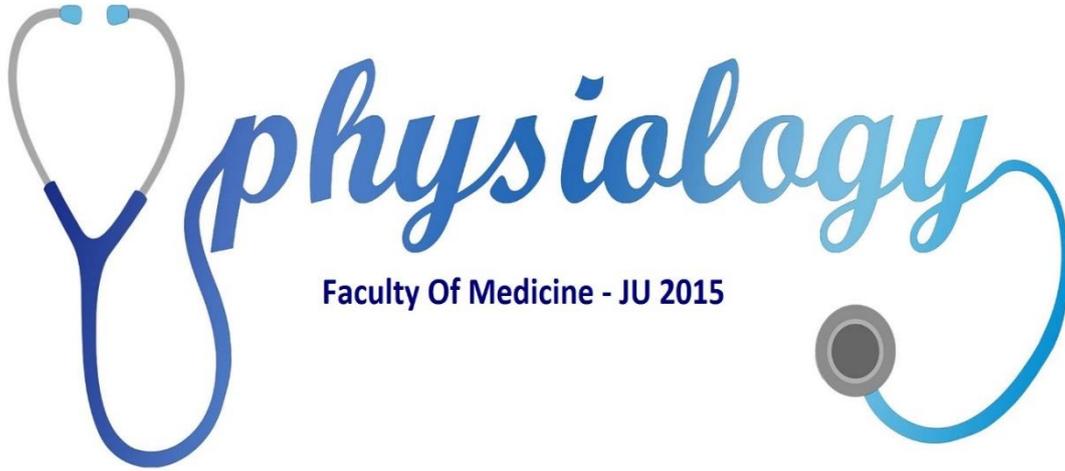




University of Jordan
Faculty of Medicine



Number: 1 + 2

Done By: Omar Abu Reesh

Subject: Introduction

Doctor: Faisal Mohammed

Anatomy: The science which deal with the (structure).

Physiology: The science which concentrate on the function of the living organism and its parts.

System Level: A system consists of group of related organs with a common function.

The Eleven systems of the human body: Circulatory system, Digestive system, Respiratory system, Urinary system, Skeletal system, Muscular system, Integumentary system, Immune system, Nervous system, Endocrine system, Reproductive system.

Homeostasis: A condition of equilibrium in the body's internal environment. Whole body contribute in maintaining the internal environment within the normal limits.

Body fluids are dilute, watery solutions containing dissolved chemicals inside or outside of the cell.

Intracellular Fluid (**ICF**): Fluid within cells, 2/3 of body's whole fluids.

Extracellular Fluid (**ECF**): Fluid outside cells, 1/3 of body's whole fluids, (Interstitial fluid 80%, plasma20%)

(Interstitial fluid) is ECF between cells and tissues, (Plasma) is ECF in the blood vessels.

The Movement of fluids across capillary walls provide nutrients (glucose, O₂, ions) to tissue cells and removes waste (CO₂).

Homeostasis is constantly being disrupted because of Intense heat or lack of oxygen (Physical insults), drop in blood glucose due to lack of food (changes in internal environments), (Physiological stress).

There are two kinds of Disruption:

-Mild and temporary (balance is quickly restored)

-Intense and Prolonged (poisoning or severe infections)

Feedback System : A Receptor which is a Body structure that monitors changes in a controlled condition; Sends input to the control center (Brain) which Evaluates input received from receptors and generates output command, Effectors receives output from the control center Produces a response or effect that changes the controlled condition.

- Negative Feedback systems: Reverses a change in a controlled condition
- Positive Feedback systems: Strengthen a change in one of the body's controlled conditions.

Example of negative feedback system (Regulation of Blood Pressure):

A stimulus increase BP, Baroreceptors (pressure sensitive receptors) Detect higher BP and Send nerve impulses to brain for interpretation, A response sent via nerve impulse sent to heart and blood vessels, BP drops and homeostasis is restored (Drop in BP negates the original stimulus).

Example of Positive Feedback (Blood Loss):

In Normal conditions, heart pumps blood under pressure to body cells (oxygen and nutrients) If Severe blood loss; Blood pressure drops and Cells receive less oxygen and function less efficiently.

Baroreceptors (pressure sensitive receptors) Detect lower BP and Send nerve impulses to brain for interpretation, a response sent via nerve impulse to heart and blood vessels, BP increase and homeostasis is restored.

Feedback Gain: A measure of the effectiveness of a specific feedback system.

$$\text{Gain} = \frac{\text{Correction}}{\text{Error}}$$

Plasma Membrane:

An important structure that separate the intracellular part from the extracellular part of the cell, the two parts differ in the concentration of different ions.

The cell membrane is maintaining this difference preventing the ions to pass throw according to their concentration gradient.

For example; if the membrane allows the passage of ions freely; this means that Na⁺ concentration in the extracellular compartments will not be high compared to the Na⁺ in the intracellular compartments which is low.

Structures of the Plasma Membrane:

1-The membrane is built up from a phospholipid bilayer because of its hydrophilic heads facing the extracellular and intracellular parts which are aqueous, this is why we have two layers of phospholipid, the inside part of the membrane (the phospholipid tails) are hydrophobic.

- The membrane is not static and constantly moving.

2-Another particles of the membrane are proteins and they are found in two types:

-integral proteins: extend into or through the lipid bilayer

-peripheral proteins: Attached to the inner or outer surface of the membrane, do not extend through it

the amount of protein in the membrane depends on the type of the cell (depending on the cell's function).

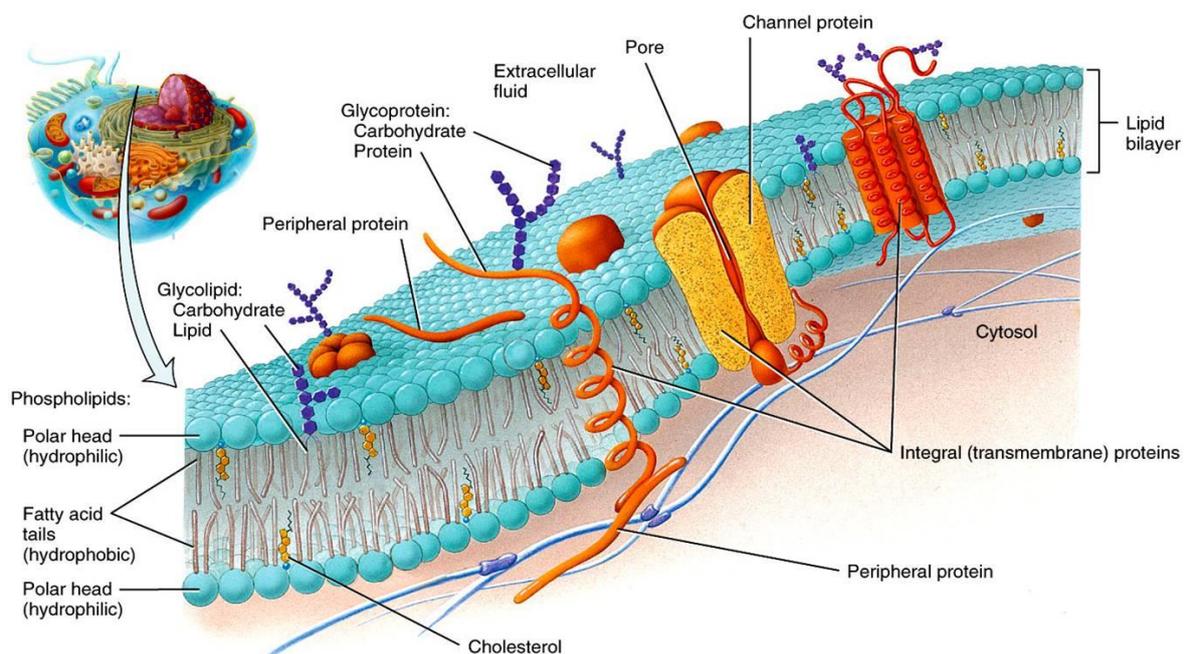
3-Carbohydrates are also part of the membrane

-Glycoproteins: membrane proteins with a carbohydrate group attached, which protrudes into the extracellular fluid

-Glycolipids: membrane lipids attached to a carbohydrate group

Functions of Membrane Proteins:

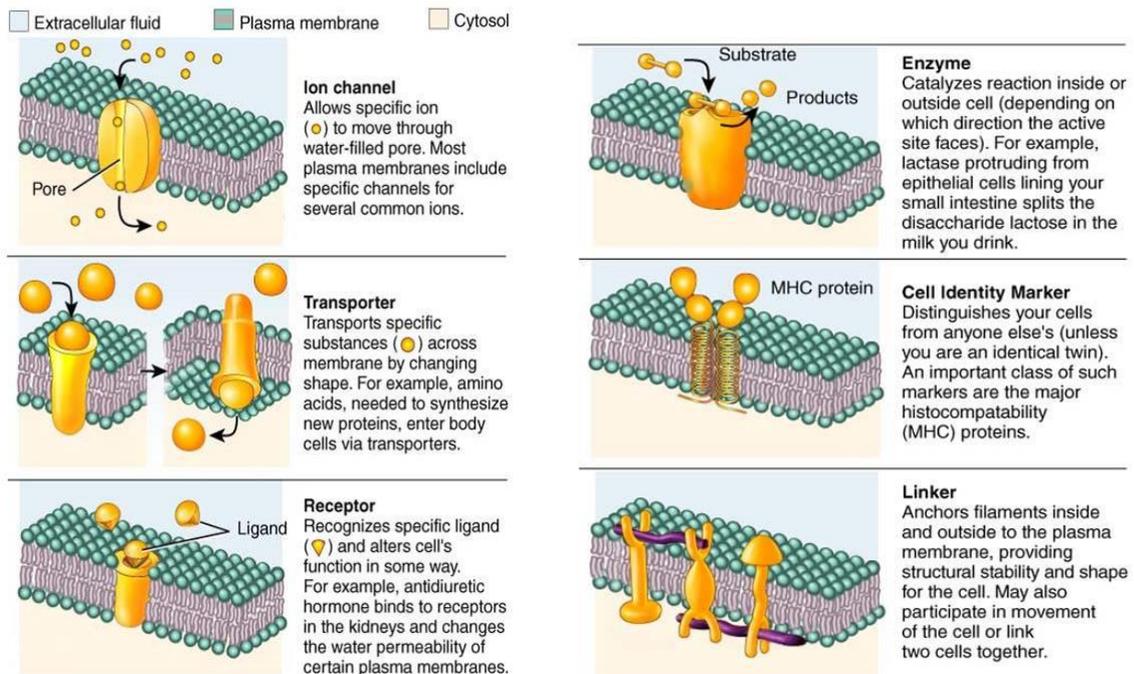
Some integral proteins are **ion channels**



Transporters: selectively move substances through the membrane, especially hydrophilic substances because hydrophobic substances can pass directly through the membrane

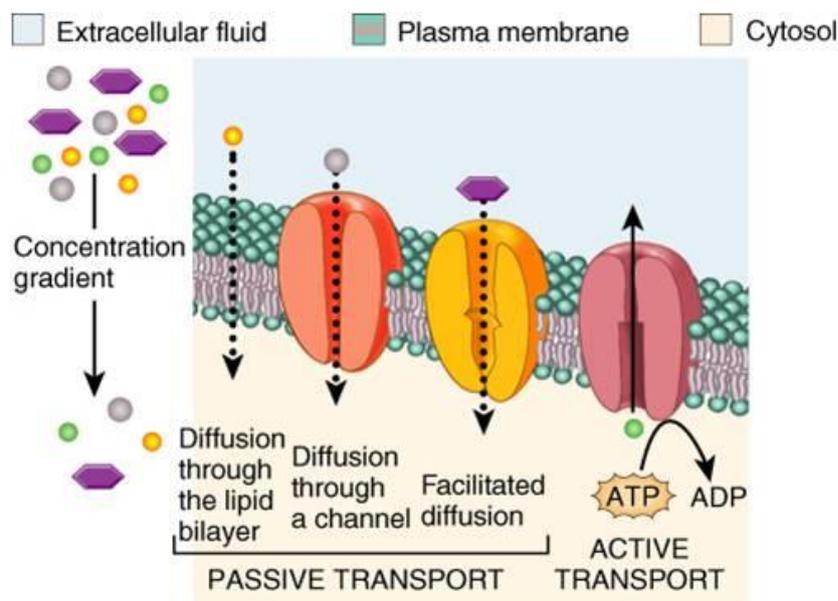
Receptors: for cellular recognition; a ligand is a molecule that binds with a receptor

Enzymes: catalyze chemical reactions, others act as **cell-identity markers**



Transport mechanisms:

-Active transport (Uphill transport): Cell uses energy, primarily from the breakdown of ATP, to move a substance across the membrane against a concentration gradient.



-Passive transport (downhill transport): Substances move across cell membranes without the input of any energy, and it is 3 kinds:

1) Simple diffusion: for the hydrophobic substances through the membrane, it is directly proportional to the difference in concentrations, solubility on lipid and the surface area. And it's inversely proportional to size of the molecule and the thickness of membrane.

2) Facilitated transport (carrier mediated transport): for the hydrophilic substances that can't pass through the membrane directly. Facilitated diffusion is saturable because the binding sites are limited and has transport maximum.

3) Osmosis: movement of water through a selectively permeable membrane from an area of high concentration of water to one of lower concentration of water.

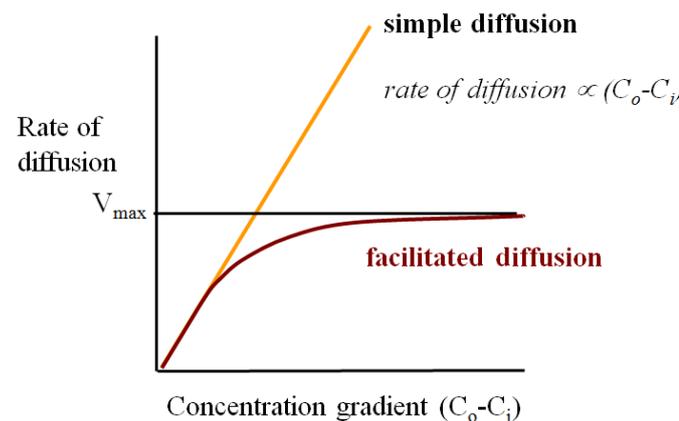
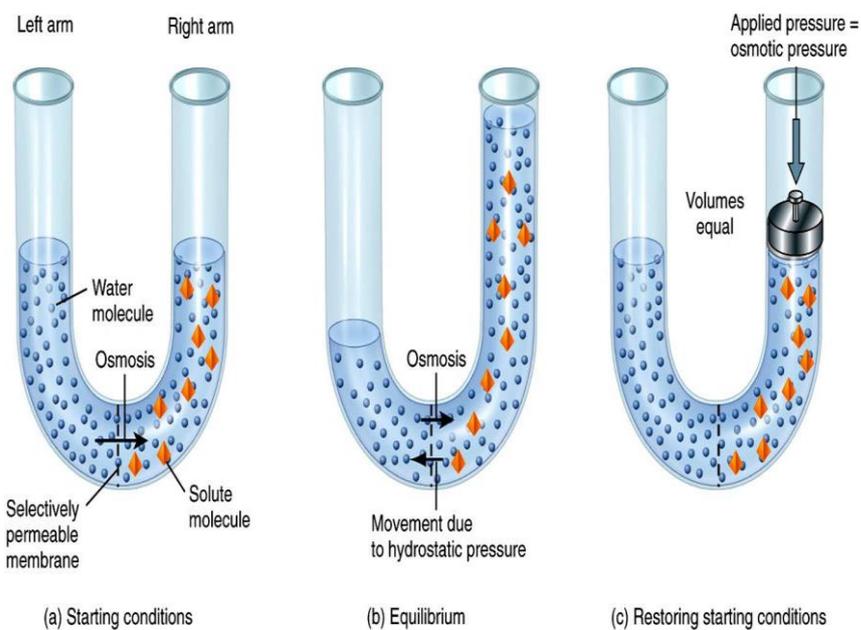


Figure 03.08 Tortora - PAP 12/e
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