

## Topic list for Exam 2 – partial list

### Chapter 5

1. Functions, properties and components of the plasma membrane

The **plasma membrane** is usually the **outermost barrier of the cell**. The plasma membrane (Fig 5-1)

The plasma membrane **contains the cell but still allows the cell to interact with the environment**.

The plasma membrane functions:

1. **Isolate the cell environment**
2. **Regulate exchanges between inside and outside**
3. **Communicate with other cells**
4. **Create attachments with other cells**
5. **Regulates bio chemicals with other cells**

-Plasma membrane is the **membrane at the boundary of every cell that acts as selective barrier** thereby **regulating the cell's chemical environment**.

2. Fluidity of membranes

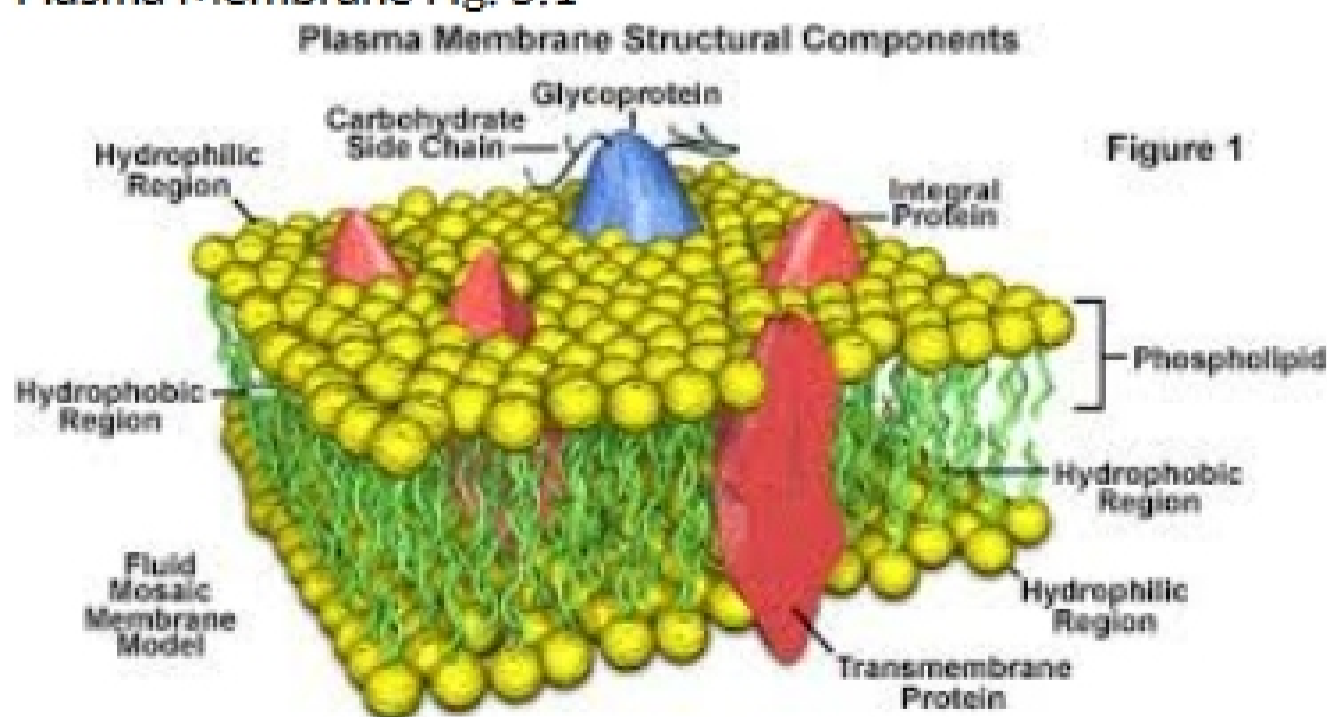
**Singer and Nicolson: FLUID-MOSAIC MODEL** - each membrane consists of a mosaic of proteins that constantly shift and flow within a fluid formed by a double layer of phospholipids

Factors which **influence fluidity of membranes** Fig. 5.4

**- lipid composition -**

**- temperature**

3. Plasma Membrane Fig. 5.1



4. Membrane proteins (Receptor, recognition, carrier, and channel)

**Some functions of Integral membrane proteins**

Transport proteins

-channel proteins - pores

-carrier proteins - selective revolving doors (Carrier proteins bind and release specific molecules)

Receptors

Cell to cell recognition - Some of the recognition keys of the surface of cells are glycoproteins, these are unique and identify the cells as self-cells

(**Glycoproteins** are proteins which have a carbohydrate attached to them.)

5. Movement of molecules (concentration gradient, passive transport, diffusion, facilitated diffusion)

How do substances move across membranes? Transport is movement.

**Movement of molecules** requires two factors

1. Movement **must be through a fluid.**  
liquid or gas

2. There **must be a concentration gradient.**

-difference in the amount of molecules from one place to another

**Molecules in a fluid always move.**

**If there is a concentration gradient then the movement has a specific direction.**

Concentration gradient - : The **graduated difference in concentration** of a **solute** per unit distance through a solution (**Diffusion of a dye**)

Passive transport - **Movement down a concentration gradient**

Diffusion - Is the **net movement of a substance down a concentration gradient.**

- movement is from greater concentration to lower concentration
- the greater the concentration difference, the faster the diffusion
- net movement continues until the system reaches equilibrium
- usually occurs over short distances

Much of the movement of substances across membranes occurs by diffusion and therefore is a form of passive transport (Fig. 5.7).

Passive transport is diffusion of a substance across a biological membrane.

- Does not require the cell to expend energy.
- Depends on the permeability of the membrane

## 6. How molecules pass the PM

Membranes are built to be selectively permeable.

--Selective permeability is the property of biological membranes which allows some substances to cross more easily than others.

- Some molecules pass by simple diffusion, others require facilitated diffusion.
- Water, oxygen and carbon dioxide AND lipid-soluble molecules (alcohol, vitamins A, D, and E and hormones) diffusion.
- Ions and sugars form bonds with water and require the aid of transport proteins. Facilitated diffusion.

## 7. Osmosis

- Osmosis is the passive transport of water or diffusion of water across a membrane
- Osmosis is the diffusion of water across a differentially permeable membrane.
- The Principles of Osmosis
  1. Osmosis is the diffusion of water across a differentially permeable membrane.
  2. Water moves from high concentration to low concentration
  3. Dissolved substances decrease the amount of free water molecules

Cellular survival depends on balancing water movement

Comparisons between the solution outside & solution inside cell determine water flow

- o Isotonic environments
- o Isotonic solutions have equal concentrations of solute
- o Hypertonic environment means there is more solute in the solution surrounding the cell
- o Hypotonic environments means there is less solute in environment (more free water)
- ---Isotonic is an equal concentration of solute compared to the inside of a cell.
- ---Hypertonic is a greater concentration of solute than the inside of a cell.
- ---Hypotonic is a lower concentration of solute than the inside of a cell.