Revision of *Biology*

Abbreviation of last two lectures

However , this files are not enough and they do not compensate for all of the information in the book ..

It’s just a study guide that will help you study easily and memorize the most important ideas in the chapter .

Best wishes … Abdullah jamal Al Abbas ..

New words

Ligaments	أربطة
Tendons	أوتار
Stimulus	مؤثر خارجي
Pancreas	بنكرياس
Endocrine glands	الغدد الصماء
Inheritance	وراثة
Anaerobic	لا هوائي
Aerobic	هوائي

Organelles -- عضيات

Pro- بدائي Eu – حقيقي

Karyotic – نووي

Prokaryotic – بدائي النواة

Nuclear membrane (envelope) – الغشاء النووي

Cilium – هدبcilia - أهداب

Flagellum – سوط flagella – أسواط

Pores – ثقوب

Filament -خيط

Skeleton – الهيكل العظمي

Organization of life :

- Atom : smallest unit of an element that retains the properties .
- Molecule : unit of two or more bounded-together atoms of the same element of different elements .
- Cell : smallest unit with the ability to live and reproduce independently or as a part of multicelled organism
- Tissue : organize aggregation of cells and substances functioning together in a specialized activity .
- Organ : structural unit in which tissues combined in specific amount and pattern to perform a common task .
- Organ system : two or more organs interacting chemically , physically or both in ways that contribute to organisms survival .
- Multicelled organism : individual consisting of cells , typically organize in : tissues , organs and organ systems
- Population : group of individuals of the same kind occupying the same area .
- Community : population of all species occupying the same area .
- Ecosystem : community and it's physical environment .
- Biosphere : all regions of the earth's crust , water and atmosphere that sustain life .

- All cells are alike in three ways → Cytoplasm, Nucleus, DNA

- The function of the cell is reflected on its structure that's why few cells are Alike .. (look the same) E.X: the nerve cells are different from the Stomach cells ..

There are two types of microscopes

- Light Microscope → Uses visible light to illuminate the specimen
- Electron microscope → Uses a beam of electrons to create a visible image of the specimen

- The light microscope magnifies from 100 to 400 times of the specimen
- The electron microscope magnifies to 100,1000 times of the original size

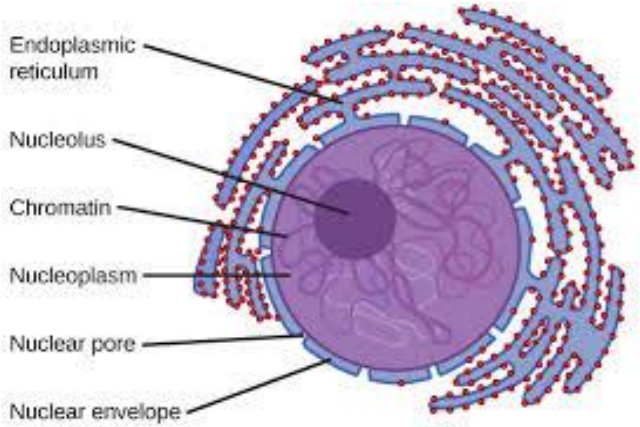
There are two types of electron microscopes

- Transmission (TEM) – investigate the internal Structure of the object .
- Scan (SEM) : to obtain three dimensional View of the object .

Number of membranes	Organelles
Double-bound membrane	Nucleus + mitochondria
Single-bound membrane	Lysosomes – vesicles – food vacuole – Golgi complex – endoplasmic reticulum
No membrane (non-membranous)	Ribosomes – cilia – flagella – Centrioles (cytoskeleton)

- The cell consist of two main compartments : the nuclear and the cytoplasmic

The nuclear compartment contains :



1-nuclear envelop (double membrane)
2- nucleolus
3- nucleoplasm (between the envelope and the nucleolus)
4- genetic material (DNA & RNA)

- Types of proteins according to How they associated with the Membrane :

1- integral :attach to the lipid bilayer and passes through the hydrophobic region , sometimes it forms channels for transport .
2- peripheral : attach to only the head of the lipid bilayer . Usually used for cellular signaling path ways .

- Types of proteins in the cell According to their functions

- Receptor : bind to extracellular substances that deliver certain signals as division , metabolites and hormones (integral + peripheral)
- Recognition protein : Identifier of cell type (self and non-self) (integral)
- Adhesion protein : attachment of cells one another to form tissues (integral)
- Transport protein : transport of molecules and ions across cell membrane (integral)

- Transport proteins and carrier proteins can be both integral and peripheral but they Are usually integral .

- Substances can move into the cell with :

1- simple diffusion : water + lipid-soluble + gases .
2- facilitated diffusion : water-soluble ex: amino acid and glucose .
3- endocytosis with phagocytosis : big molecules and entire cells .
4- active transport : from low to high concentration .

How ATP is produced from mitochondria

- First , glucose inter the cell's cytoplasm which breakdown the glucose to two molecules each with 3 carbons (anaerobic respiration)
- Then , the two molecules inter mitochondria with the presence of oxygen to complete the breakdown of glucose to produce ATP molecules (aerobic respiration)

Glycoprotein : protein + lipids : they are vital to cell survival .

What organelles are there in the prokaryotic cells ?

Any organelle that is membrane-bound structure doesn't appear in the prokaryotic cells
So : mitochondria + vesicles + lysosomes are not included in their structure .

What they do have are : ribosomes(non membranous) + cell wall + plasma membrane + Genetic material + cytoplasm

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- Phospholipids are the basic structure of the plasma membrane .
- Proteins carry out most of the functions of the plasma membrane .

❑ Proteins could be :

- Enzymes : speed up chemical Reactions .
- Play a structural role

❑ Functions of lipids : Energy, Insolation and energy storage, Structural role

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Examples of some proteins in human that play a structural role :

Keratin : found in human hair and nails .

Collagen(the most abundant protein in the human body) : found in the ligaments , tendons and bones .

- Why centrioles don't have the center pair of microtubules ?

Because they are not involved in any kind of movement .

- **What does the crista in the mitochondria do ? (what is the function of it ?)**

It increases the surface area on which chemical reactions take place .

- The three organelles involved in proteins production : RER + ribosomes + Golgi complex

Mitochondria :

It's divided into two compartments : the outer compartment contains DNA and ribosomes
And the inner compartment contains enzymes .

Definitions :

Solute : any substance dissolved in a solution .
Solvent : dissolving medium or any fluid where a substance is dissolved .
Tonicity : is the measurement of osmotic pressure or it is the relative concentration of the solvent in a solution
Isotonic : a balanced solution
Hypertonic : a solutions that has more solute and less solvent
Hypotonic : a solutions that has more solvent and less solute
Hydrophobic : hate water . (the phospholipid's tail)
Hydrophilic : love water . (the phospholipid's head)
Concentration gradient : the difference of concentration between two regions in a solution
Protein : large molecules made of many smaller molecules known as amino acids
Plasma membrane : the outermost part of the cell that holds the cell together and also controls what goes in And out of the cell . It consist of : phospholipids + proteins + carbohydrates
Diffusion : movement of substances from high to low concentration .
Facilitated diffusion : movement of substances from high to low concentration with aid of carrier proteins .
Active transport : movement of substances from low to high concentration (need ATP)
Passive transport : movement of substances without the presence of ATP molecules .
Mitochondria : organelles in which cellular energy production take place .

TABLE 3-1 Overview of Cell Organelles

Organelle	Structure	Function
Nucleus	Round or oval body; surrounded by nuclear envelope	Contains the genetic information necessary for control of cell structure and function; DNA contains hereditary information.
Nucleolus	Round or oval body in the nucleus consisting of DNA and RNA	Produces ribosomal RNA
Endoplasmic reticulum	Network of membranous tubules in the cytoplasm of the cell. Smooth endoplasmic reticulum contains no ribosomes. Rough endoplasmic reticulum is studded with ribosomes	Smooth endoplasmic reticulum (SER) is involved in the production of phospholipids and has many different functions in different cells; round endoplasmic reticulum (RER) is the site of the synthesis of lysosomal enzymes and proteins for extracellular use.
Ribosomes	Small particles found in the cytoplasm; made of RNA and protein	Aid in the production of proteins on the RER and polysomes
Polysome	Molecule of mRNA bound to ribosomes	Site of protein synthesis
Golgi complex	Series of flattened sacs usually located near the nucleus	Sorts, chemically modifies, and packages proteins produced on the RER
Secretory vesicles	Membrane-bound vesicles containing proteins produced by the RER and repackaged by the Golgi complex; contain protein hormones or enzymes	Store protein hormones or enzymes in the cytoplasm awaiting a signal for release
Food vacuole	Membrane-bound veside containing material engulfed by the cell	Stores ingested material and combines with lysosome
Lysosome	Round, membrane-bound structure containing digestive enzymes	Combines with food vacuoles and digests materials engulfed by cells
Mitochondria	Round, oval, or elongated structures with a double membrane. The inner membrane is thrown into folds.	Complete the breakdown of glucose, producing NADH and ATP
Cytoskeleton	Network of microtubules and microfilaments in the cell	Gives the cell internal support, helps transport molecules and some organelles inside the cell, and binds to enzymes of metabolic pathways
Cilia	Small projections of the cell membrane containing microtubules; found on a limited number of cells.	Propel materials along the surface of certain cells
Flagella	Large projections of the cell membrane containing microtubules; found in humans only on sperm cells.	Provide motive force for sperm cells
Centrioles	Small cylindrical bodies composed of microtubules arranged in nine sets of triplets; found in animal cells, not plants.	Help organize spindle apparatus necessary for cell division

TABLE 3-2 Summary of Plasma Membrane Transport

Process	Description
Simple diffusion	Flow of ions and molecules from high concentrations to low. Water-soluble ions and molecules probably pass through pores; water-insoluble molecules pass directly through the lipid layer.
Facilitated diffusion	Flow of ions and molecules from high concentrations to low concentrations with the aid of protein carrier molecules in the membrane.
Active transport	Transport of molecules from regions of low concentration to regions of high concentration with the aid of transport proteins in the cell membrane and ATP.
Endocytosis	Active incorporation of liquid and solid materials outside the cell by the plasma membrane. Materials are engulfed by the cell and become surrounded in a membrane.
Exocytosis	Release of materials packaged in secretory vesicles.
Osmosis	Diffusion of water molecules from regions of high water (low solute) concentration to regions of low water (high solute) concentrations.