

LYSOSOME

STRUCTURE:

- small membrane vesicles

FUNCTION:

- breaks down large molecules using digestive enzymes.



ENDOPLASMIC RETICULUM

STRUCTURE:

- a system of membranes continuous with the nuclear envelope.

FUNCTION:

- Rough ER - fold and modify proteins
- Smooth ER - produce phospholipids



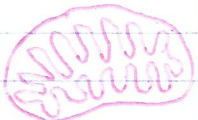
MITOCHONDRIA

STRUCTURE:

- outer membrane and a highly folded inner membrane

FUNCTION:

- creates energy for the cell by converting sugar into ATP.
- contains DNA



GOLGI BODY

STRUCTURE:

- Series of stacked membranes

FUNCTION:

- packages cell products for export.

PLASMA MEMBRANE

STRUCTURE:

- made of phospholipids

FUNCTION:

- selectively permeable (allows some molecules to pass through while blocking others).

CELL WALL

STRUCTURE:

- made of cellulose

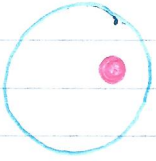
FUNCTION:

- protective layer in plant cells only
- provides strength
- prevents from bursting when storing large amounts of water.

NUCLEOLUS

STRUCTURE:

- round, dark structure inside the nucleus.



FUNCTION:

- ribosome production

VACUOLE

STRUCTURE:

- large fluid storage area.
plants (large) animals (small)



FUNCTION:

- stores mostly water
- stores some waste products & toxins

RIBOSOME

STRUCTURE:

- large subunit and a small subunit



FUNCTION:

- protein production

NUCLEUS

STRUCTURE:

- large, round object
- filled with nucleoplasm

FUNCTION:

- stores DNA as chromatin



CHLOROPLAST

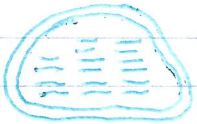
plant cells only

STRUCTURE:

- double membrane with internal discs (thylakoids) organized into stacks (grana) (granum)

FUNCTION:

- site of photosynthesis
- contains a small amount of DNA



LIVING VS. NON-LIVING

CRITERIA FOR LIFE:

- 1) gas exchange
- 2) reproduce
- 3) grow
- 4) composed of cells
- 5) adapt to environment
- 6) acquire energy
- 7) respond to stimuli
- 8) homeostasis

IONIC VS. COVALENT

Ionic - metal⁺ and non-metal⁻
- opposite charges attract

Covalent - non-metal⁻ and non-metal⁻
- like charges repel

PASSIVE TRANSPORT METHODS

NO ENERGY REQUIRED

small molecules

1) Diffusion - high to low concentration

2) Facilitated Diffusion - requires protein channel

3) Osmosis

- a. hypertonic - ^{shrink (LYSIS)} high solutes H_2O out
- b. hypotonic - ^{swell/burst (CRENATION)} low solutes H_2O in
- c. isotonic - solutes equal

ACTIVE TRANSPORT METHODS

ENERGY REQUIRED (ATP)

large molecules

1) Na/K pump - $3Na^+$ out, $2K^+$ in

2) Endocytosis - cell engulfs large particles

a. Phagocytosis

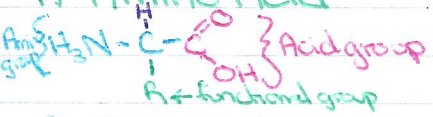
b. Pinocytosis

3) Exocytosis - moves large molecules out of the cell.

BIOLOGICAL MOLECULES: PROTEINS

Functions: O₂ transport (hemoglobin) muscle contraction (actin, myosin)
 Structure (collagen, keratin) enzymes (lactase)

1) Amino Acid



2) Polypeptide - chain of amino acids

3) Primary, Secondary, Tertiary, Quaternary Structure

Primary - peptide bonds
 Secondary - hydrogen bonds
 Tertiary - disulfide bonds
 Quaternary - covalent bonds

BIOLOGICAL MOLECULES: CARBOHYDRATES

1) Monosaccharide - monomer carbohydrate



2) Disaccharide - monomer monosaccharide

glucose + glucose $\xrightarrow{\text{dehydration synthesis}}$ maltose + H₂O
 maltose - 2 glucose monomers
 sucrose - glucose + fructose
 lactose - glucose + galactose

3) Polysaccharide - monomer monosaccharides

starch - plants } energy storage
 glycogen - animals }
 cellulose - plants } structure
 chitin - animals } support

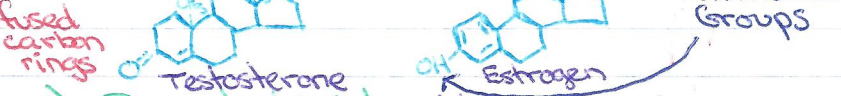
BIOLOGICAL MOLECULES: LIPIDS (FATS & OILS)

Hydrophobic (Glycerol) + 3 Fatty Acids
 Functions: Long term energy storage, insulation, components of cell membrane.

1) Triglyceride

saturated - no double bonds (animal fats)
 unsaturated - double bonds (oils)

2) Steroid



3) Phospholipid - make up cell membrane



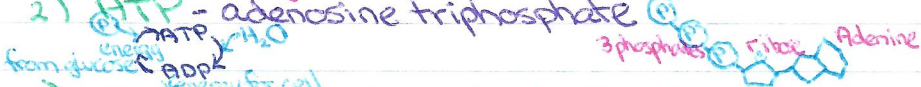
BIOLOGICAL MOLECULES: NUCLEIC ACIDS

Functions - store and transmit genetic information, usable energy currency within the cell.

1) **Nucleotide** - form polymers through dehydration synthesis



2) **ATP** - adenosine triphosphate



3) **DNA** - deoxyribose, double strand

Nitrogen bases - A, G, C, T located in nucleus

4) **RNA** - ribose, single strand

Nitrogen bases - A, G, C, U located in nucleus, cytoplasm

ACIDS VS. BASES

Acids - H^+

Bases - OH^-