

TOPIC 1: LIFE FUNCTIONS / CYTOLOGY

1. Life Functions: (R R R G E N T S)

Reproduction - making more members of a species.

- Asexual: **ONE parent/cell - daughter clls genetically identical.**

- Sexual: **TWO parentS/cells - offspring genetically identical.**

Regulation - to **CONTROL** and **COORDINATE**
- nervous + endocrine systems

Respiration - making **EN-ER-GY** or **ATP**.

Growth - to repair and replace cells (**mitosis**)

Excretion - removal of METABOLIC/Cellular wastes.

Nutrition - the **taking in** and **breaking** down of food

Transport - the **ABSORPTION** and **CIRCULATION** of materials around an organism.

Synthesis - to **MAKE, BUILD, and CREATE** “stuff”

2. **HOMEOSTASIS** - the ability of an organism to *maintain a stable internal environment.*

3. **Metabolism** - the **sum of all the chemical reactions** that occur within the cells of an organism.

4. **Organic** molecules contain both **C** and **H** / Example: **C₆H₁₂O₆**

5. Biological Organization

[*smallest*] Cells → Tissues → Organs → Organ Systems → Organism [*biggest*]

6. Organelles - small parts that make up a cell
- each has at least one specific function

- (a) Nucleus - control center of the cell (*brain*); contains DNA

Organization of the Nucleus:

[*smallest*] Nucleotide → DNA → Gene → Chromosomes → Nucleus [*biggest*]

- (b) Ribosome - site of protein synthesis

- (c) Vacuole - stores waste and water (*large in plant cells*)

- (d) Mitochondria - where energy (ATP) is made by respiration

Formula for Cellular Respiration:

glucose + oxygen → carbon dioxide + water + ENERGY (ATP)



- (e) Chloroplast - only in plant cells; where glucose (sugar) is made by photosynthesis

Formula for Photosynthesis:

carbon dioxide + water → glucose + oxygen



- (f) Cell Membrane - controls what comes in and goes out of the cell
(*plasma membrane*) - selectively permeable

7. Cell Membrane

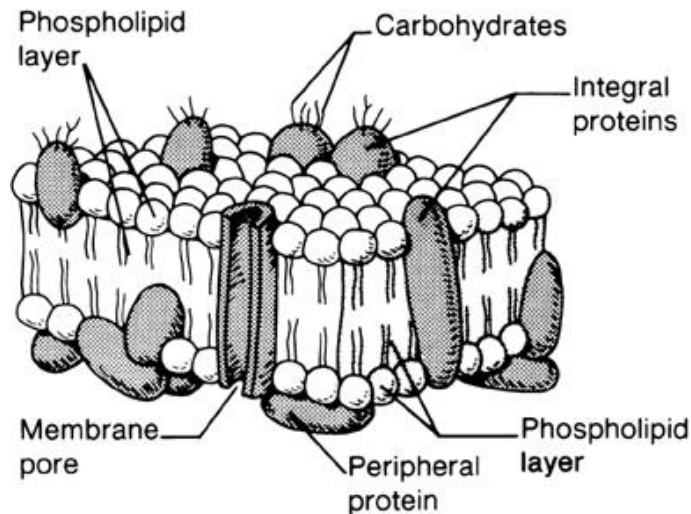
(a) separates the contents of the cell from the outside environment

(b) controls the transport of materials into and out of the cell.

(c) Receptors - recognizes other cells and chemical signals.
(hormones and neurotransmitters)

Fluid-Mosaic

Model of the Cell Membrane



8. Diffusion - movement of molecules from areas of HIGH concentration () to areas of LOW concentration ().

9. Active Transport - uses ENERGY () to move molecules from a LOW concentration to a HIGH concentration.

10. Digestion - breaking large molecules down into smaller molecules.

(a) Proteins are broken down into amino acids.

(b) Carbohydrates are broken down into glucose.

Complex Sugars \longrightarrow Simple Sugars
Polysaccharides \longrightarrow Monosaccharides

(Can easily enter cells.)