

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 cells 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. **H**OMEOSTASIS - the ability of an organism to *maintain a stable internal environment.*

3. **M**etabolism - 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*)
(Contractile Vacuole in paramecium)

- (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

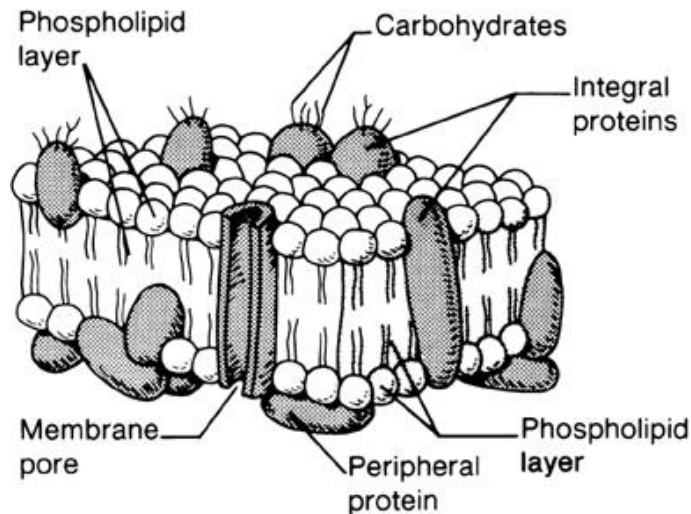
(a) separates the contents of the cell from the outside environment

(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**.

