

Chapter 3 Notes

Cells

❖ Introduction:

A. Each human cell has:

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B. Within the cytoplasm are specialized _____ that perform specific functions for the cell.

1. Cell Membrane:

A semi-permeable phospholipid bilayer with embedded proteins

2. Cytoplasm:

It's a clear liquid (cytosol=70% water)

3. Nucleus:

It's a membrane bound chromatin (DNA)

4. Nuclear envelope:

A double membrane with nuclear pores

5. Nucleolus:

Concentrated area of chromatin, RNA & proteins inside nucleus

6. Ribosomes:

Protein & RNA subunits found in cytoplasm and rough ER

7. Endoplasmic reticulum (ER):

- i. _____ contains ribosomes and functions in protein synthesis.
- ii. _____ has no ribosomes and functions in lipid synthesis.

It's a network of membranous sacs & canals attached to the nuclear envelope.

8. Golgi apparatus:

Enzyme-filled stacks of membranous sacs

9. Mitochondrion:

It's a membrane within membrane (forms cristae=folds) .

10. Lysosomes:

Membrane bound vesicles that contain digestive enzymes

11. Vacuole:

It's a membrane bound sac.

12. Centrioles:

Two hollow cylinders made up of microtubules

13. Cytoskeleton:

A mixture of microtubules & actin filaments

14. Cilia :

short hair-like structures made up of microtubules on the free surface of the cells

15. Flagellum :

long whip-like structure made up of microtubules

Movements Through Cell Membranes

A. All human cells, despite varied shapes and sizes, have a _____.

Plasma membrane is composed of:

1.

2.

3.

B. The phospholipid molecule has:

1. _____—**hydrophilic** (water loving) and face **outward**, where they encounter watery environment.

2. _____—**hydrophobic** (water-fearing) and face **inward**, where there is no water.

C. Substances move through cell membrane via:

1. _____ transport:
requires no energy from the cell
2. _____ transport:
requires cellular energy

D. Passive Mechanisms

1. Diffusion =

Ex: lipid-soluble molecules and gases

2. Facilitated Diffusion =

Ex: glucose and some ions

3. Osmosis =

- a. _____ = solution with the same osmotic pressure as body fluids; (cell stays same)
- b. _____ = solution with higher osmotic pressure (very little water) than body fluids; (cell shrinks)
- c. _____ = solution with lower osmotic pressure (lots of water) than body fluids; (cell swells)

4. Filtration =

C. Active Mechanisms

1. Active Transport =

Ex: amino acids, sodium, potassium... (and glucose)

2. Exocytosis =

3. Endocytosis =

- Types of Endocytosis

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-
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Cell Division

A. Every human begins life as a single fertilized cell.

1. Zygote =

2. The zygote then begins to divide by _____into exact duplicate “stem cells”.

- *these first cells will be the basis for all future cells in the human body.*

3. The cells will later _____ = specialize and take on different jobs.

- How does this work?

- Why do cells divide by mitosis?

B. Reasons for mitosis:

- Growth of an organism
- Replacement of cells

The Cell Cycle

C. Cell cycle

D. The cell cycle consists of

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- B. Interphase
1. G₁ phase =
 2. S phase =
 3. G₂ phase =

C. Mitosis

1. Prophase:
2. Metaphase:
3. Anaphase:
4. Telophase:

D. Cytokinesis

Cell Cycle

- Interphase
- Prophase
- Metaphase
- Anaphase
- Telophase
- Cytokinesis

E. Your body cells have a predetermined maximum number of times to divide.

F. **Apoptosis:**

G. Characteristics of the Cancer

1. **Hyperplasia** =

2. **Dedifferentiation** =

3. **Invasiveness** =

4. **Angiogenesis** =

5. **Metastasis** =