

CHAPTER 2 : THE CELL:

CELL - The basic unit of living structure and function. The adult human body consists of more than 50 trillion cells. It is about 60% water, bathed by a solution called **INTERSTITIAL FLUID**. They differ in shape and function.

CELL PARTS:

1. **NUCLEUS** - located at the center of the cell. Control center of the cell. Contains the genetic material

2. **CYTOPLASM** - semi - fluid that surrounds the nucleus. Site of cellular activities.

A. **Cytosol** - semi-transparent fluid that suspends other elements, water is the main component.

B. **Organelles** - metabolic machinery; specialized compartments each performing its own function to maintain the life of the cell.

➤ **Ribosomes** - round dark bodies ; sites of protein synthesis.

➤ **Endoplasmic Reticulum (ER)** - fluid filled cisterns (tubes or canals); serves as a mini circulatory system for the cell.

2 forms : **Rough ER** - studded with ribosomes; export protein products

Smooth ER - no ribosomes; for cholesterol breakdown, fat metabolism and detoxification of drugs.

➤ **Golgi Apparatus** - flat apparatus: sort proteins for transport for specific locations (mailing tag for proper destination.)

➤ **Lysosomes** - for intracellular digestion; present in WBC that engulf bacteria and harmful substance. (pacman effect) ☞

➤ **Peroxisomes** - sacs that detoxify poisonous substances (eg. Alcohol)

➤ **Mitochondria** - powerhouse of the cell. Energy.

➤ **Centrioles** - used in cell division.

Inclusions - substances that may or may not be present.

Eg. Melanin in skin / Melatonin

3. **PLASMA MEMBRANE** - encloses the cell. A layer of proteins and phospholipids. > (semi-permeable) specializations:

➤ **Microvilli** - fingerlike projections used for absorption.

➤ **Junctions** - meeting point.

a. **tight junctions** - impermeable; prevents passage of substances. (eg. Small intestines - prevent seeping into the bloodstream.)

b. **desmosomes** - anchoring junctions (eg. Skin cells - prevent from being pulled apart that cause stress.)

c. **gap junctions** - allow communication between cells.

TRANSPORT - materials that enter and leave the cell (for a cell to stay alive).

1. **DIFFUSION** - movement from an area of higher to lower concentration.

2. **Osmosis** - movement through a semi-permeable membrane.

a. **hypertonic solution** - loses too much water. Shrink.

b. **Hypotonic solution** - absorb too much water. Swell.

c. **Isotonic solution** - equal. (eg. Hospitalized - isotonic sol. Replenish fluids in the cell.)

3. **BULK TRANSPORT** - too large to cross the membrane.

a. **endocytosis** - folds into a pouch then encloses the particles

b. **Pinocytosis** - cell drinking. Water droplets.

c. **Phagocytosis** - Engulfs food (solid materials).

d. **Exocytosis** - opposite of endocytosis. Wastes leave the cell.

MITOSIS - cell division; should produce same material with the original cell.

STAGES:

1. Prophase

2. Metaphase

3. Anaphase

4. Telophase

CONTROL OF MITOSIS / TUMORS AND CANCER:

Causes of abnormal changes in cell:

1. heredity

2. certain chemicals

3. radiation

TUMOR - abnormal growths.

a. **benign** - cells stay together, removed by surgery.

b. **Malignant** - cells break free, migrate to new locations if touched.

CANCER - spread of malignant cells to new locations; abnormal size, shape and abilities (invade normal cells)

TREATMENT - chemotherapy or radiation therapy.