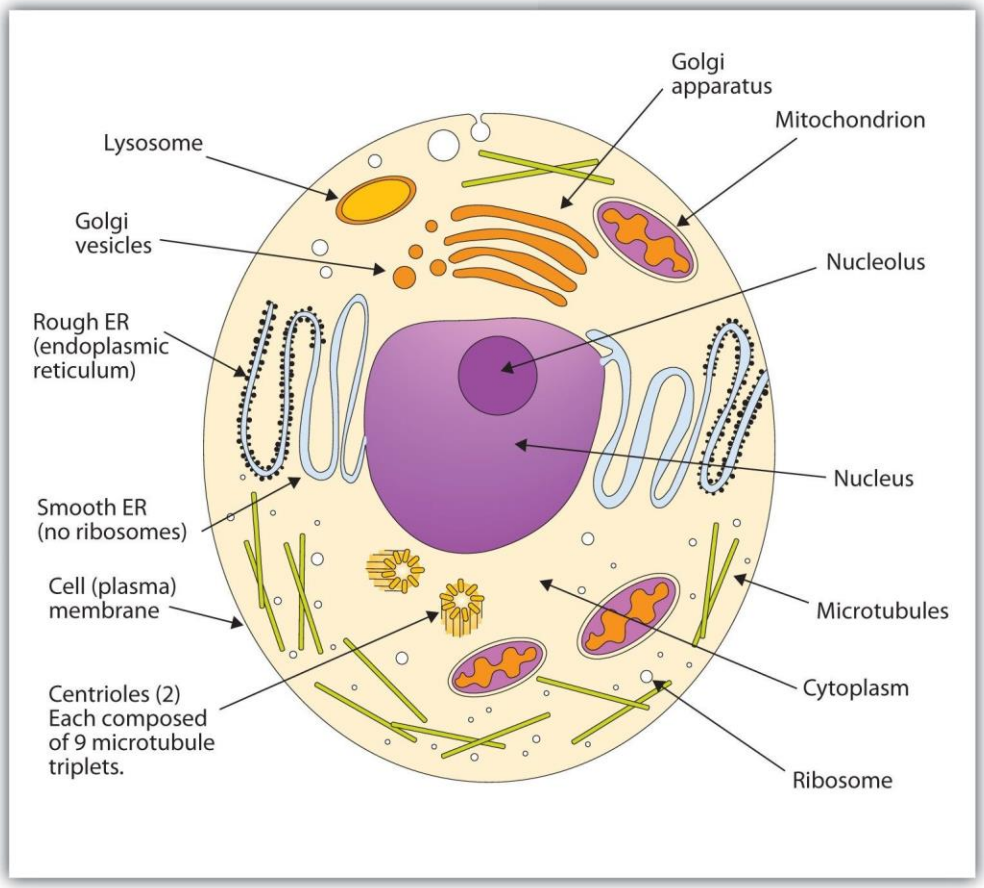
STRUCTURE OF THE BODY

Human cells are the basic structural and functional units of the human body. There are many different types of cells, each with specialized structures and functions. Here's an overview of the typical structure and functions of a eukaryotic human cell:



Cell Structure:

Cell Membrane (Plasma Membrane):

Structure: Phospholipid bilayer with embedded proteins.

Function: Controls the passage of substances in and out of the cell.

Cytoplasm:

Structure: Gel-like substance filling the cell.

Function: Supports and suspends cellular organelles.

Nucleus:

Structure: Membrane-bound structure containing genetic material (DNA).

Function: Controls cellular activities and houses genetic information.

Nuclear Envelope:

Structure: Double membrane surrounding the nucleus.

Function: Regulates passage of materials between the nucleus and cytoplasm.

Nucleolus:

Structure: Dense region within the nucleus.

Function: Synthesizes ribosomal RNA (rRNA) and assembles ribosomes.

Endoplasmic Reticulum (ER):

Structure: Network of membranes.

Function: Rough ER (with ribosomes) synthesizes proteins, while smooth ER is involved in lipid synthesis and detoxification.

Ribosomes:

Structure: Small, non-membranous structures.

Function: Site of protein synthesis.

Golgi Apparatus (Golgi Complex):

Structure: Stacked membranes.

Function: Modifies, sorts, and packages proteins for transport.

Mitochondria:

Structure: Double-membraned organelles.

Function: Site of cellular respiration; produces ATP (energy).

Lysosomes:

Structure: Membrane-bound vesicles containing enzymes.

Function: Breaks down and recycles cellular waste and debris.

Cytoskeleton:

Structure: Network of protein filaments (microfilaments, intermediate filaments, microtubules).

Function: Provides structural support, helps in cell movement and transport.

Centrioles:

Structure: Paired cylindrical structures.

Function: Involved in cell division (formation of spindle fibers).

Cell Junctions:

Desmosomes, Tight Junctions, Gap Junctions.

Function: Provide structural support, facilitate communication between cells.

Cell Functions:

Cellular Respiration:

Occurs in Mitochondria.

Function: Generates ATP through the breakdown of glucose.

Protein Synthesis:

Occurs in Ribosomes (and Rough ER)

Function: Assembles proteins based on genetic instructions.

DNA Replication and Transcription:

Occurs in the Nucleus

Function: Copies and transcribes genetic information.

Cell Division:

Mitosis and Meiosis.

Function: Reproduction, growth, and tissue repair.

Transport of Materials:

Across Cell Membrane.

Function: Regulates the movement of substances in and out of the cell.

Intracellular Signaling:

Involves Receptors and Signaling Molecules.

Function: Coordinates cellular activities and responses.

Catabolism and Anabolism:

Involves Various Organelles.

Function: Breaks down and builds up molecules for energy and cellular processes.