

Cell Structure

Each cell in eukaryotes is divided into two major parts: the nucleus + the cytoplasm.

The cytoplasm is the portion of the cell outside the nucleus.

Specialized structures within cells act like organs and are known as organelles.

Nucleus - The nucleus contains nearly all the cell's DNA and with it coded instructions for making proteins + other important molecules.

Nucleolus - The small dense region of the nucleus where the assembly of ribosomes begins.

Ribosomes - proteins are assembled on ribosomes which are small particles of RNA + protein. Ribosomes produce proteins by following coded instructions from DNA.

Endoplasmic Reticulum - internal membrane system where materials are synthesized.

(Rough ER) - synthesis of proteins with ribosomes takes place on this portion

(Smooth ER) - absence of ribosomes, synthesis of lipids, carbohydrates, + other tasks take place here

Golgi Apparatus - This organelle modifies, sorts, and packages proteins and other materials from the endoplasmic reticulum for storage in the cell or release from the cell.

Vacuoles - store materials like water, salts, proteins, and carbohydrates.
Plants have a large central vacuole.

Vesicles - small membrane enclosed structures that store and move materials.

Lysosomes - organelles filled with enzymes that break down lipids, carbohydrates, and proteins into smaller molecules that can be removed from the cell.

Cytoskeleton - internal network of protein filaments that helps the cell maintain its shape and is also involved in movement.

- microtubules - hollow structures made of proteins known as tubulins → important in cell division.
- microfilaments - threadlike structures made of actin → important in cytoplasmic movement

Chloroplasts - capture energy from sunlight and convert it to food that contains chemical energy in a process called photosynthesis.

Mitochondria - convert chemical energy stored in food into compounds that the cell can use (ATP).
Almost all mitochondria come egg cells (or from Mom)!

Two membrane structures contain some DNA

= endosymbiotic theory: once were prokaryotic cells that lived independently.