Microscopes reveal the world of the cell

Electron microscopes (EM)

SEM

TEM
Most cells are microscopic

Prokaryotic cells are structurally simpler than eukaryotic cells

Eukaryotic cells are partitioned into functional compartments (Animal)
The structure of membranes correlates with their functions

Cell structures that involve in manufacturing and breakdown

- The Nucleus
- Ribosomes
- The endoplasmic reticulum
- The Golgi apparatus
- Lysosomes
- Vacuoles
The nucleus is the cell's genetic control center:

- Two membranes of the nuclear envelope
- Nucleolus
- Chromatin
- Pore
- Endoplasmic reticulum
- Ribosomes

Overview: Many cell organelles are connected through the endomembrane system:

- Many of the membranes of the eukaryotic cell are part of an ENDOMEMBRANE SYSTEM.
- Some of these membranes are physically connected and some are related by the transfer of membrane segments by tiny VESICLES.

Ribosomes make proteins for use in the cell and export:

- ER
- Cytoplasm
- Endoplasmic reticulum (ER)
- Free ribosomes
- Bound ribosomes
- TEM showing ER and ribosomes
- Diagram of a ribosome

\[ 	ext{Ribosomes make proteins for use in the cell and export.} \]
The endoplasmic reticulum is a biosynthetic factory

Rough ER: Synthesis, modification, and packaging of a secretory protein

The Golgi apparatus finishes, sorts, and ships cell products
Lysosomes are digestive compartments within a cell.

Vacuoles function in the general maintenance of the cell.

A review of the structures involved in manufacturing and breakdown.
Energy-converting Organelles

- The Mitochondria harvest chemical energy from food.
- The Chloroplast converts solar energy to chemical energy
Mitochondria and chloroplasts evolved by endosymbiosis

The cell's internal skeleton helps organize its structure and activities

Cilia and flagella move when microtubules bend
The extracellular matrix of animal cells functions in support, movement, and regulation.

Three types of cell junctions are found in animal tissues.

Cells walls enclose and support plant cells.
Review: Eukaryotic cell structures can be grouped on the basis of four basic functions

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<th>BASIC FUNCTION</th>
<th>EUKARYOTIC CELL STRUCTURES AND FUNCTIONS</th>
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<tr>
<td>1. Chromatin Formation</td>
<td>Nucleus, nucleolus, nuclear envelope, chromatin fibers</td>
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<td>2. Cell Signaling</td>
<td>Cytoskeleton, plasma membrane, receptor proteins</td>
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<td>3. ATP Production</td>
<td>Mitochondria, chloroplasts, membrane-bound complexes</td>
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<tr>
<td>4. Progeny Cell Division</td>
<td>Endoplasmic reticulum, Golgi apparatus, microtubules</td>
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Regulation of gene expression, intracellular signaling pathways, and cellular differentiation are essential processes that occur in the cytoplasm and at the cell membrane. Understanding the roles of these structures is crucial for grasping the complexity of eukaryotic cell functions.