

Biology

Unit Five

Cell Poster Project

- **Cells:**

The **cell** is the functional basis of life. It was discovered by Robert Hooke who coined the term cell, from Latin *cellula* meaning a small room. It is the smallest unit of life that is classified as a living thing, and is often called the building block of life. Some organisms, such as most bacteria, are unicellular (consist of a single cell). Other organisms, such as humans, are multicellular. Humans have about 100 trillion or 10^{14} cells. The smallest, can be some 4 μm and the longest cell can reach from the toe to the lower brain



stem. The largest known cells are unfertilized ostrich egg cells which weigh 3.3 pounds.

The cell theory, first developed in 1839 by Matthias Jakob Schleiden and Theodor Schwann, states that all organisms are composed of one or more cells, that all cells come from preexisting cells, that vital functions of an organism occur within cells, and that all cells contain the hereditary information necessary for regulating cell functions and for transmitting information to the next generation of cells.

Living organisms can be classified according to the number of cells (multicellular or unicellular), the complexity of the cell (prokaryote, eukaryote) and cell wall.

KINGDOM	NUMBER	COMPLEXITY	CELL WALL
ANIMAL	Multicellular	Eukaryote	None
PLANT	Multicellular	Eukaryote	Cellulose (a polysaccharide)
FUNGI	Mostly multicellular but some unicellular (yeast)	Eukaryote	Chitin (a polysaccharide)
PROTIST	Mostly unicellular but some multicellular	Eukaryote	Most lack a cell wall but some have a polysaccharide or glycoprotein cell wall
ARCHAEA	Unicellular	Prokaryote	Pseudomurein, polysaccharides, and glycoproteins
BACTERIA	Unicellular	Prokaryote	Peptidoglycan

The types of cells can be classified by the presence and the types of organelles if present. Organelles are generally considered to be membrane bound functional units within a cell. Other cellular structures are also used for classification.

All eukaryotic cells have most of the organelles listed below with some exceptions. Plant cells have chloroplasts and a large central vacuole. Some Protist cells contain chloroplasts. Animal cells have centrioles. All cells have ribosomes, cytoplasm, cell membrane, and DNA.

ORGANELLE OR STRUCTURE	FUNCTION	STRUCTURE	KINGDOMS
Chloroplast	photosynthesis	Double-membrane	Plants and protist
Endoplasmic Reticulum	Translation and folding of new proteins and expression of lipids	Single membrane	Eukaryotes
Golgi apparatus	Sorting and modification of proteins	Single membrane	Eukaryotes
Lysosome	Digests all kinds of organic macromolecules	Single membrane	Eukaryotes
Mitochondrion	ATP synthesis	Double membrane	Eukaryotes
Nucleus	DNA maintenance and transcription	Double membrane	Eukaryotes
Vacuole	storage	Single membrane	Eukaryotes
Vesicle	Material transport	Single membrane	Eukaryotes
STRUCTURES THAT HAVE NO MEMBRANE			
Centriole	Anchor for cytoskeleton	Microtubule protein	Animals
Nucleolus	Ribosome production	Protein/DNA/RNA complex	Eukaryotes
Ribosome	Translation of RNA into proteins	RNA/protein complex	All cells

- **Assignment:**

1. Create an aesthetically pleasing poster illustrating three types of cells (3 kingdoms).
2. Show a diagram of each cell clearly illustrating the differences in the cells, the complexity of the cell (whether or not it has organelles), and if it has a cell wall, and if so, what type and where the cell wall is located.
3. Include the cell membrane for each cell in its correct position.
4. Illustrate and label all the organelles and structures listed above in their correct position and correct appearance, include their function.

- **Grading:**

1. Three illustrations showing the cells you chose, correctly illustrated and labeled including all items shown above. – 80 points
2. Caption illustrating the different cells you chose as it relates to number of cells in an organism, cell complexity, and cell wall. – 20 points

- **Bonus (10 points):**

Include a diagram of a virus with labels of major parts.