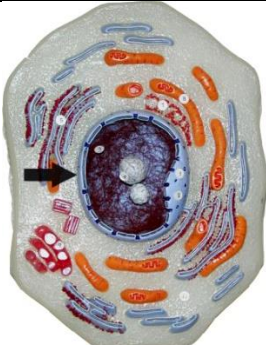


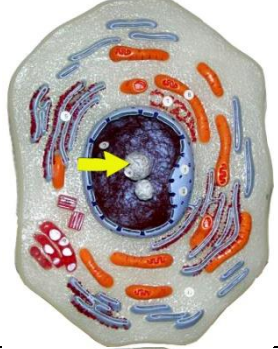
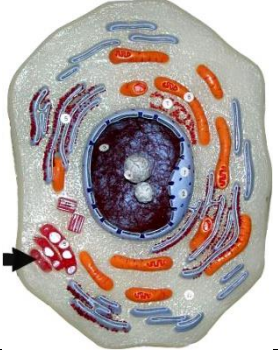
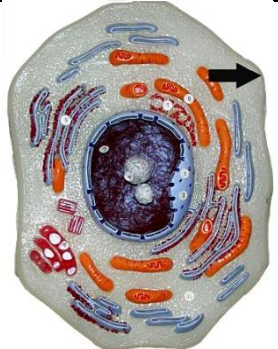
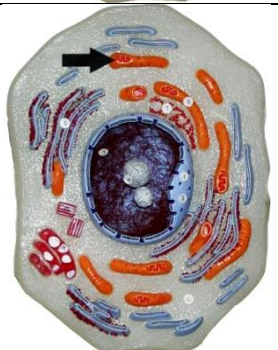

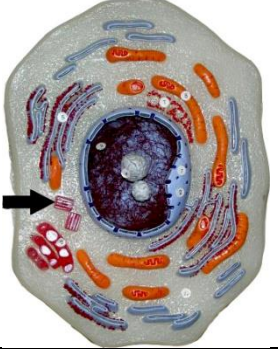


## Eukaryotic Cell Structures: Plant and Animal Cells

The Domain Eukarya includes all organisms whose cells have nuclei. These cells share many other characteristic organelles, but also have organelles or structures that are unique to their evolutionary branch. For the purposes of this module, the activities will focus on plant and animal cells and on the organelles that are easily seen with the light microscope. The table below summarizes the major eukaryotic structures, their functions and whether these structures are found in plant cells, animal cells or both.

Structure (*visible with a light microscope)		Plant Cells, Animal Cells or Both	Function	Composition/Description	Appearance (animal cell)
Nucleus*		Both	Contains the DNA of the cell.	The nucleus is a membrane-bound organelle filled with nucleoplasm. The membrane is called the nuclear envelope.	
	Nucleopore	Both	Nucleopores allow the passage of large molecules from the nucleus.	The envelope is pierced by pores called nucleopores.	
	Chromatin*	Both		In non-dividing cells, chromosomes are present as chromatin. In stained cells, chromatin has a grainy appearance.	

	Nucleoli*	Both	The nucleoli are sites of ribosome synthesis.	The nucleus may contain 1 to several nucleoli. The nuclei are darker staining bodies within the nucleus.	
	Golgi apparatus	Both	The Golgi processes and produces lipids and is important in protein packaging.	The Golgi Apparatus is a system of membranous channels within the cytoplasm. It resembles a stack of pancakes.	
	Plasma membrane*	Both	Maintains homeostasis by controlling the entry and exit of materials.	The plasma membrane is a lipid bilayer with embedded proteins.	
	Mitochondrion	Both	Responsible for cellular respiration. Produces much of the cell's ATP.	Mitochondrion are long cigar-shaped organelles. They have a folded inner membrane, the cristae membrane.	

Endoplasmic reticulum	Both	RER produces proteins. Smooth ER produces lipids.	Extensive system of membranous channels within the cytoplasm that is continuous with the nuclear envelope. The endoplasmic reticulum is described as rough (rough ER) if ribosomes are attached to it and as smooth if there are no attached ribosomes.	
Cytoskeleton	Both	Maintains the shape of cells. Aids internal movement of organelles and vesicles	Composed of microtubules, intermediate filaments and microfilaments.	
Centrioles	Animal	Assist with the separation of chromosomes during cell division.	Composed of microtubules.	
Cilia and flagella*	Both	Allow cells to move or to move fluids along the surface of the cell.	Composed of short or long extensions of microtubules.	
Peroxisomes	Both	Peroxisomes assist with the breakdown of fatty acids and with reactive oxygen species.	Small organelles containing various enzymes, like catalase and peroxidase.	
Lysosomes	Both	Digestive vacuoles that breakdown and recycle molecules and organelles.	Membrane-bound organelle containing lysozyme and other digestive enzymes.	
Cell wall*	Plant	The cell wall provides structure	The cell wall is composed primarily of cellulose.	

		and protection for the cell.		
Central Vacuole, tonoplast*	Plant	The central vacuole maintains cell turgor and is associated with some metabolic functions.	The central vacuole is a large fluid-filled vacuole bounded by a membrane called the tonoplast.	
Chloroplast*	Plant	Chloroplasts are responsible for photosynthesis. They harness light energy to make sugars.	Small, green membrane-bound organelles.	

As mentioned above, many of these structures are not visible or are just barely visible. Mitochondria for example are just barely visible under the microscope. For the activities in this module, you will focus primarily on the larger, more recognizable cell components like the nucleus, nucleolus, cell wall, cytoplasm, chloroplast, central vacuole and cell membrane.