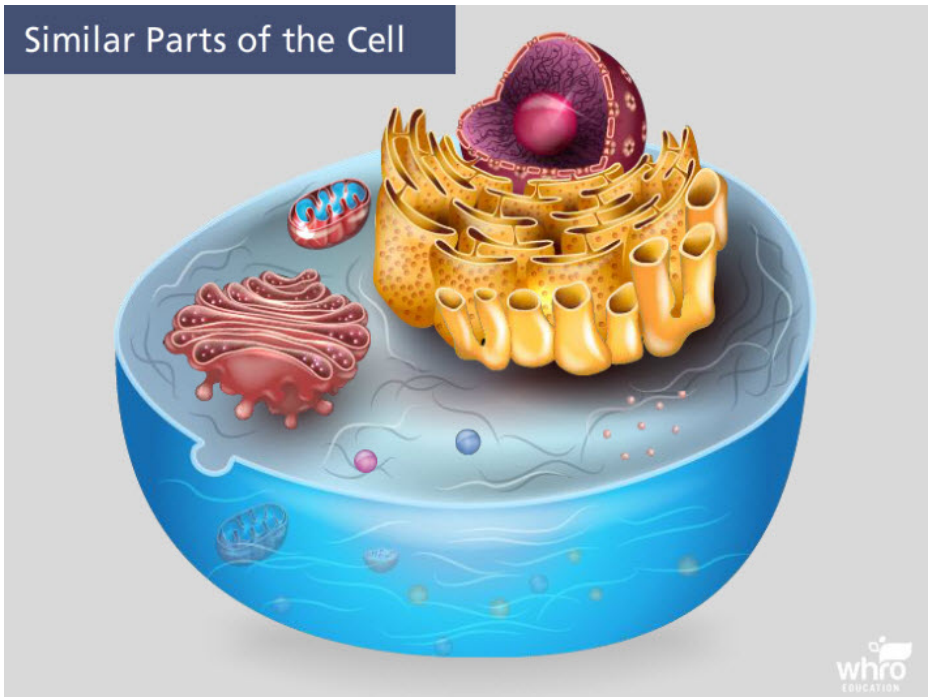
# Module 3: Cell Biology - Structure and Function

## Topic 3 Content: Similar Parts of the Cell Notes

### Introduction




Eukaryotic cells are either animal cells or plants cells. These cells contain certain organelles that perform the same functions.

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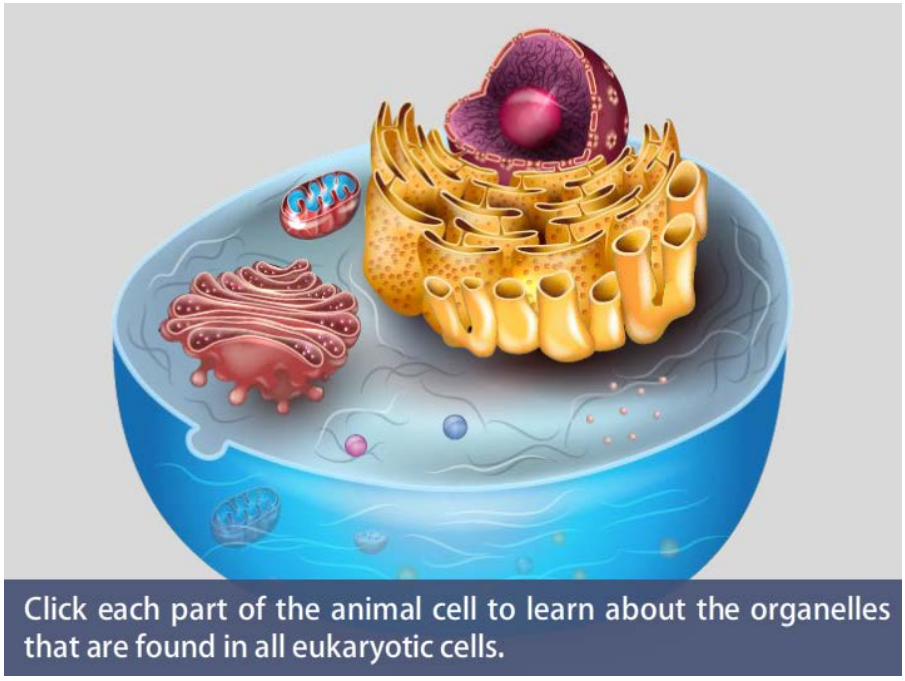
### Instructions




Since both types of eukaryotic cells have the same organelles, you will learn about the functions of these organelles by observing an animal cell. Click each part of the animal cell to learn about the organelles that are found in eukaryotic cells.

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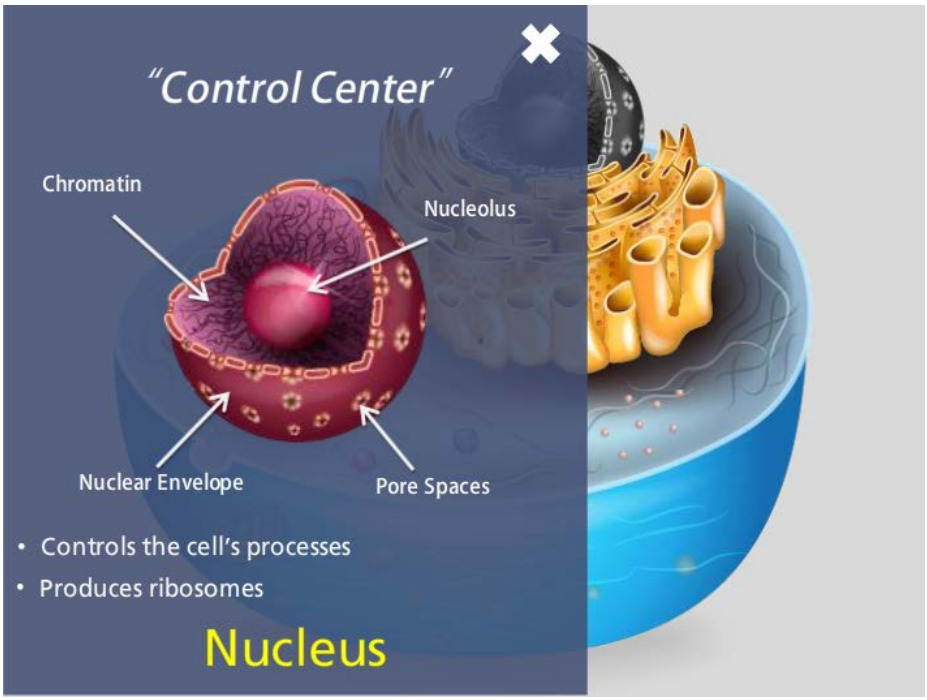
### Nucleus




The nucleus is the control center of the cell because it controls all of the cell's processes. Surrounding the nucleus is a double membrane called the nuclear envelope. There are large pores in the membrane that allow large substances to pass in and out of the nucleus. The DNA, RNA, and proteins that form chromosomes are found in a substance called chromatin that is located in the nucleoplasm. Found in the center of the nucleus is the nucleolus. The nucleolus produces ribosomes.

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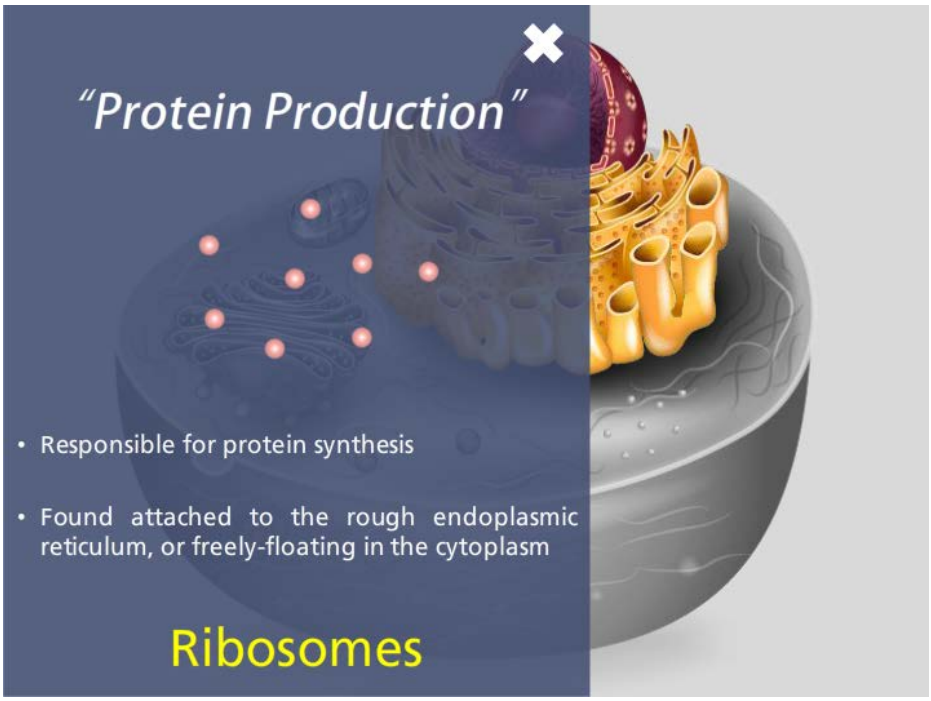
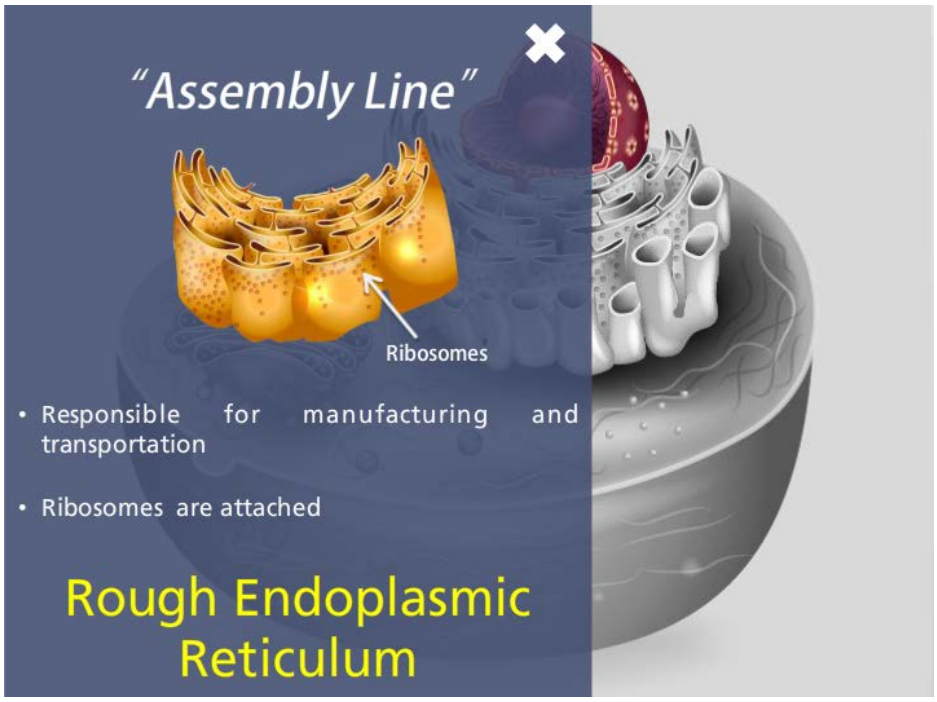
### Ribosome



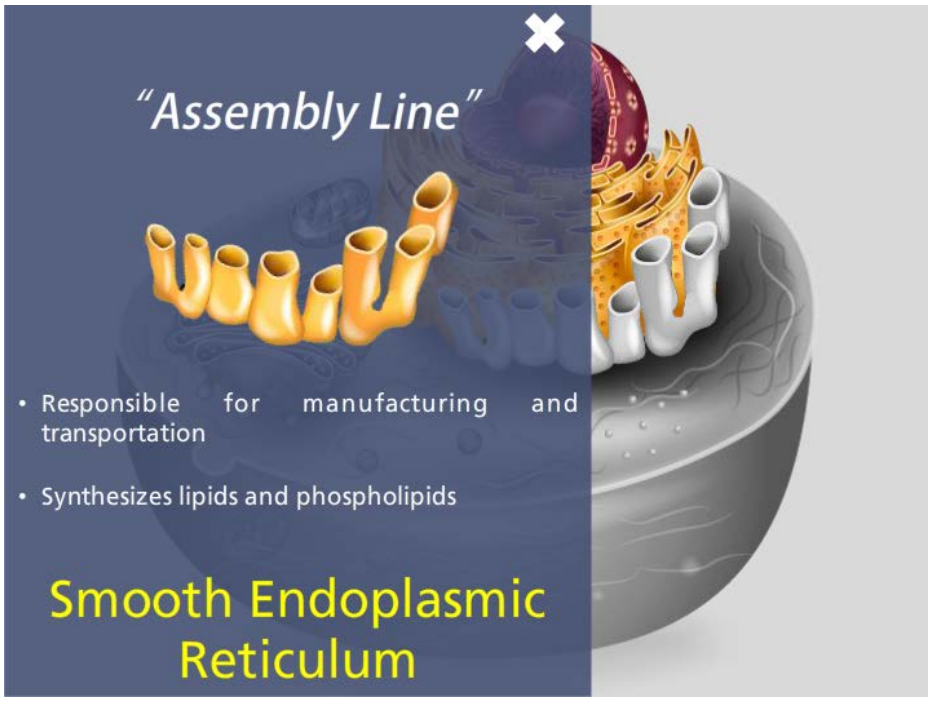

The ribosome produces proteins in the cell. Ribosomes can be found in two locations – either attached to the end of the endoplasmic reticulum or free floating in the cytoplasm. Ribosomes are different from other organelles in that they are not surrounded by a membrane.

## Rough Endoplasmic Reticulum (ER)




The endoplasmic reticulum, ER, is a system of folded membranes. The ER is similar to the assembly line in a factory, where items are manufactured and transported. The rough ER is the part of the ER to which the ribosomes are attached.

## Smooth Endoplasmic Reticulum (ER)




The endoplasmic reticulum, ER, is a system of folded membranes. The ER is similar to the assembly line in a factory, where items are manufactured and transported. The part of the ER where there are no ribosomes attached is called the smooth ER. The smooth ER is where lipids, including phospholipids, are synthesized. The smooth ER also helps to detoxify harmful substances.

## Golgi Apparatus


The Golgi apparatus is where the proteins and other molecules are sorted and prepared for transport to other cells in the body. The Golgi apparatus functions like a packaging plant, and it looks like a stack of pancakes. This flattened sac of membranes modifies and packages proteins into sacs called vesicles. Vesicles join with the cell membrane to release the proteins to the intercellular environment.

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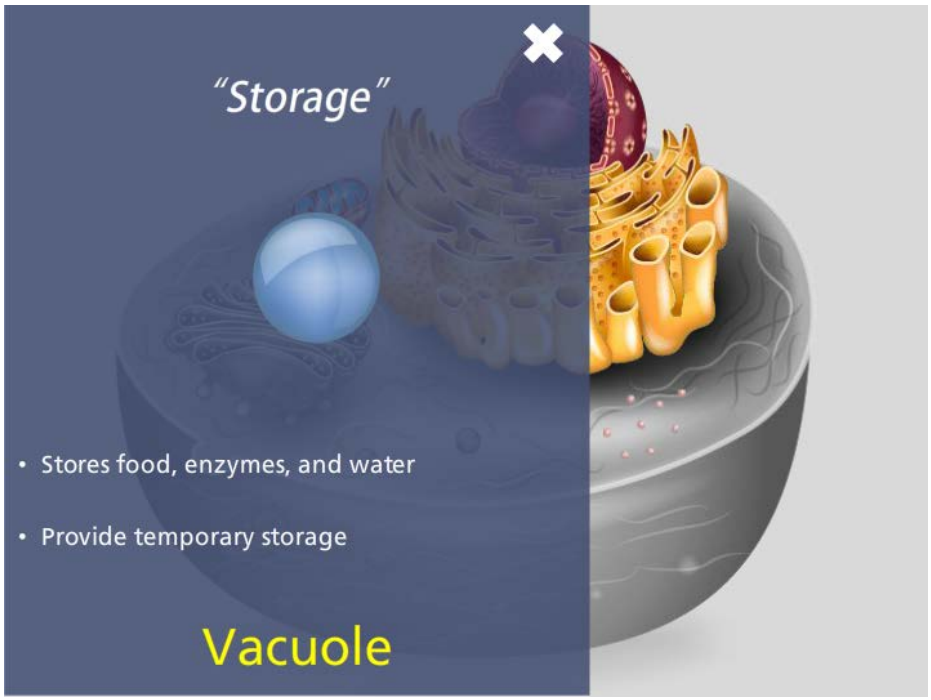
### Vacuole

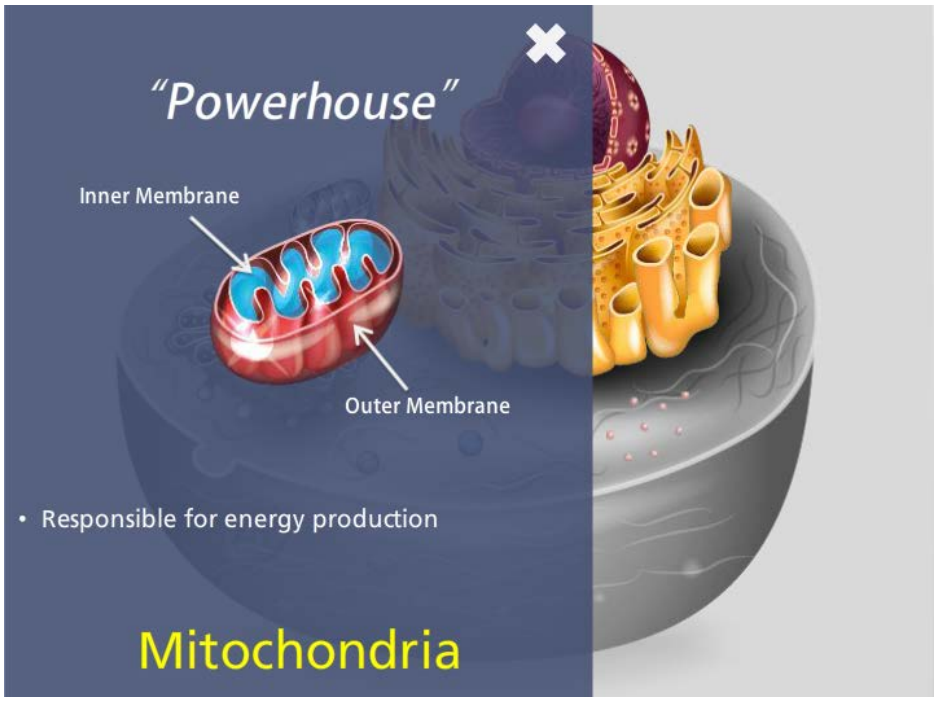



In cells, a vacuole is an organelle that stores food, enzymes, and water. Vacuoles also provide temporary storage.

## Lysosome


A special type of vesicle, called a lysosome, disposes of waste material in the cell. Lysosomes contain digestive enzymes that digest worn out organelles and food particles. Lysosomes join with vacuoles and release enzymes into the vacuole to digest the waste products inside the vacuole.

## Mitochondria




The mitochondria functions as the powerhouse of the cell. This organelle has a double membrane composed of one outer membrane and a folded inner membrane. The many folds of the inner membrane provide a large surface area for breaking the bonds of sugar molecules, which create energy for cellular processes.

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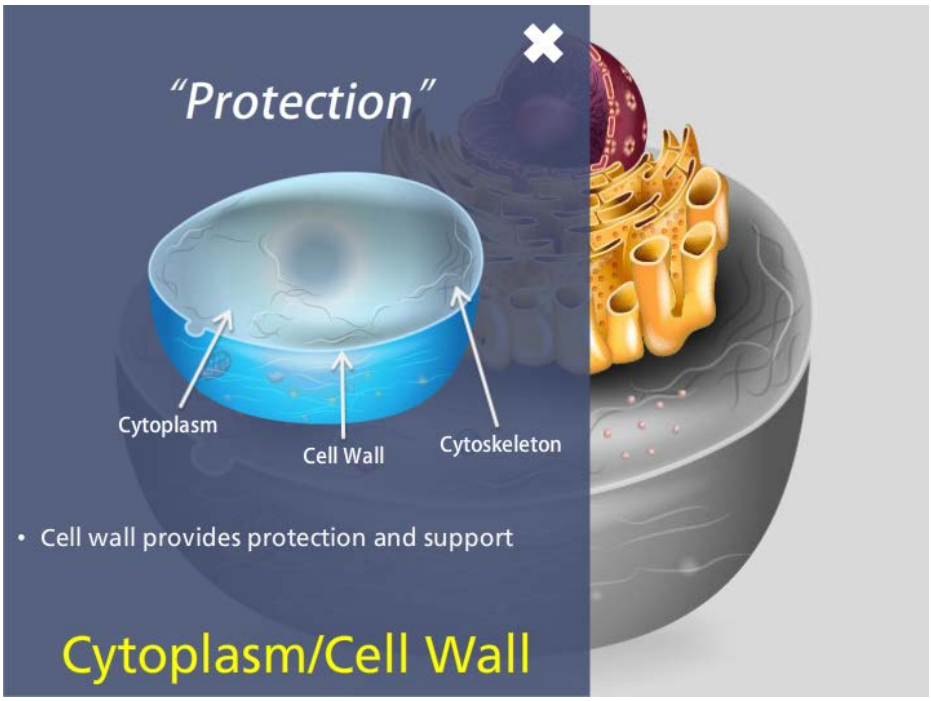
### Cell Membrane




Surrounding the cell is the cell membrane, or plasma membrane. This membrane protects the cell from the external environment and controls what substances enter and exit the cell. Inside the cell is the jelly-like substance called cytoplasm. In eukaryotic cells, a cytoskeleton made of microtubules and microfilaments supports the organelles and anchors them inside the cell.