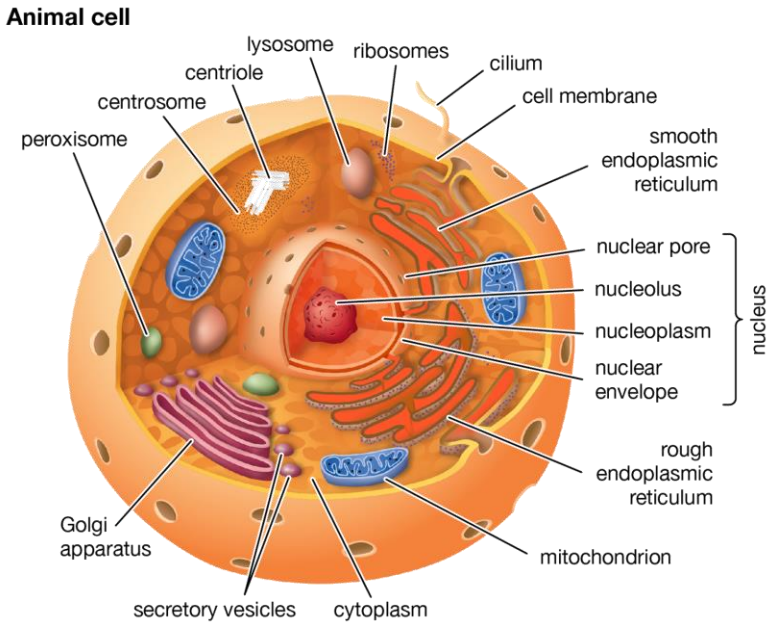
Cell Structure and Function

Section 3: Eukaryotic Cell Structure



Protists, fungi, plants, and animals all have a nucleus and other organelles that help them function. This classifies them as eukaryotic. The **nucleus** is the command center of the cell and directs the activity of a cell's organelles. It contains all of a cell's DNA. The nucleus is surrounded by the **nuclear envelope**, which has thousands of pores that allow materials in and out of the nucleus. Also found in the nucleus is **chromatin**, which are strands of DNA. **Chromosomes** are condensed chromatin that contain genetic information that is passed onto offspring.

The **nucleolus** makes **ribosomes** inside the nucleus, which is where proteins are assembled according to the DNA directions. The ribosomes use instructions from the nucleus to build proteins. The **cytoplasm** is the thick fluid outside of the nucleus found throughout the cell. While many prokaryotes and eukaryotes have cell walls, an animal cell does not. A **cell wall** is the rigid wall outside of the plasma membrane that gives a cell its shape and extra support.

Certain organelles are also necessary for the assembly, transport, and storage within a cell. The **endoplasmic reticulum** is where lipids for the membrane are assembled along with proteins. There are two kinds of endoplasmic reticulum – smooth and rough. The **Golgi apparatus** is responsible for sorting and packaging proteins and materials into structures called **vesicles**. The vesicles then ship them out, making sure they reach the right destination. The **vacuole** is a saclike structure used for storage of water, food, and enzymes. A single, large vacuole is found in plant cells, increasing their ability to support heavy structures like leaves. **Lysosomes** remove wastes using digestive enzymes. The **mitochondria** is often called the powerhouse of a cell. It transforms chemical energy from food into useful energy for both plant and animal cells. **Chloroplasts**, found in green plant cells and some protists, capture the sun's energy and convert it to chemical energy in the process called photosynthesis.

Cell Structure and Function

Section 3: Eukaryotic Cell Structure Continued

The structural support, movement, and communication of a cell happens in each of the following organelles. The **cytoskeleton** is a network of protein filaments that helps the cell keep its shape. It also helps with the movement of protein filaments called microtubules or microfilaments. **Centrioles** are made of microtubules and help with cell division. They are not present in plant cells. **Cilia** are short, hair-like projections that wave to help move a cell. **Flagella** are long, whip-like projections that aid in movement.

How many parts of the cell can you correctly identify below?