Introduction
The transport of materials through a membrane via pumps and channels, diffusion, and osmosis only pertain to the movement of relatively small substances through the membrane. Large particles need to be moved through the plasma membrane using alternative mechanisms. In this tutorial, we’ll examine the transport of large particles into and out of the cell via endocytosis and exocytosis.

Learning Objectives
• Understand the processes by which large particles are transported into and out of a cell.
• Know the different types of endocytosis.
Narration

Exocytosis
The two mechanisms for moving big particles through the membrane are called endocytosis and exocytosis. Exocytosis is the movement of particles out of the cell, while endocytosis is the movement of particles into the cell. During exocytosis, materials are moved out of the cell through a fusion of transport vesicles with the plasma membrane. The transport vesicle moves toward and attaches to the membrane, releasing the vesicle's contents into the extracellular fluid.

Endocytosis
During endocytosis, relatively large materials are moved into the cell by the infolding of the plasma membrane. There are a few different forms of endocytosis: pinocytosis, receptor-mediated endocytosis, and phagocytosis.

In pinocytosis (literally "cell drinking"), the plasma membrane forms a kind of harbor that pinches off and moves into the cytoplasm as a vesicle. The vesicle carries primarily water and some solutes.

In receptor-mediated endocytosis, receptors in the plasma membrane bind to specific molecules and then hold onto them. The cell membrane then forms an invagination called a coated pit that pinches off, delivering the receptor-held molecules to the cell's cytoplasm.

In phagocytosis (literally, "cell eating"), larger materials such as food particles or bacteria are enveloped by pseudopodia. The pseudopodia surround the particle, and their membranes fuse together, forming a vesicle that moves into the cell interior with the captured particle enclosed.

You should now be able to...

- Describe the general mechanisms of endocytosis and exocytosis.
- Discuss the importance of receptors in receptor-mediated endocytosis.
- Compare and contrast the particles that are transported during pinocytosis, receptor-mediated endocytosis, and phagocytosis.