

Specialized Cells

1. Your first task is to watch six animations to see each of the specialized cells in continuous action. To do this, click on the picture of a cell. Then click on the button that says "Entire Animation." Repeat this for the other five cells.

Next, watch each step-through animation at your own pace using the step-through buttons.

As you watch the step-through version, discuss with your partner each specialized cell. In the space below describe:

- what you see. For example, describe the structures and organelles you notice in the cell and what they appear to be doing (Note: not all of the basic structures and organelles are shown.)
- the overall function of the cell.

Animation #1:

- There are vesicles in the sending cell that move to the membrane, where they release neurotransmitters into a space that has ions. These ions move to a place on the receiving cell's membrane, where they enter the receiving cell. The flow of ions excites the receiving cell.*
- This cell is involved in sending a signal that excites another cell.*

Animation #2:

- Insulin moves into a transport vesicle from the Golgi apparatus and fuses with other vesicles to make a bigger vesicle. Then glucose comes into the cell, and the vesicle moves to the membrane where the insulin gets dumped out.*
- This cell releases insulin.*

Animation #3:

- This is showing the close-up of a muscle in an arm. The myosin binds to the actin, causing the myosin to change shape and pull on the actin. The filaments slide past each other, and so the structure becomes shorter. There are lots of mitochondria near the filaments.*
- This is a muscle contracting.*

Animation #4:

- The villi and microvilli are fingerlike projections that increase the surface area for nutrients to absorb. Nutrients are moving from one side to another through intestinal absorptive cells that make up the villi and microvilli.*
- These cells move nutrients through the intestine into the capillaries of the blood.*

Animation #5:

- The cell engulfs the microbe and contains it in a vesicle. The vesicle fuses with a lysosome and enzymes digest the microbe into small pieces. Some of these pieces are displayed on the membrane where they act as receptors for helper T cells.*
- The macrophage engulfs and digests microbes, such as bacteria, and helps other cells in the immune system to carry out their functions.*

Animation #6:

- A set of microtubule doublets use ATP to crawl and cause bending of the bundle, which makes the tail whip back and forth. There is a group of mitochondria surrounding a segment of the microtubule doublets.*
- This cell is a sperm that swims to an egg.*

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Specialized Cells (continued)

2. Watch the step-through version of each animation a second time to learn more details about the cell's structures and functions. Complete the chart below.

Name of specialized cell	Structures and functions of cell type
Neuron	Vesicles: contain neurotransmitters and carry them to the membrane Receptors: triggered by neurotransmitters to allow ions to enter and excite the receiving cell
Pancreatic	Transport vesicles: transport insulin from the Golgi apparatus Secretory vesicles: formed by fusion of smaller vesicles and contain insulin Transporter: allows glucose into the cell
Muscle	Actin: thin filaments Myosin: thick filaments that bind to and pull the actin, causing the filaments to slide past one another Lots of mitochondria: for energy
Intestinal	Villi and microvilli: small fingerlike projections that increase the surface area of the cell
Macrophage	Vesicles: enclose microbe Lysosome: fuses with vesicle and digests microbe into pieces Receptor: on membrane of helper T cell attaches to a displayed molecule on macrophage. The attachment activates other cells of the immune system to carry out their functions
Sperm	Microtubule doublets: dynein arms grab and pull on each other to cause a bending action, which moves the flagellum so it can swim to the egg. Mitochondria: for energy

3. Record which cell type you matched to each animation number below. Explain your reasoning for the match.

Animation number	Name of specialized cell	Reasoning
1	Neuron	Sends and receives signals
2	Pancreatic	Releases insulin
3	Muscle	Causes contraction for movement
4	Intestinal cell	Absorbs nutrients
5	Macrophage	Digests microbes and activates another cell to activate immune cells to carry out their functions
6	Sperm	Has flagellum that allows sperm to swim to egg

4. Check your matches in the animation. Record on the chart any changes to your matches.