Squishy Circuits

October 2023

Columbia University Neuroscience Outreach

Objectives:

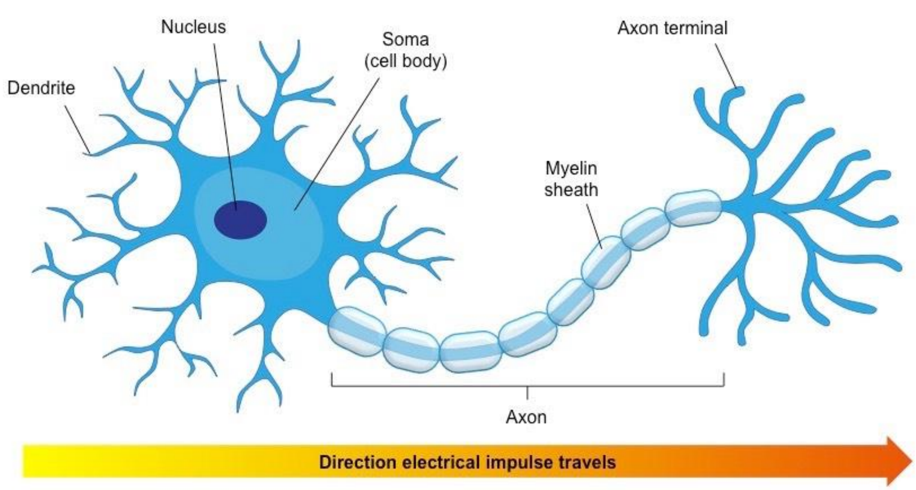
- Learn that electrical impulses travel down a neuron
- Use conductive dough to mold neurons and build your own mini-circuit!

Materials:

- Squishy Circuits kit (https://squishycircuits.com/collections/kits/products/deluxe-kit)
- Plastic neuron molds
- Laminated circuit template (attached as a separate PDF)

Possible Introductory Questions/Comments:

- **Q: We use electricity every day, from turning on the bedroom lights to looking at a computer screen. But did you know that there are electrical signals right inside our own bodies?**
- Special types of nerve cells, called neurons, use electrical signals to receive and send messages! This signal always flows in a set direction. *[Refer to the diagram below and point out the direction of the electrical impulse from dendrite, soma, axon, to axon terminal.]*



- Today, we are going to use conductive dough to model how electricity flows through neurons!

Activity: Build an active neuron using conductive dough! Can you light up a light bulb or turn on a rotor?

1. Use the 3D-printed plastic molds to shape the conductive (colored) dough into at least 2 neurons
2. Place an LED light into the neurons, with one leg inside the axon terminal of neuron #1 and the other inside the dendrite of neuron #2

3. Place the + end (red cord) of a battery pack inside neuron #1 & the - end (black cord) inside neuron #2
4. Turn the battery pack on and see the electrical current flow! *[The LED lights should turn on!]*

Possible wrap-up/follow-up:

- Some neurons have a special wrapping around their axons, called myelin. Myelin helps insulate neurons so that the electrical signal travels faster.
- **Q: Why do you think it's important that neurons are able to carry messages so quickly?**