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Responses

Markdown cells awaiting your responses to the following questions contain `...`

Edit these cells by replacing `...` with your responses.

What is the biological equivalent of the resistors in the active neuron membrane model?

Ion-specific channels

Code Text

What is the biological equivalent of the resistors in the passive axon model?

intracellular and extracellular fluid and total ion channels

What is the biological equivalent of the battery in the passive axon model?

...

When a set of ion channels (selective for Potassium, for example) opens, what happens to the *resistance* of the membrane?

...

When a set of ion channels (selective for Potassium, for example) opens, what happens to the *conductance* of the membrane?

...

How does the balance between potassium and sodium *conductance* effect the voltage across the cell membrane?

...

What part of the action potential were you simulating in **Part II and III** of the lab (modeling intracellular versus extracellular recordings). And which active ion conductance did this most closely simulate?

...

In **Part II and III**, what was the scaling factor for the measured peak amplitude between the intracellular and extracellular configuration (extracellular amplitude divided by intracellular amplitude)?

...

The *space constant* is the distance it takes for voltage to decrease to 63% of its original value. Approximate the space constant of the model membrane using the intracellular measurements of trans-"membrane" voltage as the battery source travelled down the "axon". Calculate it first by starting at Node #5 (the middle node) and then calculate it again by starting at Node #7.

...

The space constant can also be calculated using the following equation:

$$\lambda = \sqrt{\frac{R_m}{R_i + R_o}}$$

What value do you get from calculating this way?

> Note that R_o is usually so small compared to the other resistances that it can be ignored. (Why do you think it is so much smaller? In other words, what makes R_i larger? And R_m?)

...

What caused the change in polarity in your recording of the membrane potential in **Part III** (and why did the polarity not change in **Part II**)? If you did not observe a polarity change or if you observed a polarity change in both configurations, make note of that.

...

Think back to your other neuroscience courses. Draw a typical neuron's action potential and describe what physiological events across the cell membrane cause the following components of the waveform shape:

- baseline (resting) voltage
- polarity
- change in polarity
- amplitude

```
Insert an image from your google drive in a markdown cell by doing the following...

Get the "Anyone can view" share link from google drive.
With a  share link in the following format: https://drive.google.com/file/d/ID-of-image-/view
all you need is the *ID-of-image* from the URL share link.

Enter editing mode on the Markdown cell below.

In the template URL provided, replace *1WoAa-oMOkAj9r9lyls4nLSLyIeuTu4Ae* with the ID from tl

Then "run" the markdown cell (or double click it). Your image will replace the one provided.
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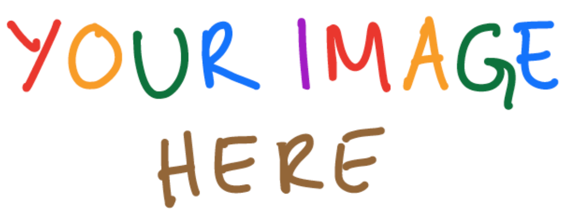
...



Would you expect small neurons to have higher or lower membrane resistance than large neurons? Why?

...

One of the most useful equations in neuroscience is $V = IR$, where V is voltage, R is resistance, and I is current. How could you calculate the membrane resistance of a neurons with known sizes to test your prediction? What experiment would you need to do?

...

Would you expect small neurons to have higher or lower capacitance than large neurons? Why?

...

If you knew that $\tau = RC$, where R is resistance and C is capacitance, how could you calculate the membrane capacitance of a neurons with known sizes to test your prediction? What experiment would you need to do?

...