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Threshold: To Fire or Not to Fire Worksheet

Instructions: Work through the **Threshold: To Fire or Not to Fire** lab in section and answer the following questions. All plots must be hand drawn. Use the back side of this sheet for drawing if you need more room. Feel free to ask TA/IAs for assistance. The lab worksheets will be graded for completion and correctness.

1. Is there a current threshold to elicit an action potential? Is there a voltage threshold to elicit an action potential? If there is a threshold, list the value. If not, explain why there is no threshold.

2. Using the "Find Current Threshold" function, what stimulus amplitude is necessary to elicit an action potential when the temperature is at 2°C? How about 20°C?

3. Run the experiment under the 'Treating myasthenia gravis' section. What stimulus pulse amplitude is necessary to generate an action potential? How does this value compare to amplitude needed to generate the action potential using the default values?

4. Run the experiment under the "Longer Synaptic Potentials" section. Is there a different relationship between duration and stimulus amplitude for the long and short stimulus pulses? Explain.

5. Run the experiment under the "Mechanosensory receptor potentials" section. What is the stimulus amplitude necessary to get repeated spiking for a 100 ms duration pulse? How does that compare to the stimulus amplitude needed for a 500 ms duration?

6. How is the peak amplitude of the action potential affected by nearness to threshold? Include a plot showing responses to different stimulus amplitude values to back up your claim.

7. Extra Credit Look up the concept of "neural accommodation" and briefly describe the concept. Discuss how this lab demonstrates this concept.