PhysioEx Ex 16B: Skeletal Muscle Physiology: Computer Simulation
Extra Credit

Become familiar with the software by practicing generating a tracing. Learn how to manipulate the voltage, stimulate, clear tracing, record data, and delete line buttons. Proceed through the activities listed below using the instructions in the lab manual unless instructed otherwise. When you have finished with each activity, print your data and attach it to this report.

**Activity Determining the Latent Period:**

How long is the latent period:________

What exactly is occurring within the muscle cell during this time?

**Activity: Determining the Threshold Stimulus:**

What is the threshold voltage:____________

**Activity: Investigating Graded Muscle Response (Graded Strength) to increased Stimulus Intensity:**

Is there a voltage at which no further increase in muscle contraction occurs?________

If so, what is its value?________

Continue with step 3, record the stimulus voltage and active force from your screen for each stimulus in the table below:

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<thead>
<tr>
<th>Stim Voltage</th>
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<td>Active Force</td>
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Use graph paper to graph your data from the table above of the stimulus voltage (x axis) and active force (y axis).

What is the maximal stimulus?________

**Activity: Investigating Treppe:**

What happens to force production with each subsequent stimulus?
Activity: Investigating Wave Summation:

Is the peak force produced in the second contraction greater than that produced by the first contraction? 

What do you think would happen if you used a voltage lower than maximal stimulus?

Activity: Investigating Fusion Frequency:

In this activity you are trying to demonstrate tetanus. How do the tracings change as the stimulus rate is increased?

From your graph on the computer screen estimate the rate above which there appears to be no significant increase in the force of contraction with increasing stimulus?

Activity: Investigating Muscle Fatigue:

Why exactly does the force begin to fall with time; what is going on inside the muscle cells?

Describe the differences between the tracings you see in steps 4, 5, and 6

The following activities investigate Isometric Contractions in which muscle length does not change regardless of the amount of force

Activity: Investigating Isometric Contractions:

What happens to the passive and active forces as the muscle length is increased from 50 mm to 100 mm?

Passive Force:

Active Force:

Total Force:
Explain the dip in the total force curve.

The following activities investigate Isotonic Contractions in which muscle length changes but force produced stays the same.

**Activity: Investigating the Effect of Load on Skeletal Muscle:**

What do you see happening to the muscle during the flat part of the tracing?

Does the force the muscle produces change during the flat part of the tracing, if so how?

Describe the muscle activity during the flat part of the tracing in terms of isotonic contraction and relaxation.

Which of the two weights used so far results in the highest initial velocity of shortening?

What does the plot of weight and total force reveal about the resistance and the initial velocity of shortening?

What does the plot of length and velocity show about their relationship?

Printing your Data: When you have finished, print your data for at least one activity and attach it to this report.