Final Exam

The Biology of Muscle (PCB 5785)
DUE Monday April 24 at 7:30 PM

(Turn in by email to moerland@bio.fsu.edu)

Instructions:

1. Your answers *must* be entirely your own work, written in your own words, and constructed without the help of anyone else. A grade of zero will be assigned to exams containing any answer formed wholly or in part by cutting and pasting from another resource.
2. Resources: You may use *only* your own notes, class web material, and any published (print or electronic) material. You may *not* use any human resource. Specifically, you may not work in groups, share notes or answers, or consult other people – whether or not they are in the class. Feel free ask me for clarification if you're not certain that a potential resource is appropriate.
3. You are encouraged to include diagrams and give equations if they are appropriate. You must provide citations for your answers where they are appropriate. Good answers will be well organized, complete, quantitative, and insightful. The very best answers will convince me – beyond *any* doubt – that you have absolute command (as in, domination) of the subject matter.
4. Answers must be submitted electronically.
5. Ask me if you have questions about any aspect of the exam. I will check my email frequently.
6. The deadline is firm.

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1. Write an abstract that gives a complete and concise overview of your presentation to the class. This should be no longer than one printed page (single spaced).

2. Similar to the previous question, write an for the presentation given by any one of your peers. Be sure to indicate the name of the presenter and the topic.

3. After graduate school you take a job with a firm that uses transgenic technology to create bio-engineered prosthetic limbs. Your first assignment is to come up with design criteria for two muscles that will be used in an artificial leg.

   a. The first muscle will be used only infrequently, but when it is used it must shorten with very high velocity, generate a large amount of force, and relax very quickly. There is no need for high economy or great resistance to fatigue.

   b. The second muscle can be slower to contract and relax than the first, and it needs to generate only modest force when contracting. However, it will be used very often and therefore should be very economical to operate.

Using all the information available to you, specify how you would design a muscle to meet these criteria. Be sure to consider all aspects of muscle function (including innervation, contraction, and energy metabolism) at the molecular, cellular, and tissue levels of biological organization.