

Spring 2007 Biology 111 Take Home Exam #3 – BioEnergetics

There is no time limit on this test, though I have tried to design one that you should be able to complete within 2 hours, except for typing. There are 5 pages for this test, including this cover sheet. You are not allowed to use your notes, old tests, the internet, or any books, nor are you allowed to discuss the test with anyone until all exams are turned in at 10:30 am on Wednesday April 18. **EXAMS ARE DUE AT CLASS TIME ON WEDNESDAY APRIL 18.** You may use a calculator and/or ruler. The **answers to the questions must be typed on a separate sheet of paper** unless the question specifically says to write the answer in the space provided. If you do not write your answers in the appropriate location, I may not find them.

-3 pts if you do not follow this direction.

Please do not write or type your name on any page other than this cover page.

Staple all your pages (INCLUDING THE TEST PAGES) together when finished with the exam.

Name (please print):

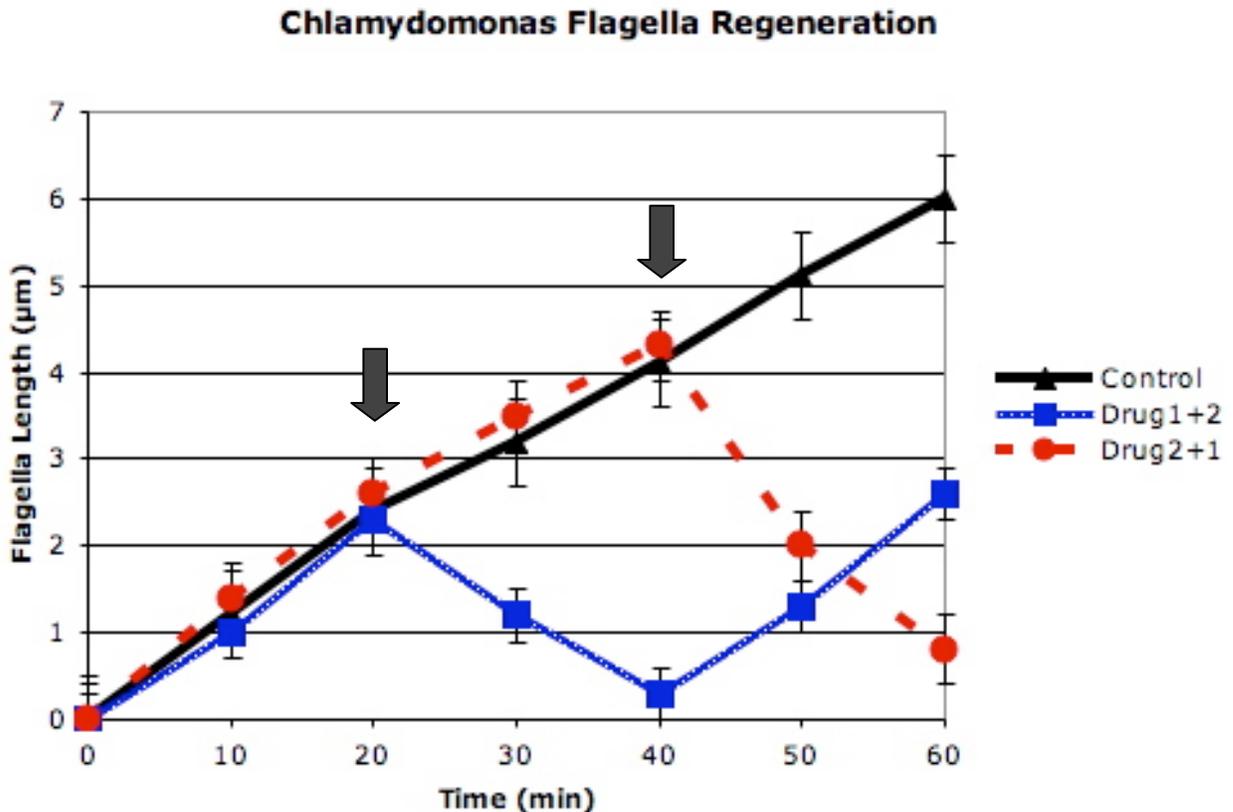
Write out the full pledge and sign:

How long did this exam take you to complete (excluding typing)?

Lab Question:

6 pts.

1) Interpret these data for the 3 cell populations shown in the graph. This was a normal flagella regeneration experiment except one population (Drug1+2) was given drug 1 at 20 minutes and drug 2 at 40 minutes. Conversely, a third population of cells (Drug2+1) was given drug 2 at 20 minutes and drug 1 at 40 minutes. Interpret these data as fully as you can.



Lecture Questions:

5 pts.

2) Draw a picture of phosphofructokinase and label all the key features that are important to its overall function in glycolysis.

10 pts.

3) Consider the evolution of chloroplasts and mitochondria. List 5 characteristics/traits they have in common, explain them in one sentence per characteristic, and state how this shared characteristic underscores their evolution.

4 pts.

4) Explain why anaerobic metabolism is considered advantageous under certain conditions, but inefficient in other conditions. To receive full credit, your answer must include real-world examples of particular conditions not used in the study guide.

6 pts.

5) Explain how we acquire the nitrogen we use to make nucleotides and amino acids. Start your explanation with air and include only the major steps.

15 pts.

6) Diagram the flow of energy and carbon starting with CO₂ and finishing with 3 fixed carbons in one molecule (“3 all new carbons”) of G3P. Use **red ink for the energy** and **black ink for the carbons and all other atoms**. You must identify one protein by name in this pathway.

8 pts.

7) If plants can perform cyclic electron flow for the light reaction of photosynthesis, why do they need water?

6 pts.

8) Create an outline of the major steps of chemiosmosis.

6 pts.

9) Define ΔG and oxidation and describe the relationship between them.