

Fall 2002 Biology 111 Exam #4 – Cancer, HIV and Final Roundup

There is no time limit on this test, though I have tried to design one that you should be able to complete within 2.5 hours, except for typing. There are three 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 noon on Wednesday December 18. **EXAMS ARE DUE NO LATER THAN NOON DECEMBER 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.

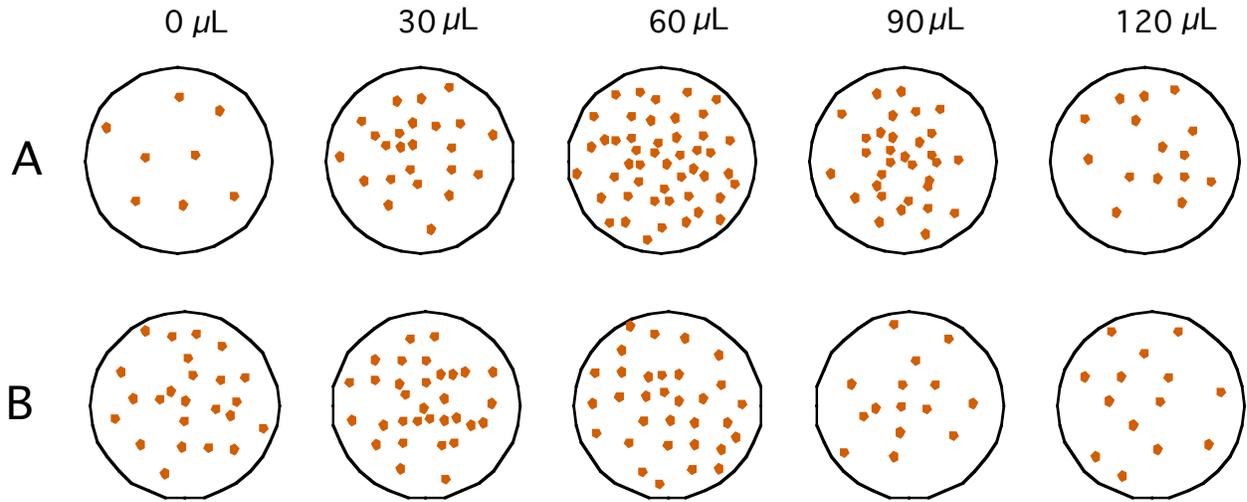
Staple all your pages (INCLUDING THE TEST PAGES) together when finished with the exam.

Name (please print):

Write out the full pledge and sign:

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

Lab Questions:



16 pts.

- 1) Tabulate the data from the Ames test above where bacterial strains A and B were tested with different amounts of a potential mutagen. Create a table summarizing your raw data.
- 2) What can you conclude about this potential mutagen?
- 3) What can you conclude about these two strains?
- 4) Design an experiment to test your conclusions from questions 2 and 3 above.

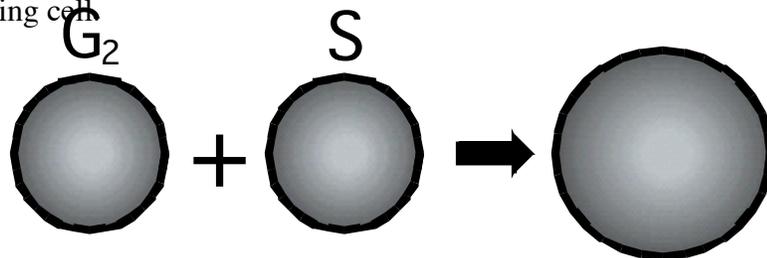
Lecture Questions:

8 pts.

- 3) Draw pictures of a haploid cell with 4 chromosomes that is undergoing mitosis. You must draw 4 pictures, one for each of the major phases of mitosis. Be sure to label each phase and put them in chronological order.

8 pts.

- 4) The figure below outlines a cell cycle heterokaryon experiment. Describe what you would expect to observe in the resulting cell.



8 pts.

- 5) a) Why is it difficult to demonstrate that a virus caused a particular patient's cancer?
- b) If you knew one virus was associated with causing the patient's type of cancer, design an experiment to determine if this virus is a provirus in the cancer.

6 pts.

6) How do carcinogenic mutations differ from other mutations?

8 pts.

7) Describe the relationship between tumor suppressors and oncogenes.

b) What changes must be present in these genes in order for cancer to arise?

5 pts.

8) Based on the mode of HIV transmission, explain to someone with little biology knowledge why HIV is not a punishment from God against homosexuals.

8 pts.

9) There are two arms of the immune system. Describe these two arms using real world infections as examples.

8 pts.

10) Our immune system has four characteristics. List all four and give one good consequence and one bad consequence for each characteristic.

8 pts.

11) Draw a picture of one cell at the initial stage of infection by HIV. Be sure to depict and label all the proteins required for HIV entry into this cell.

9 pts.

12) List the three parts of the AIDS therapeutic “triple cocktail” and describe what role each plays in fighting infection.

10 pts.

13) Draw a picture of an ELISA assay where: patient 1 is HIV seropositive, patient 2 is seronegative, patient 3 is a false negative, patient 4 is a false positive, Also include data for positive control and data for negative control.