

**Fall 2001 Biology 111 Exam #4 – Genetic Engineering 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 12. **EXAMS ARE DUE NO LATER THAN NOON DECEMBER 12.** 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:

Below is a table summarizing a lot of data from an Ames test. Strains 1 – 4 were tested with potential mutagens A – D. The negative control numbers are provided as well.

## Potential Mutagens

	A	B	C	D	NEG
1	15	98	2	8	8
2	17	98	32	100	45
3	12	98	21	3	2
4	180	98	201	46	112

**6 pts.**

1) For each strain, list which compounds are mutagenic.

**4 pts.**

2) From these data, can you deduce if any of the mutant strains had similar types of mutations? Explain your answer. By types, I do not mean which gene was mutated but what type of mutation was in the mutated gene.

Lecture Questions:

**8 pts.**

3) What is a “tumor virus”? What type of information was learned by studying these viruses?

**8 pts.**

4) Describe the four types of proteins that proto-oncogenes are known to encode.

**8 pts.**

5) Describe the relationship between tumor suppressors and oncogenes. What type of genetic changes must be present in these genes in order for cancer to arise?

**6 pts.**

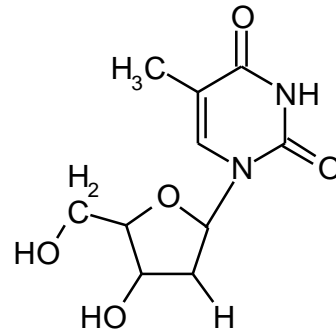
6) How does the long latency period of HIV contribute to its spread?

**8 pts.**

7) Which branch of the immune system is more effective against bacterial infections? Explain why this branch is not as effective against viral infections.

**8 pts.**

8) In the space provided here, convert 2'-deoxythymidine into AZT.



**10 pts.**

9) How might gene therapy be used to generate an HIV vaccine?

**8 pts.**

10) How was Dolly, the famous sheep, created. Outline the major steps.

**6 pts.**

11)

From the ELISA data, which patient is seropositive for HIV?

Positive Control	Negative Control	Patient A	Patient B	Patient C	Assay Control
1.689	0.153	0.055	0.412	1.999	0.123

**10 pts.**

12) Design a contraceptive that takes advantage of a sperm cell's ability to detect the presence of an egg by the secretions an egg emits.

**10 pts.**

13) If HIV is an RNA virus, where and how does it have its genome a) transcribed and b) translated? Answer each half of this questions separately.