

Spring 2006 Immunology Exam #3 - Chapters 8 - 10

There is no time limit on this test, though I have tried to design one that you should be able to complete within 4 hours. You are not allowed to use your notes, any books, any electronic sources, nor are you allowed to discuss the test with anyone until all exams are turned in at 9:30 am on Thursday March 30. **EXAMS ARE DUE AT CLASS TIME ON THURSDAY MARCH 30.** Turning in an exam late will cost you a letter grade for each 24 hours. The **answers to the questions must be typed** unless the question specifically says to write/draw the answer in the space provided. If you do not type your answers on the appropriate pages, I may not find them unless you have indicated where the answers are. You will need black, blue, and red ink pens, as well as a regular pencil to answer at least one question on this exam.

There are 3 pages to this exam, including the cover sheet.

-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 here):

Write out the full pledge and sign:

How long did this exam take you to complete?

24 pts.

I. Define these terms: 2 points each. Define the terms and demonstrate your knowledge. These terms can be defined succinctly, so using a lot of words is not the best way to demonstrate your fluency with these terms. You may combine words with pictures if this helps, but don't hand write the words unless you print VERY neatly.

priming

HEVs

CD40

cross priming

IL-2

perforin

dark zone

poly-Ig receptor

H1N5

immune complexes

commensal bacteria

SMAC

Part II

These questions encourage you to synthesize a lot of specific information. I decided to see how you can integrate this information rather than breaking it up into smaller unrelated questions.

10 pts.

1) Explain why many autoimmune diseases are associated with infections of particular pathogens. To get full credit, you must explain two parts:

- a. the infection part and
- b. the particular pathogen part.

10 pts.

2) Explain how it is possible that humans can be vaccinated for viruses to produce a humoral response. I am NOT asking what should be injected. Rather, I want you to explain how our immune systems work in these two cases:

- a. live, attenuated oral polio vaccine ;
- b. an injection for small pox. Think about what was used in the injection when I was a child, and could be used again if needed.

15 pts.

3) **Diagram** how a B cell that is specific for tetanus gets activated by a vaccine. Use colors effectively to highlight key components. Start when a person is first injected and finish with a high affinity IgG response. You may use more than one picture to show what happens, but you do NOT have to show the pathogen in a person and growing. Just focus on the immune **responses** to the vaccination.

10 pts.

4) Choose and briefly explain an example that illustrates a positive feedback loop in immunology. A positive feedback loop is one in which an input produces more input to sustain the original signal.

11 pts.

5) There is a paradox that needs explaining. How can we develop a food allergy given the existence of oral tolerance? Explain this apparent contradiction using the rules we have learned so far. This question requires that you speculate, but to get full credit you must base your speculation on accepted immunological principles.

10 pts.

6) List 5 examples of how the immune system amplifies the signal of a small antigenic stimulus. Number your 5 examples 1 – 5 and use a complete sentence for each one, not just a phrase.

10 pts.

7) Draw the outline of a human body (rectangles and circles are fine) and then use your colors to show where in the body each antibody isotype is used to produce its effect. Make sure you produce a color legend so I can be sure to understand your color code.

+2 pts.

Bonus Question: What is the most important immunological advice you could give to a new mother to help keep the infant healthy during the first month?