Spring 2003 Immunology Exam #1 - Chapters 1 - 4

There is no time limit on this test, though I have tried to design one that you should be able to complete within 3 hours, except for typing. You are not allowed to use your notes, or any books, any electronic sources, nor are you allowed to discuss the test with anyone until all exams are turned in at 8:30 am on Friday February, 7. **EXAMS ARE DUE AT CLASS TIME ON FRIDAY FEBRUARY 7**. 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 on the appropriate pages, I may not find them unless you have indicated where the answers are. There is one question where you will have to use the internet. For this question only, you may use a browser but you may only go to the one site indicated in this test.
There are 3 pages to this exam, including the cover sheet.
When you are ready to take the exam, send me an email with the subject line of Immunology Test. This will generate an automated email telling you how to download the exam.

-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 (excluding typing)?

30 pts.

I. Define these terms: 3 pts each. First define the terms and then provide a specific example to further demonstrate your knowledge. These terms can be define succinctly so using a lot of words is not the best way to demonstrate your fluency with these terms. If you do not know a real example, make up one that is very similar to a real one, but be sure to indicate when you are making up a hypothetical example.

naïve lymphocyte
combinatorial diversity
innate immunity
TNF-
attack complex
diapedesis
allotype
anchor residue
coding joint
isotype

Part II

8 pts.

1) Imagine that yesterday you got a splinter in your big toe. Today the area is looks inflamed. Answer these questions:

a) List the symptoms that indicate the area is inflamed?

b) What prevents this area of inflammation from spreading all over your big toe?

c) How did your immune system know to generate an inflammation response at this site?

d) What cells cause the pus to form?

8 pts.

2) Go to this URL <www.bio.davidson.edu/courses/Immunology/Exams/2003/examq.pdb> and describe what is shown. This particular image is a challenging question. You may not recognize it completely so be sure to describe the parts you do know and then the parts you don't know. It may be worthwhile telling me what your unknown parts *cannot* be as one way of demonstrating what you know. For example, you might say "It has feathers so it is probably a bird but I am sure it is not a badminton birdie." By indicated what the unknown is not, you have helped me evaluate what you DO know.

12 pts.

3) Compare and contrast the MHC I and MHC II. To facilitate grading, please number your similarities and differences. Here are two silly examples to illustrate what I want:

1) MHC I has one Roman number I while MHC II has two.
2) Both start with the letter M.

8 pts.

4)

a) Draw a picture of an IgA that has all its binding sites occupied with antigen (for fun, draw a microscopic gummy bear). In your diagram, neatly label all the protein chains, as well as the individual parts of the protein

that physically touch the gummy bear.
b) List all the places this gummy bear could be in your body if it is bound by IgA.

6 pts.
5) Explain to a Bio111 student how your immune system accomplishes transplant rejections, and why.

8 pts.
6) Why is it impossible to have a Ig heavy chain that is composed of VJ variable regions. You must draw a diagram to support your answer.

6 pts.
7)
a) What role does TdT play in antibody production?
b) What role does RAG1/2 play in antibody production?

8 pts.
8) a) What is the overall consequence for your immune system after it accomplishes somatic hypermutations?
b) Which cells can perform somatic hypermutations?

6 pts.
9)
a) Describe the mechanism/s that prevent your T cells from producing □:□ and □:□TCR on the same cells.
b) Given what we know so far in this semester, describe any unexplained issues that remain to be resolved given your answer to part 9a.