BIOS 328 – IMMUNOLOGY
Quiz #6 – April 1, 2003

NAME: MASTER

1. Name the primary lymphoid organs.

bone marrow
thymus (+2 points)

2. Name the secondary lymphoid organs.

lymph nodes
spleen
MALT (Mucossal-Associated Lymphoid Tissue)
(+3 points)

3. What do the letters HEV abbreviate?

High-walled Endothelium of the post-capillary Venules
(+2 points)

4. What is the function of the "red pulp" in the spleen?

destroy exhausted erythrocytes
(+2 points)

5. Some B-cells are stimulated by macrophages exhibiting type 2 thymus-independent antigens. Where do these macrophages reside?

sub capsular sinus of the lymph node
(+1 point)

6. Define natural killer cells in terms of their ontogeny (*i. e.,* development.)

lymphoid lineage
(+2 points)

7. Define natural killer cells in terms of their function (*i. e.,* how they respond to POTENTIAL targets.)

killer potntial inhibited by critical self signal
(+2 points)

8. What do the letters ADCC abbreviate?

Antibody-Dependent Cell-mediated Cytotoxicity
(+2 points)

9. Lipid inflammatory mediators are derived from arachidonic acid. Two classes of oxidized products exists: *viz.* linear and cyclic. Identify these two classes.

(i: linear) leukotrienes
(+2 points)
(ii: cyclic) prostaglandins
(+2 points)

10. Cytotoxic T-lymphocytes use two pathways to kill target cells. Briefly describe the "granule exocytosis pathway."

CTL's release combination of "porferins" which create membrane pore and "granzymes" (protease and esterases) which destroy some substrates and stimulate "caspase" cascade which leads to apoptosis.
(+2 points)

11. Cytotoxic T-lymphocytes use two pathways to kill target cells. Briefly describe the "FAS pathway."

CTL's present a *FAS ligand* to *FAS receptor* on target cell; the ligated receptor attracts a *FAS-associated protein with death domain*. This latter protein initiates the "caspase" cascade which leads to apoptosis.
(+2 points)

12. A series of proteins and glycoproteins signal effector cells to extravasate from the circulatory system. Name a signaling protein which is glycosylated.

mucin (+2 points)

13. What type of cell is "generally the first cell type to move from the bloodstream into inflammatory sites"?

neutrophil (polymorphonuclear leukocyte)
(+2 points)

14. What is a "granuloma"?

aggregate of macrophages (+2 points)

PART II Here's an item from the "STUDY QUESTIONS" in your textbook. "Some microorganisms produce enzymes that can degrade the Fc portion of antibody molecules. Why would such enzymes be advantageous for the survival of microorganisms that posses them?" (The textbook authors then give a very short answer. I [ssk] want you to give as extensive an answer as you can, a view that emphasizes the role of the constant region of immunoglobulins and with what sorts of cells they react.)

This question raises a fascinating issue. The immune system is noted for its ability to recognize ***diverse*** antigens with great ***specificity***. But this question emphasizes the **CONSTANT** part of an immunoglogulin. What this question reveals, in a sense, is the Achilles' heel of the humoral response.

So, the Fc portion is damaged. What is the consequence? Early in the semester, we learned that immunoglobulins have two different regions: the region which interacts with antigens and the region which effects two "biological responses," *viz*. complement fixation (+7 points) and stimulation of macrophages (+7 points) . The latter occurs, in part, through binding immunoglobulins via Fc-receptors. This latter circumstance establishes, in turn, that any immunological response that involves Fc-receptors will be affected by damage to the Fc portion of immunoglobulins. Such responses include: ADCC (+4 points) , display of Ag's bound to Ab's distributed on the abundant Fc-receptors of follicular dendritic cells in lymph nodes (+2 points), and sensitization of mast cells (as you learned ***after*** the quiz [unless you were a member of Team 1!]) Thus, a bacteri**um** with the ability to destroy the Fc portion of immunoglobulins would cripple a significant part of the humoral repertoire.