**Term Test 1: MICR422 September 27, 2002**

You have 45 minutes to complete this test. Except where specified, you should answer in complete sentences and/or essay format. Diagrams are acceptable additions to essays, however are NOT a substitute for a coherent, written answer. Try and keep your answers confined to the space provided, but you may use the back of the page if necessary. There are a total of 40 marks for this test.

**1. Indicate whether each of the following cells plays a role in Innate Immunity (I), Adaptive Immunity (A), or both (B).**

**5 marks**

**Cell Type:**

| | |
|---|---|
| B-Lymphocyte | A |
| Polymorphonuclear Leukocyte | I |
| Dendritic Cell | A,I |
| Eosinophil | I |
| Cytotoxic T cell | A |

2. **Indicate to which branch (es) of the immune system the following statements apply, using H for the humoral branch and CM for the cell-mediated branch. Some statements may apply to both branches.**

**5 marks**

a). CM Responds to viral infection

b). CM,H Involves CD4+ helper cells.

c). CM Involves CD8+ cytotoxic T cells

d). H Responds to extracellular bacterial antigens

e). H Involves secreted antibody

**3. For each type of cell indicated (a-m), select the most appropriate description (1-16) listed below. Each description may be used once, more than once, or not at all.**

**5 marks**

**Cell Types:**

a. Myeloid Stem Cells 7

b. Veiled Cells 4

c. Kupffer Cells 2

d. Mast Cells 10

e. M Cells 1

1. Specialized epithelial cells found in MALT
2. Macrophages found in the liver
3. Circulating blood cells that differentiate into macrophages in the tissues
4. Dendritic cells found exclusively in afferent lymph and lymph nodes
5. Blood-borne, circulating dendritic cells
6. Give rise to thymocytes
7. Give rise to red blood cells
8. Dendritic cells found in the epidermis and mucous membranes
9. Phagocytic cells important in the body's defense against parasitic organisms
10. White blood cells that migrate into the tissues and play an important role in the development of allergies

**4. Indicate whether each of the following statements is true (T) or false (F).**

**5 marks**

a) F _____ All leukocytes continually recirculate between the blood and the tissues via the lymph

b) T _____ Integrins are expressed on both leukocytes and endothelial cells.

c) T _____ Leukocyte emigration involves multiple interactions between cell adhesion molecules.

d) F _____ Most primary lymphoid organs contain High Endothelial Venules (HEV).

e) T _____ Naïve lymphocytes recirculate preferentially through lymph nodes.

**5. Give a SHORT, 1 sentence definition of each of the following terms.**

**5 marks**

**Epitope:** **site on an antigen that binds to antibody or T cell receptor**

**Antigen:** binds to an immune receptor (antibody or T cell receptor)

**Membrane Attack Complex:** terminal component of complement activation, inserts and creates holes in lipid membranes

**Apoptosis:** programmed cell death

**Bone Marrow Stromal Cell:** **supports differentiation of hematopoietic precursor, stem cells**

15 marks

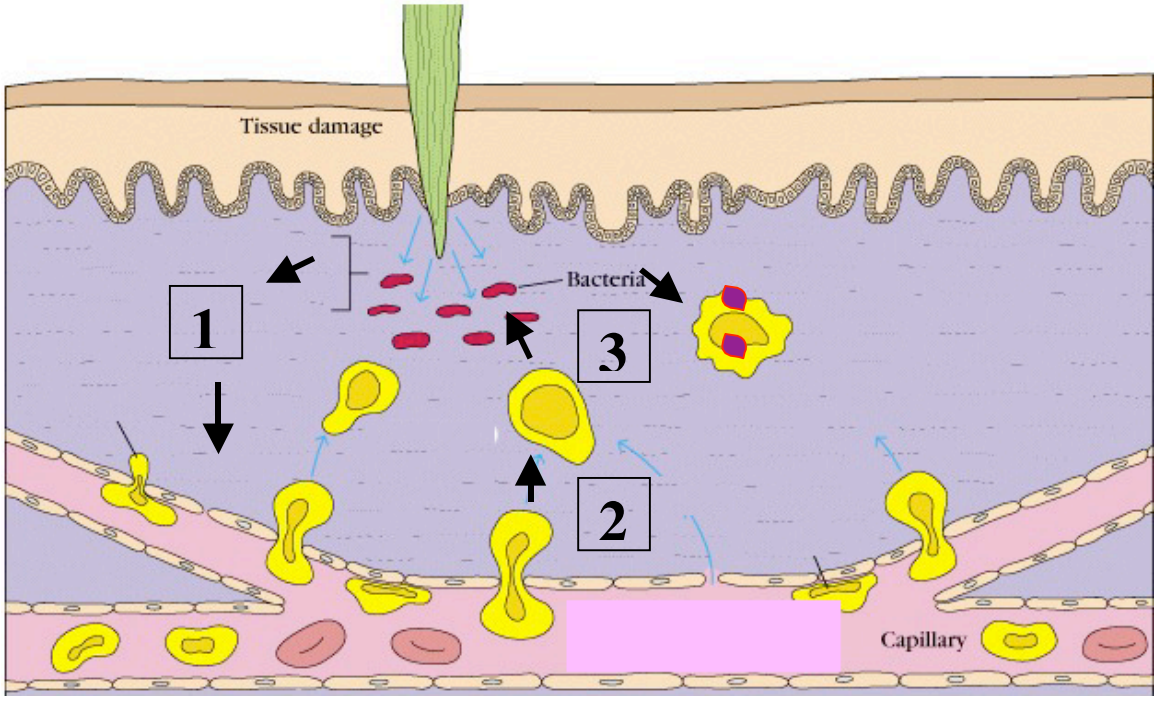
**6. Choose <u>ONE</u> of the following 3 topics, and write a brief (1-2 page) answer in essay format. Diagrams are permissible, but will not be accepted as a substitute for a well-written response. (15 marks).**

**A. Innate and adaptive immunity act in cooperative and interdependent ways to protect the host. Discuss these two forms of immunity, making specific reference to the following:**

**a) Describe and give an example of anatomic, physiologic, phagocytic, and inflammatory barriers of the innate immune system.**
**b) Describe the characteristics or attributes that define specific (adaptive) immunity, and give an example of how these are accomplished.**
**c) Give an example of how the innate and acquired immune systems collaborate during an immune response.**

**-----OR-----**

**B. With reference to the below diagram, describe the role (if any) of complement in the 5 cardinal signs of inflammation. You should use appropriate terms and examples to described how the four functions of complement (lysis, opsonization, activation of the inflammatory response, and clearance of immune complexes) participates in the initiation, proliferation, and resolution of the inflammatory response to bacteria. In your answer, make specific reference to differences in activation by the classical, alternative, and lectin pathways.**



**-----OR-----**

**C. B and T cells differ in their capacity to recognize antigen, which has marked consequences in the design of immunogenic compounds which can be used as vaccines. Discuss the important factors involved in immune recognition, making specific reference to:**

**d) Differences between antigens and immunogens**
**e) 3 important factors which contribute to immunogenicity**
**f) Comparison of antigen recognition by T and B cells according to**
  **i. Type of antigen**
  **ii. Involvement of accessory molecules/cells**
  **iii. Chemical nature of antigens**
  **iv. Epitope properties**