

Test 1: MICR422 September 26, 2003

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 is a Primary (P), Secondary (S), or Tertiary(T) Lymphoid Organ**

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|----------------|
| 5 marks |
|----------------|

Cell Type:

| | |
|-------------------|---------------|
| Bone Marrow | _____ P _____ |
| Normal Gut Tissue | _____ T _____ |
| Spleen | _____ S _____ |
| Lymph Node | _____ S _____ |
| Thymus | _____ P _____ |

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

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|----------------|
| 5 marks |
|----------------|

- a). H Involves B cells
 b). C Involves T cells.
 c). C Kills virus-infected cells.
 d). H or HC Responds to extracellular bacterial antigens
 e). H Involves secreted antibody

3. Match each term related to innate immunity (a-e) with the most appropriate description listed below (1-9)

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|---------|
| 5 marks |
|---------|

Terms:

| | |
|------------------|---|
| a. Edema | 8 |
| b. Histamine | 6 |
| c. Bradykinin | 2 |
| d. Extravasation | 4 |
| e. Complement | 1 |

- Group of serum proteins involved in cell lysis and clearance of antigen.
- Stimulates pain receptors in the skin
- Cytoplasmic vesicle containing degradative enzymes
- Migration of a phagocyte through the endothelial wall into the tissues.
- Thin layer of outer skin
- Induces vasodilation
- Adherence of phagocytic cells to the endothelial wall.
- Accumulation of fluid in intercellular space, resulting in swelling.
- Structures involved in microbial adherence to mucous membranes.

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

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|---------|
| 5 marks |
|---------|

- a) T _____ Both T_H and T_C cells recognize antigen that has been processed and presented with an MHC molecule.
- b) F _____ A hapten can stimulate antibody formation but cannot combine with antibody molecules.
- c) T _____ Many B cell epitopes are nonsequential amino acids brought together by the tertiary conformation of a protein antigen.
- d) F _____ All antigens are also immunogens
- e) T _____ MHC genes play a major role in determining the degree of immune responsiveness to an antigen.

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

5 marks

Epitope: Antigenic Determinant: The portion of an antigen that s recognized and bound by an antibody or TCR.

Antigen: anything capable of binding to an antibody or T cell receptor.

Membrane Attack Complex: Complex of complement components C5-C9 that form to cause cell lysis by “punching holes, pores” in the target cell.

Apoptosis: programmed cell death: means of regulating cell numbers during lymphocyte differentiation or activation; morphologic changes associated with programmed cell death, inducing nuclear fragmentation, blebbing and release of apoptotic bodies.

Lymphatics: Part of the “second circulatoryt system” that collects fluid and cells from the tissues. Drains antigen from the tissues and transports it to regional lymph nodes. Maintains homeostasis.

| |
|----------|
| 15 marks |
|----------|

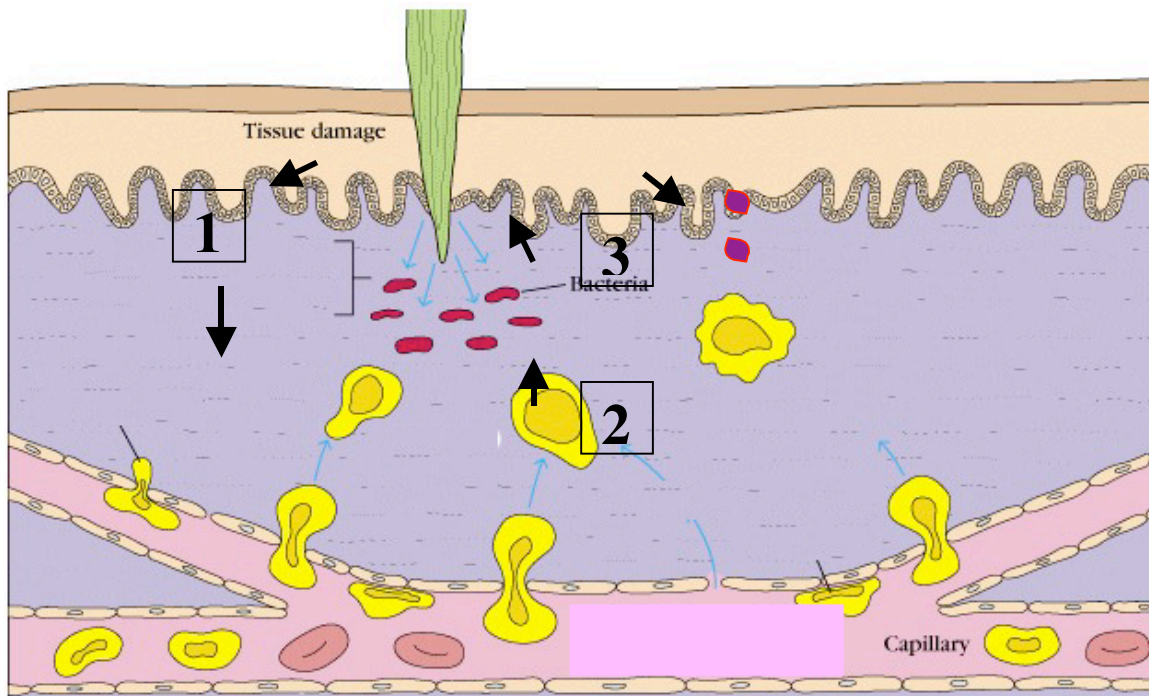
6. Choose ONE of the following 3 topics, and write a brief (1-2 page) answer in essay format. Diagrams are permissible, but will not be accepted as a substitute for a well-written response. (15 marks).

- A. Discuss innate and acquired immunity according to the following criteria:
- a) Define the differences between each system
 - b) Major cells and organs of each system
 - c) Physiological, cellular, and humoral mechanisms of each system.
 - d) Describe how these two systems interact in the production of a strong immune response as invoked by immunization in adjuvant.

-----OR-----

- B) 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:
- a) Differences between antigens and immunogens
 - b) 3 important factors which contribute to immunogenicity
 - c) 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 of antigens

- 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 describe 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. Where relevant, name the complement components involved. In your answer, make specific reference to differences in activation by the classical, alternative, and lectin pathways.



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