

一、解釋名詞

(每題 3 分)

1. Neutrophil
 2. Pathogen associated molecular pattern
 3. Graft versus host diseases
 4. SCID (severe combined immunodeficiency) mice
 5. ADCC (antibody-dependent cell-mediated cytotoxicity)
 6. CD25
 7. Chemokine
 8. Lymph node
 9. IgA
- (每題 2 分)
10. Innate-like lymphocytes
 11. Acute-phase proteins
 12. Atopy
 13. Factor B
 14. J chain
 15. Natural killer cell

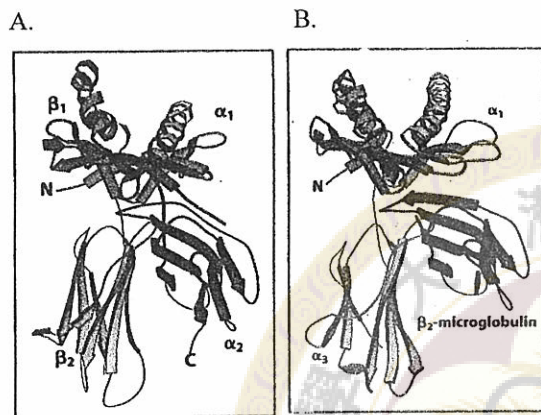
二、選擇題 (每題 2 分，除第 6 題 1 分)

1. Which one is a type of innate immune cell :
(A) mast cell; (B) basophil; (C) NK cells; (D) all right above .
2. Which one is true in comparison between MHC class I and II pathways:
(A) All is required for T cell activation; (B) All needs proteasome ; (C) All is loading peptides at same location ; (D) All binds to CLIP .
3. Which one is not a kind of immunotherapy :
(A) dendritic cell vaccine; (B) antibiotics; (C) donor lymphocyte infusion; (D) drug-conjugated antibody .
4. The diversity of the Ig repertoire is generated by which process :
(A) junction diversity; (B) somatic hypermutation; (C) recombination of V regions; (D) all right above .
5. Which one is not involved in innate immunity :
(A) Toll-like receptor ; (B) complement; (C) T cell receptor; (D) C-type lectin receptor .
6. Which of the following immunologists proposed the "Clonal Selection" hypothesis that became the cornerstone of our understanding of lymphocyte development and differentiation?
(A) Macfarlane Burnet; (B) Ray Owen; (C) James Medawar; (D) Susumu Tonegawa .
7. Which of the following molecule does not belong to the lectin pathway of complement activation?
(A) C4b2a; (B) C4b2a3b; (C) C1q, 1r, 1s; (D) MBL, MASP .

見背面

三、填充題

1. Figures shown are structures of MHC molecules. Please answer the following questions accordingly.
(每小題 2 分，共 10 分)



- (1) Figure (a) is MHC Class I; Figure (b) is MHC Class II
 (2) Cytosolic proteins are degraded by a large multicatalytic protease complex called: (c)
 (3) Degraded peptides in the cytoplasm are transported by a protein called (d) to the endoplasmic reticulum (ER).
 (4) The newly synthesized MHC Class II molecules are associated with a peptide called (e) to block antigen binding within the ER lumen.
 (5) The molecule (in human cells) that is involved in facilitating peptide loading onto MHC Class II as well as removing unstably bound peptides from MHC class II is called (f).
 2. Cytotoxic T cells kill their targets by releasing what molecules? (g), (h). (2 分)
 3. Macrophages and dendritic cells have many cell surface and intracellular receptors that function to recognize microbial structures. Please list one cell surface receptor: (i), and, one intracellular receptor: (j). (2 分)

四、問答題

1. 請簡述 2011 年諾貝爾生理或醫學獎三位得主的主要發現，以及他們的發現在免疫學中的重要性。(5 分)
 2. 王建民不小心在滑壘的過程中擦傷了左腳，回到選手村後開始腫漲發熱。這時防護員看到之後說：你受傷的部分已經開始發炎 (inflammation) 了。請簡述防護員所說的發炎反應的過程。(5 分)
 3. 請舉出 5 種應用單株抗體 (monoclonal antibody) 的免疫研究相關技術或臨床應用。(5 分)

4. Activation of naïve T cells requires 2 signals provided by antigen presenting cells such as dendritic cells. Generation of helper T cell subsets is driven by signal 3.

(1) Please briefly explain what Signal 1, Signal 2, and Signal 3 mean, respectively. (3 分)

(2) What is the specific transcription factor controlling the generation of Th1, Th2, Th17 or regulatory T cells? (4 分)

5. MHC is a highly polymorphic molecule.

(1) Please briefly explain "MHC polymorphism" (2 分)

(2) Please discuss the significance of MHC polymorphism in defense of wide spectrum infectious diseases at individual level and at population level in large outbred populations. (4 分)

6. What signals do antigen presenting cells provide to fully activate CD4 T cells? (2 分)

7. Macrophages are widely distributed in the tissues of the mammalian host. They are both physiologically and immunologically important to the host. (A) Please describe the development of mononuclear phagocytic lineage in the adult bone marrow. (B) Give the names of at least five types of tissue macrophages. (4 分)