國立臺灣大學98學年度碩士班招生考試試題

※ 注意：請於試卷上依序作答，並應註明作答之大題及其題號。

1. 解釋名詞(各 3 分)
   A. Toll like receptor
   B. anergy
   C. negative selection
   D. superantigen
   E. affinity maturation

2. The sites in or on antigens with which antibodies react are called: (單選, 3 分)
   A. haplotypes
   B. isotopes
   C. epitopes
   D. idiotypes
   E. allotypes

3. 配合題: pick up the right answer from the below list (單選，共 7 分)

_____ (1) involved complement activation
_____ (2) involved Th2 response
_____ (3) mismatched blood transfusion
_____ (4) contact hypersensitivity by nickel
_____ (5) tuberculin test reaction
_____ (6) immune complex formation
_____ (7) autoimmune hemolytic anemia

(A). Type I hypersensitivity
(B). Type II hypersensitivity
(C). Type III hypersensitivity
(D). both Type II and Type III hypersensitivity
(E). Type I, II and III hypersensitivity
(F). Type IV hypersensitivity
(G). all of the Type I, II, III and IV hypersensitivity
(H). none of any type of hypersensitivity

Multiple choices (maybe single choice, 2 points each)

4. Which cells are professional antigen presenting cells?
   A. Macrophages
   B. Dendritic cells
   C. T cells
   D. B cells

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5. Regarding to innate and adaptive immunity which are **NOT CORRECT?**
   A. Innate immunity is activated later than adaptive immunity after the host encounters pathogens
   B. NK, neutrophils, and macrophages are effector cells of the innate immunity
   C. Memory and specificity are two important features of adaptive immunity
   D. Innate immunity is not required for the development of adaptive immunity

6. Which statements are **NOT CORRECT?**
   A. IgA is important for mucosal immunity
   B. IgE can pass through placenta
   C. IgD binds to mast cells and induces allergic reactions
   D. IgG is a pentamer

7. Regarding to Src-family kinases which are **NOT CORRECT**?
   A. Src family kinases are important signal molecules for both T and B cells
   B. Phosphatases are required to initiate activation of Src family kinases
   C. Lck, Zap70 and SyK are Src kinases
   D. Src family kinases phosphorylate serine residues on ITAM motif of T cell receptor

8. Regarding to MHC restriction which are **NOT CORRECT?**
   A. It happens to both T cells and B cells
   B. T cells that recognize costimulatory molecules but not MHC-peptide will be anergized
   C. CD4 T cells recognize MHC class II plus peptide
   D. CD8 T cells recognizes MHC class I plus peptide

9. Cytokines
   A. are usually induced in response to stimulation
   B. are molecules mainly secreted by immune cells and mediate or regulate immune responses
   C. can act on the cells that secrete the cytokines
   D. can transduce signals through JAK-STAT pathways

10. Regarding to HIV-mediated acquired immunodeficiency which are **NOT CORRECT**?
   A. Patients usually die immediately after the infection
   B. HIV infection will destroy T cells including CD4 and CD8 T cells in patients
   C. Homosexual or drug abusing people are more susceptible to HIV infection
   D. It can be now cured by combination of drugs targeting HIV replicating cycle

11. Regarding to the nature of antigens which are **NOT CORRECT**?
   A. T-dependent antigens are repeated sequence such as DNA or polysaccharide
   B. It is impossible to vaccinate baby with TI-2 antigens because these antigens require mature B cells to generate protective antibodies
   C. At low concentration of TI-1 antigens, the signals delivered to B cells were sufficient to induce polyclonal B cells to proliferate and secrete antibody
   D. TD antigens deliver two signals to stimulate B cells to secrete different isotypes of antibodies

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12. Germinal center is
   A. where activated B cells undergo massive apoptosis
   B. where activated B cells undergo class switching
   C. where activated B cells differentiate into memory B cells
   D. divided into dark zone for B cells to undergo affinity maturation and light zone for B cell proliferation

13. Humoral immunity include the following EXCEPT
   A. Antibody-dependent cellular cytotoxicity (ADCC)
   B. Complement-mediated phagocytosis
   C. Cytokine-mediated inflammation
   D. Chemokine-mediated chemotaxis

14. 問答題 (5 points)
在市面上經常有廣告宣稱某些藥方或健康食品具有增強免疫力的功能,請就你/妳的免疫知識去申論一味的"增強免疫力"是否有問題?為什麼?

15. Which of the following features is belonging to (A) class I MHC molecules (B) class II MHC molecules (C) Both (D) Neither? (單選題, 每小題 1 分)

(1). Accommodates peptides of 13-30 residues
(2). Composed of α and β_2-Microglobulin polypeptide chains
(3). HLA-DQ
(4). Part of polymorphic residues locates at α1 domain.
(5). Binding site for CD8

(複選題, 每題 2.5 分)
16. Methods used for identifying IL-2-secreting cells
   A. Chromium release assay
   B. ELISA
   C. ELISPOT
   D. Intracellular cytokine staining (ICS)
   E. RNA interference (RNAi).

17. Which of the following characters of cytokines are **true**?
   A. Cytokine secretion is a brief, self-limited event
   B. Cytokine actions are only local
   C. The actions of cytokines are often pleiotropic
   D. The actions of cytokines are often redundant
   E. Cytokines initiate their actions by binding to specific membrane receptors on target cells.

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18. Which of the following factors mediate positive selection in thymus?
    A. CD4 and CD8 co-receptors
    B. Class I/II MHC molecules
    C. Lipid
    D. Thymic cortical epithelial cells
    E. Bone marrow derived antigen-presenting cells.

19. Which of the following molecules are the specific transcription factors of T helper cells?
    A. AID
    B. GATA3
    C. Pax5
    D. RORγt
    E. T-bet.

20. Which of the following transcription factors orchestrate the early stages of B cell development?
    A. E2A
    B. ID2
    C. Ikaros
    D. NFAT
    E. PU.1.

21. Which of the following statements for human immunoglobulin isotypes are **true**?
    A. There are five main immunoglobulin isotypes: IgM, IgD, IgG, IgE and IgA
    B. IgD has the high-affinity binding to mast cells and basophils
    C. IgM and IgG3 are involved in the classical pathway of complement activation
    D. IgG1 is the most abundant immunoglobulin in serum
    E. IgE is the least abundant immunoglobulin in serum.

22. Which of the following proteins mediate the recombination of immunoglobulin gene?
    A. Ku70
    B. RAG
    C. TAP
    D. TdT
    E. XRCC4.

23. Which of the following categories of immunoevasins are **true**?
    A. Blocks peptide entry to ER.
    B. Retention of MHC class I in ER
    C. Retention and degradation of MHC class II
    D. Degradation of MHC class I
    E. Binds MHC class I at cell surface.

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24. The major histocompatibility complexes (MHCs) are involved in antigen presentation to T cells. (10 points)
    (a) Please draw the structures of MHC class I and class II molecules and label each domains properly. (6 points)
    (b) MHC molecules are highly polymorphic. Based on the structures you drew from (a), the sequence variations arising from genetic polymorphism are mainly restricted in the domain of____ of MHC Class I and the domain of _____ of MHC Class II. (2 points)
    (c) A T cell recognizing antigen as a peptide bound by a particular allelic variant MHC molecule will not recognize the same peptide bound by another MHC variant. This behavior of T cells is called_____. (2 points)

25. Indicate in the Response column in the following table whether a skin graft from each donor or a recipient listed would result in a rejection (R) or an acceptance (A) response. All the mouse strains listed in the table have different H-2 haplotypes. (10 points)

DONOR	RECIPIENT	RESPONSE
C57BL/6	C3H	(1)
C57BL/6	Nude mouse	(2)
C57BL/6	C57BL/6	(3)
C57BL/6	(C57BL/6 x C3H)F1	(4)
(C57BL/6 x C3H)F1	C57BL/6	(5)

26. Please fill in the blank(s) in each statement below [(1)- (5)] with the most appropriate mechanism from the following list. Terms may be used once, more than once, or not at all. (5 points)
    a. Th17 cells
    b. Regulatory T cells
    c. CD28 costimulatory signal
    d. Fas-FasL interaction
    e. granzymes
    f. perforin
    g. lipopolysaccharide
    h. activated macrophages
    i. CpG oligonucleotides

    (1) _____Promoting survival and expansion of T cells
    (2) _____ Ligand for Toll-like receptor 4
    (3) _____Function to suppress immune response
    (4) _____Serine protease, activating apoptosis of the target cells
    (5) _____Release of antimicrobial substances, i.e. oxygen radicals

試題隨卷繳回