國立臺灣大學113學年度碩士班招生考試試題

題號：160

科目：免疫學(A)

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一、選擇題

單選題: 每題 2 分，共 38 題

1. Pathogens can be found in various compartments of the body, where they must be combated by different host-defense mechanisms. Virus-infected cell is attacked by the NK cell or **X**. What is **X**?
   (A) Cytotoxic T cell
   (B) Dendritic cell
   (C) ILC
   (D) Macrophage
   (E) Neutrophil.

2. Which is **NOT** the feature of innate immunity?
   (A) Act quickly
   (B) First line of defense
   (C) No memory
   (D) Recognize patterns common to many pathogens
   (E) Specific to a particular pathogen.

3. Which immune cell comes from common lymphoid progenitor (CLP)?
   (A) Basophil
   (B) Erythrocyte
   (C) ILC
   (D) Macrophage
   (E) Neutrophil.

4. Which is **NOT** the pattern recognition receptor (PRR) of innate cells?
   (A) Fc receptor
   (B) Glucan receptor
   (C) Mannose receptor
   (D) NOD1
   (E) TLR4.

5. Which one of the following cell-associated pattern recognition receptors (PRRs) recognizes viral RNA in cytoplasm?
   (A) Dectin-1
   (B) NOD2
   (C) RIGI
   (D) TLR5
   (E) TLR9.

6. Which one of the following biochemical intermediates is **NOT** involved in the signal transduction by the BCR complex?
   (A) Ca^{2+}
   (B) Diacylglycerol (DAG)

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(C) Pax-5
(D) Rac-GTP
(E) Ras-GTP.

7. Which one of the following molecules is used as a calcineurin inhibitor?
(A) Cyclosporin A
(B) Daidzen
(C) Genistein
(D) PP1
(E) Wortmannin.

8. Which one of the following molecules is **NOT** involved in Toll-like signaling pathways?
(A) IRF3
(B) MyD88
(C) NFκB
(D) Syk
(E) TRIF.

9. Which is **NOT** the protective response against infectious agent induced by the immune system?
(A) Effector function
(B) Recognition
(C) Regulation
(D) Memory
(E) Tolerance.

10. Which immune cell form a key link between the innate immune system and the adaptive immune system?
(A) B cell
(B) Dendritic cell
(C) ILC
(D) NK cell
(E) T cell.

11. Which isotype of immunoglobulin transports across placenta?
(A) IgA
(B) IgD
(C) IgE
(D) IgG
(E) IgM

12. Which isotype of immunoglobulin sensitizes NK cells?
(A) IgA
(B) IgD
(C) IgE

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(D) IgG
(E) IgM

13. Which is **NOT** the event of cellular immune responses?
(A) Antibody-mediated cellular cytotoxicity (ADCC)
(B) Cytokine secretion
(C) Granzyme/perforin-mediated killing
(D) Neutralization
(E) Phagocytosis.

14. Which one of following features is the characteristic of class II MHC molecule?
(A) Accommodates peptides of 10-30 residues
(B) CD4 binds mainly to the α1 domain
(C) Locations of polymorphic residues are α1 and α2 domains
(D) Nomenclatures are HLA-A, -B, -C in human
(E) Polypeptide chains are α and β_2-microglobulin.

15. Which one of following features is the characteristic of class II MHC pathway of antigen processing and presentation?
(A) β1, β2 and β5 subunits of proteasomes are responsible for protein degradation
(B) CD8+ T cells are responsive T cells
(C) Endoplasmic reticulum (ER) is the site of peptide loading to MHC.
(D) Late endosomes and lysosomes are the site of antigen degradation
(E) TAP1/2 molecules are involved in peptide transport and loading.

16. Which one of followings is a component of class II MHC pathway of antigen processing and presentation?
(A) Aminopeptidase ERAAP
(B) HLA-DM
(C) LMP7
(D) MECL-1
(E) Tapasin.

17. Which one of the following factors is involved in **negative selection** of T cell development?
(A) CD8 co-receptor
(B) Hassall's corpuscle
(C) Macrophage in the medulla
(D) MHC class I/II
(E) Peptides on MHC class I/II.

18. Which one of the following properties is the outcome of both pre-BCR and pre-TCR signaling?
(A) Allelic exclusion
(B) Class switch recombination (CSR)
(C) Positive selection

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(D) Shut off pTα transcription
(E) Stimulation of κ chain recombination.

19. Which one of the following defects impairs T cell development but **NOT** B cell development?
(A) ADA deficiency
(B) Btk deficiency
(C) NFAT deficiency
(D) RAG deficiency
(E) TAP-1 deficiency.

20. Which one of the following properties is the feature of B-1 cells?
(A) IL-7 dependent
(B) Main secretion is IgM and first produced at fetus
(C) Mode of renewal is long-lived
(D) Primary location is spleen
(E) Somatic hypermutation is high.

21. Which one of following antigens is **TI-1 antigen**?
(A) Bacterial lipopolysaccharide
(B) Dextran
(C) Diphtheria toxin
(D) Pneumococcal polysaccharide
(E) Viral hemagglutinin.

22. Which one of following transcription factors determines the CD4 commitment in the thymus?
(A) Bcl11b
(B) Ets-1
(C) GATA2
(D) Runx3
(E) ThPOK.

23. Which one of following molecules is expressed in the medulla of the thymus and facilitates negative selection for self-antigen normally expressed in peripheral tissues?
(A) AID
(B) AIRE
(C) Ak-4
(D) AP-1
(E) APOBEC1.

24. Which one of following receptors regulates the release of immature B cells from bone marrow into the circulation?
(A) CCR7
(B) CXCR4

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(C) CXCR5
(D) IL-7R
(E) S1PR1.

25. Which one of following cell marker is B-cell specific?
(A) CD3
(B) CD8
(C) CD19
(D) CD25
(E) CD44.

26. Which is **NOT** one of main CD4 effector-cell subsets?
(A) T helper 1 cells
(B) T follicular helper cells
(C) Cytotoxic T cells
(D) Regulatory T cells

27. Which cytokine is notably produced by T helper 2 cells?
(A) Interleukin-4
(B) Interleukin-17
(C) Tumor necrosis factor-α
(D) Interferon-γ

28. Which cytokine is notably produced by T helper 1 cells?
(A) Interferon-γ
(B) Interleukin-4
(C) Interleukin-5
(D) Interleukin-13

29. Which of the following statement about regulatory T cells is true?
(A) Regulatory T cells is a subset of CD8 T cells.
(B) The expression of the transcription factor FoxP3 is the hallmark of regulatory T cells.
(C) Regulatory T cells do not mediate immune tolerance.
(D) Regulatory T cells usually represent more than 50% of the T cells in circulation in humans.

30. Which of the following statement about innate and adaptive immune systems is **NOT** true?
(A) In *Drosophila melanogaster*, recognition of an invading pathogen activates the Toll or Imd signaling pathway.
(B) Mammalian Toll-like receptors are activated by different pathogen-associated molecular patterns.
(C) B cells are cellular origins of antibody immunity but not professional antigen-presenting cells.
(D) T cells, B cells and antibodies constitute major components of adaptive immunity.

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31. Which of the following statement is **NOT** true?
(A) Measles is preventable by vaccination.
(B) The available MMR (measles, mumps, and rubella) vaccine in Taiwan is a live-attenuated vaccine.
(C) Hepatitis A vaccine is available in Taiwan and is a live-attenuated vaccine.
(D) Two doses of hepatitis A vaccine are recommended for children in Taiwan.

32. Which of the following statement about vaccines is **NOT** true?
(A) The development of vaccines can be based on attenuated pathogens or material from killed organisms.
(B) Attenuation could be achieved by growing the virus in cultured cells.
(C) There is no effective vaccine available for Tuberculosis.
(D) Current BCG vaccine (Bacillus Calmette-Guérin vaccine) effectively prevents from primary infection.

33. Which of the following statement is **NOT** true?
(A) Early tumors may be recognized and destroyed by natural killer cells and T cells.
(B) Tumor-rejection antigens help the tumor to escape the immune surveillance.
(C) Tumors may avoid immune recognition by expressing inhibitor molecules that repress T cell function.
(D) Transforming growth factor-β, interleukin-10, or indoleamine 2,3-dioxygenase play roles in tumor-induced immune suppression.

34. Which of the following statement about severe combined immunodeficiency (SCID) is **NOT** true?
(A) Defects in T-cell development can result in severe combined immunodeficiencies.
(B) X-linked SCID is the most frequent form of SCID.
(C) X-linked SCID is caused by mutations in the gene interleukin 2 receptor subunit gamma on the human X chromosome.
(D) Natural killer cells develop normally in humans with X-linked SCID.

35. Which of the following statement about human immunodeficiency is **NOT** true?
(A) Severe combined immunodeficiency can arise from defects in enzymes of the salvage pathway of purine synthesis.
(B) Defects in antigen receptor gene rearrangement can result in severe combined immunodeficiency.
(C) Wiskott–Aldrich syndrome is an X-linked recessive immunodeficiency disorder.
(D) Wiskott–Aldrich syndrome is characterized by reduced T-cell numbers but with a normal antibody response.

36. Which specific abnormality leads to Bruton's X-linked agammaglobulinemia?
(A) CD40 ligand deficiency
(B) Loss of BTK tyrosine kinase
(C) Defective WASp gene
(D) Defective STAT3

37. Which of the following statement about checkpoint blockade immunotherapy is **NOT** true?
(A) Checkpoint blockade can augment immune responses to existing tumors.

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(B) Anti-PD-1 antibody immunotherapy acts to induce PD-1 signaling in T cells.
(C) Anti-PD-1 antibodies, pembrolizumab and nivolumab, are approved for treatment of several types of cancers.
(D) Anti-CTLA-4 antibody, ipilimumab, is shown to be effective in treating metastatic melanoma.

38. Which of the following statement about conjugate vaccines is true?
(A) Conjugate vaccine is designed to fight against pathogenic bacteria without capsular polysaccharides.
(B) Conjugate vaccines rely on linked recognition between T and B cells.
(C) The main aim of conjugate vaccine is to elicit species- and type-specific T cell response to the bacteria.
(D) Conjugate vaccines that are developed against *H. influenzae* type b are not successful.

複選題: 每題 3 分, 共 8 題

39. Which of the following human body tissues are part of the mucosal immune system?
(A) Salivary gland
(B) Intestine
(C) Respiratory tract
(D) Liver

40. Which of the following statements about the mucosal immune system are true?
(A) Broad surface area in contact with environmental agents and microbes
(B) Activated or memory T cells predominate even in the absence of infection
(C) Presence of distinctive microbiota
(D) Absence of inhibitory macrophages and tolerance-inducing dendritic cells

41. Which are the components of the mucosa-associated lymphoid tissue?
(A) Tonsils of Waldeyer's ring
(B) Axillary lymph node
(C) Appendix
(D) Tonsils of Waldeyer's ring

42. Which of the following statements about the gut-associated lymphoid tissue are true?
(A) The normal maturation of the intestinal mucosa and the gut-associated lymphoid tissue is initiated at birth by colonization of the intestines by the commensal microbiota.
(B) In the intestines of germ-free mice, Peyer's patches develop normally, and isolated lymphoid follicles are present.
(C) Type 3 innate lymphoid cell subset is instrumental in organizing development of the gut-associated lymphoid tissue.
(D) At maturity, the intestines maintain the largest number and diversity of commensal microbes in or on the body.

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43. Which of the following statements about Bruton's X-linked agammaglobulinemia are true?
(A) A primary immunodeficiency disease
(B) Recurrent infections with pyogenic bacteria during infancy
(C) B-cell maturation largely arrested at the pro-B-cell stage
(D) Profound B-cell deficiency

44. Which could be IgE-mediated allergic reactions?
(A) Hay fever
(B) Systemic anaphylaxis
(C) Acute urticaria
(D) Food allergy

45. Which primarily involve effector mechanisms in IgE-mediated allergic reactions?
(A) Mast cells
(B) Receptor FcεRI
(C) Histamine
(D) CD25

46. Which primarily involve mechanisms by tumors to avoid immune recognition?
(A) Tumor has high immunogenicity.
(B) Tumor is treated as self antigen.
(C) Tumor suppress immune responses directly or recruit regulatory T cells that can secrete immunosuppressive cytokines.
(D) Tumor secretes molecules such as collagen that form a physical barrier.

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