

一、選擇題 ※ 本大題請於試卷內之「選擇題作答區」依序作答。

單選題 (每題一分)

1-5. Which one of the following factors is involved in (A) Positive selection (B) Negative selection (C) Positive selection and Negative selection (D) Neither?

1. Thymic cortical epithelial cells
2. Medullary cortical epithelial cells
3. Peptides on MHC I/II
4. CD8/CD4 co-receptors
5. Bone marrow-derived DC and macrophage in the thymus

單選題 (每題 2 分)

6. Which one of following is **NOT** a human immunodeficiency syndrome?

- (A) Ataxia telangiectasia
- (B) MHC class I deficiency
- (C) Severe combined immunodeficiency
- (D) Systemic anaphylaxis
- (E) Wiskott-Aldrich syndrome.

7. Which one of following description about human immunodeficiency virus (HIV) is **INCORRECT**?

- (A) The incidence of new HIV infection is increasing more slowly in many regions of the world, but AIDS is still a major disease burden.
- (B) HIV infects and replicates within cells of the immune system.
- (C) The rapid replication rate of HIV and lack of proofreading mechanism in the viral reverse transcriptase cause the high mutation rate.
- (D) CD4 T cells are important to control HIV infection and eliminate it in the end.
- (E) Prevention and education are important in controlling the spread of HIV and AIDS.

8. Which one of the following cells is the skin-specific antigen-presenting cell?

- (A) Dendritic cell
- (B) Langerhans cell
- (C) Macrophage
- (D) Neutrophil
- (E) T cell

9. Which one of following cells comes from common lymphoid progenitor and is a key player in innate immunity?

- (A) B cell
- (B) Basophil
- (C) Eosinophil
- (D) Mast cell
- (E) NK cell

10. Which one of following protein does **NOT** express during T cell development?

- (A) CD3
- (B) GATA3

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- (C) Pax-5
- (D) RAG
- (E) TCR

11. Which one of following function is **NOT** the function of Th1?

- (A) Produce IFN γ
- (B) Produce IL-2
- (C) Produce IL-4
- (D) Eliminate intracellular bacteria
- (E) Activate macrophage

12. Which one of the following factors **decreases** the immunogenicity of antigen?

- (A) Complex composition
- (B) Intermediate dose
- (C) Large size
- (D) Mixed with adjuvants which have bacteria
- (E) Native form.

13. Which one of the following cytokines can **NOT** activate acute-phase response to infection?

- (A) IL-1 β
- (B) IL-2
- (C) IL-6
- (D) TNF α .

14. Which of the following statement for human immunoglobulin isotypes is **NOT** 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 is secreted as a pentamer and involved in the classical pathway of complement activation
- (D) IgG is the most abundant immunoglobulin in serum
- (E) IgE is the least abundant immunoglobulin in serum.

15. Mast-cell activation has different effects on different tissues. Which of the following statements is **CORRECT**?

- (A) Decreased blood flow in blood vessels
- (B) Decreased diameter in eyes and nasal passages
- (C) Decreased fluid secretion in gastrointestinal tract
- (D) Decreased mucus secretion in airways

單選題(每題 3 分)

16. Which of the following molecule can bind B7 and to transduce inhibitory signal to T cells?

- (A) CD25
- (B) CD28
- (C) Fox-P3
- (D) CTLA4
- (E) CD8

二、配合題 ※ 注意：請於試卷上「非選擇題作答區」內依序作答，並應註明作答之大題及其題號。

1. pick up the right answer from the below list (單選，每題 2 分)

___ (1) ___ invariant chain

___ (2) ___ viral antigens

___ (3) ___ Tuberculin test

___ (4) ___ hypermutation in immunoglobulin genes

___ (5) ___ anaphylaxis

(A) MHC class I antigen presentation

(B) MHC class II antigen presentation

(C) non classical MHC antigen

(D) antigen binding sites in T cell receptor (TCR)

(E) NK cell receptor

(F) Initiate the cutting of recombination sequence-specific DNA cleavage during Ig gene rearrangement

(G) affinity maturation

(H) Class switching

(I) Type I hypersensitivity

(J) Type II hypersensitivity

(K) Type III hypersensitivity

(L) Type IV hypersensitivity

三、解釋名詞 (1-4 每題 3 分，5-16 每題 2 分)

1. Toll-like receptor

2. Negative selection

3. CD28

4. MHC restriction

5. Defensin

6. Monocyte

7. IgA

8. Apoptosis

9. Foxp3

10. IL-2

11. Western blot

12. In situ hybridization

13. Monoclonal antibody

14. Immunostaining

15. Flow cytometry

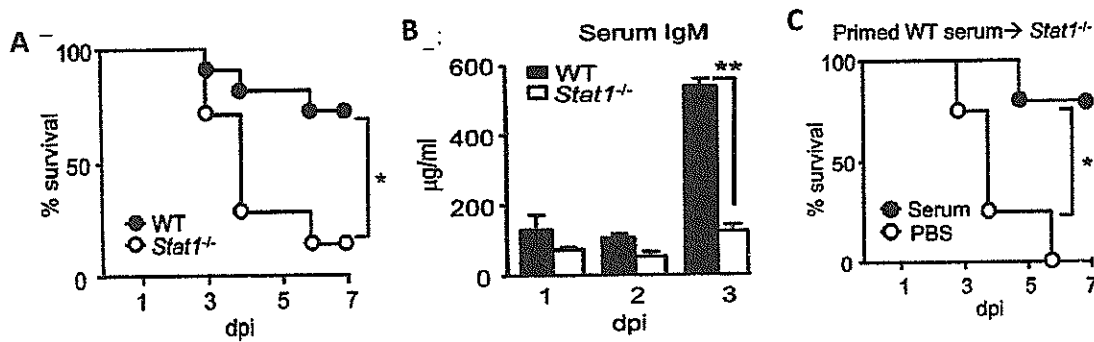
16. Polymerase chain reaction

四、問答題

1. Antibodies are produced by plasma cells that are differentiated from naïve B cells after antigen stimulation. Please describe the basic structure and functional domains of an antibody (6 分).

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2. There are five different classes or isotypes of antibodies. Please describe the functions of each isotype of antibody in humoral immunity (10 分).
3. To study the functions of IgM in anti-bacterial infection, wild type (WT) mice or mice lacking STAT1 ($STAT1^{-/-}$), a signal mediator of type I interferon, were infected with a strain of bacteria. The % survival after infection (dpi, days post infection) is shown in Figure A and the serum IgM titers are shown in Figure B. To investigate the role of serum immunoglobulin (Ig) in anti-bacterial activity, serum of WT mice previously received bacterial infection was transferred to $STAT1^{-/-}$ mice before bacterial infection. PBS was used as a control. The % survival is shown in Figure C. Please summarize the results and draw conclusions (4 分). Based on these results, please ask a question and design an experiment accordingly to further investigate the role of STAT1 in antibody response against bacterial infection (6 分).



試題隨卷繳回