

一、選擇題 ※ 注意：請於試卷內之「選擇題作答區」依序作答。

關聯題 (One point each)

1-3.

Thymic cortical epithelial cells mediate positive selection of developing thymocytes. Which cells will mature in the thymus of following mouse?

(A) Only CD4 T cells (B) Only CD8 T cells (C) Both CD4 and CD8 T cells (D) Neither.

1. MHC class I-negative mutant mouse

2. MHC class I-negative mutant mouse with MHC class I transgene expressed in thymic epithelium

3. MHC class I-negative mutant mouse with MHC class I transgene expressed that cannot interact with CD8

4-6.

Which one of the following defect impairs (A) Only T cell development (B) Only B cell development (C) Both B and T cell development (D) Neither B nor T cell development?

4. RAG deficiency

5. γ_c deficiency

6. Btk deficiency

7-8.

Which one of the followings is the example of (A) TD antigen (B) TI antigen (C) None?

7. Lipopolysaccharide (LPS)

8. Diphtheria toxin.

9-10.

Which one of the following functions is mainly mediated by human immunoglobulin (A) IgM (B) IgD (C) IgG (D) IgA (E) IgE?

9. Sensitization of mast cells

10. Neutralization in the gut lumen.

單選題 (Two points each)

11. Which is **NOT** the fate of self-responsive B cells?

(A) Replacement of light chains by receptor editing

(B) Ignorance

(C) Allelic Exclusion

(D) Apoptosis

(E) Anergy

見背面

12. Which one of the following properties of pre-B cell receptor signaling is **NOT** correct?

- (A) Survival of pre-B cell
- (B) Stimulation of light chain recombination
- (C) Shut off of surrogate light chain transcription
- (D) Proliferation of pre-B cell
- (E) Inhibition of β chain recombination

13. Which one of the following molecules is the specific transcription factor of T_H17 ?

- (A) Bcl6
- (B) FoxP3
- (C) GATA3
- (D) ROR γ t
- (E) T-bet

14. Which one of following factors determines the CD4 or CD8 commitment in the thymus?

- (A) ThPOK
- (B) TCF1
- (C) LKLF
- (D) Ikaros
- (E) Ets-1

15. Which one of following characters is **NOT** the property of IL-2?

- (A) T cell clonal expansion
- (B) Regulatory T cell (T_{REG}) development and survival
- (C) NK cells proliferation
- (D) Macrophage activation
- (E) Differentiation of T cells into effector and memory cells

16. Regarding chemokines, which statement is **NOT** correct?

- (A) The binding of chemokines to their receptors are mostly ambiguous, that is different chemokines can bind one receptor or one chemokine can bind different receptors
- (B) Chemokines can be classified into 4 groups, namely C, CC, CXC and CX3C chemokines
- (C) The signaling pathway of chemokines is the same as cytokines
- (D) Chemokines can be constitutively expressed or induced in response to stimulation

17. Regarding functions of antibodies, which statement is NOT correct?

- (A) Antibody-dependent cellular cytotoxicity (ADCC) is mainly found in T cells
- (B) Neutralizing antibody can block virus entry
- (C) Antibodies belong to the humoral immune response
- (D) Antibodies can activate the complement system

18. Regarding B cell receptors (BCR), which statement is NOT correct?

- (A) BCR is a surface immunoglobulin
- (B) B cell undergo DNA rearrangement at immunoglobulin gene locus during early development
- (C) BCR is composed of one heavy chain and one light chain
- (D) Expression of BCR is important for B cell development

19. Regarding the innate and adaptive immunity, which statement is NOT correct?

- (A) Activation of the innate immunity is faster than the adaptive immunity
- (B) The duration of the innate immunity is longer than the adaptive immunity
- (C) Evolutionarily, the innate immunity occurs earlier than does the adaptive immunity
- (D) There are more cell types in the innate immunity than the adaptive immunity

20. Which disease is an immune-related diseases?

- (A) Obesity
- (B) Stroke
- (C) Alzheimer disease
- (D) Asthma

21. 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

見背面

22. A type of lymphocyte that has no antigen receptor, and can non-specifically kill virus-infected cells and tumor cells is:

- (A) T helper cell
- (B) neutrophil
- (C) macrophage
- (D) NK cell

23. 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

24. Which of the following cell type is polymorphonuclear leukocytes?

- (A) Eosinophils
- (B) Macrophages
- (C) Megakarocytes
- (D) Kupffer cells

二、解釋名詞 (4 points each) ※ 注意：請於試卷內之「非選擇題作答區」標明題號依序作答。

1. Toll-like receptor
2. Anergy
3. MHC restriction
4. Th17
5. Neutrophil
6. CD25
7. SCID mouse
8. Antigen presenting cells
9. Autoimmune diseases

接次頁

※ 注意：請於試卷內之「非選擇題作答區」作答，並應註明作答之題號。

三、 填空及配合題

1. (2 points) Year 2011 Nobel Prize in Physiology or Medicine was awarded to three scientists. Dr. Ralph Steinman was awarded for his discovery of _____ (one immune cell type).
2. (2 points) Cytotoxic T cells and NK cells kill their targets by releasing what molecules?
_____.
3. (2 points) Macrophages and dendritic cells have many cell surface and intracellular receptors that function to recognize microbial structures. Please list
one cell surface receptor: _____,
and, one intracellular receptor: _____.
4. (4 points) Match the body compartment where the pathogen can be found and the most effective host defense mechanism against it:

<u>Pathogen</u>	<u>Defense mechanism</u>
(a) In the cytoplasm	(A) IgA antibody
(b) On the epithelial surface	(B) Macrophage activation
(c) In the phagocytic vesicles	(C) Cytotoxic T cells
	(D) NK cells

四、 簡答題

1. (3 points) List the 3 signals that antigen-presenting cells provide to activate CD4 T cells to become functionally differentiated.
2. (3 points) Antibodies exist in membrane form as B cell receptor or secreted as soluble form. (i) Please list all five major immunoglobulin isotypes. (ii) There are two isotypes of antibodies exist as multimers. Which antibodies exist as multimer? (iii) What structure stabilizes these multimers?

五、 問答題

1. What is a germinal center (GC) reaction? (3 points) What events are taking place in the GC reaction? (4 points) Which molecules on B cells are important for inducing GC reactions? (3 points)

試題隨卷繳回