

## [第一大題](40分)

## 1. 解釋名詞(各3分)

- A. Toll-like receptor
- B. Positive selection
- C. CD28
- D. dendritic cell
- E. MHC restriction
- F. Th17

## 2. Which of the following molecule can bind B7 and to transduce inhibitory signal to T cells? (單選, 3分)

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

## 3. A type of lymphocyte that has no antigen receptor, and can non-specifically kill virus-infected cells and tumor cells is: (單選, 3分)

- A. T helper cell
- B. neutrophil
- C. macrophage
- D. NK cell

## 4. 配合題: pick up the right answer from the right list (單選, 共 16分)

- |   |   |
|---|---|
| (1) invariant chain                       | (A) MHC class I antigen presentation  |
| (2) viral antigens                        | (B) MHC class II antigen presentation   |
| (3) PGYAVEDGGMLL peptide                  | (C) Non classical MHC antigen   |
| (4) Tuberculin test                       | (D) Antigen binding sites in T cell receptor (TCR)  |
| (5) hypermutation in immunoglobulin genes | (E) NK cell receptor  |
| (6) RAG-1                                 | (F) Initiate the cutting of recombination sequence-specific DNA cleavage during Ig gene rearrangement |
| (7) serum sickness                        | (G) Affinity maturation   |
| (8) anaphylaxis                           | (H) Generation of memory cells  |
|   | (I) Class switching   |
|   | (J) Type I hypersensitivity   |
|   | (K) Type II hypersensitivity  |
|   | (L) Type III hypersensitivity   |
|   | (M) Type IV hypersensitivity  |

## [第二大題] (30分)

## 1. 簡述細菌之 Horizontal gene transfer (HGT)。請包含以下課題。

- 1.1. 機制 (分類型敘述) (6%)
- 1.2. 與疾病及公共衛生的關聯性 (試舉例說明) (3%)
- 1.3. 科學研究上的應用 (試舉例說明)(3%)

## 2. 簡述下列各類抗生素的作用機制

- 2.1. Penicillins (3%)
- 2.2. Quinolones (3%)
- 2.3. Tetracyclines (3%)

## 3. 解釋名詞

- 3.1. Biofilm (3%)
- 3.2. Quorum Sensing (3%)
- 3.3. Virulence factor (3%)

見背面

[第三大題] (30 分)

1. Viruses are obligatory intracellular parasites and can only replicate within host cells. The replication of different viruses shares several common steps. Please briefly describe the critical common steps of a viral life cycle (replication of a virus). (Note: Start from infection of a host cell and end with leaving the infected cell). (8 points)
2. Please describe at least four methods of quantification of viruses and include at least one method that can measure the infectious ability of viruses. (8 points)
3. Please list four parameters that the International Committee on Taxonomy of Viruses (ICTV) (the current standard classification system) uses to classify viruses. (6 points)
4. Terminology: Please concisely explain the terms below.
  - a. Viral cytopathic effect (CPE): (2 points)
  - b. Viral pathogenesis: (2 points)
  - c. Genome Reassortment (hint: influenza virus): (2 points)
  - d. Viral latency: (2 points)



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