

## 醫學/中醫 免疫學期中考(I) 考古題

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### Terminology

1. NK cell
2. Fc region
3. PRRs
4. C3 convertase
5. Opsonin
6. Chronic granulomatous disease
7. Chemokines
8. Lysosome
9. Anti-microbial peptides
10. Anaphylatoxin

**Single Choice.** Please choose the one that is most relevant to the described terminology below.

1. Which of the following cells is a professional phagocyte? (A) B cell (B) T cell (C) macrophage (D) NK cell.
2. Innate immunity (A) smooth muscle cell (B) B cell (C) T cell (D) macrophage.
3. Antigen-presenting cell (A) NK cell (B) Dendritic cell (C) T cell (D) Mast cell.
4. Peripheral lymphoid organ (A) Thymus (B) Tonsil (C) Bone marrow (D) Liver.
5. TLR-9 (A) flagellin (B) double-stranded RNA (C) CpG DNA (D) single-stranded RNA.
6. Reactive nitrogen intermediates (A)  $H_2O_2$  (B)  $OH^\cdot$  (C)  $NO_2$  (D)  $ClO^\cdot$ .
7. Regulator of complement activation (A) CD59 (B) C3b (C) C1q (D) C5a.
8. Intracellular sensor of bacterial infection (A) TLR2 (B) Mannose-binding lectin (C) Dectin-1 (D) NOD-2.
9. The classical pathway of complement activation (A) MB-lectin (B) factor B (C) factor D (D) C1s.
10. MAC (A) C4b (B) C5a (C) C5b (D) C4a.

### Essay

1. Please describe the relationship of the complement activation products and the three immune effector functions as a result of the activation of the complement system?
2. Please list the 3 effector mechanisms mediated by the Ab in host defense and indicate the Ab regions that involve in the effector functions.
3. Please list at least 2 pro-inflammatory cytokines and their functions?

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### Single Choice

- Which of the following statements regarding an immunoglobulin is correct?
  - $V_L + V_H$  make up a single chain  $F_v$
  - The constant regions make up the antigen-bind site.
  - There is couple of covalent bonds between two light chains.
  - Regardless of their isotypes, immunoglobulins all have the same effector function.
- Which intermolecular attractive force is **NOT** involved between the bindings of any antibody to its specific antigen?
  - covalent bond
  - hydrogen bond
  - hydrophilic or hydrophobic interaction
  - Van der Waals force
- Which of the following Ag characters can usually induce better Ab production?
  - Injected intragastically.
  - Injected with very high dose.
  - With more complex composition.
  - With molecular weight less than 5 Kd
- Which of the following is paired correctly? (參考 103 年醫師國考)
  - IgA: highest levels in serum
  - IgE: highest levels in mucosal tissues
  - IgG: highest levels in body fluid
  - IgM: can cross placenta and protect fetus
- The process by which a pathogen stimulates only those lymphocytes with receptors specific for that pathogen is called
  - somatic recombination
  - clonal selection
  - antigen processing
  - antigen presentation
- Which of the following is **NOT** correct for murine monoclonal antibody (MoAb)?
  - different clones may recognize different epitopes of the same antigen.
  - the purified form of antigen is not required for the production of monoclonal antibodies.
  - can be conjugated with toxins to enhance cancer cytotoxicity.
  - the clone that can survive in the HAT medium is capable of producing desired antibody.
- Which of the following recombination is **NOT** permitted during somatic recombination in the heavy-chain and light-chain immunoglobulin loci?
  - $D_H:J_H$
  - $V_H:J_H$
  - $V_\lambda:J_\lambda$
  - $V_\kappa:J_\kappa$
- N-addition in Ig gene recombination is resulted from high activity of
  - DNA ligase IV.
  - recombination-activating genes (RAG)-1/2 proteins.
  - terminal deoxyribonucleotidyl transferase (TdT)
  - uracil-DNA-glycosylase (UNG).

9. Which of the following statement is **NOT** correct related to the gene rearrangement of TCR variable-region genes?
- (A) Higher number of  $J_\alpha$  and  $J_\beta$  gene segments than immunoglobulin  $J_H$  and  $J_L$  segments.  
 (B) One  $D_\delta$  segment can join with another.  
 (C) Can find P-addition in TCR  $\alpha$ -chain gene.  
 (D) Extensive somatic hypermutation occurs similar to Ig genes.
10. Which of the following is a **NOT** human secondary lymphoid organ? (參考 103 年醫師國考)
- (A) adenoids (B) spleen  
 (C) thymus (D) tonsils
11. Which of the following region contains most hyper-variable sequences within any immunoglobulin (Ig) molecule? (參考 103 年醫師國考)
- (A) CDR (B)  $C_L$   
 (C) Fc (D) hinge region
12. Which of the following cells has different DNA content in light chain gene region?
- (A)mature B cells (B)pro-B cells (C)mature T cells (D)liver cells

**Define the following terms**

1. adjuvant
2. humanized antibody
3. plasma cells
4. repertoire

**Match the applications below (1-4) to the most proper technique that follow (a-g).**

Applications:

- \_\_\_1. commonly used in pregnancy test kit to determine human chorionic gonadotropin in urine.
- \_\_\_2. to detect the sub-cellular location of an antigen.
- \_\_\_3. to determine total IgM concentration in serum samples.
- \_\_\_4. to determine the percentage of  $CD4^+$  cells in a sample,
- \_\_\_5. to isolate mononuclear cells from peripheral blood.

Techniques:

- a. Agglutination
- b. ELISA
- c. Ficoll-Hypaque centrifugation
- d. Fluorescent microscope
- e. Flow cytometry
- f. Immunoprecipitation
- g. Western blots

**Short Assays**

1. Describe the basic structure of RSSs (recombination signal sequences).
2. List two effects that are resulted from the genetic defect of activation-induced cytidine deaminase (AID) gene?
3. Compare the fundamental differences between  $CD4$  and  $CD8$  T molecules. You have to describe their structures and the interaction with MHC molecules.