

一、選擇題 (20%)

1. Immunogen: (A) Penicillyol group; (B) Streptolysin O of *Streptococcus pyogenes*; (C) Hemagglutinin of Influenza virus; (D) P30 of *Toxoplasma gondii*.
2. Complement activation: (A) Alternative pathway is initiated by immune complex; (B) mannose-binding lectin is produced by liver (MBL); (C) C1 is the central molecule of C' system; (D) C3bBb is the C3 convertase for classical pathway.
3. Proteins that regulate the complement system: (A) Factor I is the membrane-bound serine protease; (B) Factor H blocks the formation of C3 convertase in classical pathway; (C) C1 inhibitor binds C1q, causing dissociation from C1r2s2; (D) Inhibitor-bound C3b is cleaved by Factor I.
4. Bull's eye synapse: (A) Th1; (B) Th2; (C) Cytotoxic T cells; (D) NK cells.
5. The requirements for activation of Cytotoxic T cells: ① IL-12; ② IL-2; ③ Naïve antigen presenting cells; ④ Licensing antigen presenting cells; ⑤ CD28-B7 interaction; ⑥ CD28-CTLA-4 interaction
(A) ①③⑤; (B) ①④⑥; (C) ②③⑥; (D) ②④⑤
6. Self-MHC restriction: (A) Cytotoxic T cells; (B) Macrophage; (C) Neutrophils; (D) NK cells.
7. Inhibition markers of NK cells: (A) NKG2D; (B) CD16; (C) Ly49; (D) CD95L
8. Comparison of naïve and effector T cells: (A) Effector T cells needs CD28 engagement for activation; (B) Effector T cells express high cell adhesion molecules; Naïve T cells needs CTLA-4 engagement for activation; (D) Naïve T cells express CD45RO.
9. Endogenous pyrogen: ① IL-1; ② IL-2; ③ IL-4; ④ IL-6; ⑤ IL-8; ⑥ TNF- α ; ⑦ IFN- γ ; ⑧ HMGB-1
(A) ①④⑥⑧; (B) ②③⑤⑥; (C) ②④⑦⑧; (D) ③④⑥⑦
10. Cytokines produced by M2 macrophage: ① IL-1; ② IL-1RA; ③ IL-10; ④ IL-12; ⑤ Arginase; ⑥ iNOS; ⑦ TGF- β ; ⑧ IL-23
(A) ①④⑤⑥; (B) ②③⑤⑦; (C) ②④⑦⑧; (D) ③④⑥⑦

二、簡答題 (30%)

1. Describe "Cross-reactivity" and its importance in blood transfusion.
2. Describe the usefulness of "Mixed-lymphocyte reaction (MLR)" & "Cell-mediated lympholysis".
3. Describe the outcome of activated T cells.
4. The requirements for Th17 generation.
5. Give one of your design for anti-tumor immunotherapy.
6. What will you obtain when treating antibodies with pepsin, papain & mercaptoethanol individually?

三、問答題

1. Please explain the actions of type I interferon against viral infections. (20%)
2. Please name three types of antigen-presenting cells and explain their roles in activation of T cells. (20%)
3. Please define: (1) somatic hypermutation (5%) (2) hematopoietic stem cell (5%)