

## **PhysioQuiz 5 - Concept Review and Applications**

### **1. Sensitivity & Specificity:**

Sensitivity = 90%, Specificity = 95%, PPV ~90% for 1% prevalence.

Application: Diagnostic test development.

### **2. Sensitivity/Specificity Testing:**

Sensitivity test people with disease. Specificity test people without.

### **3. Lymphocyte Specificity:**

Each clone recognizes only one epitope (high specificity).

### **4. Antibody Functions:**

Opsonization Complement activation Mast cell degranulation Toxin neutralization

Antibodies do not directly activate dendritic cells.

### **5. Emergency Transfusion (O+):**

Safe RBC donors: only O+ and O.

### **6. Hemoglobin Functions:**

Oxygen & CO<sub>2</sub> transport pH buffering Positive cooperativity

No role in glucose/amino acid transport.

### **7. MHC-I Function:**

Presents to cytotoxic T cells (CD8+). Application: tumor immunotherapy.

### **8. Humoral vs. Cellular Immunity:**

Humoral = B cells/antibodies. Cellular = T cells (CD4+, CD8+).

### **9. Bridge Between Innate & Adaptive:**

Macrophages Dendritic cells

### **10. O<sub>2</sub> Transport & Bohr Effect:**

pH O<sub>2</sub> affinity (left shift), pH affinity (right shift).

### **11. COVID Antibody Test:**

Positive test with 98% Se/Sp at 10% prevalence = ~99% chance of true exposure.

### **12. Ion for Clotting:**

Calcium is essential for clotting cascade activation.

### **13. Interferons in COVID:**

Severe COVID linked to innate immune failure, esp. type I IFNs.

### **14. Hemostasis:**

1. Vasoconstriction 2. Platelet plug 3. Coagulation 4. Fibrin formation 5. Clot stabilization.

15. Plasma Compatibility (A+ donor):

Can give to A and AB due to presence of anti-B antibodies.

16. Complement Activation:

Initiated by LPS, immune complexes. Innate immune pathway.

17. Blood Typing & Parentage:

AB father + B mother cannot have O child likely IVF with donor egg.

References:

- Guyton & Hall. Textbook of Medical Physiology.
- Abbas AK. Cellular & Molecular Immunology.
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- West JB. Respiratory Physiology.
- Hoffman M. Thrombosis and Haemostasis.