PathMD™: Board Review Letter

Author: Greg McKenzie, M.D. **Immunology – Part 1** Volume 1, Number 6

1. Which of the following hold antigen-antibody complexes together?

   I. electrostatic forces
   II. covalent bonds
   III. van der Waals forces
   IV. hydrophobic interactions

Answer: C. Antigen-antibody binding involves formation of noncovalent bonds including hydrogen bonds, hydrophobic interactions, electrostatic and van der Waals forces. (*Clinical Diagnosis and Management by Laboratory Methods*. Henry, JB. 20th ed. 2001. p. 661)

2. Which one of the following statements regarding IgD is *false*?

Answer: B. IgD does not bind complement. The role of IgD in humoral immunity is unclear. (*Clinical Diagnosis and Management by Laboratory Methods*. Henry, JB. 20th ed. 2001. p. 885)

3. Which one of the following disease-HLA associations is incorrect?

Answer: D. Goodpasture's disease is associated with DRB1*1501. (*Robbins and Cotran: Pathologic Basis of Disease*. Kumar, et al. 7th ed. 2005. p.205,746)

4. The HLA gene is present at which chromosomal location?

Answer: A. The HLA gene is found on the short arm of chromosome 6 (6p). (*Tietz: Textbook of Clinical Chemistry and Molecular Diagnostics*. Burtis, CA, et al. 4th ed. 2006. p.1546)

5. Which one of the following is not a characteristic component of DiGeorge's syndrome?

Answer: B. The characteristic genetic defects identified in DiGeorge's syndrome are deletions at 22q11. The acronym CATCH-22 (cardiac defects, abnormal facies, thymic hypoplasia, cleft palate, hypocalcemia, and 22q11 deletions) is helpful in recalling the components of the severe end of the clinical spectrum of this syndrome. (*Clinical Diagnosis and Management by Laboratory Methods*. Henry, JB. 20th ed. 2001. p. 851, 1328)

6. Which one of the listed factors from the complement system is deficient in hereditary angioedema?

Answer: B. Deficiency of C1 inhibitor (C1INH) is associated with hereditary angioedema, an inherited immune system abnormality caused by low levels or dysfunctional C1 inhibitor. (*Tietz: Textbook of Clinical Chemistry and Molecular Diagnostics*. Burtis, CA, et al. 4th ed. 2006. p.564)

7. Which disease-hypersensitivity type association is incorrect?

Answer: D. Serum sickness is a disorder of immune complex-mediated (type III) hypersensitivity. (*Robbins and Cotran: Pathologic Basis of Disease*. Kumar, et al. 7th ed. 2005. p.206)

8. Which of the following conditions are associated with hyperviscosity?
   I. Waldenstrom's macroglobulinemia
   II. Polycythemia vera
   III. Rheumatoid arthritis
   IV. Sickle cell anemia

Answer: E. All of the above conditions are associated with either plasma or whole blood hyperviscosity. (McLeod, BC. Special Issue Clinical Applications of Therapeutic Apheresis. *Journal of Clinical Apheresis*. 2000. 15:1/2. p.30, 35, 48)

9. Which one of the following statements regarding CSF electrophoresis in a patient with suspected multiple sclerosis (MS) is correct?

Answer: A. Oligoclonal bands are "defined as two or more discreet bands in the gamma region that are absent or of lesser intensity in the concurrently run patient's serum". The electrophoresis is typically performed on agarose gel. Silver staining is a more complex process, but a more sensitive staining method than CBB. (*Clinical Diagnosis and Management by Laboratory Methods*. Henry, JB. 20th ed. 2001. p. 408)

10. Which one of the following statements regarding complement C3 is incorrect?

Answer: E. Complement proteins C5-C9 comprise the membrane attack complex. Enzymatic cleavage of C3 yields C3a, an anaphylatoxin and chemotaxin, and C3b, an opsonin. (*Tietz: Textbook of Clinical Chemistry and Molecular Diagnostics*. Burtis, CA, et al. 4th ed. 2006. p.565-567)

11. (Please refer to image 1) Which one of the following statements is correct?

Answer: D. I is the light chain. II is the amino terminus. III is the antigen-binding fragment (Fab), contains constant and variable domains, and has univalent binding capacity. IV is the crystallizable fragment (Fc). V is the carboxy terminus. (*Biochemistry*. Rawn, JD. 1983. p.145-149)

12. . A 20-year-old male presented with lethargy, fever, sore throat, and cervical lymphadenopathy. Physical examination revealed splenomegaly. Laboratory evaluation revealed lymphocytosis with large, atypical lymphocytes. Which of the following statements is correct?

Answer: "C" is correct. CMV IgM may indicate acute infection. A four-fold or greater rise in IgG titer between acute and convalescent sera is also indicative of recent CMV infection. ASO test provides serologic evidence of recent group A strep infection. Culture is preferred for the diagnosis of strep pharyngitis; however, ASO may be useful in a patient already taking antibiotics, which may result in a false negative culture.
Heterophile antibodies are nonspecific IgM molecules. "E" describes Hodgkin lymphoma (HL). Although 25% of HL patients have constitutional "B" symptoms, sore throat is not a typical symptom. Lymphocytosis as well as circulating Reed-Sternberg cells is unusual. (Rose, NR, et al. *Manual of Clinical Laboratory Immunology*. 5th ed. 1997. p. 450, 634-7), (Kjeldsberg, CR. *Practical Diagnosis of Hematologic Disorders*. 4th ed. 2006. p. 715)

13. Which one of the following statements best describes rheumatoid factor?

Answer: A. Rheumatoid factors (RF) are IgM antibodies, IgG and IgA in some cases, with specificity for the Fc portion of IgG molecules. In addition to rheumatoid arthritis, rheumatoid factors are associated with chronic viral and bacterial diseases, other autoimmune diseases, and lymphoproliferative disorders. IgA RF is associated with more severe disease with erosions. RF is detectable in many asymptomatic elderly patients resulting in a high false positive rate. The false positive rate is inversely proportional to positive predictive value (PPV). PPV= TP / (TP + FP). (*Clinical Diagnosis and Management by Laboratory Methods*. Henry, JB. 20th ed. 2001. p. 980), (Rose, NR, et al. *Manual of Clinical Laboratory Immunology*. 5th ed. 1997. p. 942)

14. (Please refer to image 2) Which one of the following statements regarding the serum protein electrophoresis pattern is correct?

Answer E. None of the above. Peak I is closest to the anode. Haptoglobin is a component of the alpha-2 component (peak III). Nephrotic syndrome has an increased alpha-2 component and a decrease in the rest. This SPEP pattern is consistent with a monoclonal gammopathy. A polyclonal pattern typically has a broad gamma component. (Bakerman, S. ABC's of Interpretive Laboratory Data. 4th ed. 2002. p. 452), (Rose, NR, et al. *Manual of Clinical Laboratory Immunology*. 5th ed. 1997. p. 156)

