

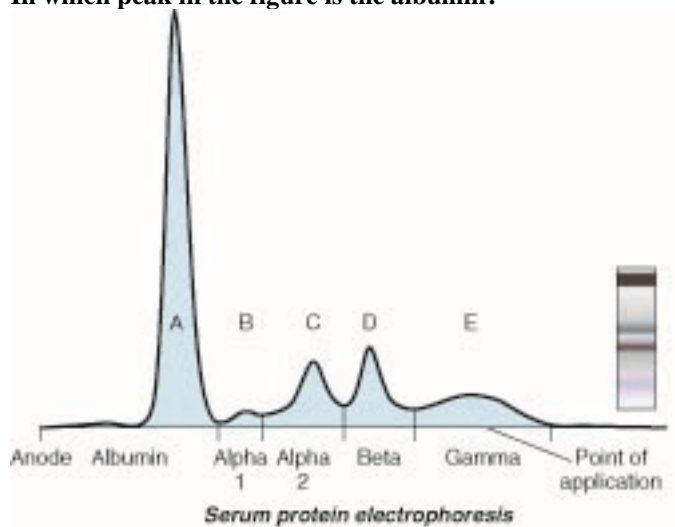
Chapter 2 Antibody

Multiple Choice Questions

- The two different cells needed to produce a monoclonal antibody are**

 - a myeloma cell that survives in the media used after fusion and a spleen cell from an immunized animal
 - a myeloma cell from an immunized animal and a spleen cell that survives in the media used after fusion
 - a myeloma cell that does *not* survive in the media used after fusion and a spleen cell from an immunized animal
 - a HAT myeloma cell and a spleen cell from an immunized animal
- Immunoglobulin diversity is produced in three stages. Which stage(s) is(are) accomplished after interaction with antigen?**

 - random recombinational events of DNA gene segments during B cell maturation
 - clonal deletion of self-reactive B cells
 - somatic mutation and affinity maturation
 - A and B
 - B and C
- In which peak in the figure is the albumin?**



Fractions	%	Reference normal % range	Reference normal concentration range
Albumin	63.0	60.0–71.0	43.00–51.00
Alpha 1	2.1	1.4–2.9	1.00–2.00
Alpha 2	11.2	7.0–11.0	5.00–8.00
Beta	11.6	8.0–13.0	6.00–9.00
Gamma	12.1	9.0–16.0	6.00–11.00

- A
- B
- C
- D
- E

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Rittenhouse-Olson/De Nardin, *Contemporary Clinical Laboratory Immunology and Serology*

4. **Given that the heavy chain has 100 V regions, 5 D regions, and 20 J regions; that the heavy chain has 200 V regions and 5 J regions; and that IgG has 4 subclasses, how many different specificities can be formed with the kappa light chain and the heavy chain given?**
- 10^7
 - 10^6
 - 4×10^7
 - 4×10^8
5. **If a particular IgG molecule and IgM molecule have the same affinity, which would have a higher avidity?**
- IgG
 - IgM
 - Both would have the same avidity
 - More data are needed to know the avidity
6. **At pH 8.6, most serum proteins**
- have a negative charge that causes them to move toward the anode
 - have a positive charge that causes them to move toward the anode
 - have a negative charge that causes them to move toward the cathode
 - have a positive charge that causes them to move toward the cathode
7. **The area in which somatic mutation occurs and increased affinity of antibody develops is the**
- bone marrow
 - lymph node
 - thymus
 - none of the above
8. **In the original experiment which determined the structure of immunoglobulin, it was broken into heavy and light chains using**
- papain
 - pepsin
 - urea and mercaptoethanol
 - none of the above
9. **IgG, IgM, IgA, and IgE**
- can bind the same antigen
 - have the same Fc region
 - have different Fc regions
 - can bind the same antigen and have the same Fc region
 - can bind the same antigen and have different Fc regions
10. **Plasma cells that make IgE are located**
- near where mast cells are located
 - along the respiratory tract, the skin, and the alimentary tract
 - primarily in the spleen
 - near where mast cells are located and along the respiratory tract, the skin, and the alimentary tract
 - near where mast cells are located and primarily in the spleen

11. **To get antibody diversity to the level that is needed,**
 - a. recombination events occur
 - b. slight changes in the junctional region during recombination can occur
 - c. somatic mutation can occur
 - d. recombination events occur and somatic mutation can occur
 - e. all of the above

12. **Protein A is a protein**
 - a. on the surface of *Staphylococcus aureus*
 - b. which binds immunoglobulin
 - c. both of the above
 - d. none of the above

13. **One of the immunoglobulin molecules found as a dimer in secretions is**
 - a. IgA
 - b. IgM
 - c. IgG
 - d. IgD
 - e. IgE

14. **Two immunoglobulin classes that have a J chain are**
 - a. IgA and IgM
 - b. IgM and IgG
 - c. IgG and IgD
 - d. IgD and IgE
 - e. IgE and IgA

15. **The antibody that is protective in serum, is made after IgM, and does *not* cause allergy is**
 - a. IgA
 - b. IgM
 - c. IgG
 - d. IgD
 - e. IgE

16. **The antibody molecule that has 10 binding sites but because of steric hinderance often binds only five antigen molecules is**
 - a. IgA
 - b. IgM
 - c. IgG
 - d. IgD
 - e. IgE

17. **A part of the immunoglobulin molecule that is between two globular regions, is rich in prolines, and is flexible is called**
 - a. the amino terminal end
 - b. the carboxyterminal end
 - c. the idiotype
 - d. the hinge region

18. **Treating IgG with pepsin causes production of**
- the hinge region
 - 2 Fab and an Fc
 - (Fab')₂ +Fc fragments
 - heavy and light chains
 - epitopes
19. **Denaturing and breaking disulfide bonds gives**
- the hinge regions
 - 2 Fab and an Fc
 - (Fab')₂ +Fc fragments
 - heavy and light chains
20. **The paratope that is seen as an antigen is called an**
- allotrope
 - isotype
 - idiotype
 - allotype
21. **In serum protein electrophoresis, the protein that moves most quickly toward the anode is**
- albumin
 - alpha 1
 - alpha 2
 - gamma globulins
22. **A spleen cell and a myeloma cell are used to produce a monoclonal antibody. How do they help produce a monoclonal antibody?**
- The myeloma cell produces factors that help the spleen cell live longer.
 - The myeloma cell and the spleen cell are fused to become one cell, a hybridoma.
 - Two myeloma cells fuse with one spleen cell to become a hybridoma.
 - Because the myeloma cell is defective, it can't make immunoglobulin, but it takes up just the genetic material from making immunoglobulin from the spleen cell and becomes a hybridoma.
23. **Immunoglobulin diversity and T cell receptor diversity both involve random recombinational events to create diversity**
- After antigen exposure, B and T cells also have somatic mutational events to improve affinity.
 - After antigen exposure, B cells have somatic mutational events to improve affinity, but T cells do not.
 - Before antigen exposure, B cells have somatic mutational events to improve affinity, but T cells do not.
 - Before antigen exposure, B and T cells have somatic mutational events to improve affinity.
24. **Given that there are 200 V regions, 5 D regions, and 20 J regions for the heavy chain; 200 V regions for the kappa light chain and 5 J regions; and 4 subclasses of IgG, how many different specificities can be formed with the kappa light chain and the heavy chain given?**
- 2×10^7
 - 2×10^6
 - 8×10^7
 - 8×10^8

25. **Compared to a secondary response, a primary response is**
- faster and higher in amount of IgG
 - slower and lower in amount of IgG
 - slower but higher in amount of IgG
 - faster, more specific but lower in amount of IgG
26. **Secretory IgA**
- is made by one cell
 - is made by two cells
 - is made by three cells
 - none of the above
27. **Monoclonal antibodies are produced by cells that are hybrids of**
- spleen cells and skin tumor cells
 - neutrophils and myeloma cells
 - spleen cells and myeloma cells
 - macroglobulinemia cells and myeloma cells

Matching Questions

- 28.
- | | | |
|----|---|-----|
| a. | binds to mast cells | IgA |
| b. | first antibody produced | IgM |
| c. | highest in serum concentration | IgG |
| d. | highest in secretions | IgD |
| e. | a maturational marker on B cells | IgE |
- 29.
- | | | |
|----|--|------------------------|
| a. | After treating antibody with urea and mercaptoethanol you get this or these | the hinge region |
| b. | After treating an antibody with papain you get this or these | 2 Fab and an Fc |
| c. | An antigen seen in the binding region of an immunoglobulin molecule | heavy and light chains |
| d. | Found in between the CH1 and CH2 regions of the heavy chain | idiotype |

Answer Key

1. c. a myeloma cell that does *not* survive in the media used after fusion and a spleen cell from an immunized animal
2. e. B and C
3. e. E
4. a. 10^7
5. b. IgM
6. a. have a negative charge that causes them to move toward the anode
7. b. lymph node
8. c. urea and mercaptoethanol
9. e. can bind the same antigen and have different Fc regions
10. d. near where mast cells are located and along the respiratory tract, the skin, and the alimentary tract
11. e. all of the above
12. c. both of the above
13. a. IgA
14. a. IgA and IgM
15. c. IgG
16. b. IgM
17. d. the hinge region
18. c. (Fab')₂ +Fc fragments
19. d. heavy and light chains
20. c. idiotype
21. a. albumin
22. b. The myeloma cell and the spleen cell are fused to become one cell, a hybridoma.
23. b. After antigen exposure, B cells have somatic mutational events to improve affinity, but T cells do not.
24. a. 2×10^7
25. b. slower and lower in amount of IgG

- 26. b. is made by two cells
- 27. c. spleen cells and myeloma cells
- 28. a. IgE/b. IgB/c. IgC/d. IgA/e. IgD
- 29. a. heavy and light chains/b. 2 Fab and an Fc/c. idiotype/d. the hinge region