The Immune System: Humoral Immunity

1. Antibodies can be found on the plasma membrane of ________________ (where they act as antigen receptors) or free in the extracellular fluid, here they are known as ______________________________.

2. Antibodies consist of four polypeptide chains made from::
   • Two identical _________ chains—located on the inside of the Y-shaped molecule
   • Two identical __________ chains—located on the outside of the Y-shaped molecule

   The chains are held together by ______________ bonds.

3. Each chain has a ____________ region which is unique for each antigen and a ___________ region which is the same for each antibody in a given class of antibodies.

4. Each arm of the Y-shaped antibody has identical ______________ sites. The shape of these sites must match the shape of the __________-____________ on the antigen in order to bind.

5. Name the five classes of antibodies, each with a distinct type of stem:
   • ______
   • ______
   • ______
   • ______
   • ______

6. Complete the list of four contributions of IgG antibodies:
   • Constitutes the __________________ of circulating antibodies
   • Formed in the late ______________ and throughout the ____________ immune response
   • Provides __________________________ to the fetus
   • Can be transferred from one individual to another (example of ______________________ immunity)

7. Match the characteristics listed below to the correct antibody. Choose either IgM or IgA.
   • These antibodies are found in secretions of tears, sweat, and saliva ______
   • First antibodies secreted in response to a new antigen ______
• Retained as monomers on the surface of B cells
• Found in the mucosa of the gastrointestinal tract
• Found in breast milk
• Secreted as pentamers

8. In modern, industrialized countries, the most common function of IgE is its role in ____________ responses. When exposed to an ______________ such as pollen, the body makes IgE antibodies.

9. The first exposure to an antigen is called _____________________. As a result, IgE antibodies are present on _______________ and _______________. During the second exposure, the allergen causes the release of ___________ and other inflammatory mediators.

10. As a result of the actions of the chemical released in question 9, the affected person gets a runny nose (due to _____________________________ ) and has difficulty breathing (due to ________________ ________________).

11. _______________ _______________ are drugs that bind and block histamine receptors, thus alleviating the allergy symptoms.

12. Allergic reactions to peanuts can be very serious, causing a systemic allergic reaction known as ____________________.

13. The two major roles of IgE are:
  • fighting __________________________________
  • ________________________________________

14. IgD antibodies are located on the surface of ______________ cells and act as an antigen receptor. They participate in activating the _______ cell.

15. There are four general ways that antibodies work (to remember: PLAN). Fill in the following:
  • P—act as opsonins to destroy pathogens by ________________
  • L—initiate complement activation resulting in _______ of the pathogen
  • A—cause ____________________, the clumping of molecules, which enhances phagocytosis
  • N—cause ____________________, which prevents toxins and viruses from interacting with body cells
16. Humoral immunity can be acquired either actively or passively. Define each and give an example of the naturally and artificially acquired forms.

Active Immunity: __________________________________________

• Naturally acquired: __________________________________________

• Artificially acquired: __________________________________________

Passive Immunity: __________________________________________

• Naturally acquired: __________________________________________

• Artificially acquired: __________________________________________

17. Determine if the following examples illustrate active or passive immunity and if the example is naturally or artificially acquired. Place an X in the appropriate column.

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<thead>
<tr>
<th></th>
<th>Active immunity Naturally acquired</th>
<th>Active immunity Artificially acquired</th>
<th>Passive immunity Naturally acquired</th>
<th>Passive immunity Artificially acquired</th>
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<tbody>
<tr>
<td>Antivenom for poisonous snake bites</td>
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<td>Bacterial infection</td>
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