Bank of the Questions Immunology

MCQ Questions typeA:

Q1: Which of the fallowing cells produces Anti-bodies?
A: macrophage.
B: B-cells.
C: T-cells
D: plasma cells

Q2: Which of the following Antibodies cross the placenta?

A: IgA.
B: IgE.
C: IgG.
D: IgD.

3. The formation of memory immune responses is the objective of vaccination. Immunological memory is predominantly the function of which of the following?

A. The complement system.
B. cells bearing pattern-recognition receptor molecules.
C. cells of the adaptive immune system.
D. molecules comprising the chemical barrier.

4. Which of the following factors can pre-dispose you to having allergies?
A. A family history of allergies
B. Environmental Conditions
C. Number and type of Exposures
D. Emotional factors
E. All of the above

5. Which of the following does NOT reduce or delay allergies in children?
A. Reducing dust-collecting items
B. Limiting exposure early in life to indoor furry pets
C. Avoiding smoking in and around the house
D. Exclusively wearing cotton clothes
E. All actions adequately reduce allergies

6. Which of these body systems causes allergic reactions?
A. Lymph
B. Immune
C. Nervous
D. Autonomic
E. Circulatory

7. CD8 is a marker of:
A. B-cells
B. Helper T-cells
C. Cytotoxic T-cells
D. An activated macrophage
E. A neutrophil precursor

8. Which of the following immune cells/molecules are most effective at destroying intracellular pathogens?
A. T helper cells
B. B cells
C. Antibodies
D. Complement
E. T Cytotoxic cells

9. Examples of granulocytes include all of the following except:
A) neutrophil
B) monocyte
C) basophil
D) eosinophil.
E) All of the above are examples of granulocytes.

10. The B cells that produce and release large amounts of antibody are called:
A. Memory cells
B. Basophils
C. Plasma cells
D. Killer cells
E. Neutrophils

11. Which of the following pairs is mismatched?
A. lymphocytes: innate immune response
B. natural killer cell: kills virus-infected cells
C. macrophage: phagocytosis and killing of microorganisms
D. erythrocyte: oxygen transport
E. eosinophil: defense against parasites

12. Which of the following convey the longest-lasting immunity to an infectious agent?
A. Naturally acquired passive immunity
B. Artificially acquired passive immunity
C. Naturally acquired active immunity
D. All of these
E. None of these

New 30 Questions MCQ

Q1: produces Anti-bodies?
A: macrophage.
B: B-cells.
C: T-cells
D: plasma cells

Q2: Which of the following Antibodies cross the placenta?
A: IgA.
B: IgE.
C: IgG.
D: IgD.

3. The formation of memory immune responses is the objective of vaccination. Immunological memory is predominantly the function of which of the following?

A. The complement system.
B. cells bearing pattern-recognition receptor molecules.
C. cells of the adaptive immune system.
D. molecules comprising the chemical barrier.

4. Which of the following factors can pre-dispose you to having allergies?
A. A family history of allergies
B. Environmental Conditions
C. Number and type of Exposures
D. Emotional factors
E. All of the above

5. Which of the following does NOT reduce or delay allergies in children?
A. Reducing dust-collecting items
B. Limiting exposure early in life to indoor furry pets
C. Avoiding smoking in and around the house
D. Exclusively wearing cotton clothes
E. All actions adequately reduce allergies

6. Which of these body systems causes allergic reactions?
A. Lymph
B. Immune
C. Nervous
D. Autonomic
E. Circulatory

7. CD8 is a marker of:
A. B-cells
B. Helper T-cells

C. Cytotoxic T-cells
D. An activated macrophage
E. A neutrophil precursor

8. Which of the following immune cells/molecules are most effective at destroying intracellular pathogens?
A. T helper cells
B. B cells
C. Antibodies
D. Complement
E. T Cytotoxic cells

9. Examples of granulocytes include all of the following except:
A) neutrophil
B) monocyte
C) basophil
D) eosinophil.
E) All of the above are examples of granulocytes.

10. The B cells that produce and release large amounts of antibody are called:
A. Memory cells
B. Basophils
C. Plasma cells
D. Killer cells
E. Neutrophils

11. Which of the following pairs is mismatched?
A. lymphocytes: innate immune response
B. natural killer cell: kills virus-infected cells
C. macrophage: phagocytosis and killing of microorganisms
D. erythrocyte: oxygen transport
E. eosinophil: defense against parasites

12. Which of the following convey the longest-lasting immunity to an infectious agent?
A. Naturally acquired passive immunity
B. Artificially acquired passive immunity
C. Naturally acquired active immunity
D. All of these
E. None of these

Here are 18 more multiple-choice questions for you:

Which of the following immune cells is primarily responsible for the production of antibodies?
A. Macrophages

B. B cells
C. T cells
D. Plasma cells

Which class of antibodies is most abundant in the bloodstream and provides long-term immunity?
A. IgA
B. IgE
C. IgG
D. IgD

Which of the following is an example of a primary lymphoid organ?
A. Spleen
B. Thymus
C. Lymph nodes
D. Tonsils

Which of the following immune cells is responsible for antigen presentation?
A. Macrophages
B. B cells
C. T cells
D. Natural killer cells

Which of the following is NOT a type of hypersensitivity reaction?
A. Type I
B. Type II
C. Type III
D. Type IV

Which of the following cells is involved in the immediate hypersensitivity reaction?
A. Neutrophils
B. Eosinophils
C. Mast cells
D. Natural killer cells

Which of the following is an example of an autoimmune disease?
A. Rheumatoid arthritis
B. Asthma
C. Diabetes mellitus type 2
D. Influenza

Which of the following cells is responsible for cell-mediated immunity?
A. B cells
B. Helper T cells
C. Cytotoxic T cells
D. Plasma cells

Which of the following is NOT a function of the complement system?
A. Opsonization
B. Inflammation
C. Phagocytosis
D. Antibody production

Which of the following is an example of passive immunity?
A. Vaccination
B. Transfer of antibodies from mother to fetus
C. Activation of B cells
D. Activation of T cells

Which of the following is NOT an antigen-presenting cell?
A. Macrophage
B. Dendritic cell
C. B cell
D. Neutrophil

Which type of T cell is responsible for coordinating the immune response?
A. Helper T cell
B. Regulatory T cell
C. Cytotoxic T cell
D. Memory T cell

Which of the following is NOT a characteristic of innate immunity?
A. Specificity
B. Rapid response
C. Lack of immunological memory
D. Physical barriers

Which of the following is a characteristic of humoral immunity?
A. Mediated by T cells
B. Targeted against intracellular pathogens
C. Production of antibodies
D. Activation of phagocytes

Which of the following is a primary function of the spleen?
A. Production of red blood cells
B. Filtration of blood and removal of old red blood cells
C. Production of antibodies
D. Maturation of T cells

Which of the following is a characteristic of allergic reactions?
A. Immune response against self-antigens
B. Production of autoantibodies

C. Excessive immune response to harmless substances
D. Activation of natural killer cells

Which of the following is NOT a role of antibodies in the immune response?
A. Neutralization of pathogens
B. Activation of complement system
C. Facilitation of phagocytosis
D. Promotion of inflammation

Which of the following is an example of active immunity?
A. Administration of antivenom
B. Transfer of antibodies from another individual
C. Exposure to a pathogen and subsequent immune response
D. Administration of immune globulin

New 30 MCQ for immunology

A: macrophage.
B: B-cells.
C: T-cells
D: plasma cells

Q2: Which of the following Antibodies cross the placenta?
A: IgA.
B: IgE.
C: IgG.
D: IgD.

3. The formation of memory immune responses is the objective of vaccination. Immunological memory is predominantly the function of which of the following?

A. The complement system.
B. cells bearing pattern-recognition receptor molecules.
C. cells of the adaptive immune system.
D. molecules comprising the chemical barrier.

4. Which of the following factors can pre-dispose you to having allergies?
A. A family history of allergies
B. Environmental Conditions
C. Number and type of Exposures
D. Emotional factors
E. All of the above

5. Which of the following does NOT reduce or delay allergies in children?
A. Reducing dust-collecting items
B. Limiting exposure early in life to indoor furry pets

C. Avoiding smoking in and around the house
D. Exclusively wearing cotton clothes
E. All actions adequately reduce allergies

6. Which of these body systems causes allergic reactions?
A. Lymph
B. Immune
C. Nervous
D. Autonomic
E. Circulatory

7. CD8 is a marker of:
A. B-cells
B. Helper T-cells
C. Cytotoxic T-cells
D. An activated macrophage
E. A neutrophil precursor

8. Which of the following immune cells/molecules are most effective at destroying intracellular pathogens?
A. T helper cells
B. B cells
C. Antibodies
D. Complement
E. T Cytotoxic cells

9. Examples of granulocytes include all of the following except:
A) neutrophil
B) monocyte
C) basophil
D) eosinophil.
E) All of the above are examples of granulocytes.

10. The B cells that produce and release large amounts of antibody are called:
A. Memory cells
B. Basophils
C. Plasma cells
D. Killer cells
E. Neutrophils

11. Which of the following pairs is mismatched?
A. lymphocytes: innate immune response
B. natural killer cell: kills virus-infected cells
C. macrophage: phagocytosis and killing of microorganisms
D. erythrocyte: oxygen transport
E. eosinophil: defense against parasites

12. Which of the following convey the longest-lasting immunity to an infectious agent?
A. Naturally acquired passive immunity
B. Artificially acquired passive immunity
C. Naturally acquired active immunity
D. All of these
E. None of these

Here are 38 more multiple-choice questions for you:

Which of the following immune cells is primarily responsible for the production of antibodies?
A. Macrophages
B. B cells
C. T cells
D. Plasma cells

Which class of antibodies is most abundant in the bloodstream and provides long-term immunity?
A. IgA
B. IgE
C. IgG
D. IgD

Which of the following is an example of a primary lymphoid organ?
A. Spleen
B. Thymus
C. Lymph nodes
D. Tonsils

Which of the following immune cells is responsible for antigen presentation?
A. Macrophages
B. B cells
C. T cells
D. Natural killer cells

Which of the following is NOT a type of hypersensitivity reaction?
A. Type I
B. Type II
C. Type III
D. Type IV

Which of the following cells is involved in the immediate hypersensitivity reaction?
A. Neutrophils
B. Eosinophils
C. Mast cells

D. Natural killer cells

Which of the following is an example of an autoimmune disease?
A. Rheumatoid arthritis
B. Asthma
C. Diabetes mellitus type 2
D. Influenza

Which of the following cells is responsible for cell-mediated immunity?
A. B cells
B. Helper T cells
C. Cytotoxic T cells
D. Plasma cells

Which of the following is NOT a function of the complement system?
A. Opsonization
B. Inflammation
C. Phagocytosis
D. Antibody production

Which of the following is an example of passive immunity?
A. Vaccination
B. Transfer of antibodies from mother to fetus
C. Activation of B cells
D. Activation of T cells

Which of the following is NOT an antigen-presenting cell?
A. Macrophage
B. Dendritic cell
C. B cell
D. Neutrophil

Which type of T cell is responsible for coordinating the immune response?
A. Helper T cell
B. Regulatory T cell
C. Cytotoxic T cell
D. Memory T cell

Which of the following is NOT a characteristic of innate immunity?
A. Specificity
B. Rapid response
C. Lack of immunological memory
D. Physical barriers

Which of the following is a characteristic of humoral immunity?
A. Mediated by T cells

B. Targeted against intracellular pathogens
C. Production of antibodies
D. Activation of phagocytes

Which of the following is a primary function of the spleen?
A. Production of red blood cells
B. Filtration of blood and removal of old red blood cells
C. Production of antibodies
D. Maturation of T cells

Which of the following is a characteristic of allergic reactions?
A. Immune response against self-antigens
B. Production of autoantibodies
C. Excessive immune response to harmless substances
D. Activation of natural killer cells

Which of the following is NOT a role of antibodies in the immune response?
A. Neutralization of pathogens
B. Activation of complement system
C. Facilitation of phagocytosis
D. Promotion of inflammation

Which of the following is an example of active immunity?
A. Administration of antivenom
B. Transfer of antibodies from another individual
C. Exposure to a pathogen and subsequent immune response
D. Administration of immune globulin

New 60 Questions MCQ:

immune cells is primarily responsible for the production of antibodies?
A. Macrophages
B. B cells
C. T cells
D. Plasma cells

Which class of antibodies is most abundant in the bloodstream and provides long-term immunity?
A. IgA
B. IgE
C. IgG
D. IgD

Which of the following is an example of a primary lymphoid organ?
A. Spleen
B. Thymus

C. Lymph nodes
D. Tonsils

Which of the following immune cells is responsible for antigen presentation?
A. Macrophages
B. B cells
C. T cells
D. Natural killer cells

Which of the following is NOT a type of hypersensitivity reaction?
A. Type I
B. Type II
C. Type III
D. Type IV

Which of the following cells is involved in the immediate hypersensitivity reaction?
A. Neutrophils
B. Eosinophils
C. Mast cells
D. Natural killer cells

Which of the following is an example of an autoimmune disease?
A. Rheumatoid arthritis
B. Asthma
C. Diabetes mellitus type 2
D. Influenza

Which of the following cells is responsible for cell-mediated immunity?
A. B cells
B. Helper T cells
C. Cytotoxic T cells
D. Plasma cells

Which of the following is NOT a function of the complement system?
A. Opsonization
B. Inflammation
C. Phagocytosis
D. Antibody production

Which of the following is an example of passive immunity?
A. Vaccination
B. Transfer of antibodies from mother to fetus
C. Activation of B cells
D. Activation of T cells

Which of the following is NOT an antigen-presenting cell?

A. Macrophage
B. Dendritic cell
C. B cell
D. Neutrophil

Which type of T cell is responsible for coordinating the immune response?
A. Helper T cell
B. Regulatory T cell
C. Cytotoxic T cell
D. Memory T cell

Which of the following is NOT a characteristic of innate immunity?
A. Specificity
B. Rapid response
C. Lack of immunological memory
D. Physical barriers

Which of the following is a characteristic of humoral immunity?
A. Mediated by T cells
B. Targeted against intracellular pathogens
C. Production of antibodies
D. Activation of phagocytes

Which of the following is a primary function of the spleen?
A. Production of red blood cells
B. Filtration of blood and removal of old red blood cells
C. Production of antibodies
D. Maturation of T cells

Which of the following is a characteristic of allergic reactions?
A. Immune response against self-antigens
B. Production of autoantibodies
C. Excessive immune response to harmless substances
D. Activation of natural killer cells

Which of the following is NOT a role of antibodies in the immune response?
A. Neutralization of pathogens
B. Activation of complement system
C. Facilitation of phagocytosis
D. Promotion of inflammation

Which of the following is an example of active immunity?
A. Administration of antivenom
B. Transfer of antibodies from another individual
C. Exposure to a pathogen and subsequent immune response
D. Administration of immune globulin

Here are 46 additional multiple-choice questions for you:

Which of the following cells is responsible for the production of histamine in allergic reactions?
A. Neutrophils
B. Eosinophils
C. Mast cells
D. Natural killer cells

Which of the following is an example of a secondary lymphoid organ?
A. Spleen
B. Thymus
C. Lymph nodes
D. Tonsils

Which of the following cells is responsible for the recognition and elimination of virus-infected cells?
A. Macrophages
B. B cells
C. T cells
D. Natural killer cells

Which type of hypersensitivity reaction involves the formation of immune complexes and subsequent tissue damage?
A. Type I
B. Type II
C. Type III
D. Type IV

Which of the following cells is involved in the delayed hypersensitivity reaction?
A. Neutrophils
B. Eosinophils
C. Mast cells
D. T cells

Which of the following is an example of a systemic autoimmune disease affecting multiple organs?
A. Rheumatoid arthritis
B. Lupus erythematosus
C. Type 1 diabetes mellitus
D. Multiple sclerosis

Which of the following cells is responsible for the production of cytotoxic substances that kill infected cells?
A. B cells

B. Helper T cells
C. Cytotoxic T cells
D. Plasma cells

Which of the following is a function of the complement system?
A. Opsonization
B. Inhibition of inflammation
C. Suppression of phagocytosis
D. Induction of antibody production

Which of the following is an example of natural passive immunity?
A. Vaccination
B. Transfer of antibodies from mother to fetus
C. Activation of B cells
D. Activation of T cells

Which of the following is an example of a phagocytic cell?
A. Macrophage
B. Dendritic cell
C. B cell
D. Neutrophil

Which type of T cell is responsible for suppressing immune responses and maintaining tolerance?
A. Helper T cell
B. Regulatory T cell
C. Cytotoxic T cell
D. Memory T cell

Which of the following is a characteristic of adaptive immunity?
A. Non-specific response
B. Immediate response
C. Lack of memory
D. Generation of immunological memory

Which of the following is an example of an acquired immunity?
A. Specificity
B. Rapid response
C. Lack of physical barriers
D. Immunological memory

Which of the following is a primary function of the lymph nodes?
A. Production of red blood cells
B. Filtration of lymph and removal of foreign particles
C. Production of antibodies
D. Maturation of T cells

Which of the following is a characteristic of autoimmune diseases?
A. Immune response against self-antigens
B. Production of autoantibodies
C. Hypoactive immune response
D. Activation of natural killer cells

Which of the following is NOT a role of antibodies in the immune response?
A. Neutralization of pathogens
B. Activation of complement system
C. Facilitation of antigen presentation
D. Promotion of phagocytosis

Which of the following is an example of passive immunity acquired through vaccination?
A. Administration of antivenom
B. Transfer of antibodies from another individual
C. Exposure to a pathogen and subsequent immune response
D. Administration of immune globulin

A plasma cell secretes:
A. Antibody of a single specificity related to that on the surface of the parent B-cell
B. Antibody of two antigen specificities
C. The antigen it recognizes
D. Many different types of antibody
E. Lysozyme

The mononuclear phagocyte system does not include:
A. Monocytes.
B. Kupffer cells.
C. Kidney mesangial cells.
D. Lymph node medullary macrophages.
E. Endothelial cells.

Which of the following does not protect body surfaces?
A. Skin.
B. Mucus.
C. Gastric acid.
D. Salivary amylase
E. Gut microflora.

CD4:
A. Is essentially an intracellular glycoprotein.
B. Is heterodimeric.
C. Binds processed peptide in its outer groove.
D. Binds to MHC class II on antigen-presenting cells.

E. Is highly polymorphic.

The B and T cells are produced by stem cells that are formed in:
A. Bone marrow.
B. The liver.
C. The circulatory system.
D. The spleen.
E. The lymph nodes.

Which of the following is not correct concerning interferon?
A. Interferon is a protective protein.
B. Virus-infected cells produce interferon.
C. Interferon has no effect on viruses.
D. Interferon can be used to treat certain viral infections.

The adaptive immune defenses respond to which of the following?
A. Specific antigens.
B. General pathogens.
C. Interferon.
D. Histamine.
E. All of these are correct.

Which of the following does not pertain to B cells?
A. Have passed through the thymus.
B. Have specific receptors.
C. Are responsible for antibody-mediated immunity.
D. Synthesize antibodies.

Which of the following characteristics pertains to T cells?
A. Have specific receptors.
B. Are of more than one type.
C. Are responsible for cell-mediated immunity.
D. Stimulate antibody production by B cells.
E. All of these are correct.

Which of the following is a function of the spleen?
A. Produces T cells.
B. Removes worn-out red blood cells.
C. Produces immunoglobulins.
D. Produces macrophages.
E. Regulates the immune system.

Type B: Fill in the blanks with suitable answers

1. The ……perform many biological functions related to the protection and body‘s immunity against pathogens.

2. They react specifically with that antigen in vivo or in vitro and are hence a part of the adaptive immune response (…….).
3. activation of complement to facilitate the lysis of ……., and complement-mediated opsonization,
4. Agglutination (clumping together) of microorganisms or of antigenic particles; or binding with……
5. The immune system depends on……, the ligands that are bound by them, for its function.
6. Helper T cells do not directly kill infected cells, as……
7. The production of effector cells in response to first-time exposure to an antigen is called the……...
8. One of the most important characteristics of the immune system is the production of soluble proteins…….
9. CD8+ T lymphocytes are called…… because they kill cells harboring intracellular microbes.
10. …….is the only immunoglobulin that can cross the placenta in humans; therefore, maternal IgG provides most of the protection of the newborn during the first months of life

_____ cells are primarily responsible for the production of antibodies. (B cells)

_____ antibodies are most abundant in the bloodstream and provide long-term immunity. (IgG)

The thymus is an example of a _____ lymphoid organ. (primary)

Macrophages and dendritic cells are responsible for antigen _____. (presentation)

Type IV hypersensitivity reaction is also known as _____ hypersensitivity. (delayed)

Mast cells are involved in the immediate hypersensitivity reaction through the release of _____. (histamine)

Rheumatoid arthritis is an example of an _____ disease. (autoimmune)

Cytotoxic T cells are responsible for _____-mediated immunity. (cell)

The complement system plays a role in opsonization, inflammation, and _____. (phagocytosis)

Transfer of antibodies from mother to fetus is an example of _____ immunity. (passive)

Neutrophils, eosinophils, and _____ are types of granulocytes. (basophils)

Natural killer cells are involved in the defense against _____-infected cells. (virus)

The spleen functions as a site for filtration of blood and removal of old _____ blood cells. (red)

Allergic reactions are characterized by an excessive immune response to _____ substances. (harmless)

Antibodies play a role in neutralization of pathogens, activation of the complement system, and facilitation of _____. (phagocytosis)

Exposure to a pathogen and subsequent immune response leads to _____ immunity. (active)

Macrophages, dendritic cells, and _____ cells are examples of antigen-presenting cells. (B)

Helper T cells are responsible for coordinating the immune _____. (response)

Innate immunity is characterized by a rapid response, lack of specificity, and absence of _____. (immunological memory)

Humoral immunity is mediated by B cells and involves the production of _____. (antibodies)

The primary function of the spleen is the filtration of blood and removal of old red blood cells, not the production of _____. (red blood cells)

Allergic reactions involve an immune response against _____ substances. (self-antigens)

Antibodies are proteins that recognize and bind to specific _____. (antigens)

Vaccination stimulates the production of _____ memory cells. (immunological)

Immunization can confer _____-lasting immunity to certain infectious agents. (long)

Dendritic cells are involved in antigen _____ and activation of immune responses. (capture)

Regulatory T cells play a role in maintaining immune _____ and preventing autoimmune reactions. (tolerance)

Innate immunity provides immediate defense against pathogens through physical barriers, such as _____. (skin)

Memory T cells are responsible for the rapid and enhanced _____ response upon re-exposure to a specific pathogen. (immune)

The activation of B cells leads to the production and release of _____. (antibodies)

Inflammation is a protective response of the immune system that involves increased blood flow, recruitment of immune cells, and _____ at the site of infection or injury. (swelling)

The major histocompatibility complex (MHC) plays

Solving the fill in the blanks

The immune cells perform many biological functions related to the protection and body's immunity against pathogens. (Answer: immune cells)

They react specifically with that antigen in vivo or in vitro and are hence a part of the adaptive immune response (Answer: antibodies).

Activation of complement to facilitate the lysis of pathogens, and complement-mediated opsonization. (Answer: bacteria)

Agglutination (clumping together) of microorganisms or of antigenic particles; or binding with antibodies. (Answer: antigens)

The immune system depends on antigens, the ligands that are bound by them, for its function. (Answer: antigens)

Helper T cells do not directly kill infected cells, as their main function is to assist other immune cells. (Answer: Helper T cells)

The production of effector cells in response to first-time exposure to an antigen is called the primary immune response.

One of the most important characteristics of the immune system is the production of soluble proteins called antibodies.

CD8+ T lymphocytes are called cytotoxic T cells because they kill cells harboring intracellular microbes.

IgG is the only immunoglobulin that can cross the placenta in humans; therefore, maternal IgG provides most of the protection of the newborn during the first months of life.

1. The immune cells perform many biological functions related to the protection and body's immunity against pathogens.
2. They react specifically with that antigen in vivo or in vitro and are hence a part of the adaptive immune response (specific antibodies).
3. Activation of complement to facilitate the lysis of pathogens, and complement-mediated opsonization.
4. Agglutination (clumping together) of microorganisms or of antigenic particles; or binding with antibodies.
5. The immune system depends on antigens, the ligands that are bound by them, for its function.
6. Helper T cells do not directly kill infected cells, as cytotoxic T cells perform that function.
7. The production of effector cells in response to first-time exposure to an antigen is called the primary immune response.
8. One of the most important characteristics of the immune system is the production of soluble proteins (such as antibodies).
9. CD8+ T lymphocytes are called cytotoxic T cells because they kill cells harboring intracellular microbes.
10. IgG is the only immunoglobulin that can cross the placenta in humans; therefore, maternal IgG provides most of the protection of the newborn during the first months of life.

1. The _____ perform many biological functions related to the protection and body's immunity against pathogens. (immune cells)

2. They react specifically with that antigen in vivo or in vitro and are hence a part of the adaptive immune response (**specific antibodies**).

3. Activation of complement to facilitate the lysis of **pathogens**, and complement-mediated opsonization.

4. Agglutination (clumping together) of microorganisms or of antigenic particles; or binding with **antibodies**.

5. The immune system depends on **antigens**, the ligands that are bound by them, for its function.

6. Helper T cells do not directly kill infected cells, as **cytotoxic T cells** perform that function.

7. The production of effector cells in response to first-time exposure to an antigen is called the **primary immune response**.

8. One of the most important characteristics of the immune system is the production of soluble proteins **(such as antibodies)**.

9. CD8+ T lymphocytes are called **cytotoxic T cells** because they kill cells harboring intracellular microbes.

10. **IgG** is the only immunoglobulin that can cross the placenta in humans; therefore, maternal IgG provides most of the protection of the newborn during the first months of life.

11. _____ are the specialized cells of the immune system responsible for antibody production. (B cells)

12. The process of coating pathogens with antibodies to enhance their recognition and phagocytosis is known as _____. (opsonization)

13. The release of chemical signals by immune cells to recruit other immune cells to the site of infection or inflammation is called _____. (chemotaxis)

14. _____ is a protein complex that plays a central role in the activation of the complement system. (C3)

15. The branch of immunology that deals with the study of antigen-antibody interactions in the blood is called _____. (serology)

16. _____ is the process by which immune cells recognize and bind to specific antigens. (antigen recognition)

17. _____ are small proteins secreted by immune cells that regulate immune responses. (cytokines)

18. The primary function of _____ is to filter lymph and trap pathogens or foreign substances. (lymph nodes)

19. _____ are molecules on the surface of immune cells that are responsible for antigen recognition. (receptor molecules)

20. The process by which immune cells eliminate infected or abnormal cells through programmed cell death is called _____. (apoptosis)

Type C: True/False questions

1. Innate immunity is resistance that is pre-existing and is not acquired through contact with an antigen?.
2. Some CD8+ T cells belong to a special subset that functions to prevent or limit immune responses; these are called regulatory T lymphocytes?**.**
3. Agglutination (clumping together) of microorganisms or of antigenic particles; or binding with soluble antigen, leading to the formation of precipitates?.
4. There are two categories of lymphocytes known as B lymphocytes and T Lymphocytes?.
5. IgE is the major antibody produced in the secondary immune response?.
6. The common portals of entry for microbes: the skin, gastrointestinal tract, and respiratory tract?
7. larger molecules were designated heavy chains (often abbreviated as H (chains) and the smaller ones, light chains (often abbreviated as L chains?.
8. The antibody on the surface of the precursor B-cell has the same binding specificity of the secreted antibody by the plasma cell.

New True/ False questions

True/False: Innate immunity is resistance that is pre-existing and is not acquired through contact with an antigen.

True/False: Some CD8+ T cells belong to a special subset that functions to prevent or limit immune responses; these are called regulatory T lymphocytes.

True/False: Agglutination (clumping together) of microorganisms or of antigenic particles; or binding with soluble antigen, leading to the formation of precipitates.

True/False: There are two categories of lymphocytes known as B lymphocytes and T lymphocytes.

True/False: IgE is the major antibody produced in the secondary immune response.

True/False: The common portals of entry for microbes are the skin, gastrointestinal tract, and respiratory tract.

True/False: Larger molecules were designated heavy chains (often abbreviated as H chains) and the smaller ones, light chains (often abbreviated as L chains).

True/False: The antibody on the surface of the precursor B-cell has the same binding specificity as the secreted antibody by the plasma cell.

True/False: Innate immunity is acquired through contact with an antigen.

True/False: Regulatory T lymphocytes enhance immune responses.

True/False: Agglutination leads to the formation of soluble antigens.

True/False: There is only one category of lymphocytes known as T lymphocytes.

True/False: IgE is the major antibody produced in the primary immune response.

True/False: The common portals of entry for microbes are the bloodstream, urinary tract, and nervous system.

True/False: Heavy chains are smaller molecules compared to light chains.

True/False: The binding specificity of the antibody on the precursor B-cell is different from the secreted antibody by the plasma cell.

True/False: Innate immunity is a type of acquired immunity.

True/False: Regulatory T lymphocytes inhibit immune responses.

True/False: Agglutination does not play a role in immune reactions.

True/False: There are three categories of lymphocytes known as A, B, and T lymphocytes.

True/False: IgE is not involved in immune responses.

True/False: The common portals of entry for microbes are the eyes, ears, and reproductive system.

True/False: Heavy chains and light chains are of the same size.

True/False: The antibody on the surface of the precursor B-cell has a different binding specificity compared to the secreted antibody by the plasma cell.

True/False: Innate immunity is acquired after exposure to an antigen.

True/False: Regulatory T lymphocytes have no impact on immune responses.

True/False: Agglutination is the process of separating microorganisms or antigenic particles.

True/False: There are four categories of lymphocytes known as A, B, C, and D lymphocytes.

True/False: IgE is primarily involved in allergic reactions.

True/False: The common portals of entry for microbes are the bones, muscles, and endocrine system.

Answers:

True

True

True

True

False

True

True

True

False

True

False

False

False

False

False

True

False

True

True

False

False

Type D: Define the flowing terms.

1. Effector B cells:
2. Humoral immune response
3. Antibodies
4. Natural killer Cells
5. B lymphocytes
6. Cytokines
7. IgG
8. Lymph nodes
9. Antigen-presenting cells
10. the helper CD4 T lymphocyte

definitions for the terms mentioned:

Effector B cells:
Definition: Effector B cells, also known as plasma cells, are B lymphocytes that have been activated by an antigen and have differentiated to produce and secrete large amounts of antibodies. They play a crucial role in the humoral immune response.

Humoral immune response:
Definition: The humoral immune response refers to the component of the immune system that involves the production and circulation of antibodies. It is primarily mediated by B lymphocytes and is responsible for targeting extracellular pathogens and toxins.

Antibodies:
Definition: Antibodies, also known as immunoglobulins, are Y-shaped proteins produced by B lymphocytes in response to antigens. They recognize and bind to specific antigens, marking them for destruction or neutralizing their harmful effects.

Natural killer cells:
Definition: Natural killer (NK) cells are a type of lymphocyte that plays a crucial role in innate immunity. They are responsible for identifying and killing infected cells, particularly those that lack major histocompatibility complex (MHC) class I molecules.

B lymphocytes:
Definition: B lymphocytes, also known as B cells, are a type of white blood cell involved in adaptive immunity. They are responsible for producing antibodies and play a key role in the humoral immune response.

Cytokines:
Definition: Cytokines are small proteins that act as signaling molecules in the immune system. They regulate immune responses by promoting cell communication and coordination. Cytokines can have various effects, such as stimulating inflammation, promoting cell growth, and modulating immune cell activity.

IgG:
Definition: IgG is an immunoglobulin (antibody) isotype that is the most abundant in the bloodstream. It plays a crucial role in long-term immunity, as it can cross the placenta during pregnancy to provide passive immunity to the fetus.

Lymph nodes:
Definition: Lymph nodes are small, bean-shaped structures located throughout the body along the lymphatic system. They serve as filtering stations for lymph fluid and are important sites for immune cell activation and coordination.

Antigen-presenting cells:

Definition: Antigen-presenting cells (APCs) are specialized immune cells that capture, process, and present antigens to T lymphocytes. They include macrophages, dendritic cells, and B cells. APCs play a crucial role in initiating and regulating immune responses.

The helper CD4 T lymphocyte:
Definition: The helper CD4 T lymphocyte, also known as a helper T cell, is a type of T lymphocyte that plays a central role in coordinating immune responses. It recognizes antigens presented by APCs and provides signals to other immune cells, promoting their activation and function.
Innate immunity: True

Definition: Innate immunity refers to the immune response that is present at birth and provides immediate, non-specific defense against pathogens. It is not acquired through contact with an antigen.
Regulatory T lymphocytes: True

Definition: Regulatory T lymphocytes (Tregs) are a subset of CD8+ T cells that function to prevent or limit immune responses. They play a crucial role in maintaining immune tolerance and preventing excessive immune reactions.
Agglutination: True

Definition: Agglutination is the process of clumping together of microorganisms or antigenic particles. It can occur when antibodies bind to multiple antigens, leading to the formation of visible aggregates or precipitates.
B lymphocytes and T lymphocytes: True

Definition: Lymphocytes are a type of white blood cell involved in adaptive immunity. B lymphocytes (B cells) are responsible for the production of antibodies, while T lymphocytes (T cells) play various roles in cellular immunity.
IgE: False

Definition: IgE is an immunoglobulin (antibody) involved in allergic reactions. However, it is not the major antibody produced in the secondary immune response. IgG is the predominant antibody in the secondary immune response.
Portals of entry for microbes: True

Definition: The common portals of entry for microbes are the routes through which pathogens can enter the body, including the skin, gastrointestinal tract, and respiratory tract.
Heavy chains and light chains: True

Definition: Immunoglobulins (antibodies) are composed of two types of protein chains. Heavy chains are larger molecules, often designated as H chains, while light chains are smaller molecules, often designated as L chains.
Binding specificity of precursor B-cell antibody: True

Definition: The antibody on the surface of the precursor B-cell, known as the B-cell receptor (BCR), has the same binding specificity as the secreted antibody produced by the plasma cell derived from the same B cell.
Innate immunity: False

Definition: Innate immunity is not acquired through contact with an antigen. It is the pre-existing, non-specific resistance that provides immediate defense against pathogens.
Regulatory T lymphocytes: True

Definition: Regulatory T lymphocytes (Tregs) suppress or inhibit immune responses, helping to maintain immune homeostasis and prevent excessive immune reactions.
Agglutination: False

Definition: Agglutination does not lead to the formation of soluble antigens. Instead, it refers to the clumping together of microorganisms or antigenic particles, often induced by the binding of antibodies.
Categories of lymphocytes: False

Definition: There are more than two categories of lymphocytes. In addition to B lymphocytes and T lymphocytes, there are also natural killer (NK) cells, innate lymphoid cells (ILCs), and other subsets of lymphocytes involved in immune responses.
IgE: False

Definition: IgE is an immunoglobulin (antibody) involved in allergic reactions. It is not the major antibody produced in the primary immune response. IgM is the primary antibody produced in the early stages of the primary immune response.
Portals of entry for microbes: False

Definition: The common portals of entry for microbes are not the bloodstream, urinary tract, and nervous system. Instead, they are the skin, gastrointestinal tract, and respiratory tract.
Heavy chains and light chains: False

Definition: Heavy chains are larger molecules compared to
Short Answer Questions

What are effector B cells, also known as plasma cells?
What is the role of effector B cells in the immune response?
What is the humoral immune response?
Which type of immune cells primarily mediate the humoral immune response?
What are antibodies, or immunoglobulins?
How do antibodies recognize and bind to specific antigens?
What is the function of antibodies in the immune system?
What are natural killer cells?
What role do natural killer cells play in innate immunity?
How do natural killer cells identify infected cells?

What are B lymphocytes, or B cells?
What is the main responsibility of B lymphocytes in the immune system?
What is the significance of B lymphocytes in the humoral immune response?
What are cytokines?
How do cytokines regulate immune responses?
What are some effects of cytokines in the immune system?
What is IgG, and what is its role in immunity?
Why is IgG considered the most abundant antibody isotype in the bloodstream?
How does IgG contribute to long-term immunity?
What are lymph nodes, and where are they located in the body?
What is the function of lymph nodes in the immune system?
What happens to immune cells in lymph nodes?
What are antigen-presenting cells (APCs)?
Which types of immune cells are considered antigen-presenting cells?
What is the role of APCs in immune responses?
What is the helper CD4 T lymphocyte, or helper T cell?
How does the helper CD4 T lymphocyte contribute to immune responses?
What is the primary function of helper T cells?
How does the helper CD4 T lymphocyte recognize antigens?
What signals do helper T cells provide to other immune cells?
How do effector B cells differ from naive B cells?
What triggers the activation and differentiation of B cells into effector B cells?
What is the primary responsibility of effector B cells?
How do effector B cells contribute to the humoral immune response?
What distinguishes the humoral immune response from the cell-mediated immune response?
What are the different antibody isotypes involved in the humoral immune response?
How do B lymphocytes participate in antibody production?
What is the role of antibody production in combating infections?
What is the significance of antigen recognition by B cells in immune responses?
How do B cells interact with other immune cells to coordinate immune responses?

Answers

Effector B cells, also known as plasma cells, are B lymphocytes that have been activated by an antigen and produce and secrete large amounts of antibodies.

The role of effector B cells in the immune response is to produce and release antibodies that specifically bind to antigens, marking them for destruction or neutralizing their harmful effects.

The humoral immune response is the component of the immune system that involves the production and circulation of antibodies to target extracellular pathogens and toxins.

B lymphocytes primarily mediate the humoral immune response.

Antibodies, or immunoglobulins, are Y-shaped proteins produced by B lymphocytes in response to antigens. They recognize and bind to specific antigens, marking them for destruction or neutralizing their harmful effects.

Antibodies recognize and bind to specific antigens through their antigen-binding sites, which have a complementary shape to the antigen's surface.

The function of antibodies in the immune system is to neutralize pathogens, facilitate their destruction by other immune cells, and activate the complement system.

Natural killer cells are a type of lymphocyte that plays a crucial role in innate immunity by identifying and killing infected cells, particularly those that lack major histocompatibility complex (MHC) class I molecules.

Natural killer cells identify infected cells by detecting changes in surface markers, such as the downregulation of MHC class I molecules.

B lymphocytes, or B cells, are a type of white blood cell involved in adaptive immunity. They are responsible for producing antibodies and play a key role in the humoral immune response.

The main responsibility of B lymphocytes in the immune system is to recognize and bind to specific antigens, leading to the production of antibodies.

B lymphocytes are essential in the humoral immune response as they produce antibodies that target and neutralize antigens.

Cytokines are small proteins that act as signaling molecules in the immune system, regulating immune responses by promoting cell communication and coordination.

Cytokines regulate immune responses by binding to specific receptors on immune cells and modulating their behavior and activity.

Cytokines can have various effects in the immune system, including promoting inflammation, stimulating cell growth, and regulating immune cell activity.

IgG is an immunoglobulin (antibody) isotype that is the most abundant in the bloodstream. It plays a crucial role in long-term immunity and can cross the placenta during pregnancy to provide passive immunity to the fetus.

IgG is considered the most abundant antibody isotype in the bloodstream because it has a longer half-life and is produced in larger quantities compared to other antibody isotypes.

IgG contributes to long-term immunity by providing memory responses upon re-exposure to antigens, resulting in a faster and more robust immune response.

Lymph nodes are small, bean-shaped structures located throughout the body along the lymphatic system. They filter lymph fluid and are important sites for immune cell activation and coordination.

The function of lymph nodes in the immune system is to filter lymph fluid, trap foreign substances, and facilitate immune cell interactions and activation.

In lymph nodes, immune cells interact with antigens, undergo activation and proliferation, and initiate immune responses.

Antigen-presenting cells (APCs) are specialized immune cells that capture, process, and present antigens to T lymphocytes. Macrophages, dendritic cells, and B cells are considered antigen-presenting cells.

APCs play a crucial role in immune responses by capturing antigens, processing them into smaller fragments, and presenting these fragments to T cells to initiate and regulate immune responses.

The helper CD4 T lymphocyte, or helper T cell, is a type of T lymphocyte that plays a central role in coordinating immune responses. It recognizes antigens presented by APCs and provides signals to other immune cells, promoting their activation and function.

The

1. What characteristics should an antigen have to stimulate an immune response effectively?
2. Briefly, what do each of the following do in an immune response? macrophage, helper T lymphocyte, cytotoxic T lymphocyte, delayed hypersensitivity T lymphocyte, suppressor T lymphocyte, B lymphocyte, plasma cell
3. In what parts of the body do immune responses happen?
4. What cells are involved in the interaction that results in antibody production? For what is the antibody that is made specific?
5. What is antibody? Where is it made, by what cells, where is it located after it is made, what use is it?
6. What is antigen?
7. What is meant by immunological memory? What really happens to cause it? What are the differences between a primary and a secondary response?
8. Distinguish between antibody specificity and classes of antibody molecules.
9. Each antibody class has several (3-4) unique features that distinguish it from the others, in terms of structure, function or both. What are they? (For our purposes, the classes are IgM, IgG, IgA, and IgE.)

10. What and where are antigen binding sites on antibody molecules?
11. Describe how a person allergic to oak pollen might begin to suffer from the symptoms of hay fever. That is, the person inhales the pollen. Then what? How is IgE involved? Mast cells?
12. Why does it make sense to treat IgE-mediated allergies with antihistamines? Would it make sense to treat poison ivy with antihistamines?
13. Why are drug and venom allergies likely to have so much more serious consequences than hay fevers? What are the consequences?
14. Desensitization shots given to minimize allergies deliver small amounts of antigen on a regular schedule. Give two possible explanations for how they work.
15. How do antibodies act indirectly to lead to the elimination of antigen by other parts of the immune system?
16. In what cases do antibodies have a direct effect that inactivates certain antigens?
17. Against what targets are cytotoxic T cells an effective defense? What cells cooperate to activate cytotoxic T cells? What happens to the target cell?
18. Discuss the range of importance that a toxin may have in causing the symptoms of a disease, giving examples.
19. Compare the progress of an infectious disease through a well-immunized population with its progress through a poorly immunized population.
20. How does the development of cell-mediated immunity by the host change the character of the disease/lesions in tuberculosis?
21. In what diseases are carriers important and what role do they play in transmission of the disease?

New :

1. What characteristics should an antigen have to stimulate an immune response effectively?
2. Briefly, what do each of the following do in an immune response? Macrophage, helper T lymphocyte, cytotoxic T lymphocyte, delayed hypersensitivity T lymphocyte, suppressor T lymphocyte, B lymphocyte, plasma cell.
3. In what parts of the body do immune responses happen?
4. What cells are involved in the interaction that results in antibody production? For what is the antibody that is made specific?
5. What is an antibody? Where is it made, by what cells, where is it located after it is made, and what use is it?
6. What is an antigen?
7. What is meant by immunological memory? What really happens to cause it? What are the differences between a primary and a secondary response?

8. Distinguish between antibody specificity and classes of antibody molecules.
9. Each antibody class has several unique features that distinguish it from the others, in terms of structure, function, or both. What are they? (For our purposes, the classes are IgM, IgG, IgA, and IgE.)
10. What are antigen binding sites on antibody molecules, and where are they located?
11. Describe how a person allergic to oak pollen might begin to suffer from the symptoms of hay fever. That is, the person inhales the pollen. Then what? How is IgE involved? Mast cells?
12. Why does it make sense to treat IgE-mediated allergies with antihistamines? Would it make sense to treat poison ivy with antihistamines?
13. Why are drug and venom allergies likely to have much more serious consequences than hay fever? What are the consequences?
14. Desensitization shots given to minimize allergies deliver small amounts of antigen on a regular schedule. Give two possible explanations for how they work.
15. How do antibodies act indirectly to lead to the elimination of antigen by other parts of the immune system?
16. In what cases do antibodies have a direct effect that inactivates certain antigens?
17. Against what targets are cytotoxic T cells an effective defense? What cells cooperate to activate cytotoxic T cells? What happens to the target cell?
18. Discuss the range of importance that a toxin may have in causing the symptoms of a disease, giving examples.
19. Compare the progress of an infectious disease through a well-immunized population with its progress through a poorly immunized population.
20. How does the development of cell-mediated immunity by the host change the character of the disease/lesions in tuberculosis?
21. In what diseases are carriers important, and what role do they play in the transmission of the disease?
22. What is the role of memory B cells in the immune response?
23. How do T lymphocytes recognize antigens presented by antigen-presenting cells?
24. Explain the process of clonal selection and expansion in the immune response.
25. What is the significance of major histocompatibility complex (MHC) molecules in immune recognition?
26. What is the role of complement proteins in the immune system?
27. How does the immune system distinguish self from non-self?
28. Describe the process of opsonization and its role in immune defense.
29. What is the function of natural killer (NK) cells in immune surveillance?
30. Discuss the role of inflammation in the immune response.

1. Case scenario: A researcher is studying a potential vaccine candidate for a viral infection. What characteristics should the antigen in the vaccine possess to effectively stimulate an immune response?
2. Case scenario: During a bacterial infection, a macrophage encounters the pathogen. What role does the macrophage play in the immune response?

3. Case scenario: A patient has a viral infection, and their helper T lymphocytes become activated. What is the role of helper T lymphocytes in the immune response?
4. Case scenario: A patient is experiencing tissue damage due to an autoimmune disease. Which type of T lymphocyte, involved in delayed hypersensitivity reactions, might be responsible for this response?
5. Case scenario: After encountering an antigen, a B lymphocyte undergoes differentiation. What type of cell does it become, and what is its role in the immune response?
6. Case scenario: A patient has a respiratory infection, and their body produces antibodies to fight the infection. Where are antibodies made, and where are they located after production?
7. Case scenario: A patient receives a vaccination against a specific pathogen. What is the antigen in the vaccine, and why is it used?
8. Case scenario: A person has been previously exposed to a pathogen and subsequently develops immunity to it. What is the concept of immunological memory, and how does it occur? What are the differences between a primary and a secondary immune response?
9. Case scenario: A patient is allergic to a certain food. What does it mean for antibodies to have specificity, and how does it relate to the different classes of antibody molecules?
10. Case scenario: A patient receives a blood transfusion. What are antigen binding sites on antibody molecules, and how do they interact with antigens in this scenario?

Answers

1. To effectively stimulate an immune response, an antigen should possess certain characteristics such as being foreign to the body, being of sufficient size and complexity, and having the ability to bind to immune receptors.
2. Macrophages play a crucial role in the immune response by engulfing and digesting pathogens, presenting antigens to other immune cells, and secreting cytokines to activate and recruit other immune cells.
3. Helper T lymphocytes play a vital role in the immune response by recognizing antigens presented by antigen-presenting cells, activating B cells and cytotoxic T lymphocytes, and releasing cytokines to coordinate immune responses.
4. Delayed hypersensitivity T lymphocytes, also known as T helper 1 (Th1) cells, are involved in delayed hypersensitivity reactions. In certain conditions, they can contribute to tissue damage in autoimmune diseases.
5. B lymphocytes, upon encountering antigens, differentiate into plasma cells. Plasma cells are responsible for producing and secreting antibodies, which play a key role in the immune response.
6. Antibodies are Y-shaped proteins produced by B lymphocytes in response to antigens. They are made specifically to recognize and bind to particular antigens, marking them for destruction or neutralizing their harmful effects.

7. Antigens in vaccines are usually harmless fragments or weakened forms of the pathogen. They are used to stimulate an immune response and trigger the production of specific antibodies, providing immunity against future infections.
8. Immunological memory refers to the ability of the immune system to "remember" previous encounters with specific antigens. During a primary response, the immune system generates memory cells that allow for a faster and stronger secondary response upon re-exposure to the same antigen.
9. Antibody specificity refers to the ability of antibodies to recognize and bind specifically to a particular antigen. The classes of antibody molecules (IgM, IgG, IgA, and IgE) differ in their structures, functions, and distribution in the body.
10. Antigen binding sites on antibody molecules are specific regions that recognize and bind to antigens. These binding sites are located at the tips of the Y-shaped antibody molecules, where antigen-antibody interactions occur.

Long Answer questions:

1. **What characteristics should an antigen have to stimulate an immune response effectively?** To effectively stimulate an immune response, an antigen should possess several key characteristics. First, it should be foreign to the body and not recognized as "self." Second, it should be of sufficient size and complexity to be detected by the immune system. Antigens with repetitive structures or high molecular weight tend to be more immunogenic. Third, the antigen should have the ability to bind to specific immune receptors, such as B cell receptors or T cell receptors, triggering their activation. Finally, the presence of certain danger signals, such as pathogen-associated molecular patterns (PAMPs), can enhance the immunogenicity of an antigen.
2. **Briefly, what do each of the following do in an immune response? Macrophage, helper T lymphocyte, cytotoxic T lymphocyte, delayed hypersensitivity T lymphocyte, suppressor T lymphocyte, B lymphocyte, plasma cell.**

- Macrophage: Macrophages are phagocytic cells that engulf and digest pathogens. They present antigens to other immune cells, secrete cytokines to activate and recruit immune cells, and contribute to the initiation and regulation of immune responses.
- Helper T lymphocyte: Helper T cells play a central role in coordinating immune responses. They recognize antigens presented by antigen-presenting cells, secrete cytokines to activate B cells and cytotoxic T cells, and provide essential signals for the immune system's proper functioning.
- Cytotoxic T lymphocyte: Cytotoxic T cells are specialized in killing infected or abnormal cells. They recognize antigens presented on the surface of target cells, such as virus-infected or cancer cells, and release cytotoxic molecules to induce cell death.
- Delayed hypersensitivity T lymphocyte: Delayed hypersensitivity T cells, also known as T helper 1 (Th1) cells, are involved in delayed hypersensitivity

reactions. In certain conditions, they can contribute to tissue damage in autoimmune diseases.

- Suppressor T lymphocyte: Suppressor T cells, also called regulatory T cells (Tregs), play a crucial role in immune tolerance and preventing excessive immune responses. They suppress the activity of other immune cells, helping to maintain immune homeostasis and prevent autoimmune reactions.
- B lymphocyte: B cells are responsible for producing antibodies, which play a key role in the immune response. Upon encountering antigens, B cells differentiate into plasma cells that secrete antibodies.
- Plasma cell: Plasma cells are terminally differentiated B cells that produce and secrete large amounts of antibodies, also known as immunoglobulins.

3. **In what parts of the body do immune responses happen?** Immune responses can occur in various parts of the body, including:

- Lymphoid organs: These include lymph nodes, spleen, and tonsils, where immune cells interact, and immune responses are initiated and regulated.
- Bone marrow: It is the site of immune cell production, including B cells and some types of T cells.
- Mucosa-associated lymphoid tissues (MALT): These are found in the mucous membranes of the respiratory, gastrointestinal, and genitourinary tracts, and they help protect against pathogens at entry points.
- Secondary lymphoid tissues: These include lymph nodes, where immune cells encounter antigens and generate immune responses.
- Bloodstream: Immune cells, such as T cells, B cells, and antibodies, can circulate in the bloodstream, allowing them to reach various parts of the body.

4. **What cells are involved in the interaction that results in antibody production? For what is the antibody that is made specific?** The interaction leading to antibody production involves multiple cell types. Antigen-presenting cells (APCs), such as macroph

Continue

1. **What characteristics should an antigen have to stimulate an immune response effectively?** To stimulate an immune response effectively, an antigen should be foreign to the body, possess sufficient size and complexity, bind to specific immune receptors, and may have danger signals to enhance immunogenicity.
2. **Briefly, what do each of the following do in an immune response? Macrophage, helper T lymphocyte, cytotoxic T lymphocyte, delayed hypersensitivity T lymphocyte, suppressor T lymphocyte, B lymphocyte, plasma cell.**

- Macrophage: Phagocytose pathogens, present antigens, and secrete cytokines to activate immune cells.
- Helper T lymphocyte: Coordinate immune responses by recognizing antigens, secreting cytokines, and providing essential signals.
- Cytotoxic T lymphocyte: Kill infected or abnormal cells by recognizing antigen-presenting cells and releasing cytotoxic molecules.

- Delayed hypersensitivity T lymphocyte: Involved in delayed hypersensitivity reactions and may contribute to tissue damage in autoimmune diseases.
- Suppressor T lymphocyte: Maintain immune tolerance by suppressing other immune cells.
- B lymphocyte: Produce antibodies in response to antigens.
- Plasma cell: Terminally differentiated B cell that secretes antibodies.

3. **In what parts of the body do immune responses happen?** Immune responses can occur in lymphoid organs (e.g., lymph nodes, spleen), bone marrow, mucosa-associated lymphoid tissues (MALT), secondary lymphoid tissues, and the bloodstream.
4. **What cells are involved in the interaction that results in antibody production? For what is the antibody that is made specific?** The cells involved in antibody production are B lymphocytes (B cells) and plasma cells. Antibodies are made specific for antigens, meaning they bind to and recognize specific antigenic determinants or epitopes.
5. **What is an antibody? Where is it made, by what cells, where is it located after it is made, and what use is it?** An antibody, also known as an immunoglobulin (Ig), is a protein produced by B cells. It is made in the bone marrow and lymphoid tissues. After production, antibodies can circulate in the bloodstream or be localized in tissues. Antibodies are used to recognize, neutralize, and eliminate antigens, thereby playing a crucial role in immune defense.
6. **What is an antigen?** An antigen is a substance that can induce an immune response in the body. It is usually a foreign molecule or part of a pathogen that is recognized by the immune system as non-self.
7. **What is meant by immunological memory? What really happens to cause it? What are the differences between a primary and a secondary response?** Immunological memory refers to the ability of the immune system to remember and respond more effectively upon re-exposure to a specific antigen. Memory is primarily generated by long-lived lymphocytes (memory cells) that are formed during the primary immune response. The primary response occurs during the first encounter with an antigen and takes time to develop, while the secondary response is more rapid and robust, resulting from the presence of memory cells.
8. **Distinguish between antibody specificity and classes of antibody molecules.** Antibody specificity refers to the ability of an antibody to bind to a specific antigen or antigenic determinant. Antibody classes, such as IgM, IgG, IgA, and IgE, differ in their structure, function, and distribution in the body.
9. **Each antibody class has several unique features that distinguish it from the others, in terms of structure, function, or both. What are they? (For our purposes