EnterMedSchool.org

Basic Immunology: Concepts for Pre-med/IB

Study Guide — Immunology

High-school/pre-med level questions on innate vs adaptive immunity, cells of the immune system, antibodies, vaccination, inflammation, allergy and autoimmunity.

28 items — Study Guide with Answers

Free & Open-Source

Generated February 20, 2026

Scan to visit online

1 **Immunity is best defined as:**

A The complete absence of microorganisms in the body

B **The body's ability to resist and fight infection by harmful agents** ✓

C The ability to digest food efficiently

D The production of red blood cells

E The process of breathing oxygen

▶ **Explanation:** Immunity refers to the body's defence capacity against pathogens and other harmful substances.

2 **Which of the following is part of the BODY'S FIRST LINE of defence against infection?**

A Antibodies in the blood

B Cytotoxic T cells

C **Intact skin and mucous membranes** ✓

D Memory B cells

E Vaccination

▶ **Explanation:** Physical and chemical barriers such as skin, mucus, tears and stomach acid form the first line of defence.

3 **Innate (nonspecific) immunity differs from adaptive (specific) immunity because innate immunity:**

A **Is present from birth and responds rapidly to many pathogens in the same way** ✓

B Develops only after vaccination

C Has memory and improves with repeated exposure

D Acts only against one specific type of virus

E Depends entirely on antibody production

▶ **Explanation:** Innate immunity is present at birth, reacts quickly and in a general way; adaptive immunity is specific and has memory.

4 **Which of the following is primarily a component of ADAPTIVE immunity?**

A Skin barrier

B Stomach acid

C **B lymphocytes producing antibodies** ✓

D Phagocytic neutrophils

E Natural killer (NK) cells

▶ **Explanation:** B cells and the antibodies they produce are key parts of specific (adaptive) immunity.

5 **Which of the following cell types is BEST known for engulfing and digesting microbes (phagocytosis) as part of innate immunity?**

A B lymphocytes

B Cytotoxic T lymphocytes

C **Neutrophils and macrophages** ✓

D Erythrocytes

E Platelets

▶ **Explanation:** Neutrophils and macrophages are professional phagocytes that ingest and destroy pathogens.

6 **Which statement about antibodies (immunoglobulins) is TRUE?**

A They are produced by T lymphocytes

B **They are produced by plasma cells derived from B lymphocytes** ✓

C They are produced only before birth

D They are enzymes that digest bacteria

E They are lipids stored in adipose tissue

▶ **Explanation:** Activated B cells differentiate into plasma cells, which secrete antibodies specific for an antigen.

7 **An antigen is best defined as:**

A **Any molecule that can be recognised and specifically bound by an antibody or T cell receptor** ✓

B Any protein made by lymphocytes

C A special type of white blood cell

D A chemical that always causes disease

E A molecule that cannot be recognised by the immune system

▶ **Explanation:** Antigens are typically foreign molecules that can trigger a specific immune response and bind to antibodies or T-cell receptors.

8 **Which of the following pairs is correctly matched?**

A B cells – cell-mediated immunity

B **Cytotoxic T cells – kill virus-infected cells** ✓

C Helper T cells – produce antibodies directly

D Macrophages – produce antibodies

E Red blood cells – antigen presentation

▶ **Explanation:** Cytotoxic T cells ($CD8^+$ T cells) kill virus-infected or abnormal cells. B cells handle antibody (humoral) immunity.

9 **The MAIN function of helper T cells (Th cells) is to:**

A Engulf and digest bacteria directly

B Produce antibodies against viruses

C **Coordinate the immune response by activating B cells and other immune cells** ✓

D Carry oxygen to tissues

E Form blood clots

▶ **Explanation:** Helper T cells release signals (cytokines) that activate B cells, cytotoxic T cells and macrophages, orchestrating the immune response.

10 **Which type of immunity primarily involves antibodies circulating in blood and body fluids?**

A Cell-mediated immunity

B **Humoral immunity** ✓

C Mechanical immunity

D Hormonal immunity

E Innate barrier immunity

▶ **Explanation:** Humoral (antibody-mediated) immunity involves antibodies in body fluids, mainly produced by B cells.

11 **Cell-mediated immunity is MOST important for defending against:**

A Extracellular bacteria in the blood

B **Viruses and pathogens inside host cells** ✓

C Physical injuries

D Dehydration

E High blood pressure

▶ **Explanation:** Cell-mediated immunity (mainly cytotoxic T cells) targets infected or abnormal cells, such as virus-infected or cancer cells.

12 **Which description BEST matches the inflammatory response?**

A A specific antibody response to a single antigen

B **A rapid, nonspecific reaction causing redness, heat, swelling and pain at a site of injury or infection** ✓

C A process where only T cells are activated

D A long-term memory response after vaccination

E A purely psychological reaction to stress

▶ **Explanation:** Inflammation is part of innate immunity, drawing immune cells to the site and helping contain and repair damage.

13 **Which of the following is the BEST description of immunological memory?**

A The ability of immune cells to store glucose

B The ability of the immune system to respond faster and stronger to a second encounter with the same antigen ✓

C The storage of antibodies in the brain

D The process of inflammation at the site of injury

E The ability of red blood cells to remember oxygen levels

▶ **Explanation:** Memory B and T cells are formed during the primary response and allow a quicker, more powerful secondary response.

14 **Which comparison between the PRIMARY and SECONDARY immune response is correct?**

A Primary response is faster and stronger than secondary

B Secondary response is faster and produces higher antibody levels than primary ✓

C Primary response involves memory cells, secondary does not

D Secondary response occurs only in innate immunity

E Primary and secondary responses are identical

▶ **Explanation:** The secondary response benefits from memory cells, making it quicker and more intense.

15 **Vaccination (immunisation) protects mainly by:**

A Killing all bacteria in the body directly

B Teaching red blood cells to carry more oxygen

C Stimulating the immune system to form memory cells against a harmless form of a pathogen or its antigens ✓

D Creating physical barriers on the skin

E Replacing the innate immune system

► **Explanation:** Vaccines expose the immune system to antigens in a safe way, generating memory cells that respond rapidly on real infection.

16 **Which of the following is an example of ACTIVE immunity?**

A A baby receiving antibodies through breast milk

B Injection of antibodies from another person or animal

C Developing immunity after recovering from an infection ✓

D Antibodies crossing the placenta from mother to fetus

E Barrier protection from skin

► **Explanation:** Active immunity results from the person's own immune response (after infection or vaccination); antibodies made elsewhere are passive immunity.

17 **Which of the following is an example of PASSIVE immunity?**

A Vaccination with weakened viruses

B Production of antibodies after chickenpox

C **Transfer of maternal antibodies across the placenta to the fetus** ✓

D Activation of memory T cells

E Formation of memory B cells after infection

► **Explanation:** Passive immunity is the transfer of ready-made antibodies (e.g. from mother to baby or antibody injections).

18 **Which statement about self vs non-self recognition is MOST accurate?**

A **The immune system normally ignores the body's own cells and targets foreign molecules** ✓

B The immune system always attacks self tissues

C The immune system cannot distinguish between self and non-self

D Self tolerance means the immune system never attacks any cell

E Only innate immunity can distinguish self from non-self

► **Explanation:** Healthy immune systems are tolerant of self but reactive to non-self; failure of this leads to autoimmunity.

19 **Autoimmune diseases occur when:**

A The immune system is completely absent

B **The immune system attacks the body's own cells as if they were foreign** ✓

C A person does not receive any vaccines

D Only innate immunity is active

E The body fails to produce any antibodies

▶ **Explanation:** In autoimmunity, self-tolerance is lost and immune responses are directed against the body's own tissues.

20 **Allergic reactions (such as hay fever or some food allergies) are best described as:**

A Normal immune responses to dangerous pathogens

B **Overreactions of the immune system to harmless substances like pollen or foods** ✓

C Complete failure of the immune system

D Autoimmune attacks on joints

E Purely psychological conditions with no immune involvement

▶ **Explanation:** Allergy is a hypersensitive immune response to non-harmful antigens (allergens).

21 **Which statement about immune memory after vaccination is CORRECT?**

A Memory cells exist only during the first week after vaccination

B **Memory cells can persist for years, allowing a rapid response to later exposure** ✓

C Vaccination works only if memory cells are destroyed

D Memory cells are red blood cells with special receptors

E Memory cells are only part of innate immunity

▶ **Explanation:** Long-lived memory B and T cells are the basis for long-term protection after vaccination or infection.

22 **Which cell type can kill virus-infected or cancer cells WITHOUT recognising a specific antigen like T cells do?**

A B lymphocytes

B Helper T cells

C **Natural killer (NK) cells** ✓

D Platelets

E Erythrocytes

▶ **Explanation:** NK cells are part of innate immunity and can destroy abnormal cells without prior specific sensitisation.

23 **Lymph nodes are important in immunity because they:**

A Produce red blood cells

B **Filter lymph and provide a meeting place where antigens, antigen-presenting cells and lymphocytes interact** ✓

C Store only platelets

D Produce stomach acid

E Have no role in immune responses

▶ **Explanation:** Lymph nodes trap antigens from tissues and allow activation and proliferation of B and T cells.

24 **Which organ is the PRIMARY site where T lymphocytes mature?**

A Bone marrow

B **Thymus** ✓

C Spleen

D Liver

E Kidney

▶ **Explanation:** T cells are produced in the bone marrow but mature and are 'educated' in the thymus.

25 **Which organ filters blood, removes old red blood cells, and also acts as an important immune organ with many lymphocytes and macrophages?**

A Thymus

B **Spleen** ✓

C Kidney

D Pancreas

E Gallbladder

▶ **Explanation:** The spleen filters blood, removes old cells and participates in immune responses against blood-borne antigens.

26 **Which of the following statements about antibiotics and the immune system is CORRECT?**

A Antibiotics directly strengthen adaptive immunity and replace the need for vaccines

B **Antibiotics kill or inhibit bacteria, but the immune system is still needed to clear infections** ✓

C Antibiotics are effective against viruses in the same way as against bacteria

D Once antibiotics are available, immunity is unnecessary

E Antibiotics permanently change genetic immunity

▶ **Explanation:** Antibiotics help control bacterial growth; the immune system still plays a key role, and vaccines prevent infection rather than treat it.

27 **Which of the following BEST explains why a vaccine for one disease (e.g. measles) does not protect against an unrelated disease (e.g. influenza)?**

A Innate immunity cannot recognise viruses

B Vaccines only affect skin barriers

C Adaptive immune responses are specific to particular antigens and generate memory only against those antigens ✓

D Vaccines always protect against all pathogens

E Antibodies are identical for all infections

▶ **Explanation:** Adaptive immunity is highly specific; memory cells recognise only the antigens they were primed against.

28 **Which person is most likely to suffer from frequent infections due to a globally WEAKENED immune system?**

A Someone with a minor allergy to pollen

B Someone whose helper T cells are severely decreased (e.g. advanced HIV infection) ✓

C Someone with only mild inflammation after injury

D Someone who has had a vaccine booster

E Someone with a single autoantibody but fully functioning T cells

▶ **Explanation:** Helper T cells coordinate many aspects of both humoral and cell-mediated immunity; their loss leads to immunodeficiency.