

The Human Body

Chapter 6 - Lesson 1: How does the Immune System Protect the Body?

Page	Question	Answer(s)	Links/Sources	Student Resources
214	Does avoiding the risk of disease mean that you must avoid being close to other people? Explain your answer.	*Students may know, or will learn, that there are ways to protect themselves from many diseases, along with ways these diseases are spread and ways they can be prevented.		
215	Why is it important to know how diseases are spread?	So you can avoid situations and behaviors that spread disease.		
215	Does your family know how diseases are spread?	Sample answer: Yes they do.		
215	How can all of you become educated on this topic?	Sample answer: Reading health information articles and pamphlets, watching for new information scientists are learning about new and old disease. Talking with health professionals. Watching health education programming on TV or online.		
216	In what ways might this pathogen enter the body?	*Sample answer: Through the mouth, nose, or cut in the skin.		
216	What other ways can infection or illness set in?	Pathogens may enter the body through broken skin, through your mouth if eaten, through your eyes, breathed through your nose, or through dirty needles or anything that punctures your skin.		
216	How many invaders do you think your body fights off in a day?	Sample answer: Every day you breathe in over 100 million viruses, and most likely lots of bacteria.	https://www2.mrc-imb.cam.ac.uk/viruswars/viruses.php	
216	What things can you do to keep your immune system strong?	Sample answer: Eat a healthy diet, get lots of rest, exercise, have lots of sunlight, get plenty of rest and sleep, avoid stress, trust in God.		
216	When might there be times when your body needs help fight off invaders?	Sample answer: When your resistance is low, or your immune system is compromised, when the disease is new.		
217	What are the body's first line of defense against illness and infection?	*Sample answer: The skin keeps illnesses and infections from entering the body.		
217	Why is it important to keep our skin clean?	*Sample answer: To keep our line of defense against illness and infection strong.		
217	Which of the body's defenses are physical barriers? Which ones are chemical defenses?	*Physical barriers: tears, skin, saliva, mucous, cilia; Chemical defenses: tears, mucous, lysosomes, acid, sweat, oils, fatty acid secretions, urine		

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217	What physical and chemical barriers might act on a pathogen that enters the body through your nose?	Mucus and cilia trap organisms.	Page 217 diagram.	
217	What about the pathogens that enter through a cut on your hand?	Acidic skin cells, sweat, oils kill many bacteria.	Page 217 diagram.	
218	How do white blood cells compare to each other?	Sample answer: They all help fight off pathogens and are carried by the blood; they differ in size, shape, and how they work.		
218	Which type of blood cell will be observed the most? The least?	Sample answer: Neutrophils will be the most common. Basophils are most likely the least common.		
218	How will more observations affect your result?	Sample answer: The more observations that are made the more accurate the data. If all of the slides are of blood in which there is no disease, the data will probably be similar.		
219	Why do our bodies need an inflammatory response?	*To fight the pathogens that get past our body's physical and chemical barriers.		
219	Should you take medication to get rid of a fever?	*Guide students to understand that a high fever can be dangerous in itself, so their families will probably use medicine to bring it down. However, a high fever as one over 46° C, is a signal that the person is fighting a strong infection and may need to see a doctor.		
219	You accidentally cut yourself. Why are pain and swelling a good sign?	*These are signs that the body's inflammatory response is working to attach the pathogen in the body.		
219	What are some other examples of how pathogens might be able to get past the body's first line of defense?	Sample answer: Through a scrape that breaks the skin, a knife cut, putting your unwashed hands or fingers in your mouth, nose, or eyes.		
220	If we truly believe that our bodies are the temple of the Holy Spirit, how does that make a difference in the way we live our lives?	*Sample answer: We will treat our body properly and will honor God by taking care of it.		
220	What would happen if all T-helper cells in your body were destroyed?	*Your immune system wouldn't be activated that a pathogen is in the body and this would hinder your defense mechanism. If the pathogen caused enough damage you could get seriously ill and it could eventually lead to death.		

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220	What is the purpose of the immune system?	*Sample answer: The immune system enables the body to protect the body from infection and fight off and destroy pathogens that get into the body."		
220	The marker molecules on pathogens are different shapes. How does that help the immune system?	*The shapes make it easy for antibodies to recognize different pathogens and bind with them.		
220	What is the difference between how T cells fight infection and how antibodies fight infection?	*T cells destroy infected body cells. Antibodies bind with pathogens, making them clump together, preventing them from binding with body cells and making it easier for the white blood cells to kill them.		
220	What do you suppose causes this pus to form?	Sample answer: A buildup of dead, white blood cells when the body's immune system responds to the infection.	https://www.medicalnewstoday.com/articles/249182	
220	How does the immune response work?	Your immune system contains millions of T cells, which are special white blood cells called lymphocytes. T-helper cells turn on the immune system, Killer T cells identify specific pathogens and destroys the cell.	Page 220.	
220	What might happen if all the T-helper cells in your body were destroyed?	Your immune system wouldn't be activated that a pathogen is in the body and this would hinder your defense mechanism. If the pathogen caused enough damage you could get seriously ill and it could eventually lead to death.		
221	Are all antibodies the same shape as the ones in this diagram? Why or why not?	*Antibodies are shaped like puzzle pieces that only fit marker molecules and specific pathogens.		
221	How do antibodies stop pathogens?	*Antibodies are a protein that will only link to a specific pathogen. When the antibody links to the pathogen it signals other cells to destroy the pathogen.		
221	How are antibodies represented in the diagram?	*Y-shapes.		
221	What is the difference between helper B cells and killer B cells?	*Helpers turn on the immune system, while killers destroy infected body cells.		
221	How are B cells and T cells alike?	*They are both specialized white blood cells that fight infection.		

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221	How are B cells and T cells different?	*T cells recognize specific pathogens and some T cells destroy infected body cells. After a signal from the T cells, B cells produce antibodies that can destroy antigens.		
222	Which immune system, adaptive or innate, would be most helpful to someone who has been reinfected by a virus?	*The adaptive immune system "remembers" specific pathogens and reacts with an amplified response when a known virus reenters the system.		
222	What other childhood diseases might a person have immunity to because of memory cells?	Mumps, measles.		
223	How is passive immunity different from adaptive immunity?	*In passive immunity, the body does not produce its own antibodies, but gets them from another source, such as a vaccination.		
223	Why do you think it is necessary to get annual flu vaccinations, but not necessary to get annual measles or chicken pox vaccinations?	*Flu viruses change from year to year, so a vaccine will only protect against a certain type of virus.		
223	How can you stimulate the immune system in our body?	*Sample answer: Choose a healthy lifestyle by exercising and eating a healthy well-balanced diet; get enough sleep at night; have a yearly check up with a doctor.		
223	Why do you think the baby has not developed the ability to produce its own antibodies?	It still has not yet had the time to do so.	Page 223	
223	What are the consequences for the baby if it did not acquire passive immunity from the mother?	It would not have the antibodies to fight pathogens, since its immune system is not yet developed.		
223	What do you think is the reason for this difference?	Sample answer: Because they are developed from other sources and not from our own bodies.		
224	Why would reducing the body's immune response help treat autoimmune disease?	*In the diseases, the immune system attacks the body's own cells and organs. If the immune response is reduced, the attacks will be less frequent, or weaker.		
224	What happens if someone must take medicine that reduces his or her immune system?	*That person will have a harder time fighting off other infections and diseases.		
224	If someone you know has an autoimmune disease, how can you help them to maintain good health?	*Sample answer: Do not expose him or her to a cold or the flu, and encourage them to maintain good health.		

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224	How can "hidden" ingredients affect someone with allergies?	"Hidden" ingredients that could be problematic for someone with food allergies may include milk, soy, and nut ingredients.		
224	What challenges do you think researchers face in developing medicines to prevent or control autoimmune diseases.	Sample answer: Treatment mainly targets relief of symptoms because there is no targeted therapy. Drugs use to treat diseases have varied side effects. A person can have more than one autoimmune disease. Symptoms of various diseases are also very similar.	https://www.omicsonline.org/open-access/autoimmune-disease-a-major-challenge-for-effective-treatment-96354.html	
224	Do you know anyone who has an allergies?	Sample answer: Yes		
224	What kind of allergies are they?	Sample answer: Peanuts and gluten.		
224	How do they affect the person?	Sample answer: The peanut allergy can be life threatening. My friend has to read food labels of what he eats, or ask the person preparing the food if the items contain peanuts or were processed where they could have come in contact with peanuts. He must always carry an EpiPen with him or have immediate access to one.		
225	What are some things that can cause an allergic reaction in some people?	*Sample answer: Peanuts, bee stings, grass, dust.		
225	Why isn't everyone allergic to peanut butter?	*Most peoples' immune systems do not react to harmless substances.		
225	What is the easiest way to treat an allergy?	*Be responsible for your health by avoiding things that can cause an allergic reaction. If you cannot avoid allergens, use medications such as antihistamines to help reduce the effect of the allergens. If you have a severe allergy, have medication with you all the time in case of an anaphylactic reaction.		
225	Based on its name, what do you think an antihistamine does?	Sample answer: It can reduce or eliminate common allergic reactions.		
225	How do you think people with these type of allergies can take extra care to guard and take personal responsibilities for their health?	Carry an EpiPen, avoid situations where bees, etc. are prevalent, read labels carefully for food allergies, take allergy shots, make sure you take your allergy medication as prescribed by your doctor.		