

Help shape future versions of this course by sharing your feedback via the [elective feedback form](#).
 For immediate assistance email: ubeats@unmc.edu

Week 4: Health, Protection, and Early Detection

Module 1: Immunology Overview

Lesson: Friend or Threat? How Your Body Decides What to Attack

Lesson Overview	
Students investigate how the immune system decides what to attack and what to leave alone. They use evidence to explain how correct and incorrect immune responses affect health outcomes.	
Learning Targets	Vocabulary
Explain how the immune system distinguishes between self and non-self. Describe how immune cells decide when to attack. Use evidence to explain how immune system mistakes cause disease.	Immune system body system that protects against disease Self vs non-self how the body distinguishes its own cells from threats Antigen a signal that shows something is present T-cell an immune cell that checks and responds to signals Autoimmune disease when the immune system attacks healthy cells
Materials	Instructional Notes
Module Signs: ATTACK / DO NOT ATTACK / NOT SURE Chart paper or whiteboard Student notebooks	This lesson shifts students from understanding body systems to understanding how those systems make decisions. Many students assume the immune system should attack anything unusual. The key idea is that the immune system must make accurate decisions. It must recognize real threats while avoiding healthy cells and beneficial organisms. Encourage students to justify decisions with evidence and avoid revealing answers too early.



Learning Experience

8 min	Opening	Post three signs around the room: ATTACK, DO NOT ATTACK, and NOT SURE. Read one scenario at a time: Bacteria in your stomach; A virus inside your body's cells; Cells from a cut; Cells growing abnormally. Ask students to make an individual decision before discussing with others. Students move to the sign that matches their decision, explain their thinking to a partner, and share 1–2 responses with the class. Sentence Frame: “I chose _____ because the immune system should _____ when _____, which means _____.”
15 min	Module	Focus: How does the immune system decide what to attack and what to protect? Guiding Questions: • How does the immune system recognize threats? • What signals tell immune cells to respond? • How do T-cells determine if something is safe or dangerous? • What happens if the immune system makes a mistake? Quick Checks: • Thumbs up/down: “The immune system should attack everything unusual.” • Turn-and-talk: “What helps the immune system decide what to attack?” Sentence Frame: “The most important factor is _____ because it helps the immune system _____.”
15 min	Application	Introduce the challenge: “Today you are part of an immune system investigation team.” “You will examine two medical cases. For each case, determine what the immune system is likely to do and whether that response helps or harms the patient.” “Remember: the immune system responds based on what it detects. Sometimes that response protects the body, and sometimes that response creates problems.” Students: Step 1: Review the Cases Read each case and review the evidence. Case A: The Transplant Patient A 12-year-old patient receives a kidney transplant after a serious illness. The new kidney is healthy and working correctly. It cleans the blood and helps keep the patient alive. Several weeks later, immune cells begin gathering around the transplanted kidney. Evidence: • The kidney is functioning normally. • The kidney helps the patient survive. • The kidney came from another person's body. • Immune cells detect unfamiliar markers on the kidney cells. • No bacteria or viruses are present.



Case B: The Hidden Invader

A virus enters the body and infects several cells.

The infected cells still look very similar to healthy body cells.

Evidence:

- The infected cells originally belonged to the body.
- The virus is reproducing inside the cells.
- More infected cells appear each day.
- The cells appear mostly normal from the outside.

Step 2: Determine the Immune System Response

For each case, determine: What will the immune system likely do? Attack or Not Attack?

Which evidence supports your decision?

Step 3: Evaluate the Outcome

For each case, determine whether this response helps the patient or harms the patient and how the evidence supports your reasoning.

Sentence Frames:

"The immune system will likely _____ because _____."

"This response is helpful/harmful because _____."

"The strongest evidence is _____ because _____."

Students then:

Share their explanation with another group, compare evidence and reasoning, and revise their explanation if needed.

Step 4: Create the Rule

Review both cases.

Complete the statements:

"The immune system responds when _____."

"A response can be harmful when _____."

"The most important job of the immune system is _____."

Teacher:

Lead a brief discussion using student responses.

Ask: How did the immune system respond in both cases? Why was the response

helpful in one case but harmful in the other? Which piece of evidence mattered most?

What does this tell us about how the immune system makes decisions?

Teacher Answer Key

Case A: The Transplant Patient

Expected Immune System Response: Attack

Helpful or Harmful: Harmful

Reasoning: The immune system detects unfamiliar markers and recognizes the kidney as non-self, even though the kidney is helping the patient.

Case B: The Hidden Invader

Expected Immune System Response: Attack

Helpful or Harmful: Helpful

Reasoning: The virus is reproducing and spreading inside the body. Responding helps stop the infection.

Possible Student Rule:

"The immune system responds to signals that indicate something is foreign or abnormal."

"A response can be harmful when the immune system targets something that should be protected."



		"The most important job of the immune system is distinguishing what should be targeted from what should be protected."
2 min	Reflection	Conclude: "The immune system's most important job is not simply attacking threats. It is making the correct decision about what should and should not be targeted."
2 min	Career Connections	Doctors and immunologists study how the immune system responds to infections, damaged cells, transplants, allergies, autoimmune diseases, and vaccines. They use evidence to determine whether the immune system is overreacting, underreacting, or responding correctly. Understanding how immune cells distinguish between threats and healthy tissue helps healthcare professionals diagnose disease, develop treatments, improve transplant success, and create vaccines that protect human health.