Chapter 37 Project

Qualified Immunity

Project Goal + Timeline

Sometimes, the best way to understand a system is to find ways to challenge or disrupt it. Here, you will do that with the immune system. In this project, you'll develop a pathogen that can evade certain components of the immune system. Throughout the project, you'll consider how other immune system components might be able to combat the pathogen and identify similarities between your proposed pathogen and existing pathogens. At the end of this project, you'll develop a short news segment in which you'll act as a newscaster covering the emergence of your new pathogen. This project should be completed by yourself or with a partner over the course of a week.

Directions

Part 1: Design Your Pathogen

Our bodies harbor a complex and powerful immune system. Many different tissue and cell types work together to prevent and combat invading pathogens. These pathogens can take many forms, including viruses, bacteria, and fungi, necessitating the complex and adaptable immune system we have. Based on your knowledge of the immune system from the chapter, imagine a pathogen that can evade certain components of the immune system.

When developing your imaginary pathogen, propose one or more adaptations that it has to thwart some specific action by the immune system.

1. What type of pathogen are you proposing (i.e., virus, bacterium, fungus, parasite, etc.)? How does this pathogen enter the body and spread? Draw your proposed pathogen and give it a name!
2. What special adaptation are you proposing for this new species of pathogen?
3. What part of the immune system is this adaptation specifically directed against? How does that part of the immune system normally work?
4. How does this adaptation specifically thwart that part of the immune system?

Part 2: Identify Immune Defenses

Next, consider the other ways the immune system might respond to your pathogen.

1. What other branches of the immune system might still be active against your imaginary pathogen? How do they work?
2. What would infection with your pathogen look like? How long might it last, what symptoms might it produce, and how might it resolve?
3. What medical intervention might be warranted to help combat this pathogen?

Part 3: Research Similar Pathogens and Conditions

In this part, use the internet or other resources to identify whether your imagined pathogen has a real-world equivalent.

1. Are there any pathogens that have some resemblance to your imaginary one? How does the actual pathogen differ from your imagined pathogen?
2. Are there any conditions in which individuals have reduced or altered functioning in the component of the immune system that was evaded by your imaginary pathogen? What symptoms or challenges do they face?

Part 4: Record a News Segment

Now that you've designed and investigated your pathogen, create a short (between one and three minutes) video segment introducing your pathogen. In the video, imagine yourself as a newscaster discussing the emergence of the new pathogen. Your segment should cover all information that you think would be important for viewers to be aware of regarding a new pathogen. For example, you may want to explain:

- the general features of the pathogen
- the adaptation that allows the pathogen to evade the immune system
- how the immune system responds to the pathogen
- the general progression of the illness caused by the pathogen
- treatment options for infection with the pathogen
- existing pathogens that are similar to the new pathogen

Keep your video segment short and concise. Highlight the facts and the information viewers would want to know. Limit the use of scientific terminology as much as possible so that the segment can be understood by a wide audience.

Project Materials

- Project worksheet
- Pen or pencil
- Recording device (such as a phone or computer)
- Computer with internet access

Student Checklist

- ☐ Answer Design Your Pathogen Questions (Part 1)
- ☐ Answer Identify Immune Defenses Questions (Part 2)
- ☐ Answer Research Similar Pathogens and Conditions Questions (Part 3)
- ☐ Record your news segment