Bellwork

• We have already discussed the Lymphatic System.
• Now describe in your own words what you already know about the “immune system.”
• Are the lymphatic system and immune system the same thing?
The Immune System
State Standards

• 32) Illustrate in a digital or 3D format the process of inflammation that occurs when tissue has been damaged in the body. Synthesize the inflammatory response process within the circulatory system using medical terminology, then translate information into a brochure that can be provided to a pediatric or geriatric patient. Use phrases and explanations that can be easily understood by each group.
Objectives

• Student will be able to explain the inflammatory response process of our immune system to a pediatric patient by creating an informational “cartoon” flyer or brochure.

• Student will be able to relate the inflammatory response to multiple body systems.
Introduction

• Your playing “Call of Duty” with your friends online. You all have your gear ready and are waiting for an invasion.

• You recognize all the people with the same blue screen icon as you.

• Suddenly you see someone with a red icon and your team rushes them!

• Did you know that your immune system works in a similar way?
Barriers to Pathogens

• Your body has barriers that are designed to keep pathogens like viruses and bacteria out.
• This is the **first line of defense** that your body has.
• These include your **skin, breathing passages, mouth, stomach, and even tears**.
• The barriers are designed to kill most pathogens before they can get inside of your body.
Skin

• Your sweat and the oils on your skin are made up of harsh chemicals that kill bacteria.
• If the chemicals don’t kill them then they may just fall off with dead skin cells.
• The only true way for pathogen to get through your skin is through a cut or lesion.
• Even if there is a cut your body quickly tries to form a scab to keep bacteria from getting in.
Breathing Passages

• Every time you inhale you are breathing in pathogens.
• Your nose, pharynx, trachea, and bronchi contain mucous and cilia that traps the pathogens before it can get to the lungs.
• Mucus is removed when the cilia moves it toward the stomach to be digested.
• Pathogens may also make you sneeze or cough which projectile the pathogen out of your body.
Mouth and Stomach

- Some foods you eat, even if they are handled safely, may contain pathogens.
- The saliva in your mouth contains destructive chemicals that can kill pathogens.
- Your stomach contains large amounts of acids which would kill nearly anything.
The Response

• Some pathogens will get passed your first line of defense and make it into your body.
• When cells begin to get damaged they send out chemicals that trigger an inflammatory response.
• An inflammatory response is when red and white blood cells leak into surrounding tissue from blood vessels.
• This is the body’s second defense.
White Blood Cells

- There are different types of white blood cells and each has their own unique function.
- Define vasodilation. What is it?
- The type that take part in the inflammatory response are called phagocytes.
- Phagocytes are a white blood cell that engulf pathogens and digest them.
*The small specks are bacteria and the round cells are red blood cells. The large white blood cell is pursuing the bacteria—note how flexible it is.
Inflammation

• Blood vessels in the area widen during inflammation which increases blood flow.

• More disease-fighting white blood cells are delivered to the area.

• The area will appear swollen and red. If you touch it, it will be warmer than the surrounding area.

• If you get a mosquito bite and touch it, it will feel warmer than the surrounding skin due to inflammatory response.
• Have you ever had a fever?
• It doesn’t feel very good does it?
• A fever may make you feel bad, but it actually helps your body fight infection.
• Some pathogens cannot reproduce or grow in higher temperatures.
The Immune System

- If a fever is triggered that means that an immune response has started.
- The immune response is the third line of defense.
- The cells of your immune system can distinguish between different types of pathogens.
- The white blood cells that make this distinction are known as lymphocytes.
- There are two types of lymphocytes known as T-cells and B-cells.
T-Cells

• T-cells identify pathogens and distinguish one type of pathogen from another.
• (Phagocytes present them to the T-cell)
• T-cell use marker molecules called antigens which are found on pathogens.
• This signals whether or not the cell is part of your body or foreign material.
• Each antigen has a different chemical structure.
Antigen Presentation

1. A phagocyte "eats" a bacteria.
2. Parts of the bacteria (antigen) goes to the surface of the phagocyte.
3. The phagocyte presents the antigen to a helper T cell.
4. The helper T cell is activated.
B-Cells

- B-cells produce proteins that help destroy pathogens.
- These proteins are known as antibodies.
- Antigens and antibodies fit together like a puzzle piece and can only bind to their specific type.
- What else does this sound like?
  - For example, the antigen for the flu virus can only fit to the antibody for the flu virus.
- Once that antibody is on the pathogen it marks it for destruction.
- They either clump together, keeping it from attaching it to body cells, or make it easier for eater cells (phagocytes) to find.
1. The B cell finds an antigen which matches its receptors.
2. It waits until it is activated by a helper T cell.
3. Then the B cell divides to produce plasma and memory cells.

4. Plasma cells produce antibodies that attach to the current type of invader.
5. “Eater cells,” prefer intruders marked with antibodies, and “eat” loads of them.
6. If the same intruder invades again, memory cells help the immune system to activate much faster.
Activities

• Work with a partner to create an informational brochure, flyer, or poster that is geared towards a very young person.

• You will explain the process of the inflammation response in the human body.

• Do this in a creative and fun manner. (Think cartoon or comic strip)

• Explain what immunity is, the lines of defense our body has, and detailed (creative) description of the inflammation response.
Exit Ticket

• Complete the matching vocabulary activity by yourself.
• Do not use your notes.
• Add to your worksheet the answer to this question:
  • What main body systems are combined and work together within the “immune system?”
• Hand the completed worksheet in to me!
Conclusion

- Like a line of military defense your body’s immune system protects it from pathogens.
- **Barriers** including your skin, breathing passages, mouth, and stomach act as the body’s first line of defense.
- The second line of defense is the **inflammatory response**.
- Finally, the third line of defense is the **immune response** that involves white blood cells, t-cells, and b-cells.
Thank you from:

Laurel Education
Blood Cell Count....

• Explain the difference between white blood cells, red blood cells, and platelets?
• What is the normal range of WBCs?
• Give two reasons blood cell count might be low when cancer exists?
• Describe the three main complications associated with low blood cell count?
• Draw and copy in the “Condition/What to Look For” Chart.
• What three ways do we treat low blood cell count?
• What steps to take or avoid with a low blood cell count?