

Innate Immunity

by Sophia



WHAT'S COVERED

In this lesson, you will learn to identify the characteristics of the body's second line of defense against pathogens. Specifically, this lesson will cover:

1. Innate Immunity

Innate immunity is the body's second line of defense, after physical barriers. It involves very general responses, meaning that the cells working in innate immunity are not specialized. Our body recognizes our own **antigens** (unique chemical markers). If something within our body doesn't match our own antigens, it is tagged as a pathogen (foreign invader) and targeted for destruction by the innate immune system.

When a pathogen has gotten past the physical barriers, macrophages will be the first on the scene and will engulf those foreign cells. "Macrophage" means "big eater"; these cells will surround, engulf, and "eat" pathogens via phagocytosis.

Innate immunity is carried out by white blood cells and proteins. It includes processes such as:

- Phagocytosis
- Fever
- Inflammation



TERMS TO KNOW

Innate Immunity

Also known as non-specific immunity, innate immunity consists of general physiologic responses (fever, inflammation, etc.) that can affect the entire body.

Antigen

A unique marker found on the surface of cells that have the potential to stimulate an immune response; antigens are basically the identity marker of cells for the immune system to see.

2. The Complement System

The proteins involved with innate immunity are part of the **complement system**. This set of proteins in the body that will roam around unactivated, and once they encounter a pathogen, they will become active. By

becoming active, they trigger additional complement proteins, which then trigger certain processes.

The complement system triggers several processes to occur:

- More phagocytic white blood cells (such as macrophages) will be on the scene to engulf whatever the invader is.
- Inflammation will be triggered. Mast cells and basophils will release something called **histamine**. Histamine causes arterioles to dilate, allowing more blood to flow through them. More blood flowing through them is going to cause the tissue to become red and warm. At the same time, capillaries are also leaking out plasma proteins and phagocytes that will act as a line of defense.
- Fever occurs when macrophages release substances, which then cause the brain to release signal molecules to raise the body's set temperature. The body's set temperature is around 98.6 degrees and is set by the hypothalamus. The body raises its temperature because doing so will inhibit these pathogens so they can't function as well.

Generally, a fever of around 100 degrees Fahrenheit is ideal. This temperature inhibits those pathogens but is not causing any tissue damage. If a person's fever gets too high, it can damage tissue. Also, when the temperature becomes too high, enzymes in our body do not function properly, and it can lead to death. If these processes do not work, the next step is for adaptive immunity to take over.



TERMS TO KNOW

Complement System

A group of normally inactive proteins in the blood that are activated by antibodies during an infection; complement proteins join together to form a complex that attacks membranes, this complex pierces cell membranes, causing damage to the pathogens that are invading us.

Histamine

A chemical secreted by mast cells and basophils that promotes inflammation by causing capillaries to become more permeable.



SUMMARY

If a pathogen gets past our body's physical barriers, which is our first line of defense, our **innate immunity** will kick in. This involves white blood cells, which will try to engulf the invader. Certain proteins in our body are part of **the complement system**. They activate when they come in contact with a pathogen and cause several processes to occur (including phagocytosis or inflammation and fever) to rid the body of most types of pathogens. If a pathogen persists, adaptive immunity will then need to take over.

Keep up the learning and have a great day!

Source: THIS WORK IS ADAPTED FROM SOPHIA AUTHOR AMANDA SODERLIND



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