

# Pathogens

by Sophia



## WHAT'S COVERED

In this lesson, you will learn about pathogens and the three types of defenses the body has against them. Specifically, this lesson will cover:

## 1. Pathogens

**Pathogens** are any disease-causing agent. They could be fungi, bacteria, viruses, or parasites. They are found almost everywhere, and in order for our body to survive and not succumb to the attacks of these pathogens, it has to find ways to defend us against them.

The body has three lines of defense against pathogens:

- Physical Barriers
- Innate Immunity
- Adaptive Immunity



### TERM TO KNOW

#### **Pathogen**

Any disease-causing agent that we are exposed to (bacteria, virus, fungus, parasite, etc.).

---

## 2. Physical Barriers

The first line is the body's **physical barriers**. The goal is to prevent pathogens from even entering the body at all, or, if they do enter, trying to get rid of them immediately. Mucosal linings, mucus, and our skin will prevent pathogens from entering the body.

➞ **EXAMPLE** Mucus in our nose and wax in our ears physically trap microbes, irritants and pollen.

If pathogens do get past, our body will try and get rid of them right away with:

- Lysozyme: An enzyme that breaks down pathogens. For example, lysozyme is in our tears and breaks down pathogens that get in our eyes.
- Diarrhea: A way which our body tries to flush out pathogens.
- Good bacteria within our body: Will take up real estate so that there are no resources by which pathogens

can take hold.



#### TERM TO KNOW

##### Physical Barriers

Consisting of skin and mucous membranes, physical barriers are our first line of defense against pathogens; physical barriers are part of our non-specific immunity.

---

## 3. Innate Immunity

**Innate immunity** will activate if a pathogen gets past the physical and chemical barriers. Innate immunity is a generalized cure-all response; it's very nonspecific. It attempts to wipe out many invaders before they can even cause infection. Examples of responses of the innate immunity are phagocytes, inflammation, and fever.

Cells that are involved in innate immunity don't care what type of pathogen it is; they attack any type of pathogen.



#### TERM 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.

---

## 4. Adaptive Immunity

**Adaptive immunity** is a much more specific type of immunity. This will also start when innate immunity starts, but there is a difference. Adaptive has specialized cells that fight specific pathogens. White blood cells that attack in adaptive immunity have specific receptors for specific **antigens** for each pathogen. This type of immunity also changes throughout life; as you encounter different sorts of illnesses, your adaptive immunity produces memory cells of each illness. This means that if you've had a certain type of illness once, your body remembers that illness and how to fight it.



#### TERMS TO KNOW

##### Adaptive Immunity

Also known as specific immunity, adaptive immunity is carried out by T & B lymphocytes and reacts to specific antigens of cells; adaptive immunity also produces memory cells to target the same pathogen if we are ever exposed to it again.

##### Antigen

A unique chemical marker on the surface of a cell that can stimulate an immune response.



#### SUMMARY

**Pathogens** are any disease-causing agent, and your body has three lines of defense against them. **Physical barriers** that keep out pathogens in the first place or try to flush them out as soon as they enter. If a pathogen gets past this, then the body's **innate immunity** will kick it. This produces very

generalized responses to fight pathogens. At the same time **adaptive immunity** will start. This type of immunity is carried out by white blood cells that target specific pathogens. This type of immunity also produces memory cells to fight a pathogen again in the future.

Keep up the learning and have a great day!

Source: THIS WORK IS ADAPTED FROM SOPHIA AUTHOR AMANDA SODERLIND



## TERMS TO KNOW

### **Adaptive Immunity**

Also known as specific immunity, adaptive immunity is carried out by T & B lymphocytes and reacts to specific antigens of cells; adaptive immunity also produces memory cells to target the same pathogen if we are ever exposed to it again.

### **Antigen**

A unique marker on the surface of a cell that can stimulate an immune response.

### **Innate Immunity**

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

### **Pathogen**

Any disease-causing agent that we are exposed to (bacteria, virus, fungus, parasite, etc.).

### **Physical Barriers**

Consists of skin and mucous membranes, physical barriers are our first line of defense against pathogens. Physical barriers are part of our non-specific immunity.