

Human Systems - Blood and Immunity: Chapter 11 - Lesson 2: Immunity

Our body is constantly being invaded by microbes that have the potential to cause great harm to us.

- Our body has 3 lines of defense to resist infection and illness

- Physical barriers - **nonspecific response**
- Phagocytosis and inflammatory response - **nonspecific response**
- Immune Response - **specific response**

in a te
immune
response

- All cells involved in the immune system are produced in the bone marrow

Physical Barriers

- **Intact skin** provides a barrier that cannot be penetrated by bacteria or viruses

- Skin also has an acidic pH which inhibits bacteria growth

- An antimicrobial enzyme, called **lysozyme**, is a part of tears, mucous, saliva and sweat

- Destroys the cell membrane of bacteria

- The respiratory tract contains **mucous** and **cilia** which traps bacteria and particles and sweeps them back to the mouth where coughing can get rid of them

- Stomach contains acid and protein digesting enzymes which destroy most invaders that are in food

- All of the above are **non-specific** defenses

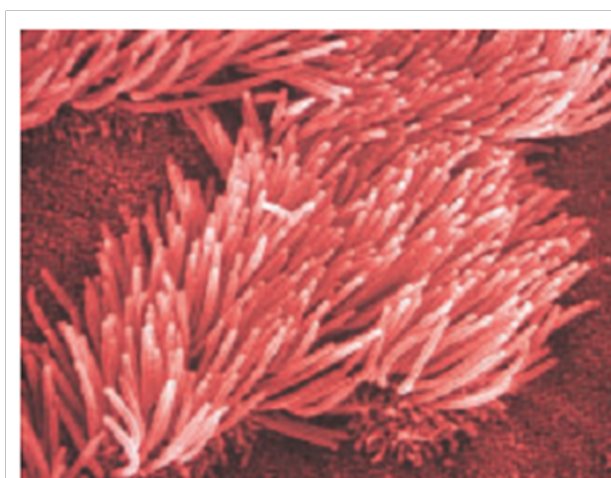


Figure 1
Cilia in the respiratory tract

Phagocytosis and Inflammatory Response

- Despite the physical barriers, pathogens sometimes enter the body
- **Phagocytosis** - the ingestion of invading microbes by certain types of white blood cells
- When body cells are injured, chemical signals attract **phagocytic** WBC's to the area
 - o **Monocytes** move from capillaries into the tissues and become **macrophages**
 - Develop sticky protrusions to gather microbes
 - They engulf the microbes and digest them using enzymes
 - Kill themselves in the process
 - o **Neutrophils** also move to the infected area
 - They also engulf and digest invaders and kill themselves as well
 - o **Pus** is a thick liquid composed of protein fragments from the digested WBC's and invading microbes
- Inflammatory response also occurs causing the area to heat up and swell or "inflammation"
 - o Injured cells release histamine
 - o Histamine increases blood flow to the injured area and increases the permeability of the surrounding capillaries
 - o Fluid and WBC's leak from capillaries into nearby tissue
 - o Temperature of the area also increases
 - This reduces effectiveness of invader and helps WBC's work better

