Anatomy & Physiology: THE IMMUNE SYSTEM

The immune system protects the body from infection by bacteria, viruses, and parasites.

**Terms**

**adaptive immune system**: specifically targets pathogens and attacks them based on their specific properties

**antibodies**: proteins that bind to the antigen to neutralize it and stimulate phagocytes to ingest the entire structure

**antigens**: substances unrecognized by the immune system that exist on the surface of pathogenic cells

**antimicrobial peptides**: interfere with membrane and DNA function of bacteria, destroying it

**B cells**: stimulated by helper T cells; produce antibodies for an antibody-mediated response

**cell-mediated response**: destruction of infected cells by cytotoxic T cells

**cytotoxic T cells**: actively destroy infected cells by binding to the targeted cell’s surface

**earwax**: bars pathogens from entry at the ears

**helper T cells**: a type of T cell that binds to the antigen under attack by the immune system

**immune response**: series of events triggered when antigens are detected by the immune system

**immunity**: resistance to a pathogen following an antibody-mediated response

**inflammation response**: release of histamines around injured body tissue to raise the temperature and increase blood flow into the area, bringing more white blood cells to the tissue for repair

**innate immune system**: nonspecific defenses including physical barriers as well as specific cells that attack invaders that penetrate these barriers

**interferon**: released by infected cells; causes nearby cells to increase their defenses

**leukocytes**: white blood cells

**lymphocytes**: two distinct kinds of white blood cells (T and B cells)

**memory cells**: a type of B cell that stores information for producing the antibody; activated when the same antigen appears in the body

**mucus**: traps pathogens before they can replicate and infect

**natural killer lymphocytes**: respond to virus-infected cells; can recognize damaged cells with the presence of antibodies; part of early defense against bacterial infection

**neutrophils**: leukocytes that destroy invaders

**pathogens**: any foreign substances that cause disease or infection; include viruses, bacteria, and fungi

**phagocytes**: specialized white blood cells that can engulf portions of or entire pathogens

**plasma cells**: a type of B cell that produces antibodies

**skin**: organ that surrounds the entire body, leaving few openings for an infection-causing agent to enter

**T cells**: antigen-detecting lymphocytes

**white blood cells**: specialized blood cells that attack pathogens

**Lines of Defense in the Immune System**

1. **external barriers**: skin, enzymes, mucus, earwax, native bacteria
2. **the innate response**: inflammation, eukocytes (white blood cells), antimicrobial peptides, natural killer lymphocytes, interferon
3. **the adaptive response**: helper T cells, cytotoxic T cells, B cells, memory B cells

**Types of White Blood Cells**

- **Bone Marrow Stem Cells**
  - **Lymphocytic Cells**
    - Neutrophils
    - Eosinophils
    - Basophils
    - Monocytes/Macrophages
    - Natural killer cells
  - **T Cells**: Cytotoxic T Cells, Helper T Cells, Suppressor T Cells
  - **B Cells**: Plasma cells
  - **Antibodies**

- **Myelocytic Cells**
  - **Neutrophils**
  - **Eosinophils**
  - **Basophils**
  - **Monocytes/Macrophages**

- **Skin**: organ that surrounds the entire body, leaving few openings for an infection-causing agent to enter