

Immune System Objectives

- To define resistance to disease.
- To identify the types of non-specific immune response.
- Enumerate the steps of inflammation.
- To outline the steps of the complement system.
- To recognize and explain the role of interferon in fighting viral infection.
- To describe the antigen/antibody complex involved with immune response.

Resistance

The ability of the body to resist invading organisms and chemicals

- I. Non-specific/Innate
- II. Specific/Adaptive

Immunity – The body's ability to protect itself.

Non-specific Responses aka Innate Defenses

- 1) Skin & Mucous membranes
- 2) Phagocytes – first line of cellular response by *macrophages*.
- 3) Natural Killer cells – target cancerous cells or viral infected cells for immediate destruction.
- 4) Inflammation – isolate and repair after trauma
WBC's move in to attack.
- 5) Fever
- 6) Lysozyme & Stomach Acids

Inflammation

Signs of Acute inflammation:

- Pain
- Swelling
- Heat
- Redness
- Impairment of function e.g. joint movement reduced.

Inflammatory Response

Steps

- 1) Alarm is sent out (May Day!)
 - 2) Cytokines released
 - 3) Inflammatory chemicals released (mediators)
 - 4) Hyperemia
 - 5) Capillaries become more permeable
- Result: Macrophages on the scene attack & eat!*

The Complement System

This defense system "complements" or enhances the effectiveness of innate and adaptive defenses
Composed of plasma proteins

Mechanism:

- Attack & ultimately kill invading cells via lysis.
- Inactive plasma proteins called to active duty:
 - > Stimulate phagocytosis
 - > Cytotoxic (cell destroying) abilities

"Self invested" fighting team

Interferon

Importance – viral infection

Produced by cells of the body – already infected.

- These cells will not be saved.
- Infected cells sound the alarm to save others.
- These cells make a protein that interferes with the viral replication in healthy cells by disrupting viral use of the protein synthesis mechanism.
- Activates macrophages & NK cells

Fever is the immune system's method of fighting infection.

The normal body temperature is 98.6 degrees F

Fever inhibits bacterial reproduction.

Pyrogens & Prostaglandins

When fevers are above 102 degrees Fahrenheit they are a cause for concern. Potential damage to the Central Nervous System can result.



Adaptive Immune Response

Provides defense against specific foreign agents or microbes.

Exposure prompts ways to cope with subsequent/ later infections.

Competent lymphocytes provide specific, trained armies to deal with an attack.

When Nonspecific Defenses are insufficient → Adaptive Response

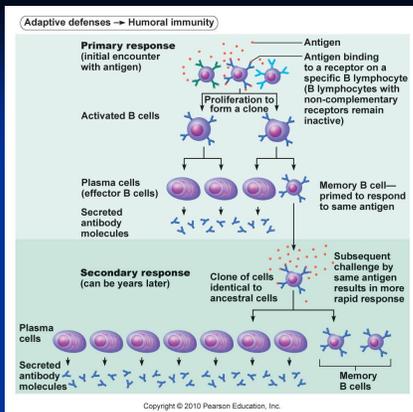
I. Cell Mediated Immunity

T cells

II. Humoral Immunity

B cells produce antibodies for a specific response.

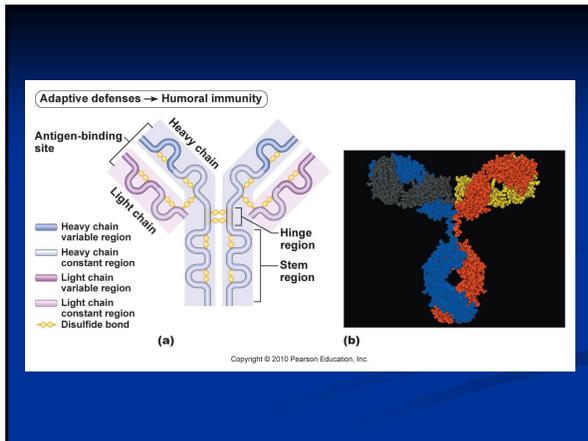
- Plasma cells
- Memory B cells



Antibody

Characteristics:

- A Y-shaped protein produced by cells of immune system.
- Found circulating in the blood.
- Recognize foreign antigens.
- Highly variable but specific to their target.
- Normally facilitates **destruction** of the antigen.
- Found commonly attached to surface of B cells.



Function of Antibodies

- Neutralize the invading organism.
- Promote phagocytosis
- Agglutination
- Activate complement reactions

Antigens

A complex molecule
Stimulates the production of specific antibodies.
Typically found on the surface cells.

*Antibody response **Generating***

Examples: Bacteria, mold, pollen, dust and dander, toxins, household chemicals.

Specific Immunity

Lymphocytes – Originate in the bone marrow.

- I. B cells (mature in bone marrow)
- II. T cells
 - > Cytotoxic (bind & destroy target cells)
 - > Helper T's (stimulate response)
 - > Suppressor (Inhibits immune response)
- III. Memory – long term immunity for future.

Humoral Immunity

- I. Passive
 - Artificial Immunity (Serum w/ antibodies)
 - Natural Immunity (From mothers)
- II. Active
 - Natural Immunity
 - Artificial Immunity

The Immune System:
Importance of Vaccines – Segment 6
<http://digital.fox.com/PortalViewVideo.aspx?vid=39506&vid=6527&spid=0&sid=0&State=&title=The%20Immune%20System&Search=Y&parentSceneID=1>

