

Immune System Objectives

- To identify the defense team of the specific immune response.
- To recognize the incredible diversity of antibodies and why this structure is engineered to deactivate foreign substances.
- To identify the difference between active immunity and passive immunity.
- Case study involving Hepatitis & gammaglobulin.
- To address how the immune system is involved with allergic response.
- To distinguish the difference between an immune deficiency disorder and an autoimmune disease.
- Assignment: Flow chart to trace the immune response on Pg 2-15.

Specific Immunity

Lymphocytes – Originate in the bone marrow.

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

Immuno-competency

When B & T cells become immuno-competent they display unique receptors on their surface.

Major Histocompatibility Complex

MHC I – Found on ALL body cells

MHC II* – Found only on cells involved with immunity.

- * These receptors commit the cell to only interacting with that antigen form. Coded by Genes!

Types of Humoral Immunity

- I. **Active:** B cells encounter antigens & produce antibodies.
 - > Natural (contract the disease/infection & survive)
 - > Artificial (vaccines)
- II. **Passive:** Antibodies harvested from serum of a human or animal donor.
 - > Mother to fetus (placenta & breast milk)
 - > Injections of gamma globulin (after exposure)
 - > Serum – for fast protection
 - Snake bites, Botulism, Rabies, Tetanus

Hepatitis

Inflammation of the liver

Viral infection

Types:

Hepatitis A – from contamination of food, water, shellfish [32% of cases in U.S.]

Hepatitis B – from blood and sexual contact, immunization exists [40% of the cases in U.S.]

Hepatitis C – can lead to chronic liver infections, can lead to death. [Treatment with interferon drugs]

Discuss Case Study 2-16

What about Allergies?

Hypersensitivity

Allo = altered

Erg = reaction

Result when the immune system causes tissue damage as it fights off a perceived threat.

Overproduction/ inappropriate response of IgE antibodies.

Allergen: antigens that incite this reaction.

Examples - Pollen, mold, sting, food, dander

Hapten – antigen grabs a self molecule & blends e.g. drugs, poison ivy, detergents

Immediate Hypersensitive

Acute or Type I

Anaphylaxis – Initial encounter produces no symptoms, but sensitizes the individual. Later encounter can set up an extreme reaction of the immune system.

Involves:

T cells, B cells, mast cells (detector cells) and basophils.

Massive release of **histamines** by mast cells.

Asthma type symptoms occur.

> **Epinephrine** is the drug of choice to reverse.

Immune deficiency

Congenital or acquired condition that decreases the effectiveness of the immune system.

Examples:

- SCID – genetic deficit of B or T cell production.
- AIDS – Acquired Immune deficiency Syndrome.
Caused by HIV – which destroys Th cells.
- Hodgkin's Disease – cancer of the lymph nodes

Autoimmune diseases

Immune system loses its ability to **distinguish** itself from foreign antigens. The body produces antibodies and sensitized Tc cells that set about to destroy the body's own tissues.

Examples of Autoimmune diseases:

- Multiple sclerosis – destruction of myelin in nervous sys.
- Type I (juv) diabetes – destruction of pancreatic beta cells
- Rheumatoid arthritis – destruction of the joints