

Chapter 13- Lymphatic System and Immunity Notes

The Lymphatic system is comprised of:

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-
-

Functions of the lymphatic system:

-
-

Lymph Pathway

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.

Lymphatic Organs

1. Lymph Nodes

- contain both lymphocytes and macrophages which _____ by removing bacteria and cellular debris
- are also centers of _____

2. Thymus

- contains lymphocytes that _____ (Tcells) to provide immunity
- _____ to stimulate maturation of T cells

3. Spleen

-

4. Lymphatic Nodules

- present in _____ around pharynx, _____ in intestines, & _____
- _____ & fight infections that enter via mouth, nose & intestinal tract

5. Red Bone Marrow

- _____, present in most bones; _____, present in sternum, vertebrae, ribs, pelvic girdle
- the site of stem cells that _____
- the site for _____

Lymphocytes vs. Macrophages

- _____; present in all lymphatic organs
- _____ and are involved in the body's immunity

Lymphocytes

Macrophages

Nonspecific & Specific Defenses

Immunity involves

1. nonspecific defenses =
2. specific defenses =

1st Line:

2nd Line:

3rd Line:

Nonspecific Defenses

1. Barriers to Entry

- a. provide _____ to entry by certain pathogens
- b. include _____ and _____, secretions of _____ glands, acid _____ of the stomach microbes in _____ & _____

2. Inflammatory Response

- a. consisting of _____, _____, _____, and _____ that occur when tissue is damaged
- b. includes _____ to dilate vessels, _____, _____

3. Natural Killer Cells (NK Cells)

- a. kill _____ and _____ by cell-to-cell contact
- b. large, granular lymphocytes with _____ and _____

4. Protective Proteins (Complement Proteins)

- a. _____ to the scene or bind to and _____ for phagocytosis
- b. blood _____ activated when pathogens enter the body

5. Interferons

- a. proteins produced by _____
- b. signal nearby cells to _____

Specific Defenses

1. The immune system is able to distinguish _____ proteins from _____ proteins
2. Antigen can be recognized because it has certain receptors
 - a. antigen =
 - b. antibody =
3. Types of Antibodies (immunoglobins) =
 - a. IgG is in tissue fluid and plasma and _____
 - b. IgM is found in plasma and _____
 - c. IgA is in exocrine gland secretions (breast milk, saliva, tears) and _____
 - d. IgD is found on the surface of most B lymphocytes and _____
 - e. IgE is found in exocrine gland secretions and _____
4. Types of cells that provide specific immunity:
 - 1) B lymphocytes (B cells)
 - a. mature in _____
 - b. produce _____
 - c. involved in _____ immune response
 - 2) T lymphocytes (T cells)
 - a. mature in _____
 - b. _____ cells with nonself proteins
 - c. involved in _____ immune response
5. Types of T cells
 - 1) Cytotoxic T cells
 - kill _____ and _____ by releasing toxic proteins, cutting holes, and by other means
 - 2) Helper T cells
 - secrete _____ that stimulate _____ to form plasma cells in order to form antibodies

Types of Immunity

1. **Naturally acquired active** immunity occurs _____.
2. **Artificially acquired active** immunity occurs through the _____.
3. **Artificially acquired passive** immunity involves the _____.
4. **Naturally acquired passive** immunity occurs as _____.

Immunity Side Effects

Sometimes, the immune system's response is _____ and excessive as when an individual develops _____, suffer _____, or have an _____.

1) **Allergies:** _____
that may damage tissue.

2) **Tissue rejection reaction** occurs when an organ is _____ from one person to another because the immune system recognizes that the transplant is not _____, and then _____ attack it.

3) **Autoimmune disease** occurs when the immune system _____ attacks the body's _____ (as if they have foreign antigens).