

Chapter 14 Lymphatic System and Immunity

Lymph System:

The lymphatic system is comprised of a network of _____ that transport body fluids, the cells and chemicals in them and the organs and glands that produce them.

Lymphatic vessels collect and carry away excess _____ from interstitial spaces and special vessels called _____ transport fats to the circulatory system.

The organs of the lymphatic system help defend against _____.

Lymphatic Pathways:

Vessels start as lymphatic capillaries that merge to form larger vessels that empty into the circulatory system.

Lymph capillaries: Lymphatic capillaries are tiny, _____ -ended tubes that extend into _____ spaces.

They receive tissue fluid through their thin walls; once inside, tissue fluid is called _____.

Lymph vessel: The walls of lymphatic vessels are _____ than those of veins but are constructed with the same three layers with _____ on the inside.

Larger lymphatic vessels pass through lymph nodes and merge to form lymphatic _____.

Lymph trunks and ducts: The lymphatic trunks drain lymph from the body. How are they named? These trunks join one of two _____ ducts. What are their names? What blood vessels do they drain into?

Tissue Fluid and Lymph:

Tissue fluid becomes lymph once it has entered a lymphatic capillary; lymph formation depends on tissue fluid formation. Tissue fluid is made up of _____ and _____ substances that leave blood capillaries by _____.

During filtration, some smaller proteins leak from capillaries into the tissues and are not returned to the blood-stream, thus increasing _____ pressure within the tissues. This rising pressure interferes with the return of fluids to the bloodstream. This pressure forces some of the fluid into lymphatic capillaries.

Lymph movement:

The _____ pressure of tissue fluid drives the entry of lymph into lymphatic capillaries.

What are the forces that propel lymph forward in lymph vessels?

A condition that interferes with the flow in lymph will result in a condition called _____.

Lymphatic Organs:

Lymph nodes: Where are they located?

Lymph nodes are _____-shaped, with blood vessels, nerves, and efferent lymphatic vessels attached to the indentation called the _____, and with afferent lymphatic vessels entering on the convex surface.

Lymph nodes are covered with _____ tissue that extends inside the node and divides it into nodules and spaces called _____.

The white blood cells within lymph nodes filter _____ and remove bacteria and cellular debris before it is returned to the blood.

Lymph nodes are also centers of _____ production; these cells function in immune surveillance.

Thymus: The thymus is a soft, bi-lobed organ located behind the _____ shrinks in size during the lifetime (large in children, microscopic in the elderly).

The thymus is surrounded by a _____ tissue capsule that extends inside it and divides it into _____.

These contain _____, some of which mature into _____ cells that leave the thymus to provide immunity.

The thymus secretes the hormone _____, which influences the maturation of T lymphocytes once they leave the thymus.

Spleen: The spleen lies in the upper _____ cavity and is the body's largest lymphatic organ.

The spleen resembles a large lymph node except that it contains _____ instead of lymph.

Inside the spleen lies _____ pulp (containing many lymphocytes) and _____ pulp (containing red blood cells, macrophages, and lymphocytes).

The spleen filters the blood and removes damaged _____ and foreign particles, such as _____.

Body Defenses Against Infection:

The body has two types of defense against disease causing agents: _____ defenses that guard against any of them, and _____ defenses (immunity) that mount a response against a very specific target.

The presence of disease-causing agents (pathogens) may cause a(n) _____

The first line of defense is the _____ barrier with the rest of non-specific defenses are the _____ line of defense.

Non-specific defense:

Describe the following types of nonspecific resistance

- species resistance:
- mechanical barriers:

chemical:

- interferon:
- inflammation and fever:
- phagocytosis:

Immunity (specific defense):

The body's third line of defense, immunity refers to the response mounted by the body against specific, recognized foreign molecules.

Antigen: Before birth, the body makes an inventory of " _____ " proteins and other large molecules.

_____ are generally larger molecules that elicit an immune response. Sometimes small molecules called _____ combine with larger molecules and become antigenic.

Lymphocytes: During fetal development, _____ bone marrow releases lymphocytes into circulation, 70-80% of which become _____ lymphocytes and the remainder of which become _____ cells.

Undifferentiated lymphocytes that reach the thymus become T cells; B cells are thought to mature in the bone marrow. Both B and T cells reside in lymphatic organs.

T-Cells and the Cellular Immune Response:

_____ cells attack foreign, antigen-bearing cells, such as bacteria, by direct cell-to-cell contact, providing cell-mediated immunity.

The activation of this cell requires the presence of an antigen-presenting cell, such as a B cell or macrophage, that has already encountered the antigen. There are several kinds of T cells.

In order for a _____ T cell to become activated, it must first encounter a macrophage displaying the antigen on its major _____ complex (MHC) proteins; if the antigen fits the T cell's antigen receptor, it becomes activated and stimulates B cells to produce antibodies.

_____ T cells continually monitor the body's cells, recognizing and eliminating tumor cells and virus-infected cells by release of proteins, cutting holes and by other means. These T cells become activated when an antigen binds to its receptors.

_____ cells provide a no-delay response to any future exposure to the same antigen at a later time.

Humoral Mediated Immunity:

A _____ cell may become activated and produce a clone of cells when its antigen receptor encounters its matching antigen, but most of these cells need _____ T cells for activation. This cell releases _____ that activate the B cell so that it can divide and form a _____.

Some of the B cells become _____ cells, producing and secreting _____.

Like T cells, some of the B cells become _____ cells to respond to future encounters with the antigen.

Types of Antibodies: There are five major types of antibodies (immunoglobulins) that constitute the gamma globulin fraction of the plasma.

_____ is in tissue fluid and plasma and defends against bacterial cells, viruses, and toxins and activates complement.

_____ is in exocrine gland secretions (breast milk, saliva, tears) and defends against bacteria and viruses.

_____ is found in plasma and activates complement and reacts with blood cells during transfusions.

_____ is found on the surface of most B lymphocytes and functions in B cell activation.

_____ is found in exocrine gland secretions and promotes allergic reactions.

Antibody Actions: Antibodies can react to antigens in three ways: what are they? Describe each.

Primary and Secondary Immune Responses:

When B or T cells become activated the first time, their actions constitute a _____ immune response, after which some cells remain as memory cells.

If the same antigen is encountered again, more numerous memory cells can mount a more rapid response, known as the _____ immune response.

The ability to produce a secondary immune response may be long lasting. In which case is the person most likely to become ill? Why?

Types of immunity:

Describe and give an example of each of the following:

- active immunity:
- passive immunity:
- naturally acquired immunity:
- artificially acquired immunity:

Allergic Reactions

Allergic reactions to _____ are excessive immune responses that may lead to tissue damage.

_____ -reaction allergy results from repeated exposure to substances that cause inflammatory reactions in the skin.

_____ -reaction allergy is an inherited ability to overproduce _____.

During allergic reactions, _____ cells release _____, _____ and leukotrienes, producing a variety of effects.

List physiological effects caused by allergy mediators.

Transplantation and Tissue Rejection:

A transplant recipient's immune system may react with foreign _____ on the surface of the transplanted tissue, causing a tissue _____ reaction.

How can this reaction be reduced?

Autoimmunity

In autoimmune disorders, the immune system manufactures antibodies against some of its _____ antigens.

What may cause this? List some autoimmune disorders.