Chapter 16

Immune System

The immune system consists of cells and chemicals that protect the body against invasion by foreign substances and maintain its general health.

Nonspecific Immune Mechanisms

Nonspecific immune defenses protect against foreign cells without knowing their identities.

Integumentary system -provides a protective physical and chemical barrier for the body.

Gastrointestinal system -contains hydrochloric acid and saliva, which prevent pathogens from multiplying.

Respiratory system- provides mechanical and chemical barriers. There are ciliated mucous membranes to filer substances. Mucus on the system entraps foreign objects, and it also has antiseptic properties.

Other mechanisms include tears and urine which can wash foreign substances from the body, limit bacteria growth, and kill certain organisms.

Pyrogens- are release by leukocytes and bacteria, which cause the body temperature to increase.

Interferons- are a family of immune proteins messengers that inhibit virus replication and promote antitumor activities.

Specific Immune Mechanisms

Antigens are substances that are capable of producing specific immune reactions. Examples are bacteria, virus, and parasites.

Once an attack is over the majority of the T cells, B, cells, and null cells die by apoptpsis. This is programmed cell death.

B cells

Formed in the bone marrow and mature there. They create a humoral (chemical) response. B cells produce proteins called antibodies or immunoglobulins that respond to antigens.

Five classes of antibodies

IgG- most abundant

IgM- first produced when antigens invade

IgE allergic reactions

IgA- found in saliva, tears, milk, and mucus membrane lining GI tract and bronchi

IgD- unclear function

Activating a B cell also produces plasma cells and memory cells.

Plasma cells -create the initial or primary response. Some disease occurs.

Memory cells- create the secondary of memory response which do not initially secrete antibodies, when activated again can produce large amount of specific antibodies.

T cells

Formed in the bone marrow, but mature in the thymus. They are involved in cellular immunity. There are two main types of T cells.

Cytotoxic T cells- attack cells. They can destroy virus- infected cells, cancer cells, and cells of transplanted foreign tissue. They can also become memory cells. They produce long term immunity.

Helper T cells -secrete cytokines, which stimulate the immune response of T cells and C Cells.

Null cells- cannot turn into memory cells. They are the natural killer cell which are important in defense of tumor cells and cells infected with a virus.

Protective Immunity

Passive Immunity- is when antibodies are transferred from a mother to her fetus or are injected into and animal.

Active Immunity - vaccination or by natural infection.

Immune System Problems

Immune System Weakness or Deficiency

Agammaglobulinemia-Having no gamma globulin (antibodies) in their blood, These animals are highly susceptible to fatal infections

Immunosupression -can be induced by viruses, bacteria, and parasites. I.E feline immunodeficiency virus, tuberculosis, lymphoma

Immunomodulator and immunostimulant -drugs are used to stimulate the immune system.

Excessively Strong Immune System Reaction

Anaphylaxis- a severe response to a foreign substance like bee stings. This can cause swelling, airway blockage, and tachycardia. This can possibly be life-threatening.

Autoimmune disease- when the body cannot tell the difference between foreign antigens and those of its own cells. The body attacks its own cells and tissues.

Antiinflammatory drugs- such as corticosteroids, aspirin, and ibuprofen are used to suppress inflammation.

Immunosuppressants- such as cyclophosphmide and cyclosporine are used in bone marrow and organ transplants. These drugs suppress the immune system