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Medical surgical nursing assignment

1. Explain the role of immune system

2. Describe the two types of immunity

3. Explain the different types of antibodies and their role

Answers.

1. The role of the immune system is a collection of structures and processes within the body that is to protect against disease or other potentially damaging foreign bodies. When functioning properly, the immune system identifies a variety of threats, including viruses, bacteria and parasites, and distinguishes them from the body's own healthy tissue. The immune system is a host defense system comprising many biological structures and processes within an organism that protects against disease. To function properly, an immune system must detect a wide variety of agents, known as pathogens, from viruses to parasitic worms, and distinguish them from the organism's own healthy tissue

2. The immune system can be broadly sorted into categories: innate immunity and adaptive immunity.

A. Innate immunity is the immune system you're born with, and mainly consists of barriers on and in the body that keep foreign threats out, according to the National Library of Medicine (NLM). Components of innate immunity include skin, stomach acid, enzymes found in tears and skin oils, mucus and the cough reflex. There are also chemical components of innate immunity, including substances called interferon and interleukin-1.

Innate immunity is non-specific, meaning it doesn't protect against any specific threats. Innate immune defenses are non-specific, meaning these systems respond to pathogens in a generic way. This system does not confer long-lasting immunity against a pathogen. The innate immune system is the dominant system of host defense in most organisms.

B. Adaptive, or acquired, immunity targets specific threats to the body, according to the NLM. Adaptive immunity is more complex than innate immunity, according to The Biology Project at The University of Arizona. In adaptive immunity, the threat must be processed and recognized by the body, and then the immune system creates antibodies specifically designed to the threat. After the threat is neutralized, the adaptive immune system "remembers" it, which makes future responses to the same germ more efficient. The adaptive immune response is antigen-specific and requires the recognition of specific "non-self" antigens during a process called antigen presentation. Antigen specificity allows for the generation of responses that are tailored to specific pathogens or pathogen-infected cells. The ability to mount these tailored responses is maintained in the body by "memory cells". Should a pathogen infect the body more than once, these specific memory cells are used to quickly eliminate it.

Both innate and adaptive immunity depend on the ability of the immune system to distinguish between self and non-self molecules. In immunology, self molecules are those components of an organism's body that can be distinguished from foreign substances by the immune system. Conversely, non-self molecules are those recognized as foreign molecules. One class of non-self molecules are called antigens (short for antibody generators) and are defined as substances that bind to specific immune receptors and elicit an immune response.

3. There are five different antibody isotypes seen in humans: IgG, IgA, IgM, IgE, and IgD.2﻿

1. IgG:

IgG is the most abundant antibody isotype in the blood (plasma), accounting for 70-75% of human immunoglobulins (antibodies). IgG detoxifies harmful substances and is important in the recognition of antigen-antibody complexes by leukocytes and macrophages. IgG is transferred to the fetus through the placenta and protects the infant until its own immune system is functional.is the antibody isotype that most people think of when they're talking about antibodies. It is the antibody that is built by immunization. It activates an immune cascade that can eliminate some forms of infection. IgG can also neutralize certain toxins.

2. IgA

IgA is abundant in serum, nasal mucus, saliva, breast milk, and intestinal fluid, accounting for 10-15% of human immunoglobulins. IgA forms dimers (i.e., two IgA monomers joined together). IgA in breast milk protects the gastrointestinal tract of neonates from pathogens. it is the antibody isotype that is found in usually mucosal areas, such as the mouth and the vagina. It can also be found in saliva, tears, and breast milk. IgA is formed by two Ig subunits bound together. When IgA binds to a target, it can stimulate inflammation. In mucosal areas, IgA can also keep pathogens from sticking to epithelial cells. The production of IgA against inappropriate targets is associated with certain autoimmune diseases, such as celiac disease.

3. IgM

IgM usually circulates in the blood, accounting for about 10% of human immunoglobulins. IgM has a pentameric structure in which five basic Y-shaped molecules are linked together. B cells produce IgM first in response to microbial infection/antigen invasion. Although IgM has a lower affinity for antigens than IgG, it has higher avidity for antigens because of its pentameric/hexameric structure. IgM, by binding to the cell surface receptor, also activates cell signaling pathways.it is one of the first types of antibody to be produced after a pathogen has entered the body. Since it is made up of five Ig subunits bound together, it has very high avidity. In other words, it sticks very strongly to its target. IgM is very important in the early stages of an infection. IgM sometimes appears when an infection becomes reactivated, such as with a herpes outbreak. It can also appear when someone is reexposed to a disease they've previously gotten rid of.

4. IgE

IgE is present in minute amounts, accounting for no more than 0.001% of human immunoglobulins. Its original role is to protect against parasites. In regions where parasitic infection is rare, IgE is primarily involved in allergy. Is the antibody that is responsible for the allergic response. It is mostly found in the lungs, skin, and mucous membranes. When IgE binds to an allergen, it starts the histamine reaction. It's the histamine reaction that causes the symptoms of an allergy attack. This single subunit antibody also helps to protect the body from parasitic worms.

5. IgD

IgD accounts for less than 1% of human immunoglobulins. IgD may be involved in the induction of antibody production in B cells, but its exact function remains unknown is important in the early stages of the immune response. Bound to B cells, it does not circulate. Instead, it signals those cells to become active. This can help to stimulate inflammation. IgD is the least understood type of antibody, and its functions are still being discovered.