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ASSIGNMENT

1. Explain the role of the immune system
2. Describe the two types of immunity
3. Define the different types of antibodies and their roles

THE ROLE OF THE IMMUNE SYSTEM

The major function of the immune system is to protect the host from environmental agents such as microbes or chemicals, thereby preserving the integrity of the body. This is done by the recognition of self and response to non-self. The immune response has been artificially divided into innate immunity (resistance) and specific immunity. Specific immunity is further divided into humoral immunity, the one involved with antibody, and cellular immunity, which is orchestrated by T cells. It is essential to understand that although these divisions have helped in understanding and analyzing the immune response, the system functions as a single unit rather than as a separate entity. In this paper, a simplified analysis of specific immunity will be given. However, the importance of nonspecific immunity, especially as it pertains to its role in preventing exposure of environmental substances, should not be forgotten.

The role of the immune system- a collection of structures and processes within the body 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, according to Merck Manuals.

THE TYPES OF IMMUNITY

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

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.

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 DIFFERENT TYPES OF ANTIBODIES AND THEIR ROLES

•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.

•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 signalling pathways.

•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.

•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.

•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.