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ASSIGNMENT

The immune system functions as the body’s defense mechanism against invasion and allows a rapid response to foreign substances in a specific manner. The success of the immune system depends on its ability to discriminate between foreign and host cells. When an organism is threatened by microorganisms, viruses, or cancer cells, the immune system acts to provide protection. Immune function is affected by a variety of factors, such as central nervous system integrity; general physical and emotional status; medications; dietary patterns; and the stress of illness, trauma or surgery. The basic function of the immune system is to remove foreign antigens such as viruses and bacteria to maintain homeostasis.

Tolerance is the mechanism by which the immune system is programmed to eliminate foreign substances such as microbes, toxins and cellular mutations but maintains the ability to accept self-antigens. Normally the immune system does not mount a response against self. How the human body recognize foreign against itself employs a complex "I.D." system. Each cell in the human body carries on it's surface a mixture of proteins and sugars that serve to identify the cell to the immune system. Foreign objects lack the identifiers that all of the body's cells have, but each one has unique features or antigens where the immune system attaches identifiers called antibodies. This is the basis for the specific defense mechanisms. Once antibodies for a specific antigen has been built, the immune system will respond faster than if they had been no previous exposure to the antigen. The non-specific part of the immune system is mostly composed of phagocytes which engulf and digest foreign substances like bacteria and viruses, which do not bear the body's specific identifiers.

Types of immunity

Immunity is the body’s specific protective response to a foreign agent or organism. There are two general types of immunity and they are:

Innate (non-specific) immunity

Acquired (specific) immunity

* Innate immunity: innate immunity or natural immunity, which is nonspecific, provides a broad spectrum of defense against and resistance to infection. It is considered the first line of host defense following antigen exposure, because it protects the host without remembering prior contact with an infectious agent. Natural immunity co-coordinates the initial response to pathogens through the production of cytokines and other effector molecules, which either activates cells for control of the pathogen or promote the development of the acquired immune response. The cells involved in this response are monocytes, macrophages, dendritic cells, natural killer cells, basophils, eosinophils, granulocytes.
* Acquired immunity: acquired (adaptive) immunity, which is specific usually develop as a result of prior exposure to an antigen through immunization or by contracting a disease, both of which generate a protective immune response. This form of immunity relies on the recognition of specific foreign antigens. The acquired immune response is broadly divided into two mechanisms:
  + - The cell mediated response, involving T-cell activation and,
    - Effector mechanism, involving B-cell maturation and production of antibodies.

The two types of acquired immunity are known as active and passive and are interrelated. Active acquired immunity refers to immunologic defenses developed by the person’s own body. It lasts for many years or an entire lifetime. Passive acquired immunity is temporary immunity transmitted from a source outside the body that has developed immunity through previous disease or immunization. Active and passive acquired immunity involve humoral and cellular immunological responses.

Antibodies

Antibodies are large proteins, called immunoglobulins, that consist of two subunits, each containing a light and heavy peptide chain held together by chemical link composed of disulfide bonds. Antibodies defend against foreign invaders in several ways, and the type of defense used depends on the structure and composition of both the antigen and the immunoglobin.

The body can produce five different types of immunoglobin. Each of the five types or classes is identified by a specific letter of the alphabet, IgA, IgD, IgE, IgG and IgM.

* IgG (75% of total immunoglobulin)
  + Appears in serum and tissues (interstitial fluid)
  + Assumes a major role in bloodborne and tissue infections
  + Activates the complement system
  + Enhances phagocytosis
  + Crosses the placenta
* IgA (15% of total immunoglobulin)
  + Appears in body fluids (blood, saliva, tears, breast milk, pulmonary, gastrointestinal, prostatic, vaginal secretions)
  + Protects against respiratory, gastrointestinal, genitourinary infections
  + Protects absorption of antigens from food
  + Passes to neonate in breast milk for protection
* IgM (10% of total immunoglobulin)
  + Appears mostly in intravascular serum
  + Appears as the first immunoglobulin produced in response to bacterial and viral infections
  + Activates the complement system
* IgD (0.2% of total immunoglobulin)
  + Appears in small amounts in serum
  + Possibly influences B-lymphocyte differentiation but role is unclear
* IgE (0.004% of total immunoglobulin)
  + Appears in serum
  + Takes part in allergic and some hypersensitivity reactions
  + Combats parasitic infections.