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SOLUTION TO MY ASSIGNMENT

Explain The Role Of Immune System

Describe The Two Types Of Immunity

Explain The Different Roles Of Antibodies And Their Role

**IMMUNE SYSTEM :** the collection of organ ,cells, tissue, and molecules that meditate the immune response . The immune system is composed of an integrated collection of various cell, types ,each with a designated function in defending ,against infection and invasion by other by other organisms. Supporting this system are molecules that are responsible for the interaction ,modulation and regulation of the system .

These molecules and cells participate in specific interaction with immunogenic epitopes (antigenic determinant ) present of foreign materials initiating a series of action in a host ,including the inflammatory response, the lysis of microbial agent ,and the disposal of foreign toxins.

The major component of the immune system including central and peripheral organ ,tissues, and cells .

**The Bone Marrow** :- the white blood cells (WBC) involved In immunity are produced in the bone marrow . lymphocyte are generated from stem cells ,these are two types of lymphocytes -B lymphocyte B cells and T lymphocyte T cells.

**Lymphocytes** :- its makes up to 20-30% of circulating with the blood cells but at any one times most of them are found in lymphatic and others tissue rather than in the blood stream. They include natural killers cells which are involved in immunological surveillance, T cells migrates to the thymus gland for final maturation.

For each of the millions of possible antigen =s that might be encountered In life, there are , therefore Vast numbers of different T- and B -cells in the body ,each capable of responding to only one antigen

**T -Cells** :- the hormone is thymosin , produced by the thymus gland is responsible for promoting T-cells maturation , which leads to the formation of fully specialised mature , functional T-cells . it is important to recognised that a mature T-cell has been programmed to recognise only one type of antigen, during its subsequent travels through the body will react to no other antigen ,however dangerous it might be. Thus ,a T cells manufacture to recognise the chickenpox virus will not react to a measles virus ,a cancer cell, or a tuberculosis bacterium.

T -cells provide cell-mediated immunity

**B-Cells** :- these are both produced and matured in the bone marrow .they produce antibodies (immunoglobulins), proteins designed to bind to ,and destroy, an antigen. As with T-cells, each B-cell provide target one specific antigen; the antibody released reacts with one type of antigen and no other. B cells provide antibody -mediated immunity.

**Lymphoid Tissues**:- the spleen ,composed of red and white pulp ,acts somewhat like a filter. The red pulp is the site where old and injured red blood cells (RBCs) are destroyed .the white pulp contains concentration of lymphocytes. The lymph nodes ,which are connected by lymph channels and distributed throughout the body they removed foreign materials from the lymph system before it enter the blood stream. The lymph node also serve as centres for immune cell proliferation.

The remaining lymphoid tissue contains immune cells that defend the body’s mucosal surface against surface against microorganisms.

The basic function of the immune system is to remove foreign antigen such as viruses and bacteria to maintain homeostasis . there are two generals types of immunity : natural (innate)and acquired (adaptive). Natural immunity or nonspecific immunity is present at birth. Each types has a distinct roles in defending the body against harmful invaders, but the various component usually interdependent .

Describe the two types of immunity

Natural immunity

Artificial immunity

 **Natural Immunity** :- they are nonspecific, but provides a broad spectrum of defence against and resistance to infection. It is considered the first line of host defence following antigen exposure because it protects the host without remembering prior contact with an infectious agent. Response to foreign invader are very similar from one encounter tom the next, regardless of the number of times the invader is encountered. Natural immunity co-coordinates the initial response to pathogen through the production of cytokines and other effector molecules, which either activate cells for control of the pathogen by elimination or promote the development of acquired immune response. The cells involves in this response are monocytes, macrophages, dendritic cells , natural killer NK cells, basophils, eosinophils, and granulocytes. The early event in this process are critical in determining the nature of the adaptive immune response. Natural immune mechanism can be divided into two stages: immediate (generally occurring within minutes ) and delayed (occurring within several days afters exposure)

**White blood cell action**

The cellular aspect is the key to the effective initiation of the immune response . WBCs, or leucocytes , participate in both natural or acquired immune response. Granular leucocyte, or granulocyte, fight invasion by foreign bodies or toxins by releasing cell mediator, such as histamine, bradykinin, and prostaglandins and by engulfing the foreign bodies or toxins.

Granulocyte include neutrophils , eosinophils, and basophils .

Neutrophils are the first cell to arrive at the site where inflammation occurs. Eosinophils and basophils, others types of granulocytes, increase in the number during allergic reaction and stress responses. Non granular leukocyte includes monocyte or macrophages lymphocytes. Monocytes are the first to arrive on the scene and functions as phagocytic cells, engulfing, ingesting and destroying greater number and qualities of foreign bodies or toxins than granulocytes to do. Lymphocytes, consisting of B cells and T-cells, plays major roles I n humoral and cell-mediated immune response. About 70% to 80% of lymphocyte in the blood are T-cells, about 10% to 15% are B cells.

**Inflammatory phase**

The inflammatory response is a major function of the natural immune system that is elicited In response to injury or invading organisms.

Chemical mediators assist this response by minimizing blood loss, walling of the invading organism, activating phagocytes and promoting formation of fibrous scar tissue and regeneration of injured tissue. Inflammatory response is facilitated by physical and chemical barrier that are part of the human organism.

**Physical and chemical barriers**

Activation of the natural immunity response id enhance by processes inherent in physical chemical barriers. Physical surface barrier includes the skin, mucous membranes and cilia of the respiratory tract, which prevent pathogens from gaining access to the body. The cilia of the respiratory tract, along with coughing and sneezing responses, filter and clear pathogens from the upper respiratory tract before they can invade the body further.

Chemical barriers, such as mucus, acidic gastric secretions, enzymes in tears and saliva, and substance in sebaceous and sweat secretion, act in nonspecific way to destroy invading bacteria and fungi.

**Immune regulation**

Regulation of immune responses involve balance and counterbalance. Dysfunction of the natural immune system can occurs when the immune components are inactivated or when they remain active long after their effects are beneficial. A successful immune response fails to develop and clear an antigen sufficiently, the host is considered to be immunocompromised or immunodeficient . if the response is overly robust or misdirected, allergies, asthma, or automobile disease result . the immune system recognition of one’s own cells or tissues as “foreign” rather than as self is the basis of many autoimmune disorders. Despite the fact that the immune response is critical to the prevention of disease, it must be well controlled to curtail to immunopathology. Most microbial infection induced an inflammatory response mediated by T-cells and cytokines, which, in excess can cause tissue damage.

**Acquired immunity**

Is an immunity usually develops as a result of prior exposure to an antigen through immunization vaccination or by contracting a disease, both of which generate a protective immune response. Acquired immunity is necessary to defend against these resistant agents. Weeks or month after the exposure to the disease or vaccine, the body produces an immune response that is sufficient to defend against the disease on re-exposure.

The acquired immune response is divided into two mechanism:

1. The cell mediated response, involving T-cell activation
2. Effector mechanisms, involving B-cell maturation and production of antibodies

The two types of acquired immunity are known as active a d passive and are interrelated .

Active acquired immunity refers to immunologic defences developed by the person’s own body

This immunity usually last many years or even lifetimes.

Passive acquired immunity is temporary immunity transmitted from a source outside the body tnhat has developed immunity through previous disease or immunization. Examples include immunity resulting from the transfer of antibodies from mother to an infant in utero or through breastfeeding or receiving injection to immune globulin. Active and passive acquired immunity involve humoral and cellular immunologic response.

 When the body invade or attack by bacteria, virus or other pathogens it has three means of defence: The phagocytic immune response

The humoral or antibody immune response

The cellular immune response

**The phagocytic immune response** : this is the first line of defense primarily involves the WBCs which have the ability to ingest foreign particles and destroy the invading agent; eosinophils are one only weakly phagocytic. Phagocytes also remove the body’s own dying or dead cell. **Apoptosis** ,or programmed cell death, is the body’s way of destroying worn out cells such as blood or skin cells or cells that need to be renewed.

**The humoral immune response** : this is the second protective response sometimes called the antibody response, it begins with the B lymphocytes ,which can transform themselves into plasma cells that manufacture antibodies. These antibodies are highly stream and attempt to disable invaders

**Cellular immune response** also involve the T lymphocyte, which can turn into special cytotoxin t-cell that can attack the pathogens. The structural part of the invading or attacking organism that is responsible for stimulating antibody production is called antigen

 **THE ROLES OF ANTIBODIES**

Antibodies are large proteins, called immunoglobulins, that consist of two subunit , each containing a light and a heavy peptide chain held together by a chemical link composed of disulfide bones.

 Antibodies defend against foreign invaders on several ways ,and the types of defence used depends on the structure and composition of both the antigen and the immunoglobulin.

**Types of antibodies**

IgA 15% of total immunoglobulin :appear in body fluid (blood, saliva ,tears and breast milk as well as pulmonary ,gastrointestinal ,prostatic, and virginal secretions). Prevent absorption of antigen from food

Passes to neonate to breast milk production

Protect against respiratory, gastrointestinal, and genitourinary infection

**IgD 0.2%of total immunoglobulin** : appear in small quantity in the serum

This is made by B-cells and displayed on their surface, Antigen bind here to activate B-cell

**IgE 0.004%of total immunoglobulin** :found in the cell membrane of e.g basophils and mast cell, and if it bind its antigen ,activates the inflammation response , this antibody is often found in excess in allergy. It also combats with parasitic infections

IgM (10%of total immunoglobulin ): Appear mostly in intravenous serum, it also appears as the first immunoglobulin produced in response to bacteria and viral infections. Its also activates the complement system

**IgG (75% of total immunoglobulin**): produced In large quantities in the primary response and is a potent activators of complements

Reference

Medical surgical Nursing (Brunner& Suddarth’s)

Anatomy and physiology (Ross& willson)