INTRODUCTION

Humans and different mammalians live in a world that's heavily inhabited by pathogenic and nonpathogenic microbes and contains an enormous array of harmful substances that threaten traditional physiological state. The community of microbes includes each obligate pathogens and useful commensal organisms, which the host should tolerate and hold under control to support traditional tissue and organ performance. Infective microbes possess various assortments of mechanisms by that they replicate, spread, and threaten traditional host functions. At constant time that the system is eliminating pathologic microbes and harmful or matter proteins, it should avoid responses that turn out excessive injury of self-tissues or that may eliminate useful commensal microbes. The environment contains a large vary of infective microbes and harmful substances that challenge the host through awfully broad choice of infective mechanisms. So it's not stunning that the system uses a fancy array of protecting mechanisms to regulate and typically eliminate these organisms and toxins. A general feature of the system is that these mechanisms have confidence detection structural options of the infectious agent that mark it as distinct from host cells. Such host-pathogen or host-toxin discrimination is crucial to allow the host to eliminate the threat while not damaging its own tissues.

THE ORGANS OF THE IMMUNE SYSTEM

a. Bone Marrow
b. Thymus
c. Spleen
d. Lymph Nodes

a) Bone Marrow

By the process of hematopoiesis all the cells of the immune system originated from the bone marrow. The bone marrow produces B cells, natural killer cells, granulocytes and immature thymocytes, additionally to red blood cells and platelets.
b) Thymus
The function of the thymus is to supply mature T cells. Immature thymocytes leave the bone marrow and migrate into the thymus. Through a stimulating maturation method generally noted as thymic education, T cells that are useful to the immune system are spared, while those T cells that may evoke a harmful response are eliminated. The mature T cells are then moved to the bloodstream.[8-15]

c) Spleen
The spleen, an immunologic filter of the blood made up of B cells, T cells, macrophages, dendritic cells, natural killer cells and red blood cells. An immune response is initiated once the scavenger or nerve fiber presents the antigen to the suitable B or T cells. This organ will be thought of as an immunologic center. Within the spleen, B cells become activated and produce large amounts of antibody.[16-21]

d) Lymph Nodes
The lymph nodes perform as an immunologic filter for the lymph, a bodily fluid. Lymph Nodes composed mostly of T cells, B cells, nerve fiber cells and macrophages, the nodes drain fluid from most of our tissues. Antigens are filtered out of the lymph in the lymph node before returning the lymph to the circulation. In a similar fashion as the spleen, the macrophages and dendritic cells capture antigens present these foreign materials to T and B cells, consequently initiating an immune response.[22-25]

The Cells of the Immune System

a) T-Cells
b) Natural Killer Cells
c) B Cells
d) Granulocytes or Polymorphonuclear (PMN) Leukocytes
e) Macrophages
f) Dendritic Cells

a) T-Cells

T lymphocytes are usually divided into two major subsets:-

i) CD4+ T cell
ii) CD8+ T cell

CD4+ T cell, is a pertinent coordinator of immune regulation.
Function:
T helper cell is to augment or potentiate immune responses.
CD8+ T cells important in down-regulation of immune responses [26-35].

b) Natural Killer Cells

Function:-
As effector cells that directly kill certain tumors such as melanomas, lymphomas and viral-infected cells, most notably herpes and cytomegalovirus-infected cells [36-42].

c) B Cells

Function:-
Antibodies in response to foreign proteins of microorganisms, viruses, and tumor cells were produced by B-Lymphocytes. Antibodies are specialized supermolecules that specifically recognize and bind to one particular protein that specifically recognize and bind to one particular protein [35,38].

d) Granulocytes or Polymorphonuclear (PMN) Leukocytes

Granulocytes are composed of three cell types
i) Neutrophils
ii) Eosinophils and
iii) Basophils
Function:-
Removal of bacteria and parasites from the body by engulfing these foreign bodies and degrade them using their enzymes [40,33].

e) Macrophages

Function:-
For the regulation of immune responses, Macrophages play an important role. Because of their pick up and ingest foreign materials they were referred as Scavengers or Antigen Presenting cells [41-44].

f) Dendritic Cells

Function:-
Dendritic Cells mainly captures antigen and move it to the lymphoid organs where an immune response is initiated [45].

TYPES OF IMMUNE SYSTEM

There are two types of Immune system.
i) Innate immune system
ii) Adaptive immune system

Innate immune system

The innate immune system consists of cells and proteins which are ready to mobilize and fight microbes at the site of infection. Broadly outlined, the innate system includes all aspects of the host's immune defense mechanisms that are encoded in their mature purposeful forms by the germ line genes of the host. These include physical barriers, like somatic cell layers that express tight cell-cell contacts (tight junctions, cadherin-mediated cell interactions, and others); the secreted mucus layer that overlays the epithelial tissue within the metabolic process, channel, and genital organs; and therefore the animal tissue cilia that sweep away this mucus layer, allowing it to be perpetually invigorated once it's been contaminated with ingested particles [46-50].

The main components of the innate immune system are 1) physical epithelial barriers, 2) phagocytic leukocytes, 3) dendritic cells, 4) a special type of lymphocyte called a natural killer (NK) cell, and 5) circulating plasma proteins.

The innate response additionally includes soluble proteins and bioactive tiny molecules that either constitutively in biological fluids or that is free from cells as they're activated. Lastly, the innate system includes membrane-bound receptors and cytoplasmic proteins that bind molecular patterns expressed on the surfaces of invasive microbes [51-55].

Adaptive immune system

The adaptive immune system is called into action against pathogens that are able to evade or overcome innate immune defenses. Components of the adaptive immune system are normally silent. However, when activated, these components “adapt” to the presence of infectious agents by activating, proliferating, and creating potent mechanisms for neutralizing or eliminating the microbes. There are two types of adaptive immune responses: Humoral immunity and Cell-mediated immunity. Humoral immunity is mediated by antibodies produced by B lymphocytes and cell-mediated immunity, mediated by T lymphocytes [56-60].

CONCLUSION

Finally concluded that immune system is an interactive network of lymphoid organs, cells, humoral factors, and cytokines.

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