Introduction

SPECIFIC DEFENSE MECHANISM

- Immunity and Antigens
- Viruses
- Bacteria
- Fungi
- Parasites
- Pollen and insect venum

- Immune system is based upon the lymphocytes and macrophages which exist together within secondary lymphoid organs (Lymph nodes and spleen).
- Primary lymphoid organs, the thymus plays a role in maturation of lymphocyte precursors to permit them to become antigen responsive T lymphocytes

- T cells mediate an element of immune response known as cell-mediated immunity.
- B cells mediate an element of immune response known as humoral immunity

ACQUIRED IMMUNITY

- Refers to the protection develops against certain type of microbes or foreign substances.
- Acquired Immunity is developed during a person's lifetime and it is not inherited.

Types of Acquired Immunity

- 1- Natural Acquired Immunity
- A-Natural acquired active Immunity:
  - Infections

B- Natural Acquired passive Immunity

-Antibodies

2-Artficially Acquired Immunity

A- Active

Vaccination

- B-Passive
- Antibodies
- Antivenum

Types of Immune Systems

- Humoral Immune system (HIS)
- Antibodies
- B-lymphocytes
- Plasma Cells
- Defends mostly against bacteria, bacterial toxins and viruses in body's fluids

Cell mediated immune system

- T-lymphocytes
- Tc cells
- TD cells
- Ts cells
- TH cells
- Killer cells
- CMIS is most effective against bacteria and viruses located within phagocytes or infected host cells and against fungi, protozoans and helminths. It is also acting against transplanted tissues.

Types of Immune responses

- HIR (humoral Immune Responses)
- Primary Response: first response to antigen
- 1-Lag period
- 2-Increase
- 3-Peak
- 4-Decline

Secondary Immune Response

- Second or subsequent exposure to same antigen
- 1-shorter lag phase
- 2-Shorter increase phase
- 3-Higher peak
- 4-More persistent

Cell Mediated Immune Response

- Graft rejection
- Primary Response
- Survival 10 days-Vsculation- looks OK.
  - 7 days- vessels degenerated
  - 10 days graft dies, sloughed

- Secondary Response
- 1-2 days graft rejection

ANTIGENS

- Any substance that when introduced into the body causes immune response (HIR or CMIR)
- Types: proteins, glycoproteins, lipoproteins and large poly saccharides.
- They are either
- 1-microbes or their components
- 2-non-microbial agents (venums , egg white
- Blood cells, serum proteins and others

Antigenicity and Immunogenicity

- Antigenicity
- Immunogenicity

- FACTORS AFFECTING IMMUNOGENICITY
- 1-Molecular weight and size
- 100 KDa potent
- 10 KDa weak

- 2-Foreigness
- 3-Chemical complexity
- Glycogen 2600 Da but immunogenic
- Lipids and NA are not immunogenic
- 4-Flexibility (high flexible substances like gelatin are less or poor immunogens) Flagilla

- 5-Degradability
- Stainlesssteel, pins, plastic heart valves not inducing immune responses
- Unstable and highly fragile substances are mostly not immunogenic.
- 6-Route of Administration
- Mouth
- Skin
- Muscle
- Inhalation

- 7-Genetics
- NDV can infect chicken but not sheep
- IBR can infect bovine but not chicken
- 8-Cellular reaction
- Some Ag can stimulate T-lymphocytes easily but some others are not
- A-Thymic dependent antigens: Ags can react with B cells in the presence of T-helper cells

- B-Thymic independent antigens
- Can stimulate B cells without the need to T helper cells (lipopolysaccarides)
- 9-Antigenic determinants
- Specific region on the surface of an antigen against which antibodies are formed.

Cross Reactivity

- Proteus vulgaris X Rickettsia typhi
- There is at least one antigenic determinant for each 5000 Dalton of antigen MW.
- 4-6 aa form one antigenic determinant.
- HAPTENS