

Immunology

Immunology: is the science that deals with study immune response [host defense reactions to foreign (non self) bodies known as antigens], hypersensitivity (including allergy), antigen recognition molecules, Auto-immunity, Transplantation, immune tolerance, immune genetics and immunodeficiency.

Type of immunity

1)The innate (natural or nonspecific immune system) is inherited by the organism from the parents and protects it from birth through life

2)The adaptive :-The immunity that an individual acquires after the birth is called acquired or adaptive or specific immunity. It is specific and mediated by antibodies or lymphocytes or both which make the antigen harmless(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. Immune response is divided into two parts (Cell-mediated immunity and Humoral immunity)

*These two systems perform many of their functions by cooperative interactions

<u>Innate immunity</u>	<u>Adaptive immunity</u>
	<i>Humeral and Cell-mediated</i>
<u>Components</u>	<u>Components</u>
Macrophages	antigen presenting cells
Granulocytes	T-cells
Natural killer cells	B-cells
Complement	Antibodies
Other chemicals: HCL, lysozyme	Complement
<u>Characteristics</u>	<u>Characteristics</u>
* Action is immediate	* Action requires days to develop
* Response is non-specific	* Response is specific
* Response is not enhanced on repeated exposure to pathogen	* Response is enhanced on repeated exposure to pathogen

***Component of Innate Immunity**

-First line

1-Mechanical barriers

2-Chemical & biochemical inhibitors

3-Normal flora

-Second line

A- cells

1- Natural killer

2- Phagocytes

B- Soluble factors

C- Inflammatory barriers

***Types of Acquired Immunity**

1- Natural Acquired Immunity

A-Natural acquired active Immunity(Infections)

B- Natural Acquired passive Immunity (Antibodies)

2- Artificially Acquired Immunity

A- Active (Vaccination)

B-Passive –(Antibodies, Antivenum)

INTRODUCTION INTO IMMUNOLOGY LABORATORY

Safety rules the immunology (serology) Lab :-

All samples are assumed to be possible carriers of blood borne pathogens. Transmission may occur by skin puncture from a contaminated sharp object or by passive contact through open skin lesions or mucous membranes.

1. Hand washing: Wash hands after touching blood, body fluids, secretions, excretions, and contaminated items, whether or not gloves are worn.
2. Gloves: Wear gloves (clean, non-sterile gloves are adequate) when touching blood, body fluids, secretions, excretions, and contaminated items.
3. Mask, Eye Protection, and Face Shield: Wear a mask and eye protection or a face shield to protect mucous membranes of the eyes, nose, and mouth during procedures that are likely to generate splashes or sprays of blood, body fluids, secretions, and excretions.
4. Gown: Wear a gown (a clean, non-sterile gown is adequate) to protect skin and to prevent soiling of clothing during procedures and patient-care activities that are likely to generate splashes of blood, body fluids, secretions, or excretions.
5. Injuries: Take care to prevent injuries when using needles, scalpels, and other sharp instruments or when handling sharp instruments after procedures; when cleaning used instruments; and when disposing of used needles.
6. Waste Disposal: Any supplies contaminated with blood and body fluids must also be disposed of in containers clearly marked with the biohazard symbol or with red or yellow color-coding.
7. Decontaminating Work Area: Contaminated non-disposable equipment, blood spills, and blood and body fluid processing areas must be disinfected. The most commonly used disinfectant is a 1:10 dilution of sodium hypochlorite (household bleach) prepared weekly and stored in a plastic bottle.

Material and equipment necessary for basic serologic tests

The following are some of the equipment used in routine serology:

1. Glass wares:

Dirty glass wares easily affect the serological test. After using all the glass wares (test tube, beaker, pipette, etc.) They should be soaked in detergent for several hours and rinsed several times in tap water. Finally allow drying by placing in a dry oven or dust free place. Test tubes and pipettes should not be scratched or broken, which will interfere with the reading of a test.

Types of glassware include:

- Test tube -Glass slides (Microscopic slides) –Flasks -Beakers.

2. Micropipette:

Automatic micropipette devices allow rapid repetitive measurements and delivery of predetermined volumes of reagents or specimens. Micropipettes are continuously adjustable so that variable volumes of liquids can be dispensed with the same device. Delivery volume is selected by adjusting the settings.

3. Incubator and water bath:

The incubator and water bath are source of heat which is needed to assist antigen-antibody reactions. These materials are electrically operated and have a thermostat that holds the temperature within the required limits. These devices should be checked prior to use by installing a thermometer.

4. Rotating machines (Rotator):

Rotating machines are required to facilitate antigen-antibody reactions. Such machine has a flat plate, which rotates at a prescribed rate of speed. A knob located on the front part of the machine controls the number of revolution per minute.

5. Centrifuge:

A centrifuge is an instrument, which produces centrifugal forces. Basically, it has containers fixed in such a way that they can be rotated around the central axis with the help of electric motors. They have speed up to 3000–4000 rpm.