Immunology: is the study of the organs, cells, and chemical components of the immune system that implicated in the mechanism of body defense against invaders or foreign antigens.

Immunity: is a biological term that describes a state of having sufficient biological defenses to avoid infection, disease, or other unwanted biological invasion.

Immune system: cells, tissues, and molecules that mediate resistance to infections.

Role of the immune system

1.Defense against microbes

2.Defense against the growth of tumor cells, kills the growth of tumor cells

3.Homeostasis: destruction of abnormal or dead cells (e.g. dead red or white blood cells, antigen-antibody complex).

Immune response: collective and coordinated response to the introduction of foreign substances in an individual mediated by the cells and molecules of the immune system.

Antigen (Ag): a macromolecule that can induce immune response to formation of Antibody (Ab).

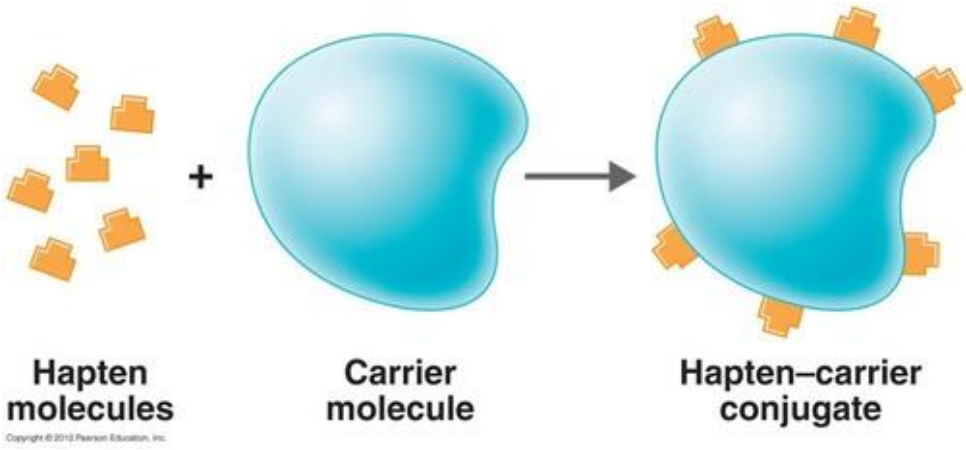
Antibody (Ab): a globulin formed in response to exposure to antigen (Ag).

Hapten: is a molecule or substance with low molecular weight that cannot induce an immune response on its own. However, if a hapten is combined with larger macromolecules (usually proteins) which serve as carriers then a response can be induced.

Hapten + carrier → complete antigen (immunogen).

Examples of haptens are antibiotics.

The carrier molecules may be albumins, globulins



Serology: its study of Ag-Ab in Vitro and use serum in diagnosis of infection.

Serum: is the yellow watery part of blood that is left after blood has been allowed to clot and all blood cells have been removed.

Plasma: is essentially the same as serum, but is obtained centrifuging the blood without clotting. plasma therefore contains all of the clotting factors, including fibrinogen

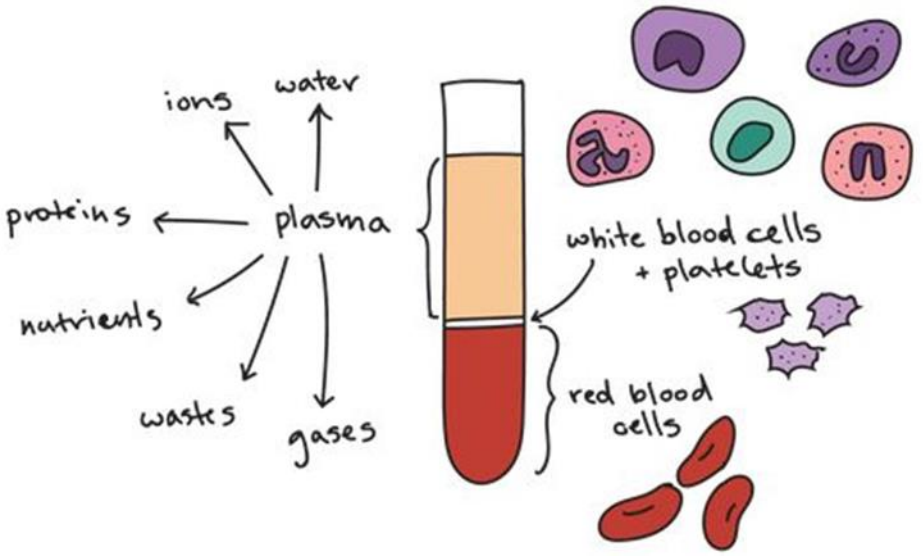
Serum = Plasma – Clotting Factors

Blood includes: 1- Erythrocytes (RBCs).

2- Leucocytes (WBCs).

3- Platelets.

❖ After blood centrifuge we get:



Humoral immunity: is the aspect of immunity that is mediated by macromolecules found in extracellular fluids such as secreted antibodies, complement proteins.

Cellular immunity: immunity works inside the infected cells, where it destroyed the pathogens or microorganisms by the process of lysis by the releasing cytokines.

❖ The main difference between humoral and cell mediated immunity is that antigen-specific antibodies are produced in humoral immunity whereas antibodies are not produced in cell mediated immunity. Instead, T cells destroy the infected cells by inducing apoptosis.

Material and equipment that use in serological test

1. Samples
2. water distillatory
3. incubator
4. cylinders and eppendroff tube
5. (anti-coagulant tube) EDTA tubes
6. Centerifuge, Freezer, Shaker, Immunoflurescent Microscope
7. Enzyme Linked Immuno-Sorbent Assay (ELISA)
8. Kits