



# MICROBIOLOGY



Jinia Tarin

The immune system is a bodily system that functions to defend us against infectious microbes. The immune system develops a defense against the antigen. This defense known as the immune response and usually involves the production of protein molecules by B cells called antibodies.

However, immune responses are also capable of causing damage. Many common diseases are caused by uncontrolled or excessive immune response.

**Immunity:** Immunity is the ability of the human body (self) to tolerate the presence of material indigenous to the body and to eliminate foreign (non-self) material.

There are two common mechanism of immunity.

1. Active immunity.
2. Passive immunity.

**Active immunity:** Active immunity is protection that is produced by the person's own immune system. So the immunity which results from the production of antibodies in response to the presence of an antigen.

**Passive immunity:** Passive immunity is protection by products produced by an animal or human and transferred to another human, usually by injection. So the short term immunity which results from the introduction of antibodies from another person or animal.

### Difference between Active Immunity and Passive Immunity

Active immunity	Passive immunity
1. Active immunity refers to immunity.	1. Passive immunity refers to short-term immunity.
2. Mediated by the antibodies produced by the person's own cell.	2. Mediated by the antibodies produced outside the body.
3. The pathogen has direct contact with the body.	3. The pathogen doesn't have direct contact with the body.
4. Doesn't generate a rapid response.	4. Generate a rapid response.
5. May last a long time.	5. May not last for a long time.
6. Generates an immunological memory.	6. Does not generate an immunological memory.
7. Side effects are very low.	7. The body may react to antisera.
8. Doesn't work in immune deficient hosts.	8. Works in immune deficient hosts.

**Write down the source of passive immunity.**

1. IgG from mother to fetus during pregnancy that generally lasts 4 to 6 months after birth.
2. IgA and IgG found in human colostrum and milk of babies who are nursed.
3. Many types of blood or blood products.
4. Homologous pooled human antibody (immune globin)
5. Hyper immune globulin.
6. Antitoxin.

**Antigen:** Antigen is a toxic or foreign substance which is capable of producing an immune response.

**Antibody:** Antibody is blood protein molecules produced by B lymphocytes to help eliminate an antigen.

**Difference between Antibody & Antigen**

<b>Antibody</b>	<b>Antigen</b>
1. Antibody is blood protein molecules produced by B lymphocytes to help eliminate an antigen.	1. Antigen is any substance that triggers an immune response in body.
2. Also called immunoglobulins.	2. Also called immunogens.
3. Glycoproteins.	3. Can be either proteins, carbohydrates, lipids or nucleic acids.
4. Variable site can bind to the epitope.	4. Interacting domain with the antibody is called the epitope.
5. Protect the body from antigen.	5. Cause either disease.
6. There are four types of antibody.	6. There are four types of antigen.

**Difference between Monoclonal & Polyclonal Antibodies**

<b>Monoclonal Antibody</b>	<b>Polyclonal Antibody</b>
1. Produced by a single clone of plasma B Cells.	1. Secreted against a particular antigen.
2. Produced by same clone of plasma B Cells.	2. Produced by different clone of plasma B Cells.
3. A homogeneous antibody population.	3. A heterogeneous antibody population.
4. Production is expensive.	4. Production is not expensive.
5. Used as therapeutic drugs.	5. Used in general research applications.

**Vaccine:** A vaccine is a biological preparation of weakened or killed pathogen. Vaccines stimulate the body's own immune system to protect the person against infection or disease. There are two basic types of vaccines.

1. Live attenuated. Ex: Viral, Bacterial
2. Inactivated. Ex: Viruses, Bacteria

**Live Attenuated Vaccines:** Live attenuated vaccines are composed of microorganisms that have been cultivated under conditions which disable their ability to induce disease.

Example: Influenza, Rotavirus, Chicken Pox.

**Inactivated Vaccines:** Inactivated vaccines are made from a protein or other small pieces taken from a virus or bacteria.

Example: Hepatitis A, Hepatitis B, Poliovirus.