

What is Immunity?

Immunity is the ability of the body to defend itself against disease-causing organisms. Everyday our body comes in contact with several pathogens, but only a few results into diseases. The reason is, our body has the ability to release antibodies against these pathogens and protects the body against diseases. This defence mechanism is called immunity.

Types of Immunity

There are two major types of immunity:

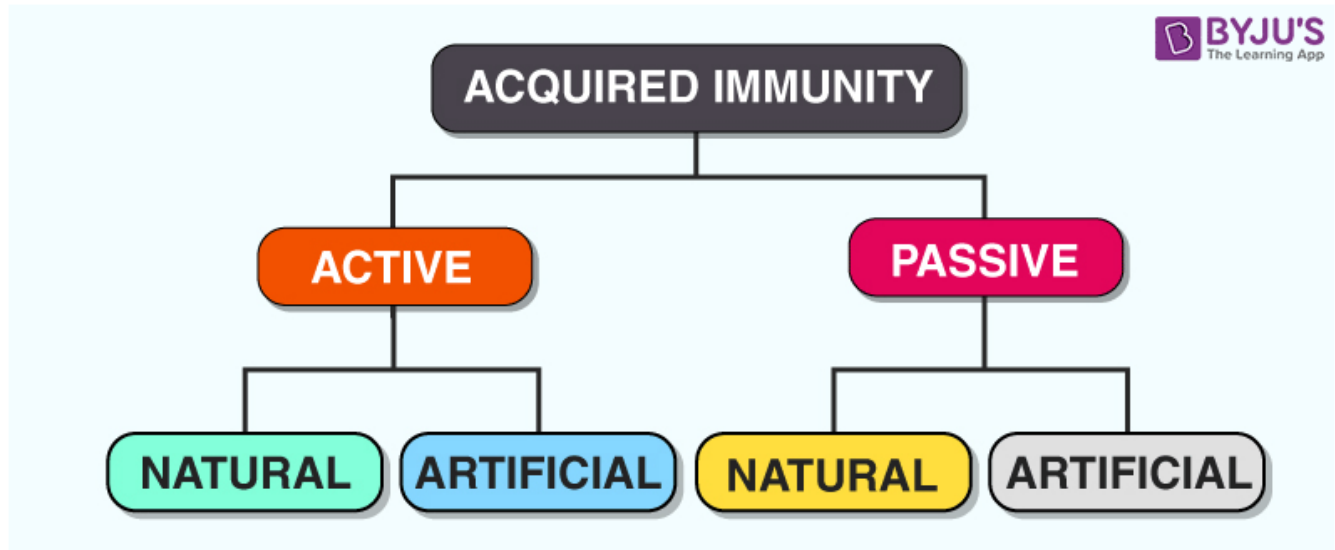
1. Innate Immunity or Natural or Non-specific Immunity.
2. Acquired Immunity or Adaptive Immunity.

1. Innate (Natural) Immunity:

It is the natural resistance components such as intact skin, salivary enzymes, and neutrophils natural killer cells, which provide an initial response against infection that is present in an individual at birth prior to exposure to a pathogen or antigen

2. Adaptive (Acquired) Immune System:

It is that which develops antibodies after an attack of an infectious disease or by a pregnant mother passing through the placenta to a fetus or by vaccination



2.1 Active Immunity

- It refers to the method of exposing the body to an antigen for generating an adaptive immune response
- The response takes days/ weeks to develop but may be long lasting.
- For example recovery from Hepatitis A virus gives a natural active immune response that usually leading lifelong protection
- In a similar manner, administration of two doses of Hepatitis A vaccine generates an acquired active immune response which leading to long lasting defense

2.2 Passive Immunity

- It refers to the process of imparting IgG antibodies to keep safe against infection.
- It gives immediate, but short-lived protection such as several weeks to 3 or 4 months at most.
- It is occurs during pregnancy
- The transfer of maternal tetanus antibody (mainly IgG) across the placenta provides passive immune to newborn baby for several weeks/ months until such antibody is degraded and lost

- Naturally acquired active immunity occurs when a person is exposed to a live pathogen, develops the disease, and then develops immunity
- Naturally acquired passive immunity occurs during pregnancy, when antibodies are passed from the maternal blood into the fetal bloodstream
- Immunity is transferred through the placenta in the form of antibodies, mainly IgG and IgA
- Natural passive immunity can also be transferred through breast milk
- Natural passive immunity is short-lived after the birth of the child

Types of Barriers

The four types of barriers are:

Physical barrier

These include the skin, body hair, cilia, eyelashes, the respiratory tract, and the gastrointestinal tract. These form the first line of defence.

The skin does more than providing us with fair or dark complexions. Our skin acts as a physical barrier to the entry of pathogens. The mucus coating in our nose and ear is a protective barrier which traps the pathogen before it gets inside.

Physiological barriers

We know that our stomach uses hydrochloric acid to break down the food molecules. Due to such a strongly acidic environment, most of the germs that enter our body along with the food are killed before the further process is carried on.

Saliva in our mouth and tears in our eyes also have the antibiotic property that does not allow the growth of pathogens even though they are exposed all day.

Cellular barriers

In spite of the physical and physiological barriers, certain pathogens manage to enter our body. The cells involved in this barrier are leukocytes (WBC), neutrophils, lymphocytes, basophil, eosinophil, and monocytes. All these cells are all present in the blood and tissues.

Cytokine barriers

The cells in our body are smarter than we give them credit for. For instance, in case a cell in our body experiences a virus invasion, it automatically secretes proteins called interferons which forms a coating around the infected cell and prevents the cells around it from further infections.

Cells Involved In Innate Immunity

- **Phagocytes:** These circulate through the body and look for any foreign substance. They engulf and destroy it defending the body against that pathogen.
- **Macrophages:** These have the ability to move across the walls of the circulatory system. They release certain signals as cytokines to recruit other cells at the site of infections.
- **Mast Cells:** These are important for healing wounds and defence against infections.
- **Neutrophils:** These contain granules that are toxic in nature and kill any pathogen that comes in contact.
- **Eosinophils:** These contain highly toxic proteins that kill any bacteria or parasite in contact.
- **Basophils:** These attack multicellular parasites. Like the mast cells, these release histamine.
- **Natural Killer Cells:** These stop the spread of infections by destroying the infected host cells.
- **Dendritic Cells:** These are located in the tissues that are the points for initial infections. These cells sense the infection and send the message to the rest of the immune system by antigen presentation.

Artificial Immunity

Artificial immunity is a mean by which the body is given immunity to a disease by intentional exposure to small quantities of it.

The most common form of artificial immunity is classified as active and comes in the form of vaccinations, typically given to children and young adults.

The passive form of artificial immunity involves introducing an antibody into the system once a person has already been infected with a disease, ultimately relieving the present symptoms of the sickness and preventing re-occurrence.

Once the body has successfully rid itself of a disease caused by a certain pathogen, a second infection with the same pathogen would prove harmless

