

Immune system

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Contents

- What is immune system ?
- What is Immunity ?
- Functions of the Immune System
- Types of Immunity
- What is barrier
- Types of barrier
- Description different types of immunity

Immune system

Immune system A combination of body defenses made up of the cells, tissues, and organs that fight off pathogens and disease

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

Immunity : body's ability to resist germs that cause a particular disease

Functions of the Immune System

- Provide immunity to the body by protecting against disease.
- Identify and kill pathogens and tumor cells.
- Produces white blood cells and antibodies.
- Filters out organisms that cause disease

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

Innate Immunity

This type of immunity is present in human body by birth.

This is activated immediately when the pathogen attacks. Innate immunity includes certain barriers and defence mechanisms that keep foreign particles out of the body.

Innate immunity refers to the body's defence system.

This immunity helps us by providing the natural resistance components including salivary enzymes, natural killer cells, intact skin and neutrophils, etc.

It is a long-term immunity in which our body produces the antibodies on its own.

Our body has few natural barriers to prevent the entry of pathogens

Types of Barriers

The four types of barriers are:

Physical barrier

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

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 with the food are killed.

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

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

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 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.

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

Acquired Immunity

Acquired immunity or adaptive immunity is the immunity that our body acquires.

The ability of the immune system to adapt itself to disease and to generate pathogen-specific immunity is termed as acquired immunity.

It is also known as adaptive immunity.

An individual acquires the immunity after the birth is called as the acquired immunity.

ACQUIRED IMMUNITY

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graph TD; A[ACQUIRED IMMUNITY] --> B[ACTIVE]; A --> C[PASSIVE]; B --> D[NATURAL]; B --> E[ARTIFICIAL]; C --> F[NATURAL]; C --> G[ARTIFICIAL];
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ACTIVE

PASSIVE

NATURAL

ARTIFICIAL

NATURAL

ARTIFICIAL

Types of Acquired Immunity

Active Immunity

Active immunity involves the direct response to a foreign antigen within the body. In the case of the acquired or adaptive immune system, the body remembers the pathogens it has encountered in the past. This is a direct result of the active immune system

Passive Immunity

Passive immunity involves the immune response by the antibodies attained from outside the body.

active immunity may protect us from a disease for a lifetime, passive immunity is the more short term.

Passive immunity develops immediately and our body could begin its attack on the pathogen right away

There are two types of passive immunity:

- Natural Passive Immunity
- Artificial Passive Immunity