

# IMMUNITY



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**IMMUNITY= RESISTANCE=DEFENCE**

# Immunity:

- ▶ State or quality of being immune/ fight against disease /to protect the body from infection.
- ▶ Resistance exhibited by the host against any foreign antigen and towards injury caused by microorganisms and their products.

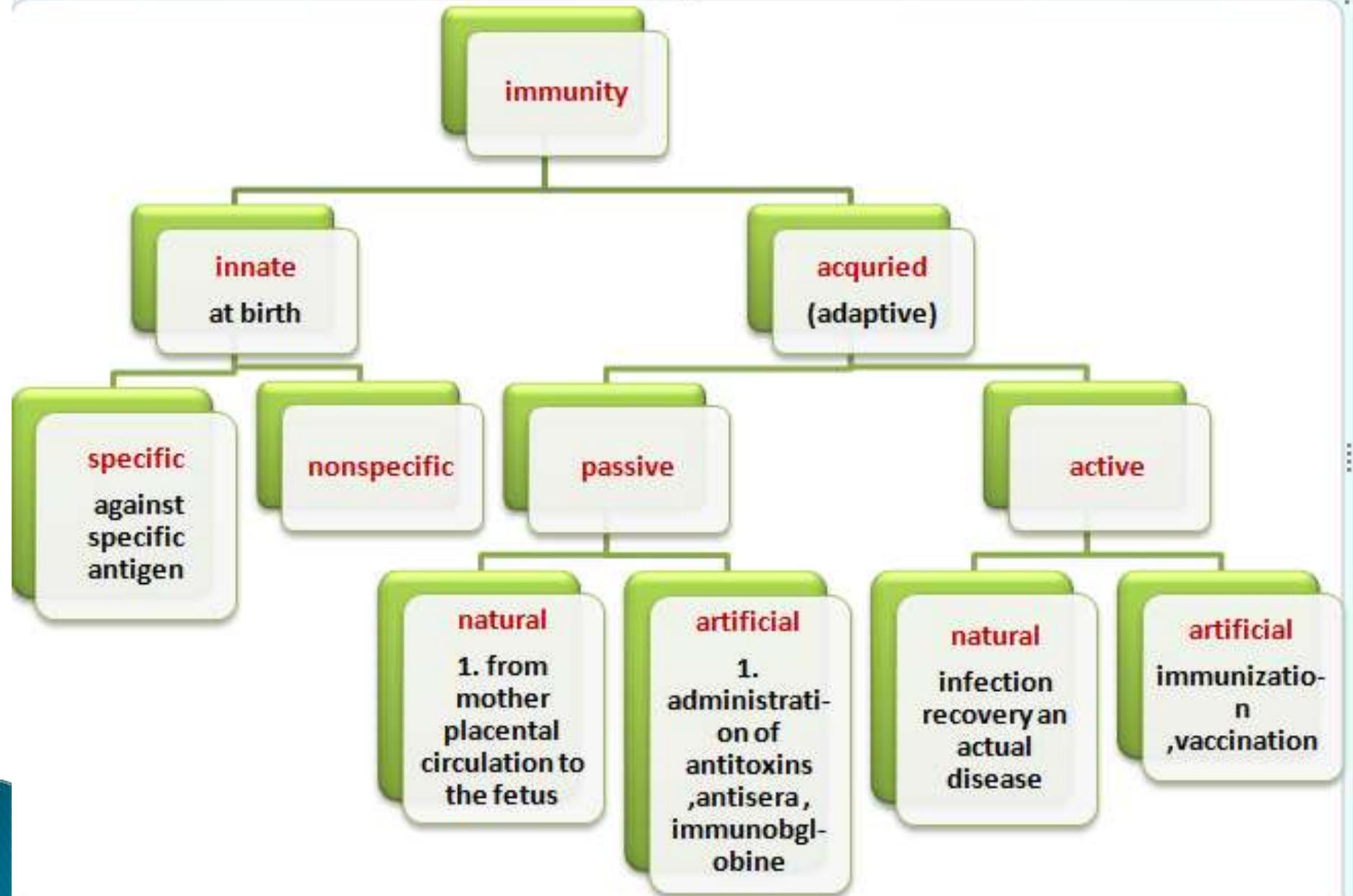
# ANTIGEN

- *A substance that induces an immune response is called an antigen. If the antigen stimulates production of an antibody, it will react specifically, generally in an observable manner, with the antibody.*

# **ANTIBODY**

- ***An antibody (immunoglobulin) is a glycoprotein molecule formed by the immune system in response to an antigenic stimulus; it is found in blood, bodily secretions or on mucous surfaces, & binds to the specific antigen responsible for its production, thereby inactivating it.***

# CLASSIFICATION OF IMMUNITY



# A. Innate or Native Immunity:

- ▶ Resistance possessed by an individual by birth i.e. inherited.
- Provides first line of defense against infections.

It is of two types

1. Specific innate immunity
2. Non-specific innate immunity

# **SPECIFIC INNATE IMMUNITY**

- *Innate immunity in which the individual is protected against a specific disease.*

# **NON SPECIFIC INNATE** **IMMUNITY**

- ***Immunity that protects against many types of infection.***

# Factors affecting innate immunity:

- ▶ Age
- ▶ Hormones
- ▶ Nutrition

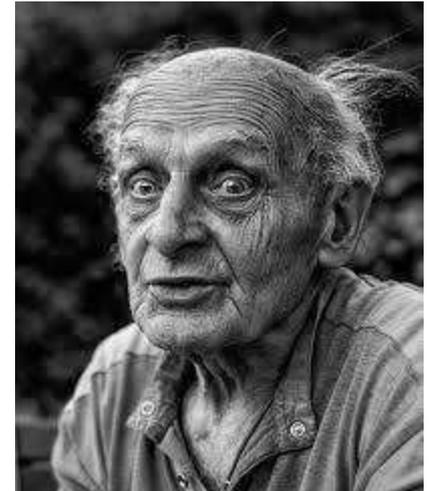
# Contd....

## • AGE:

• Foetus or new born and old persons (2 extremes of life) carry higher susceptibility to various infections.

• In foetus, immune system is immature where as in old age there is gradual waning of immune responses.

• In some diseases, clinical illness is more severe in adults than in young children due to more active immune response which causes greater tissue damage. e.g: chicken pox and poliomyelitis.



# Cont.....

## ▪ HORMONES:

- Certain hormonal disorders enhance susceptibility to infections.e.g:- diabetes mellitus,adrenal dysfunctions and hypothyroidism

- Staphylococcal sepsis is more common in diabetes ,which may be caused by increased level of carbohydrates in tissues

- Corticosteroids depress host resistance by its antiinflammatory,antiphagocytic effects and by inhibiting antibody formation.

# cont.....

## ▶ Nutrition:

- Both humoral and cell mediated immunity are reduced in malnutrition
- In Kwashiorkor (severe protein deficiency), cell mediated immune response reduces.



## B. Acquired or Adaptive immunity:

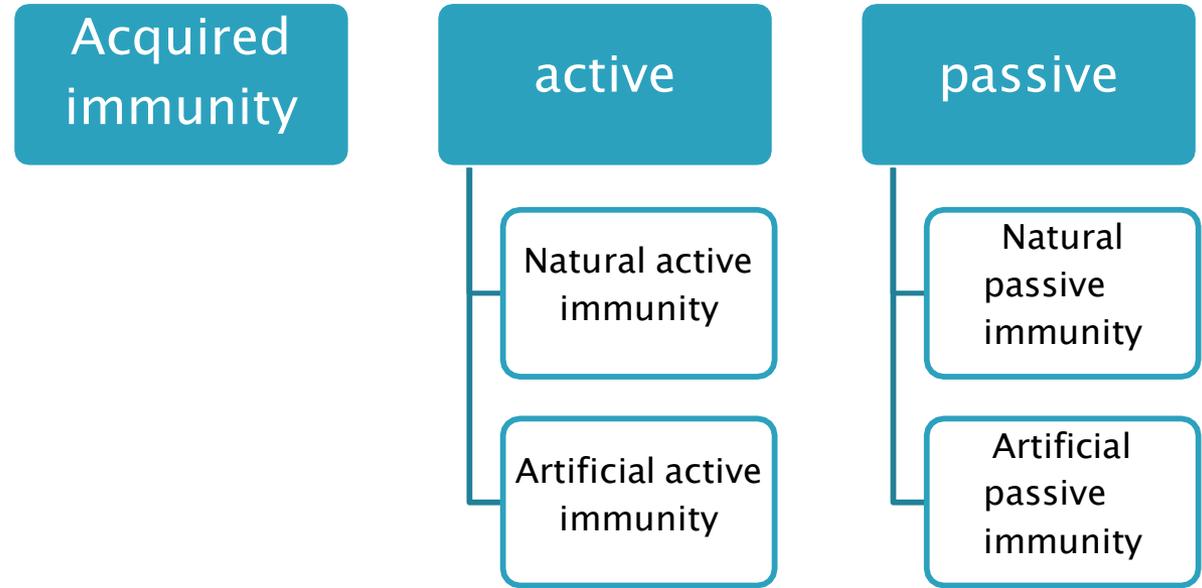
- The resistance acquired by an individual during life by recognizing and selectively eliminating specific foreign molecules.
  - Provides second line of defense against infection.
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# Characteristics:

- ▶ **Antigen specificity:** immune system or antibodies can distinguish among antigens, even between two proteins that differ in only one amino acid.
  - ▶ **Diversity:** immune system is capable of generating large antibody diversity in its recognition molecules.
  - ▶ **Immunologic memory:** immune system exhibits memory on second encounter of same antigen by generating a secondary response which is more specific and quick.
  - ▶ **Self/non-self recognition:** does not react with body's own molecule but effectively eliminates foreign antigens.
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# Types

- ▶ Active acquired immunity
- ▶ Passive acquired immunity



- ▶ **Active immunity:**
  - ▶ also known as adaptive immunity
  - ▶ Resistance developed by an individual as a result of an antigenic stimulus
  - ▶ Used for prophylaxis to increase body resistance
  - ▶ 2 types: • natural active immunity
    - artificial active immunity
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## ▶ Passive immunity:

- ▶ Resistance transmitted passively to a recipient in a readymade form.(recipient's immune system plays no active role)
- ▶ Used for treatment of acute infection
- ▶ 2 types: :
  - natural passive immunity
  - artificial passive immunity

Active Immunity	Passive Immunity
Produced actively by host's immune system	Received passively, no active participation of host's immune system
Induced by infection or by immunogens	Conferred by administration of readymade antibodies
Long-lasting & effective protection	Short-term & less effective protection
Immunity effective only after lag period (time required for generation of antibodies.)	Immediate immunity
Immunological memory present	No memory
Booster effect on subsequent dose	Subsequent dose less effective
Negative phase may occur	No negative phase
Not applicable in immunodeficient,	Applicable in immunodeficient

# Types of active immunity

## ▶ Natural active immunity:

- ▶ Results from either a clinical or an inapparent infection by a microbe.
- ▶ Usually long lasting
- ▶ E.g., person recovering from chicken pox and measles develop natural active immunity.

\* **premuniton:** “special type of immunity seen in syphilis”.

immunity to the re-infection lasts only as long as the original infection remains active.(once the disease is cured the patient becomes susceptible to the spirochetes again)

# cont....



- ▶ **Artificial active Immunity:**
- ▶ Resistance induced by vaccination.
- ▶ **Vaccines:** preparations of live or killed microorganisms and their products (antigens or toxoids)
- ▶ **bacterial vaccines:** live or attenuated- **BCG for tuberculosis**  
killed- **Cholera vaccine**  
Subunit- **Typhoid Vi antigen**  
Bacterial products- **Tetanus toxoids**
- ▶ **Viral Vaccines:** live or attenuated-**oral polio vaccine-Sabin**  
killed-**injectable polio vaccine-Salk**  
Subunit-**Hepatitis B Vaccine**

# Types of passive Immunity:

## ▶ Natural passive Immunity:

Resistance passively transferred from mother to foetus or infant, through placenta(transplacentally) and through milk(colostrum).



## Artificial passive immunity:

resistance passively transferred to a recipient by administration of antibodies.

Agents used: • hyperimmune sera of animal

- convalescent sera

- pooled human gamma globulin

“These are used for prophylaxis and therapy”.

- ▶ **Combined immunization:**
  - ▶ combination of active and passive method of immunization
  - ▶ Whenever passive immunization is employed for immediate protection, combined immunization is preferred
  - ▶ E.g. protection of non-immune individual with a tetanus prone wound i.e., injection of TIG in one arm and first dose of tetanus toxoid in other arm followed by full course of phased tetanus toxoid injections.
  - ▶ **“TIG provided the protection necessary till active immunity is able to take effect”**
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# Local immunity

- ▶ Natural infection or live vaccine administered orally or intranasally provides local immunity at site of entry such as :gut mucosa,nasal mucosa
- ▶ IgA plays important role in local immunity.

# Herd Immunity

- ▶ Overall level of immunity in a community
- ▶ Is relevant in control of epidemic diseases
- ▶ “Eradication of communicable diseases depends on the development of high level of herd immunity rather than on development of high level of immunity in individuals”



A close-up photograph of a pink cosmos flower with a bright yellow center, set against a soft teal background. The petals are delicate and layered, with some showing subtle white variegation. The flower is positioned on the left side of the frame, with its stem extending downwards. The overall mood is gentle and appreciative.

*Thank  
you so  
much!*

