

INNATE IMMUNITY

(For II Year BSC BIOTECHNOLOGY IV
SEMESTER)

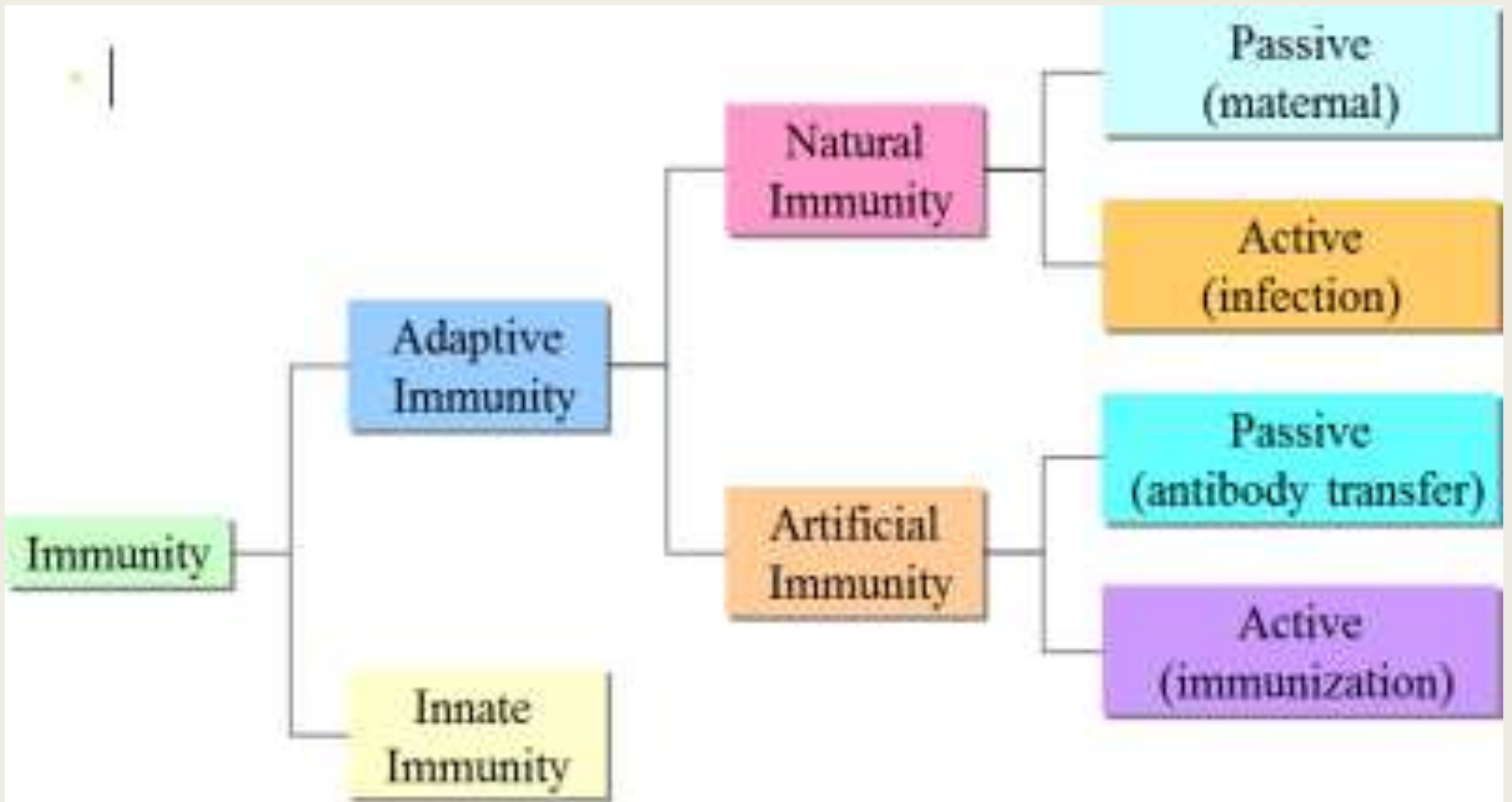
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Immunology is the Science that studies Immunity (defence against infectious diseases)

Our body mounts a reaction against foreign substances that enters the body

IMMUNITY- reaction against foreign substances or altered self cells

The body operates this immunity with the help of several molecules, cells and organs which are collectively called as Immune System.



INNATE IMMUNITY

- Also called as Natural immunity or First line of defence
- This immunity is present from birth
- Non specific- no discrimination
- Non adaptive- do not alter on repeated exposure to foreign body
- Memory is absent.

- The various non specific defence mechanisms present are:
 - 1.anatomical and physical barriers.
 - 2.physiological and chemical barriers.
 - 3.biological barriers.
 - 4.general barriers.

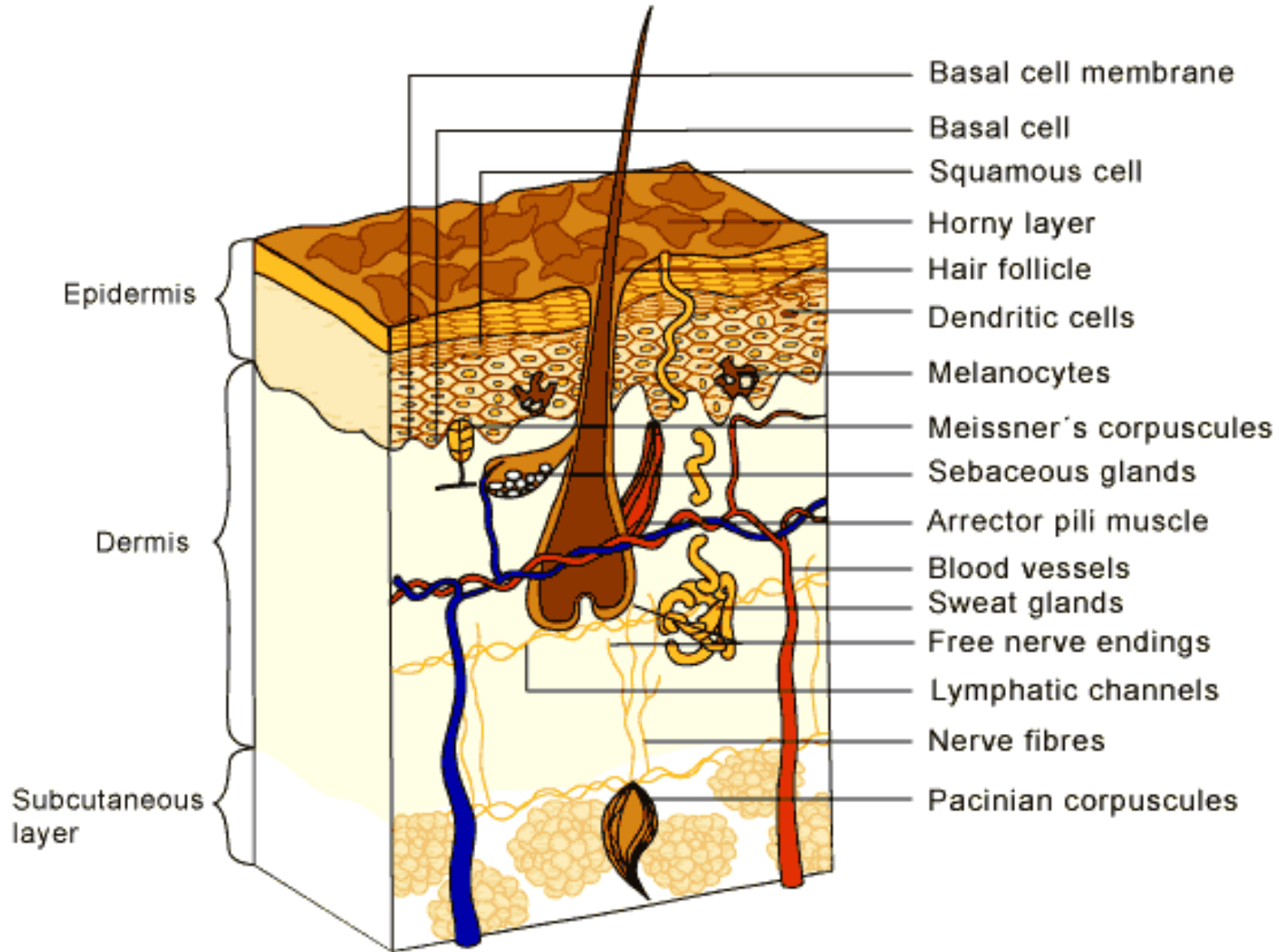
Mechanism of Innate Immunity

■ 1. Anatomical & physical barriers

- They tend to prevent the entry of pathogens into the body

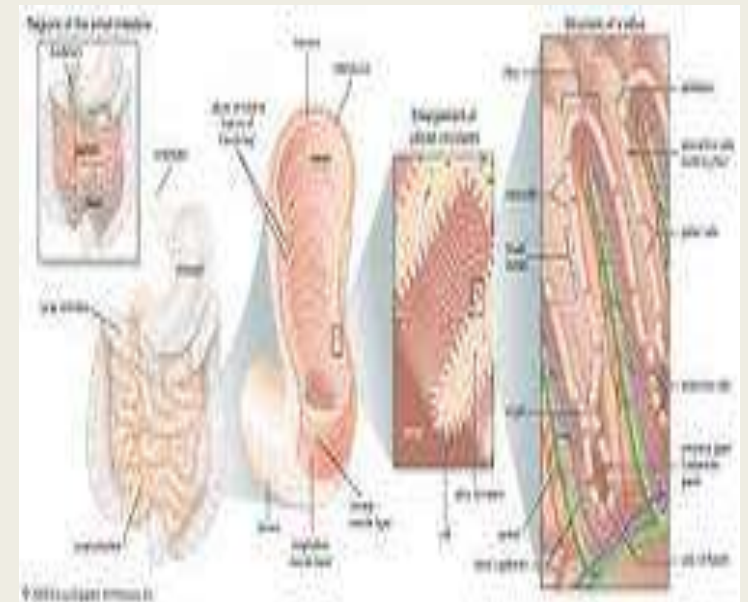
SKIN:

- ❖ Effective barrier for the entry of microbes
- ❖ It has 2 layers- inner epidermis- has epithelial cells
 - outer dermis –consists of dead cells and protein called keratin(water proofing)
- ❖ Sebaceous glands in dermis produces oily secretion called SEBUM
- ❖ Sebum consists of lactic acid and fatty acids with pH 3-5.
- ❖ This pH inhibits microbes growth on skin.
- ❖ Any breaks or wounds on the skin results in infection



■ MUCOUS:

- ❖ There is a lining of mucous membrane in the alimentary canal, respiratory & urinogenital tracts.
- ❖ Mucous is a viscous fluid secreted by the mucous membrane.
- ❖ It traps foreign bodies and prevents its entry.
- ❖ Antimicrobial substances
- ❖ Cilia helps in propelling the microbes entrapped in the mucous out.



■ COUGHING & SNEEZING:

- MECHANICAL ACTION BY THE BODY- HELPS IN ELIMINATING THE FOREIGN BODIES THAT ENTERS THE RESPIRATORY OR DIGESTIVE TRACTS.



2. PHYSIOLOGICAL & CHEMICAL BARRIERS

HUMAN MILK -Rich in anti microbial substances like immunoglobulins, lactoferitin, neuraminic acid etc.

- They fight against pathogens

BODY TEMPERATURE- High temp. Prevents the growth of certain pathogens

Fever is a natural mechanism to minimize microbial growth.

pH- Gastric acid- lower pH in stomach kills most microbes that enters digestive tract.

LYSOZYME- an enzyme present in mucous and tears kills bacteria by cleaving bacterial cell wall.

INTERFERONS- proteins produced by virus infected cells that protects other cells from viruses

COMPLEMENTS- group of serum proteins

3. BIOLOGICAL BARRIERS

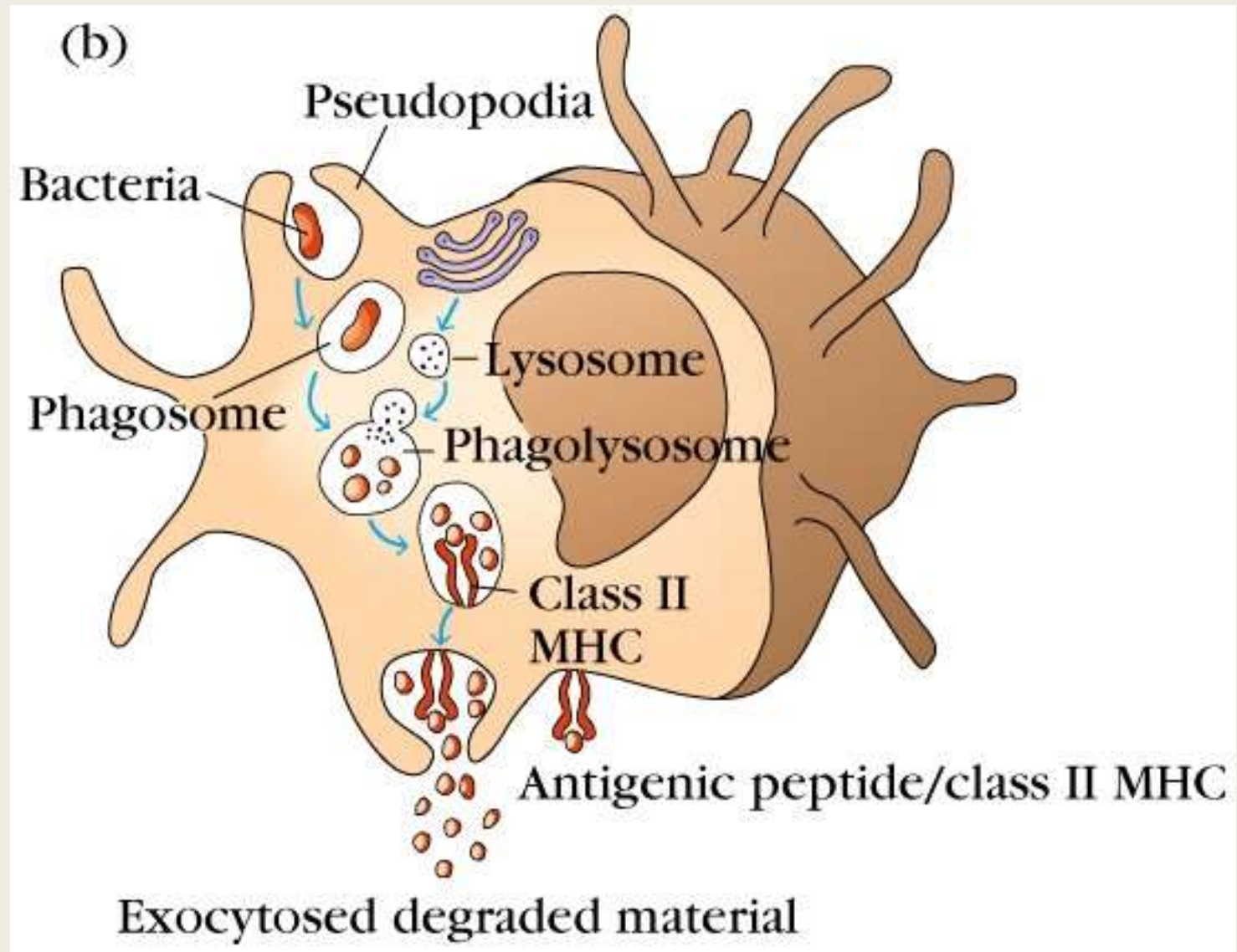
■ PHAGOCYTOSIS:

- *INGESTION OF EXTRA CELLULAR PARTICLES*
- *PHAGOCYTOSIS IS CONDUCTED BY IMMUNE CELLS LIKE MONOCYTES, NEUTROPHILES AND MACROPHAGES.*

STEPS INCLUDE::

- 1. BACTERIA ATTACHES TO PSEUDOPODIA*
- 2. BACTERIA INGESTED- FORMS PHAGOSOME*
- 3. PHAGOSOME FUSES WITH LYSOSOME- PHAGOLYSOSOME*
- 4. LYSOSOSMAL ENZYMES DIGEST BACTERIA*
- 5. DIGESTED PRODUCTS ARE EXOCYTOCISED*

PINOCYOSIS: IS INGESTION OF LIQUID FROM ENVIRONMENT.



4. GENERAL BARRIERS

- **AGE**:- with age immunity weakens
 - Old age people are more susceptible to diseases
 - Very young infants are susceptible

RACIAL- certain races in humans shows differences in their immune response.
racial differences are genetic in origin.
resistance to plasmodium falciparum Malaria is seen in parts of Africa.

INDIVIDUAL- differences in innate immunity is exhibited by different individuals within a race
Eg: homogenous twins exhibit similar degree of resistance

SPECIES- all members of a species shows relative resistance towards microbes.
all humans are totally resistant to plant pathogens.