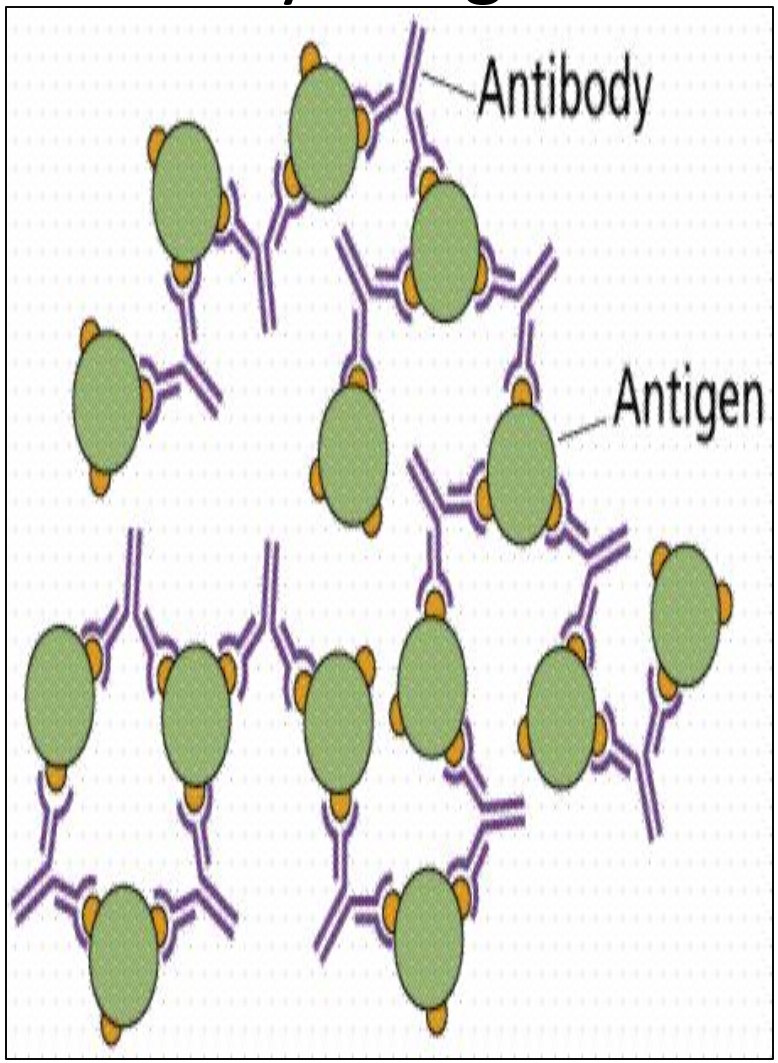
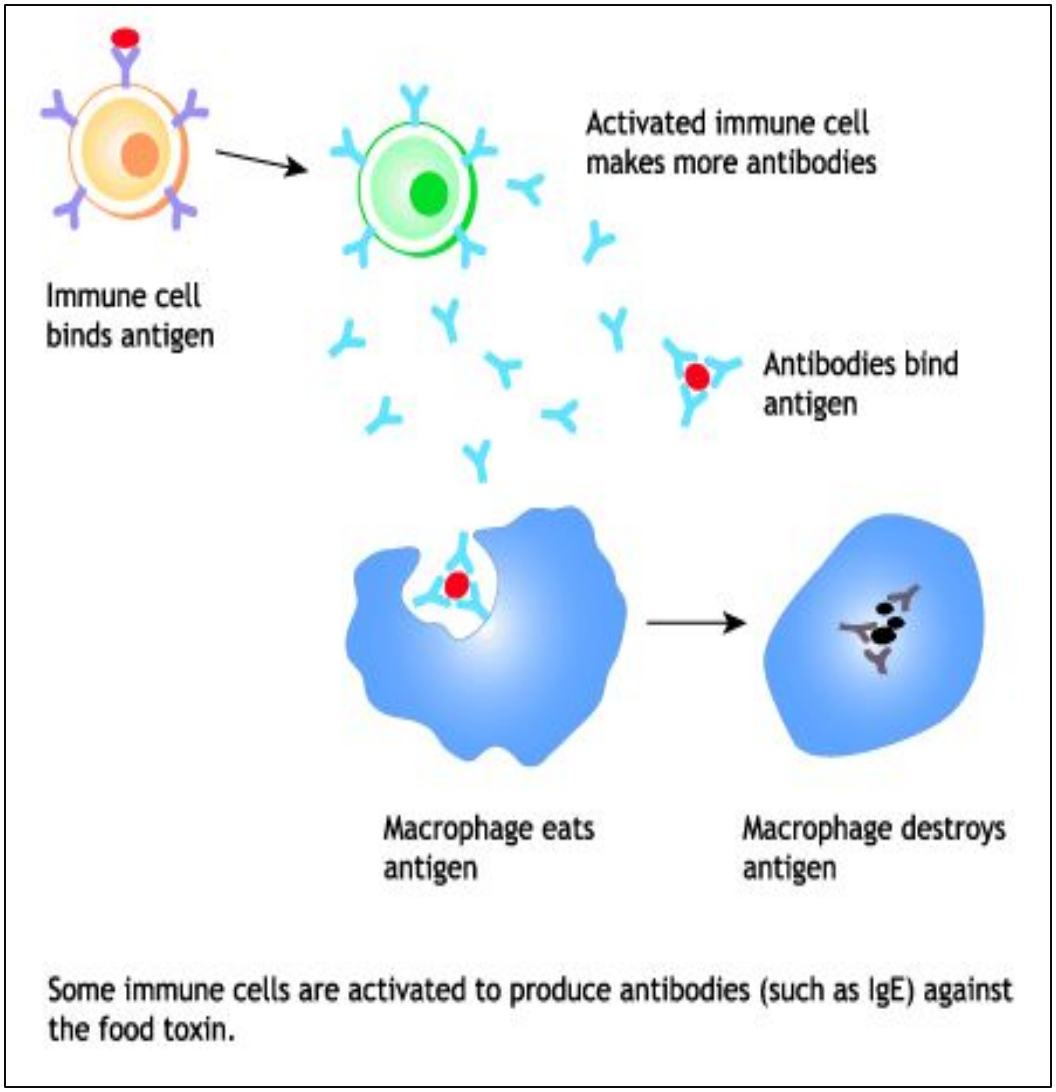
Immunity

- ***Immunity*** is the recognition and removal of molecules foreign (pathogen) to the body

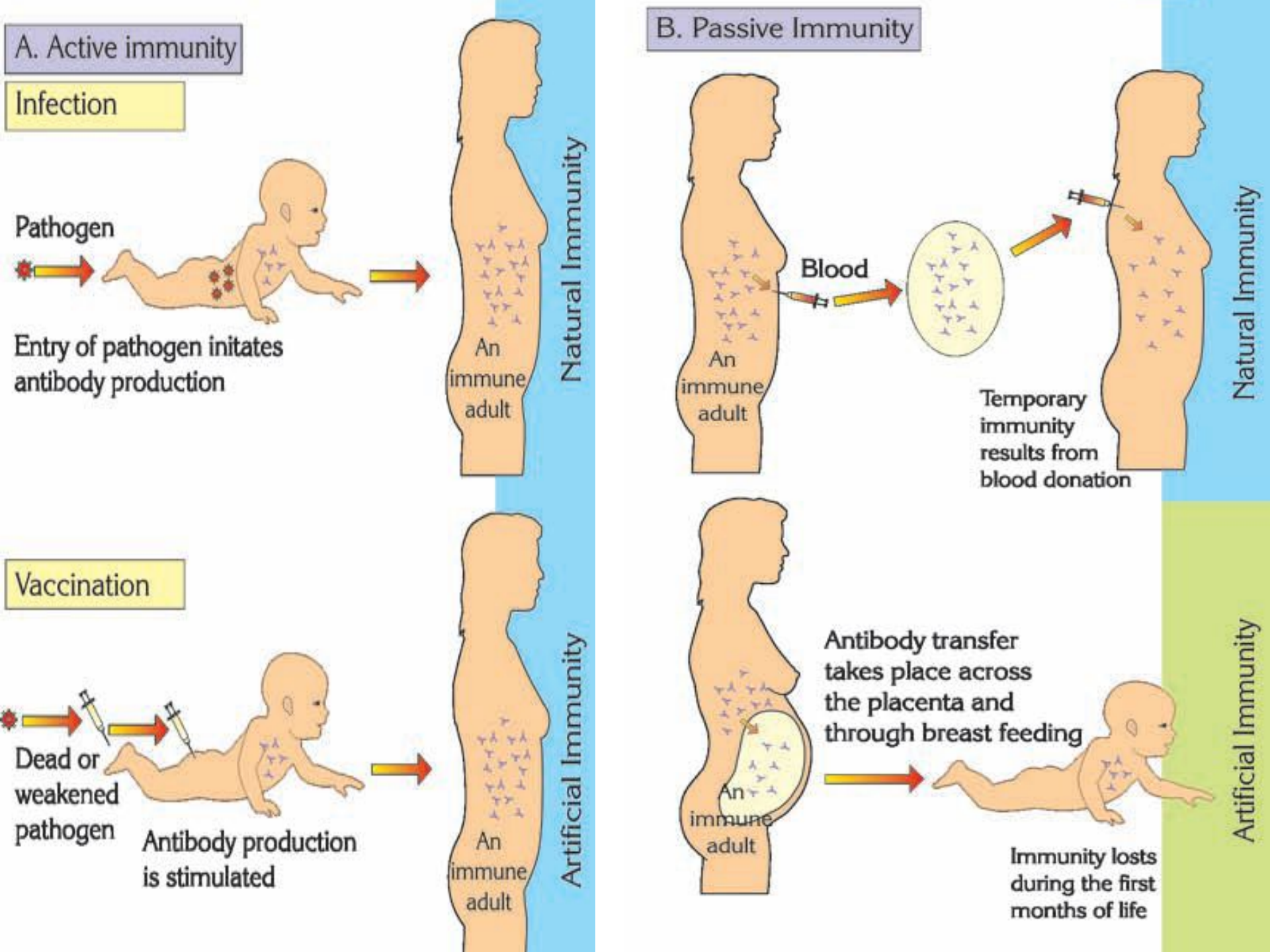
- ***Antigen*** – foreign substance
- ***Antibody*** is produced against antigen, and helps to destroy antigen

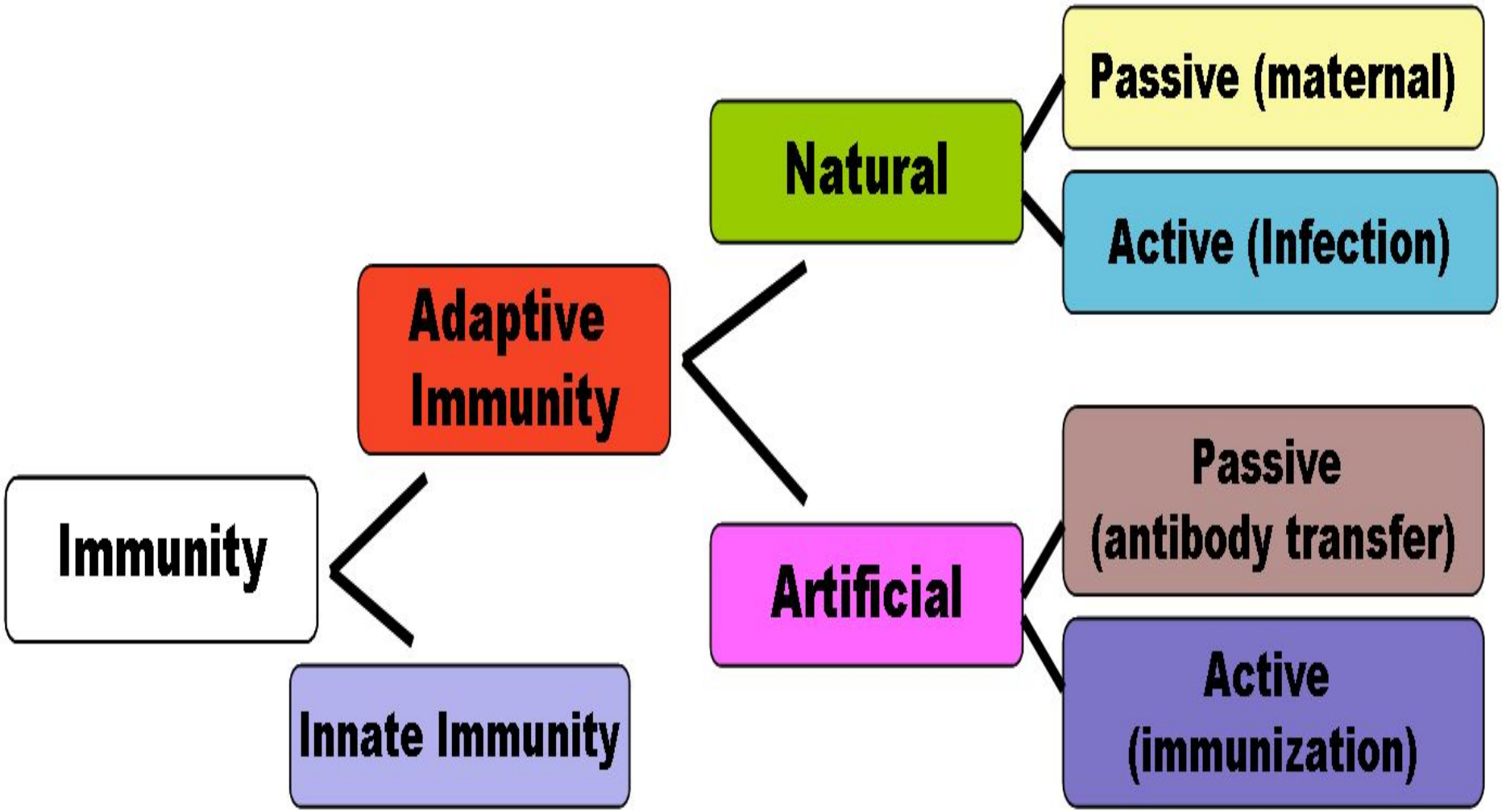




Acquisition (приобретение) **of Immunity**

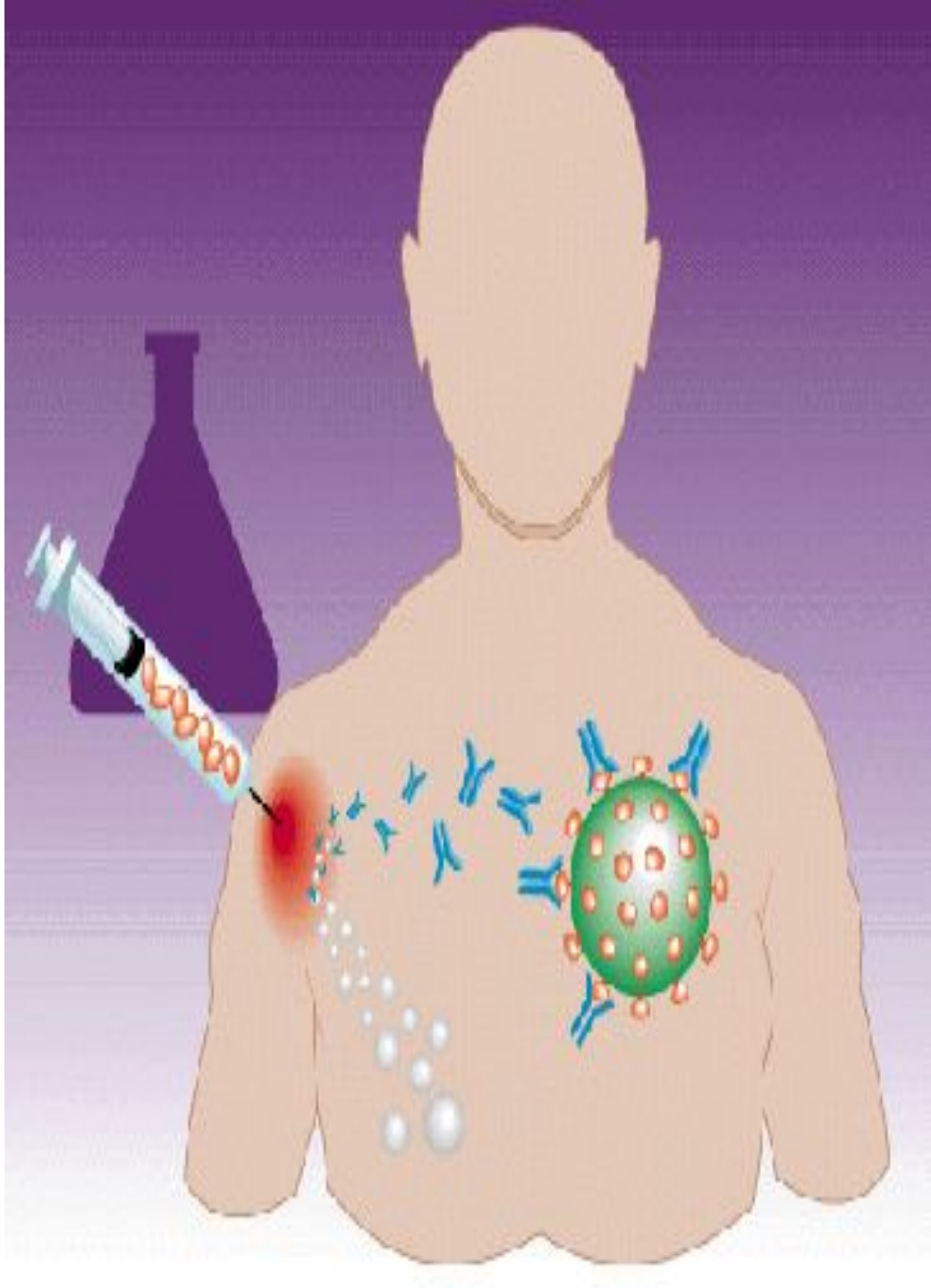
- Active immunity: the individual alone (itself) produces antibodies against an antigen, or it is activated by vaccines
- Passive immunity: the individual is given prepared antibodies (plasma of other people or from milk of mother)


A. Active immunity
Infection
Pathogen
Entry of pathogen initates antibody production
An immune adult
Natural Immunity
Vaccination
Dead or weakened pathogen
Antibody production is stimulated
An immune adult
Artificial Immunity
B. Passive Immunity
An immune adult
Blood
Temporary immunity results from blood donation
Natural Immunity
An immune adult
Antibody transfer takes place across the placenta and through breast feeding
Immunity losts during the first months of life
Artificial Immunity


Immunity
Innate Immunity
Adaptive Immunity
Natural
Passive (maternal)
Active (Infection)
Artificial
Passive (antibody transfer)
Active (immunization)

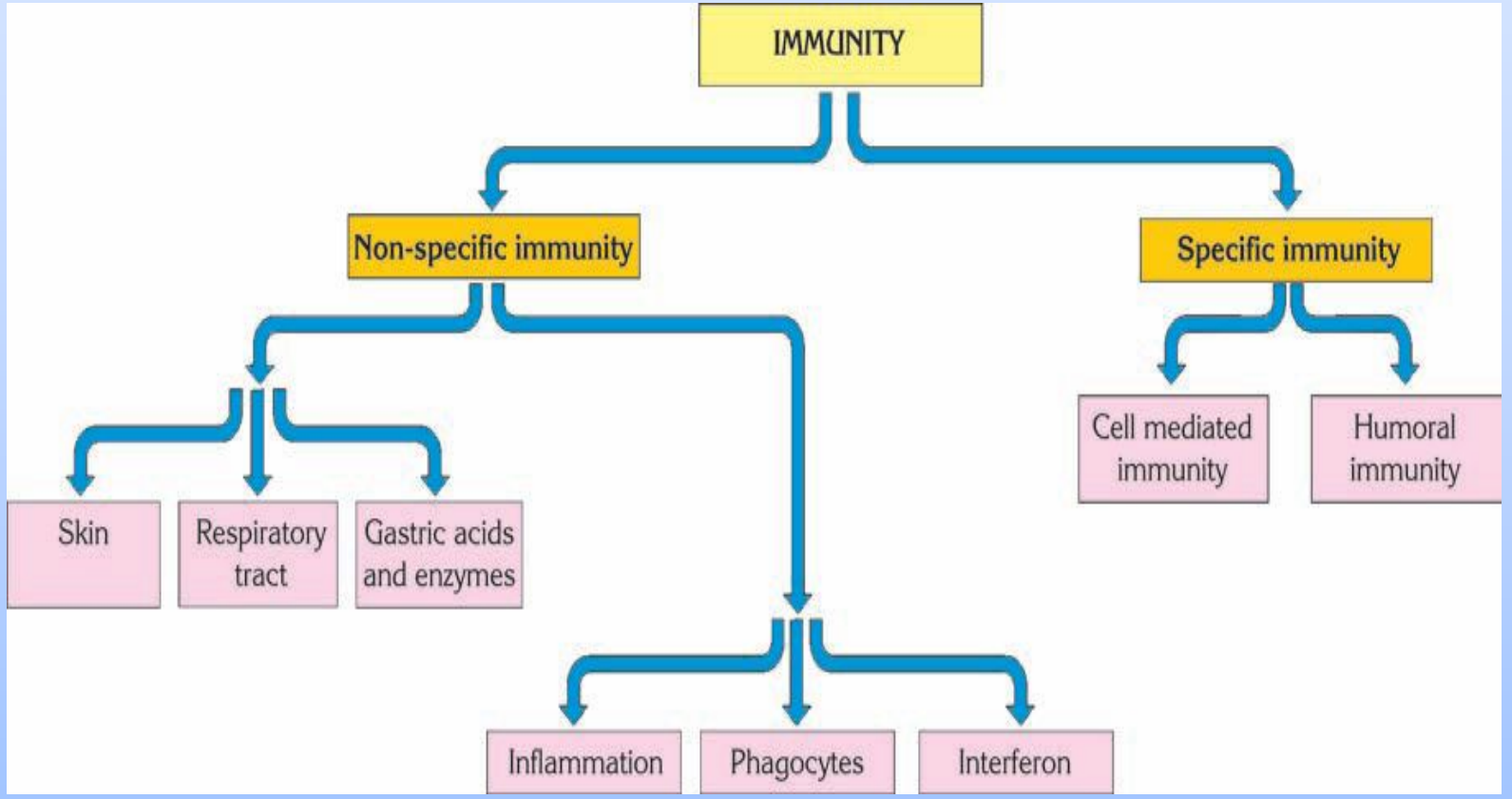
Vaccines

- Vaccines function as a precaution (предосторожность) before exposure (воздействие) to the illness
- They are composed of a physiological fluid and a weakened or dead microbe
- **Properties:**
- - they should have little or no side effects
- - any vaccination should not be given during illness or after surgery
- - they have allergic functions



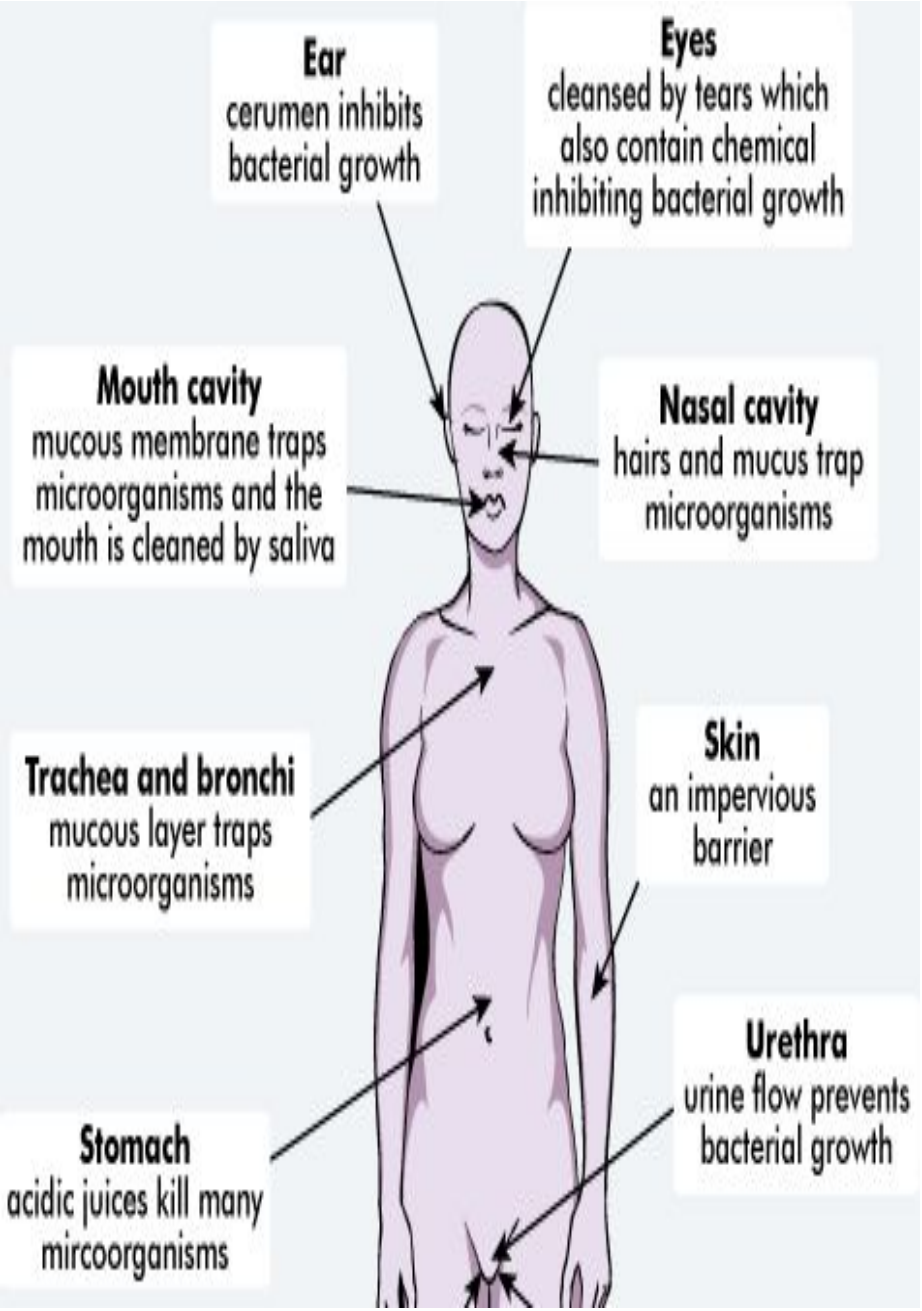
Types of Immunity

- ***Immunity is maintained by two pathways:***
- non-specific immunity (1st and 2nd lines of defence)
- specific immunity (3rd line of defence)



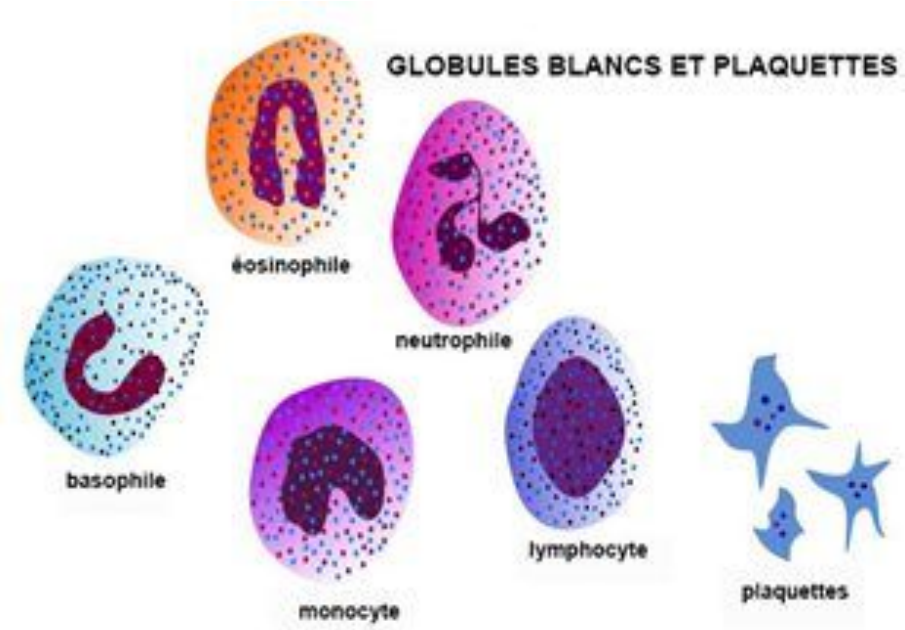
Non-specific Immunity (*1st line of defence*)

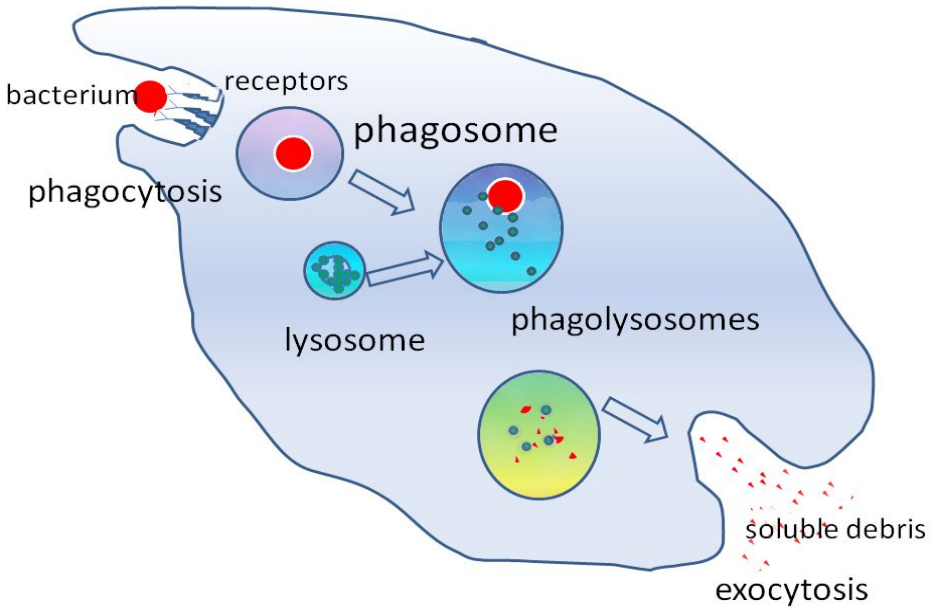
- Barriers nonspecifically prevent microbes from entering the body (without recognizing pathogen)
- - It is maintained by
- ***Skin***
- ***Tears*** and ***sweat***
- ***Gastric juices***
- ***Hair*** and ***mucus*** in the respiratory tract

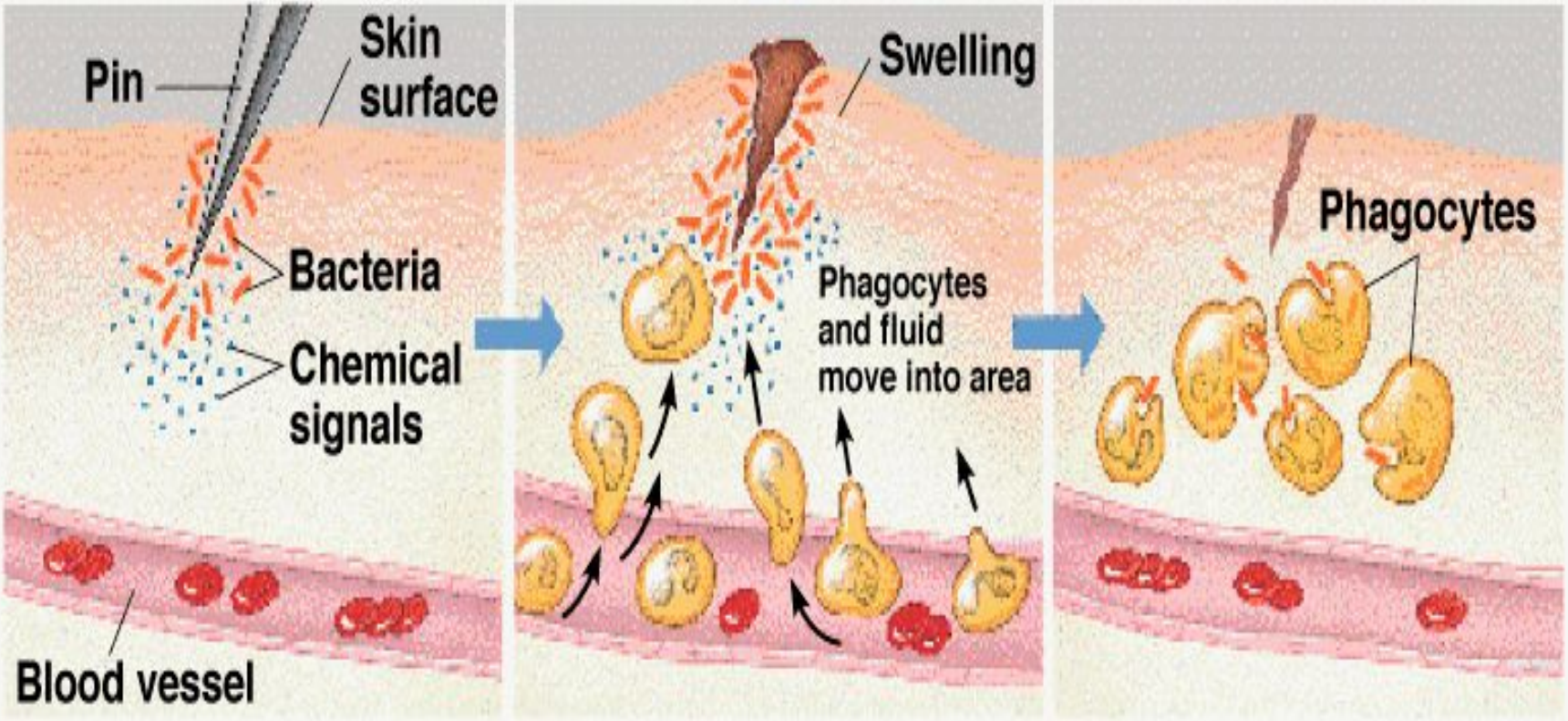


Non-specific Immunity (2nd *line of defence*)

- **Leucocytes** (<u>white blood cells</u>) are found circulating throughout the body
- If a pathogen penetrates the first line of defence, they inhibit or destroy the pathogen before it harms the body
- **<u>Phagocytes</u>** are type of leucocytes which makes ***phagocytosis***



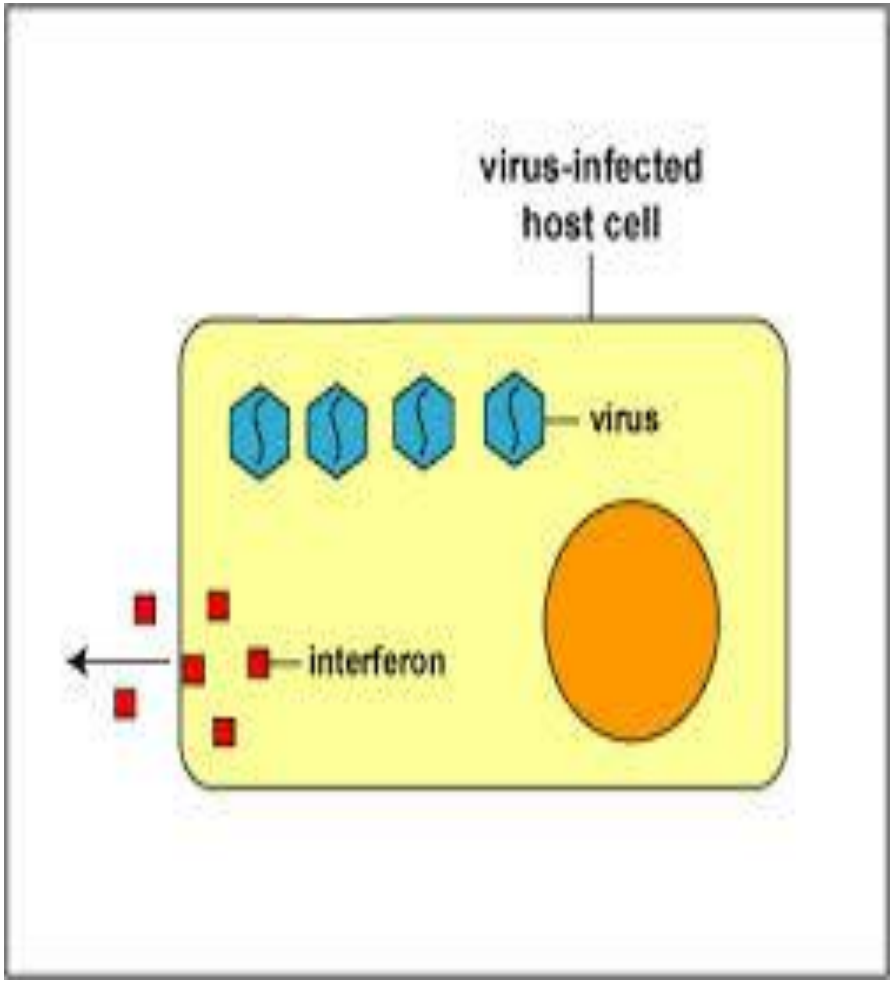




1. Tissue injury; release of chemical signals such as histamine
2. Dilation and increased leakiness of local blood vessels; migration of phagocytes to the area
3. Phagocytes (macrophages and neutrophils) consume bacteria and cell debris; tissue heals

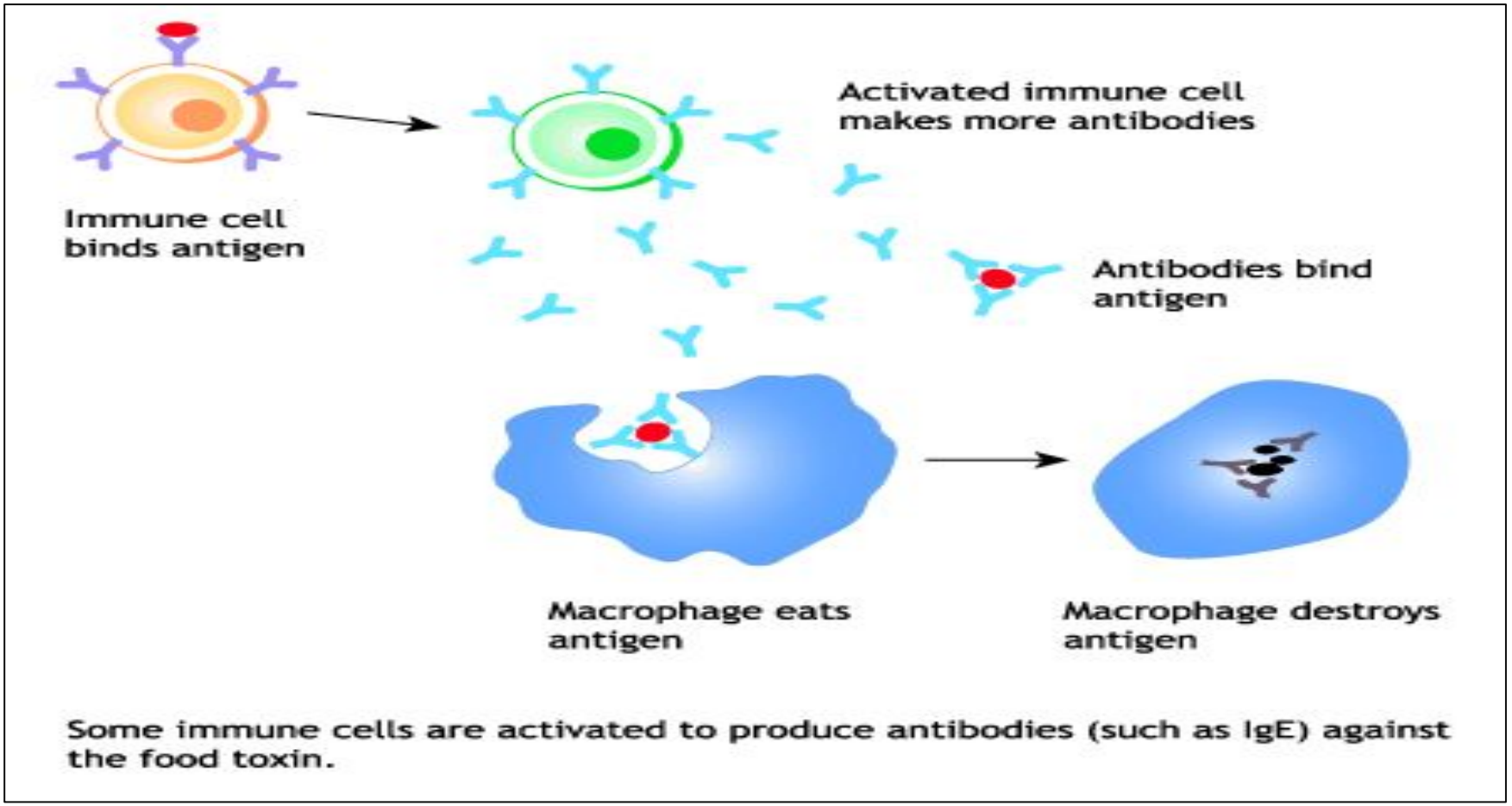
Non-specific Immunity (*2nd line of defence*)

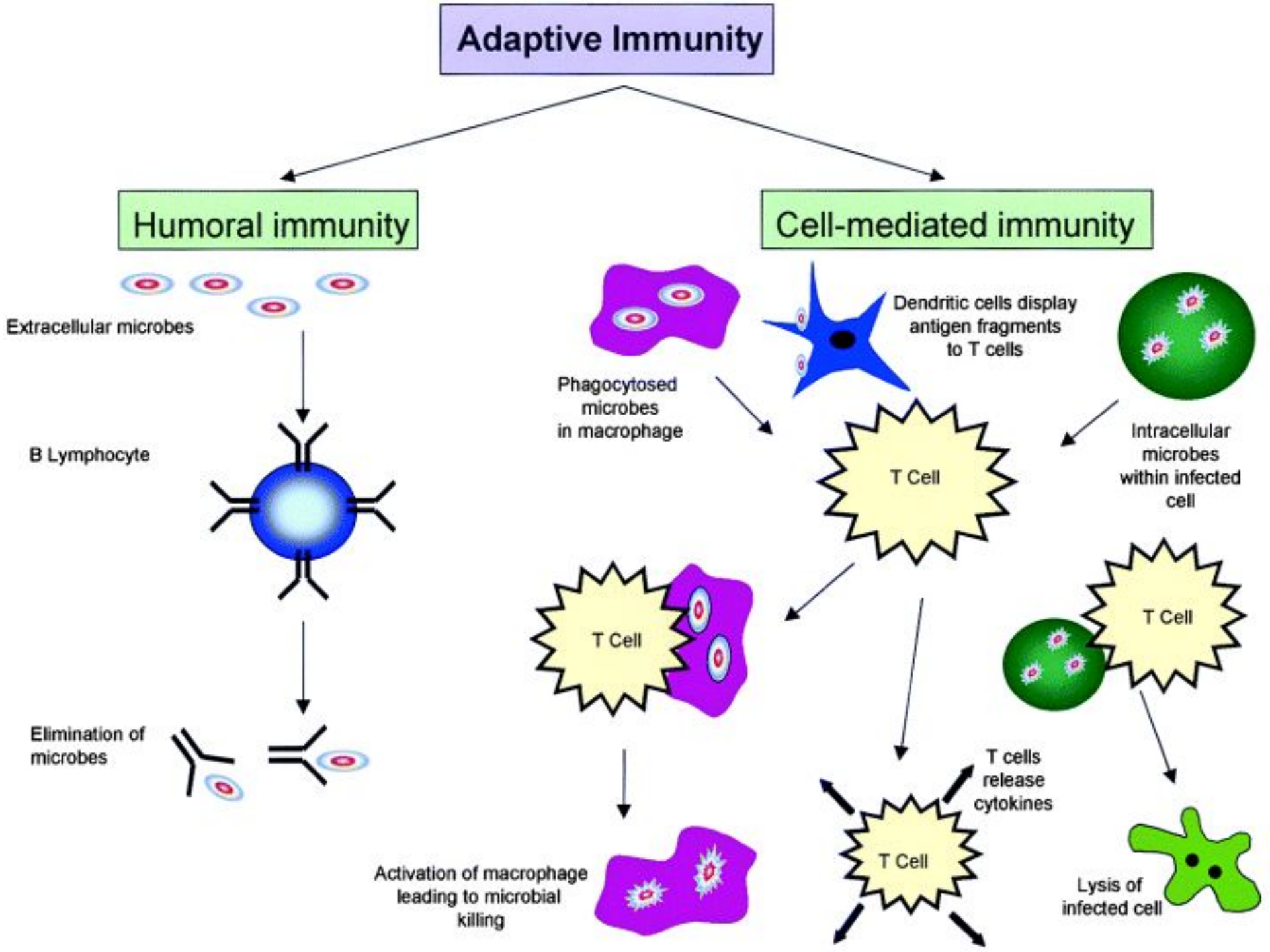
- ***Interferon***
  (inactivates viruses and degrades cancer cells)



- It is based on production of a different type of antibody against each different type of microorganism antigen (or disease)

Specific immunity (3rd line of defence)



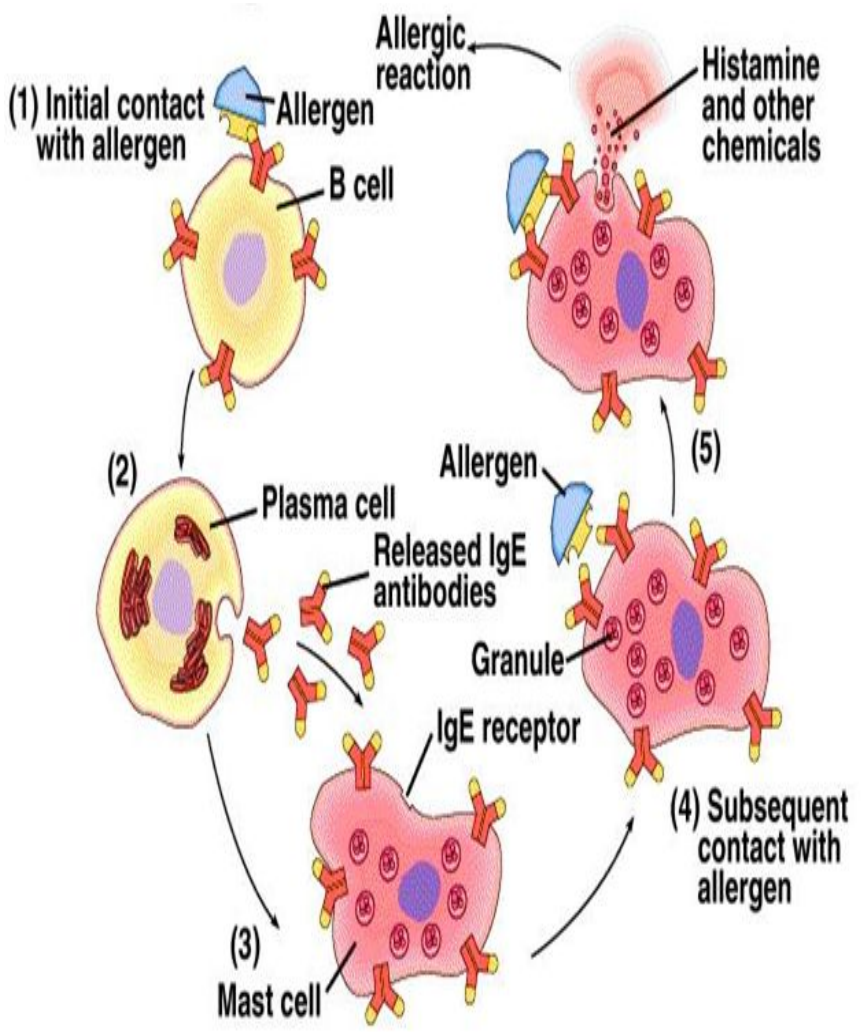

Adaptive Immunity
Humoral immunity
Cell-mediated immunity
Extracellular microbes
B Lymphocyte
Elimination of microbes
Phagocytosed microbes in macrophage
Dendritic cells display antigen fragments to T cells
Intracellular microbes within infected cell
T Cell
T Cell
T Cell
T cells release cytokines
T Cell
Activation of macrophage leading to microbial killing
Lysis of infected cell

Allergy

- All allergies can be described as a type of response by the immune system to infection from disease
- A few bacteria, such as *tuberculosis bacillus*, produce an allergic response
- All factors causing allergy are called ***allergens***

Allergy

- 1) Antigens (allergen) *react* with antibodies
- 2) Production of ***histamine*** and ***histamine-like substances***
- 3) Enlargement of capillaries
- 4) Blood plasma flows from blood to interstitial fluid
- 5) ***Allergic symptoms*** (*edema (отек)* and *high fever (лихорадка)* appear)



AIDS

- AIDS is caused by a virus called **HIV** (Human Immunodeficiency Virus)
- This can damage the body's immune system so that it cannot fight certain infections