

Fundamentals of Immunology

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Fundamentals of immunology

What is immunity

You can not prosecute
diplomats
– they have immunity



"I have diplomatic immunity!"

Fundamentals of immunology

Immunity – is the ability of host to defense it self from foreign harmful organisms

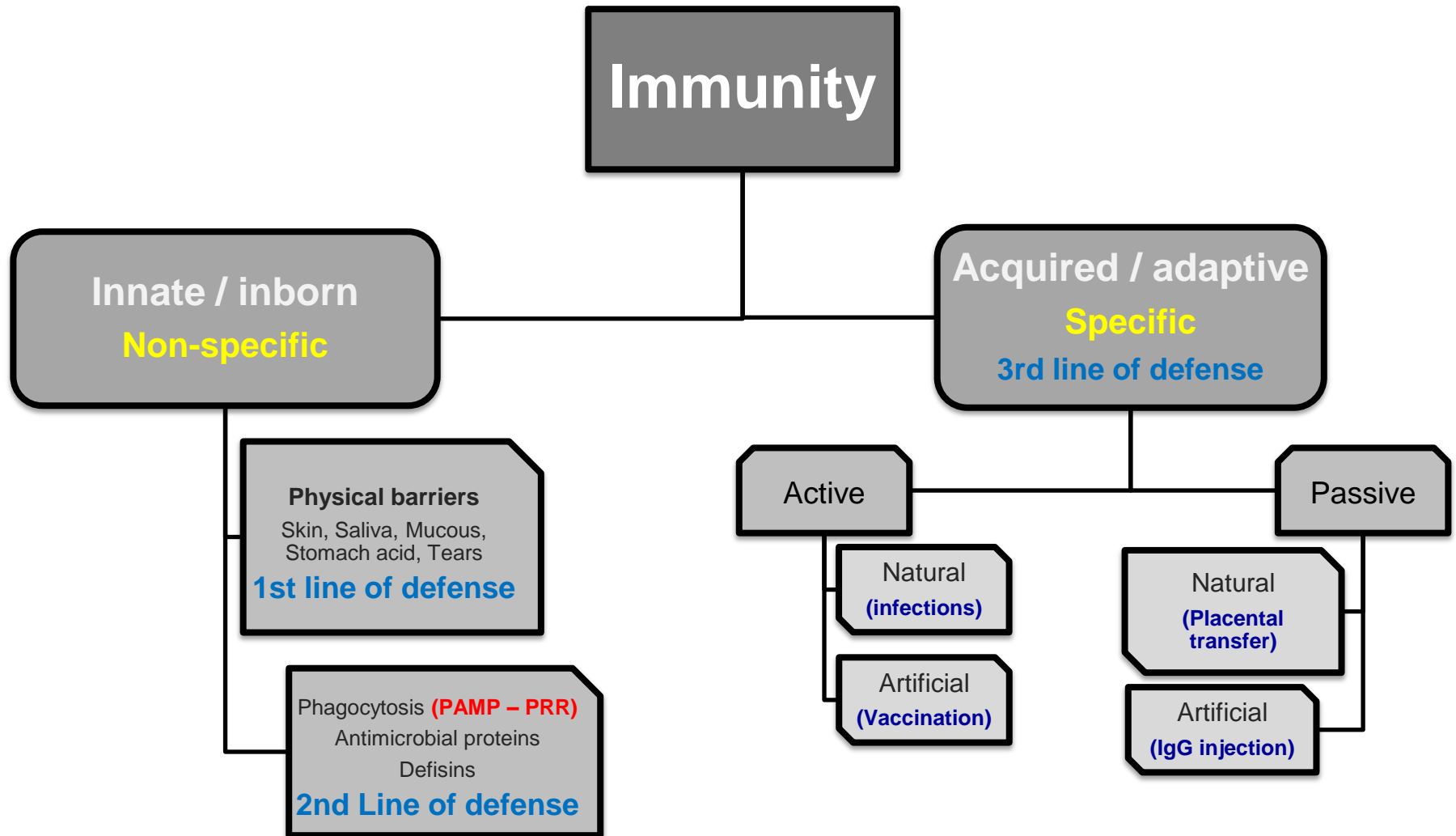
Not all defense mechanisms constitute immunity



Fundamentals of immunology

- Immunity – is the ability of host to defend it self from invading foreign harmful organisms and altered self proteins or cells

Types of immunity



Types of immunity

Innate immunity

- Skin, Saliva, tears
mucous
- Non-specific
- Recognize molecular patterns not common in host
- Immediate maximal response
- No immunological memory

Adaptive immunity

- Have specialized cell
 - T cells, B cells
- Specific to particular antigen
- Time lag between exposure and maximal response
- **Immunological memory**

Types of immunity

Specific	Non Specific	
3rd line of defense	2nd line of defense	1st line of defense
T cells	Phagocytes	Skin
B cell	Pore forming anti microbial proteins Defensins	Secretions
Antibodies	Inflammatory response	Mucous membranes

Basic terms of immunology

- **Antigen** – A molecule that stimulates immune response (generally proteins)
- **Hapten** – Small portion of antigen which by it self can not elicit immune reaction
- **Epitope** – Part of Antigen recognized by the immune system
- **Antibody** – protein (globulin) which is reactive against specific antigen
- **Paratope** – part of antibody which recognizes the antigen

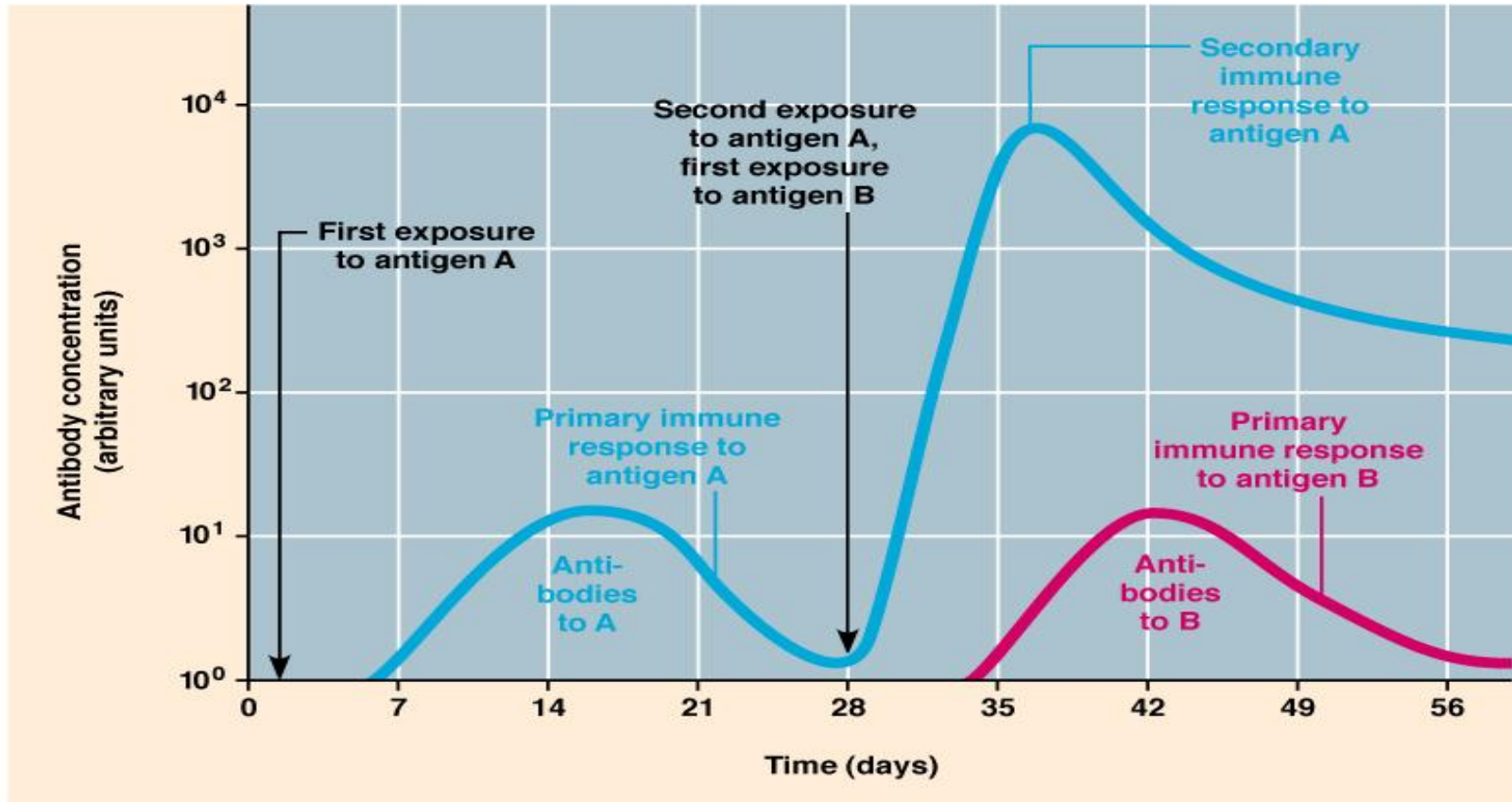
Basic terms of immunology

- **Cytokines** – are proteins used for inter cellular communication and intra cellular signalling pathways
 - Interleukins are kind of cytokines
- **Immunization** – is the means of providing specific protection against a damaging pathogen
- **Tolerance** – refers to an antigen induced specific unresponsiveness

Basic terms of immunology

- **Autoimmunity** – failure of immune system to develop tolerance for self proteins and starting immune response
- **Immunological memory** – capacity of immune system to remember a antigen and react more vigorously upon re-exposure of the same antigen
 - Involves B cells and T cells

Immunological memory

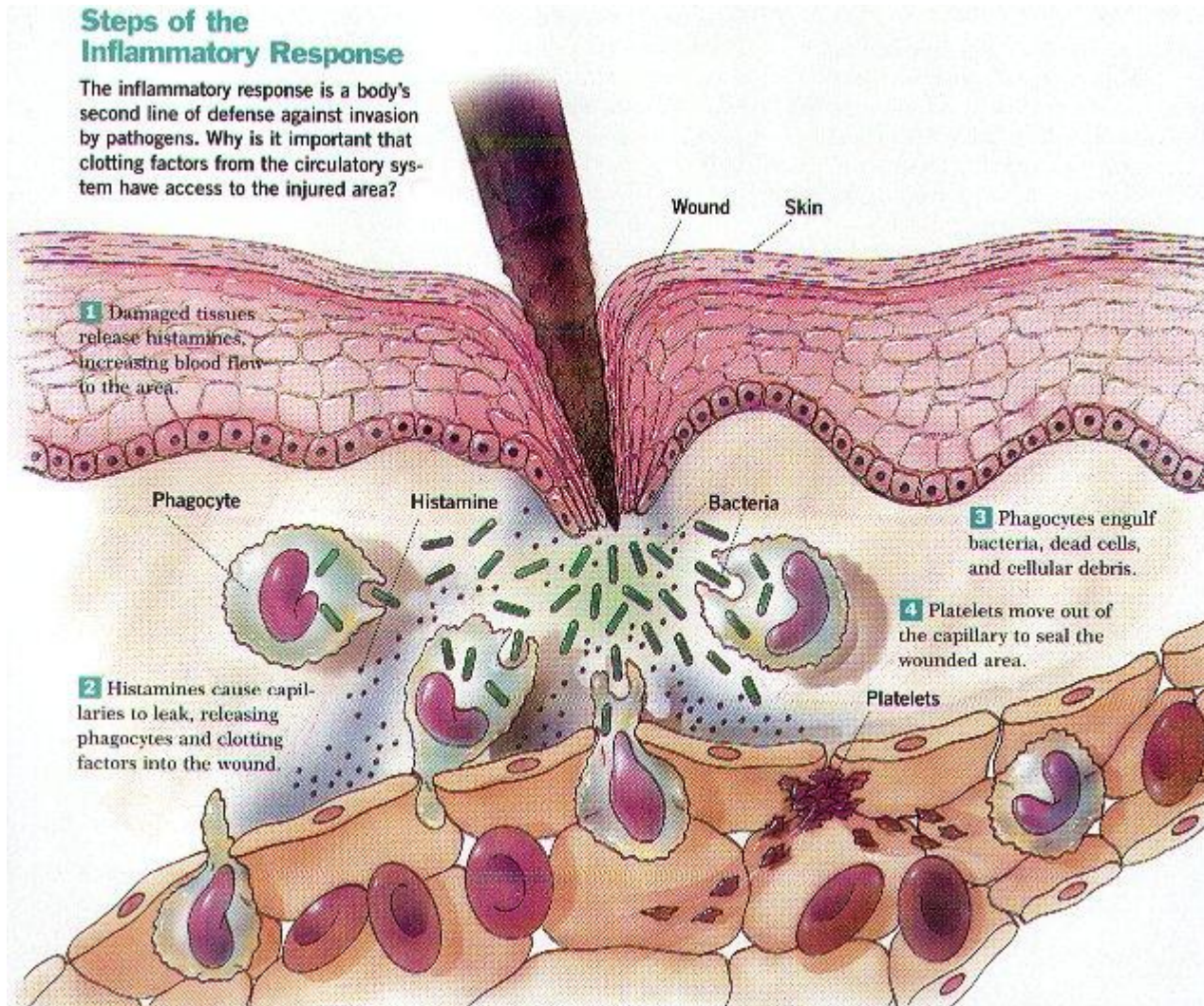


- Immunological memory
- Upon secondary exposure there will be boost of immunity

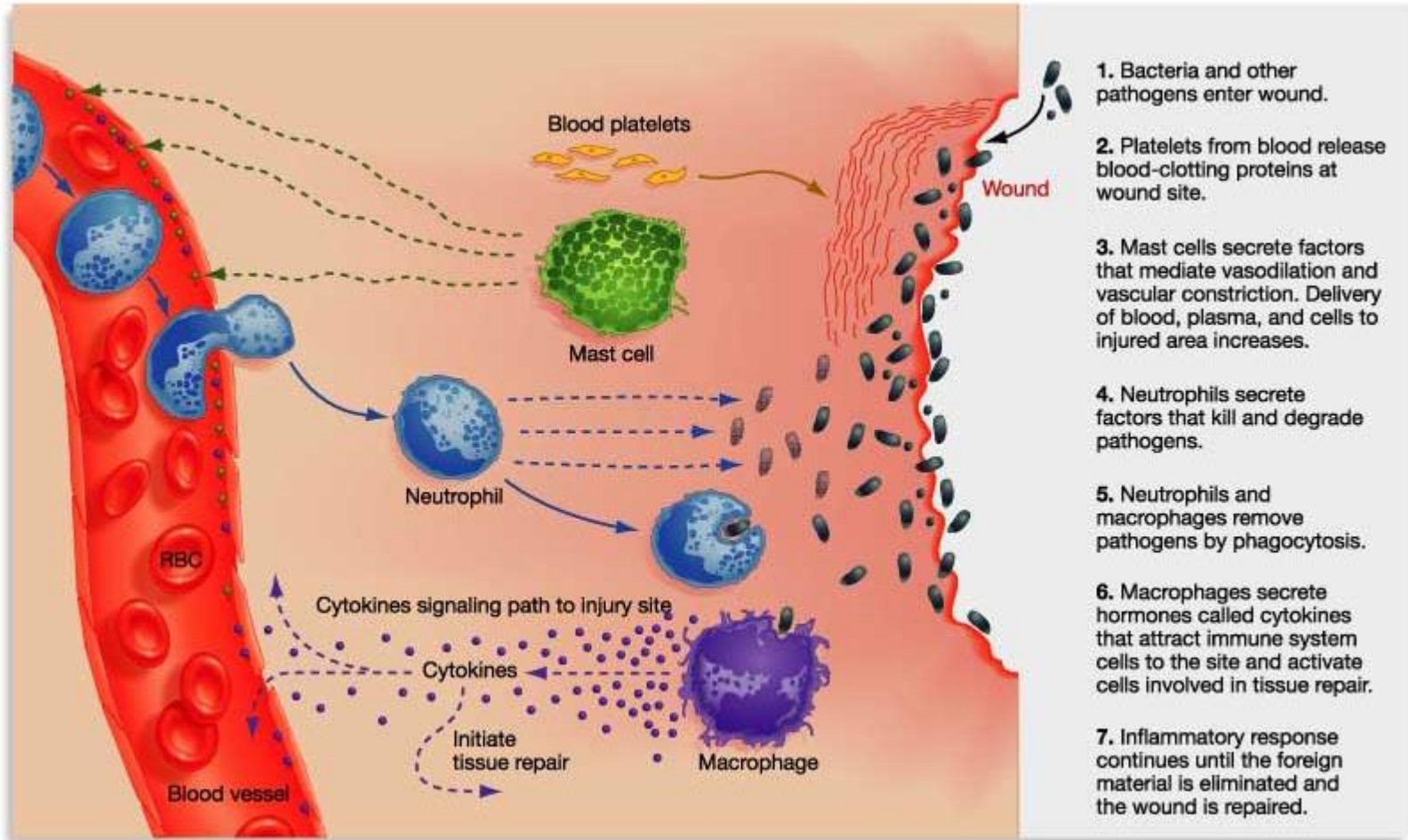
Basic terms of immunology

- **Inflammation** – a set of physiological reactions to damage of tissue integrity, leading to protection against infection, localization and restriction of damaged site and finally to healing
 - Reddening (rubor)
 - Swelling (tumor)
 - Pain (dolar)
 - Increased temperature (calor)

Inflammation



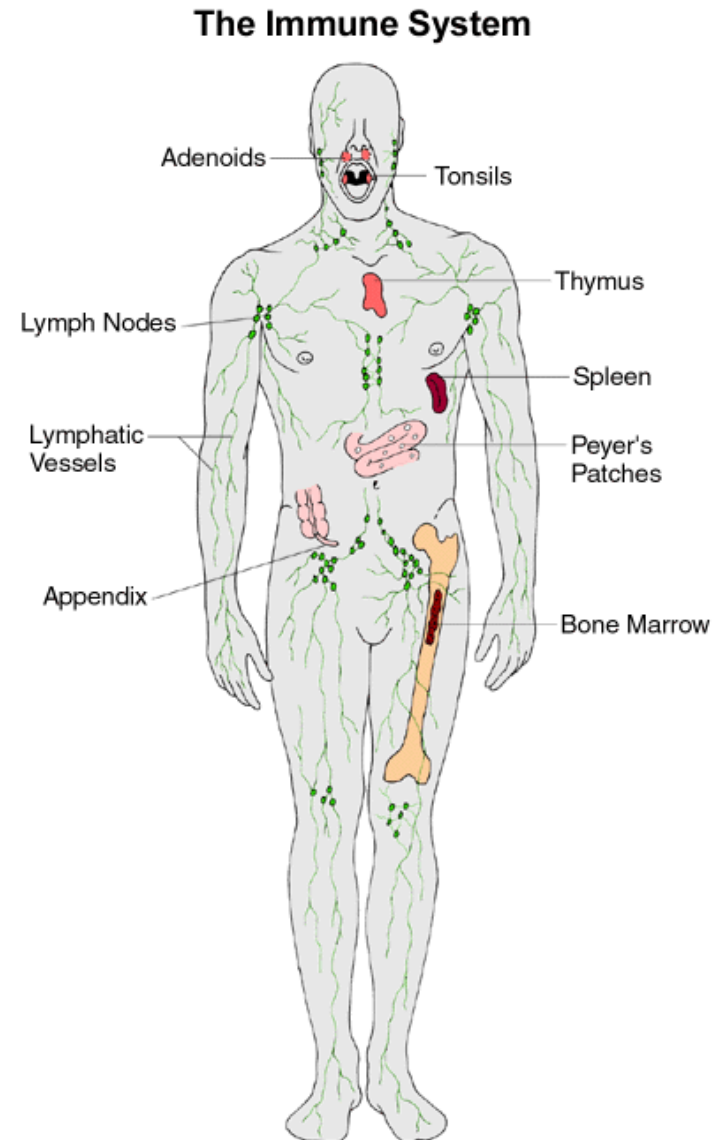
Inflammation



Several chemokines will also be released

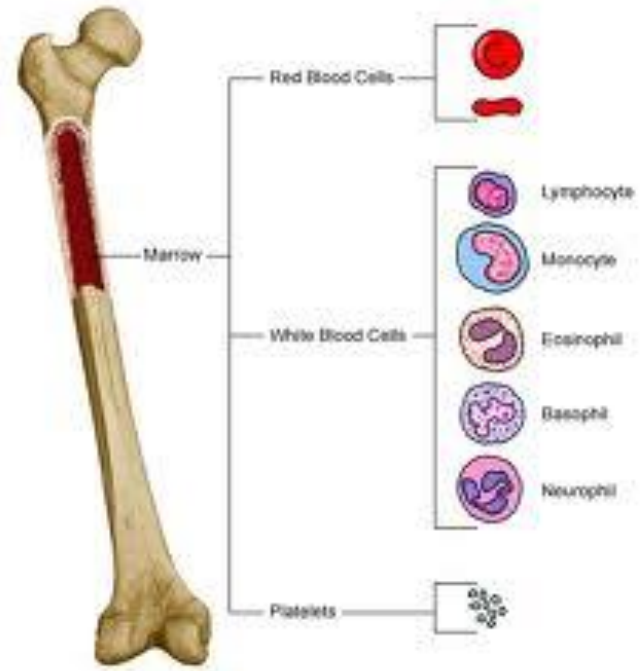
Organs of immune system

- Bone marrow
- Spleen
- Thymus
- Lymphatic system



Main organs of immune system

- **Bone marrow**
 - Source of stem cells
 - Maturing site for B cells

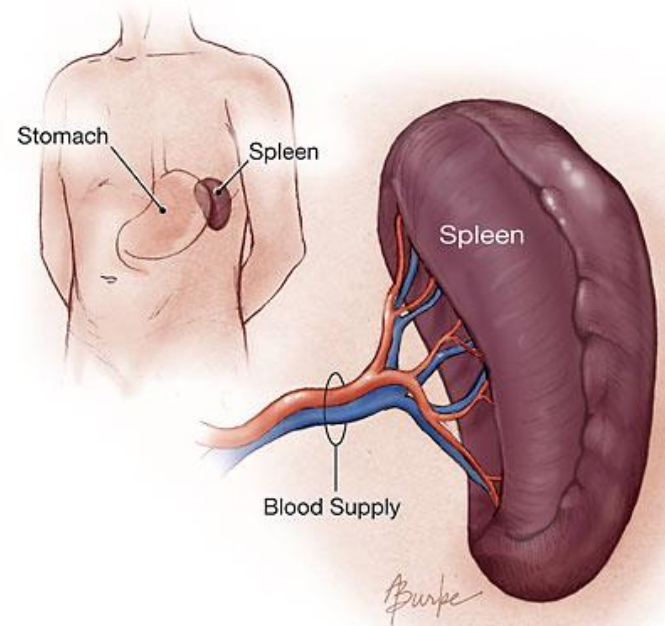


- In **B**irds B cells mature in Bursa of fabricius

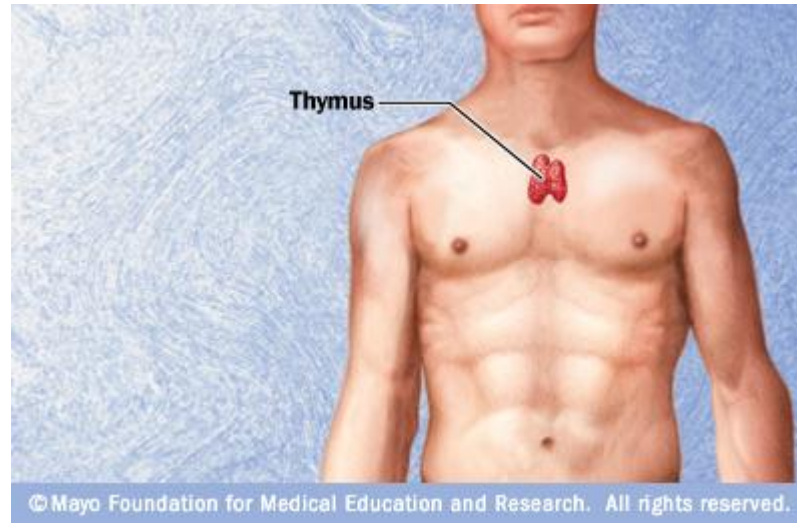


Main organs of immune system

- **Spleen**
 - Effective against blood born pathogens
 - Replaces old RBC
 - Produces complement components
 - Have macrophages

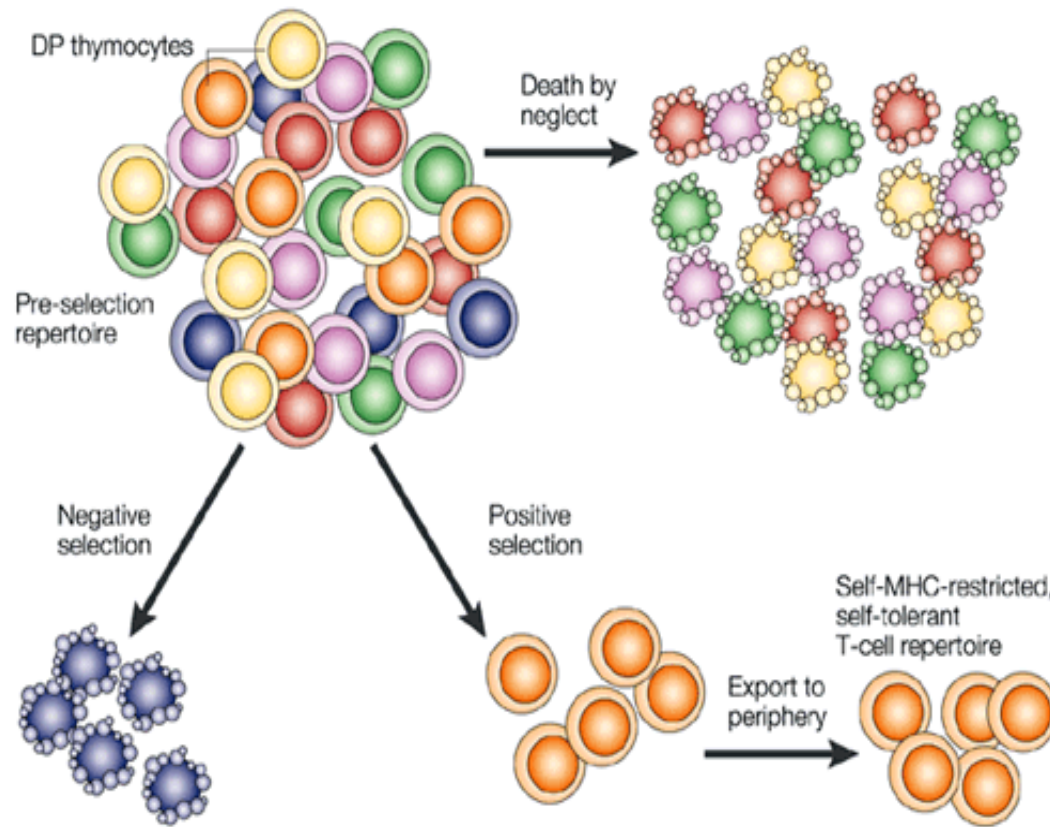


Main organs of immune system



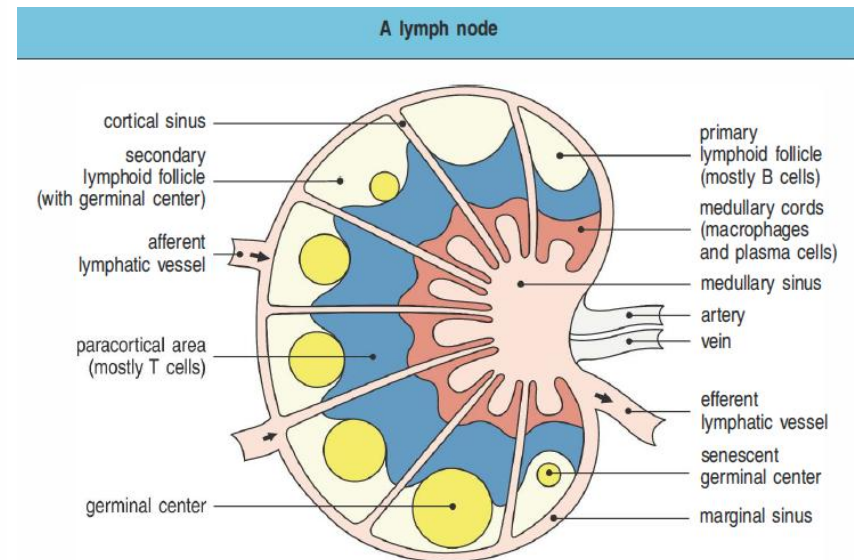
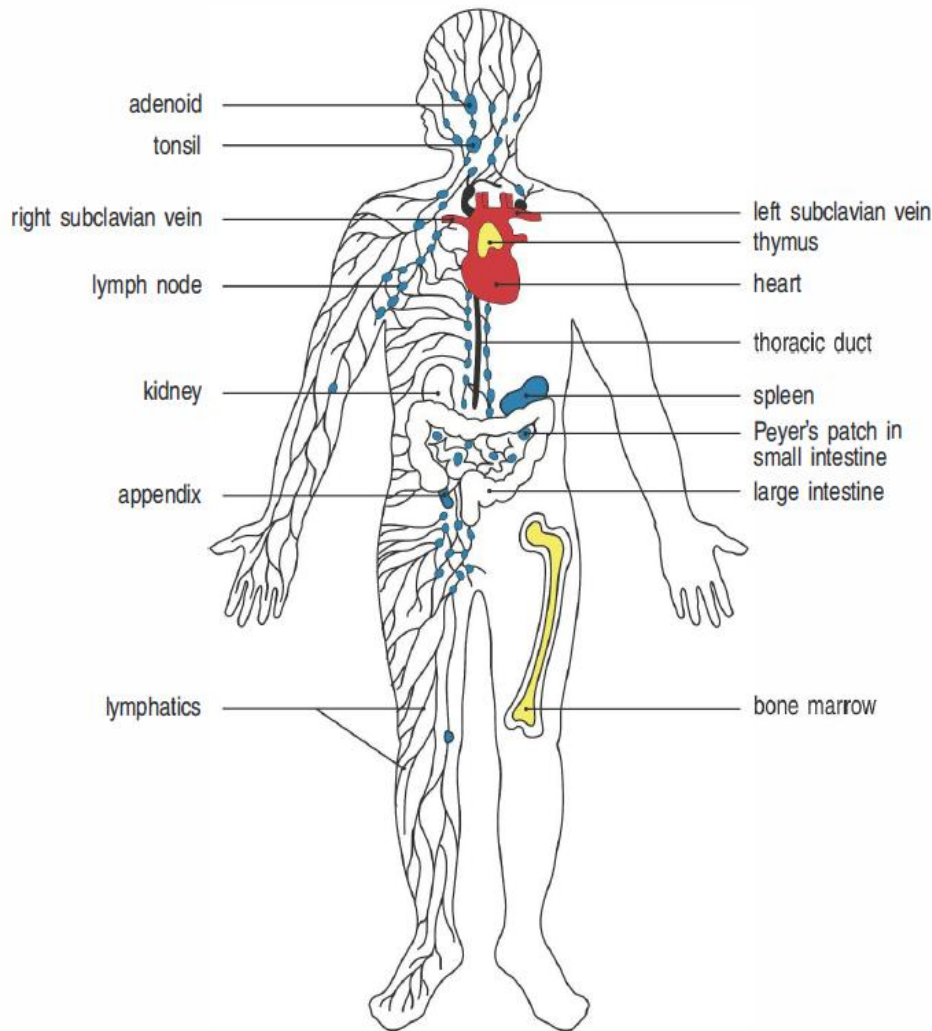
- **Thymus**
 - Development and differentiation of T cells
 - Where T cell education happens
 - Self and non self discrimination

Development and selection of T cells in thymus



Main organs of immune system

Lymphatic system



Cells of immune system

Cells of the Immune System

