

# Immune System

Essential Question: How does the immune system function to maintain homeostasis?

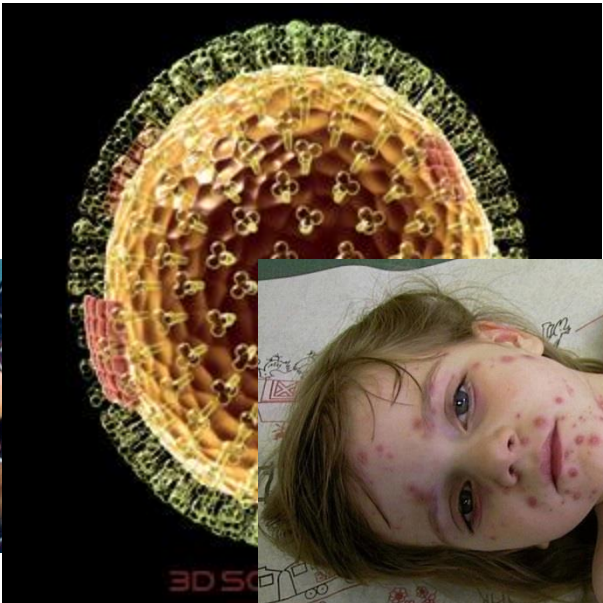
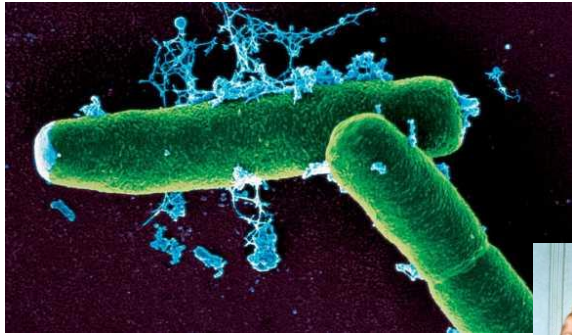
# Pathogens

- Pathogens are the cause of infectious diseases and can be bacteria, viruses, protozoans, fungi and parasites


# Your Turn!

- List five pathogens and give an example of an infectious disease they cause.
- 90 seconds





# Think

- Think of some ways pathogens can be transmitted from human to human or animal to human
- 30 seconds 



# Transmission



# Transmission



# Skin Barrier

- Skin is your 1<sup>st</sup> line of defense
- Many of the bacteria that live on the skin are good
- They digest skin oils and produce acids that inhibit pathogens





# Chemical Barriers

- Saliva, tears and nasal secretions contain an enzyme called lysozyme which breaks down bacterial cell walls, killing them
- Mucus acts as a barrier that blocks bacteria from sticking to inner cells
- Hydrochloric acid in your stomach kills many microorganisms in food that cause disease

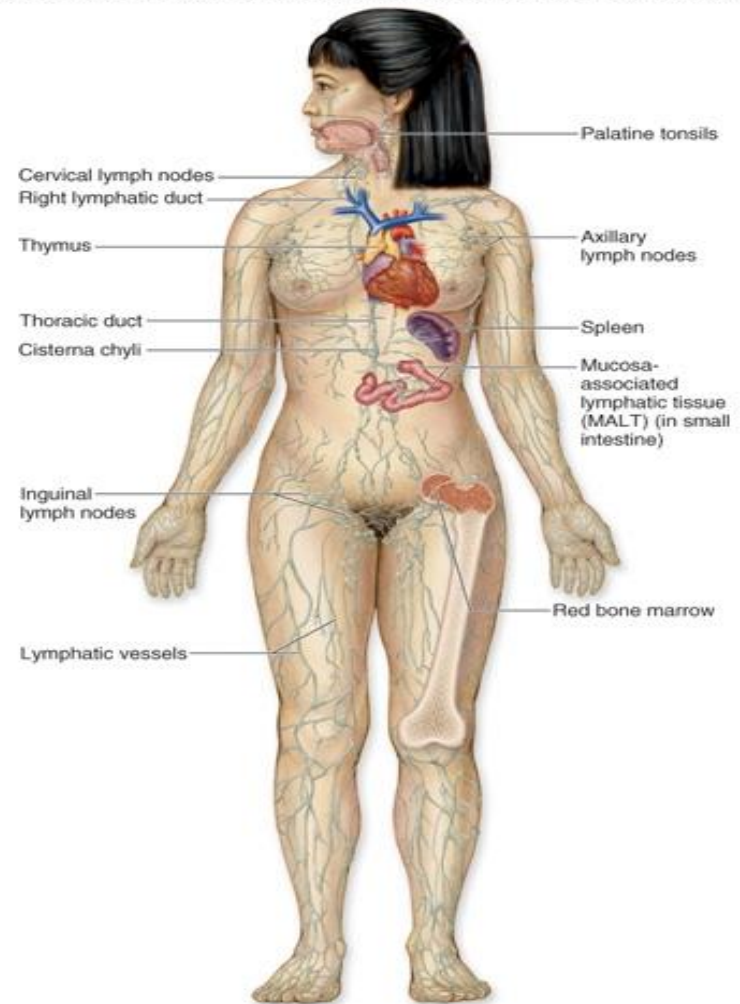
# Chemical Barriers



# Lymphatic System

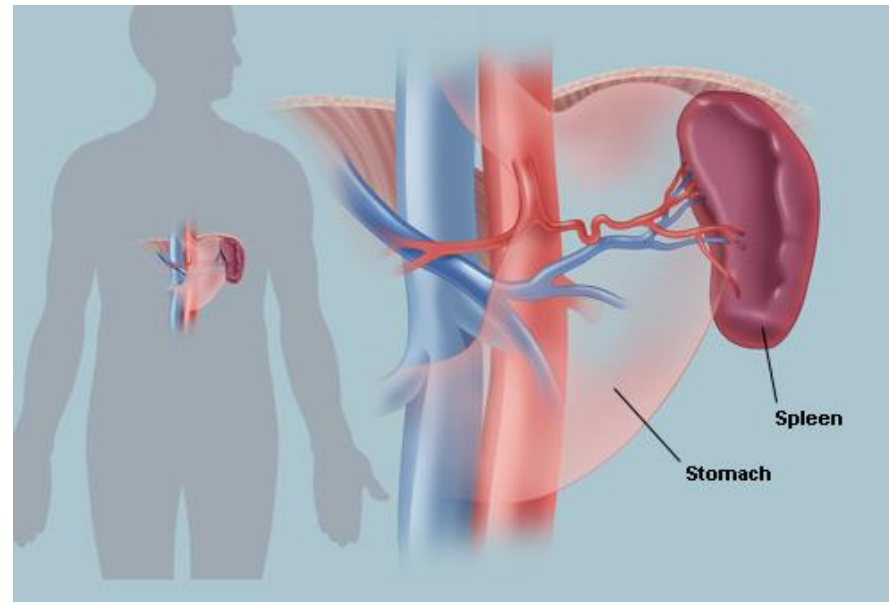
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- Includes organs and cells that filter lymph and blood and destroy foreign microorganisms
- Lymph is the fluid that leaks out of capillaries to bathe body cells



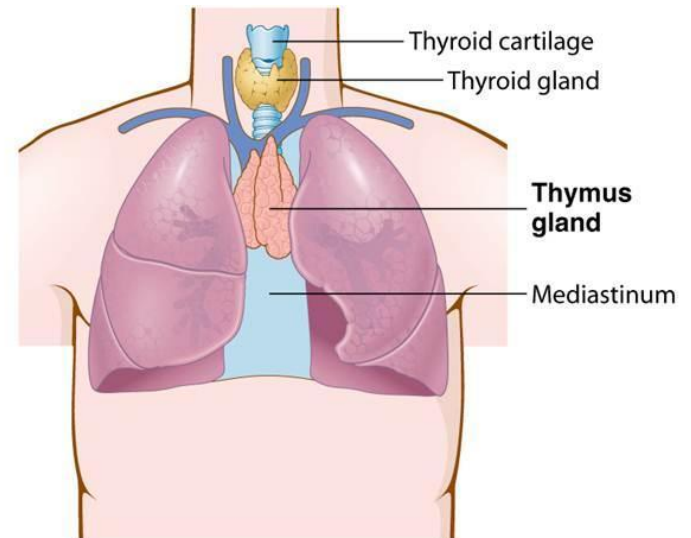
# Lymphatic Organs

- Organs in this system contain lymphocytes which are a type of white blood cell that is produced in red bone marrow
- Organs include the lymph nodes, tonsils, spleen, thymus gland



# Organ Roles

- Tonsils form a protective ring of lymphatic tissue between the nasal and oral cavity
- The spleen stores blood and destroys damaged red blood cells and foreign substances.
- The thymus gland plays a role in activating T cells.
- T cells are produced in bone marrow and mature in the thymus.



# For you to do

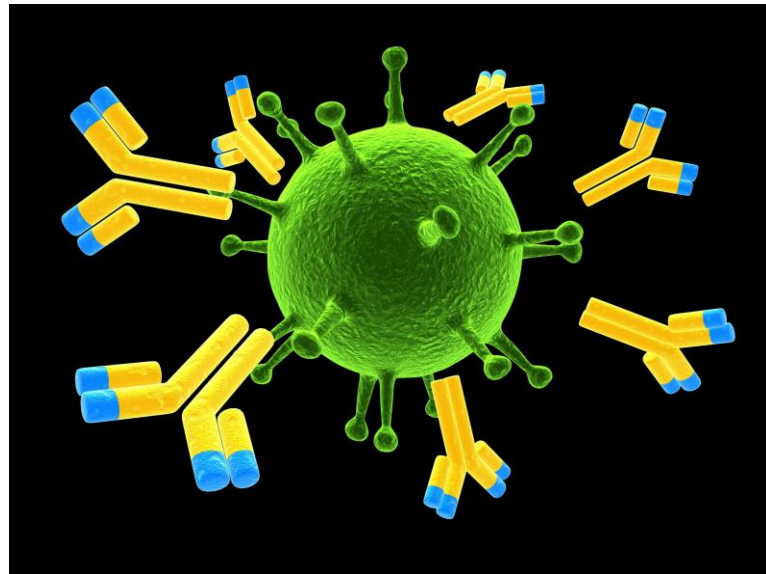
- Describe the role of the tonsils, spleen and thymus gland in your own words.
- 2 minutes





# B Cell Response

- Antibodies are proteins produced by B lymphocytes that specifically react with an antigen
- An antigen is a substance foreign to the body



# The B Cell Path

- When a macrophage digests a pathogen it displays it on the membrane.
- The macrophage and pathogen then binds to a helper T cell which activates antibody secretion



# T Cell Response

- Once helper T cells are activated by the presentation of an antigen, helper T cells can bind to and activate cytotoxic (killer) T cells.
- Killer T cells destroy pathogens

