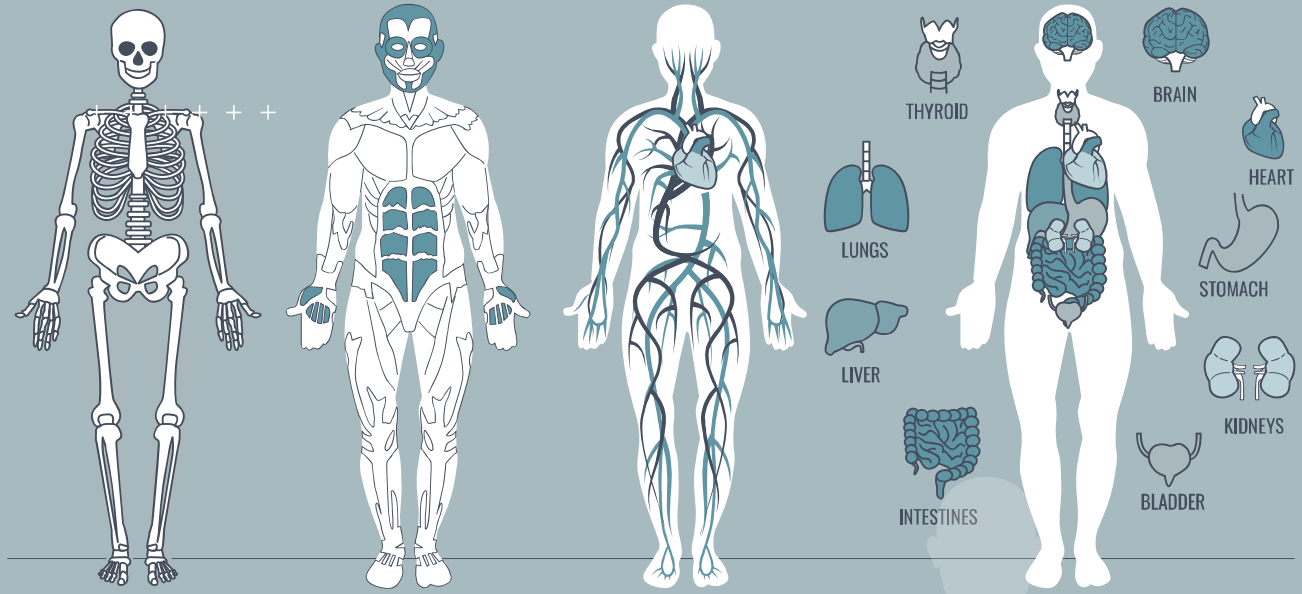
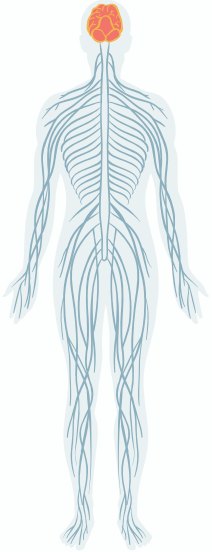


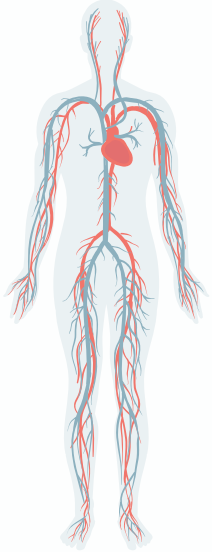
Human body systems

Dr: DJAMAI. S

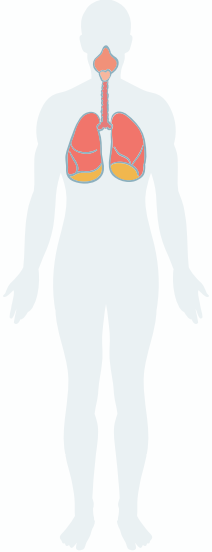
Content



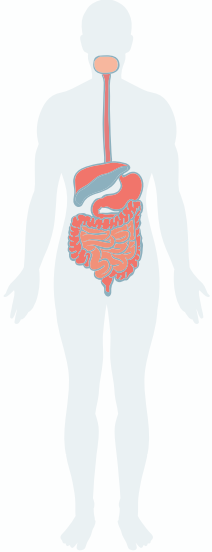
Nervous system



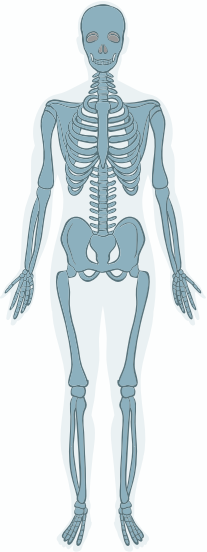
Circulatory system



Respiratory system



Digestive system



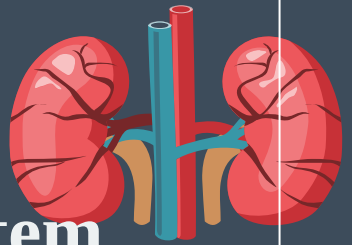
Skeletal system

Levels of organisation

Cells work together to form **tissues**

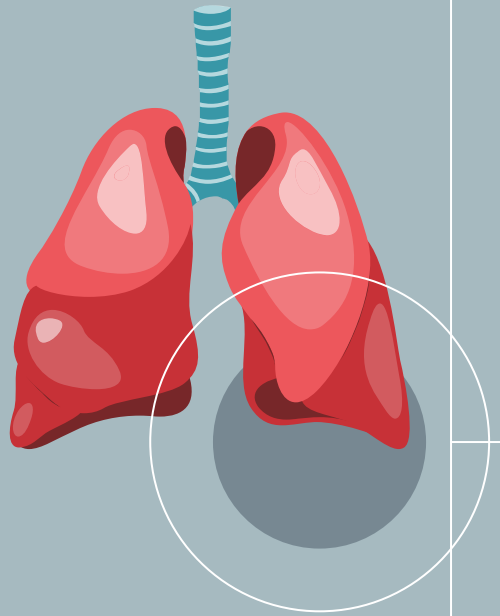
Tissues work together to form **organs**

Organs work together to form **organ system**



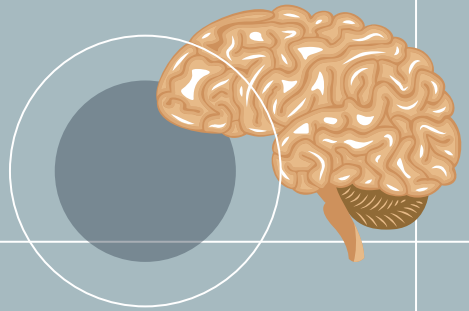
Body

The physical structure of a person or an animal including different organs and systems.



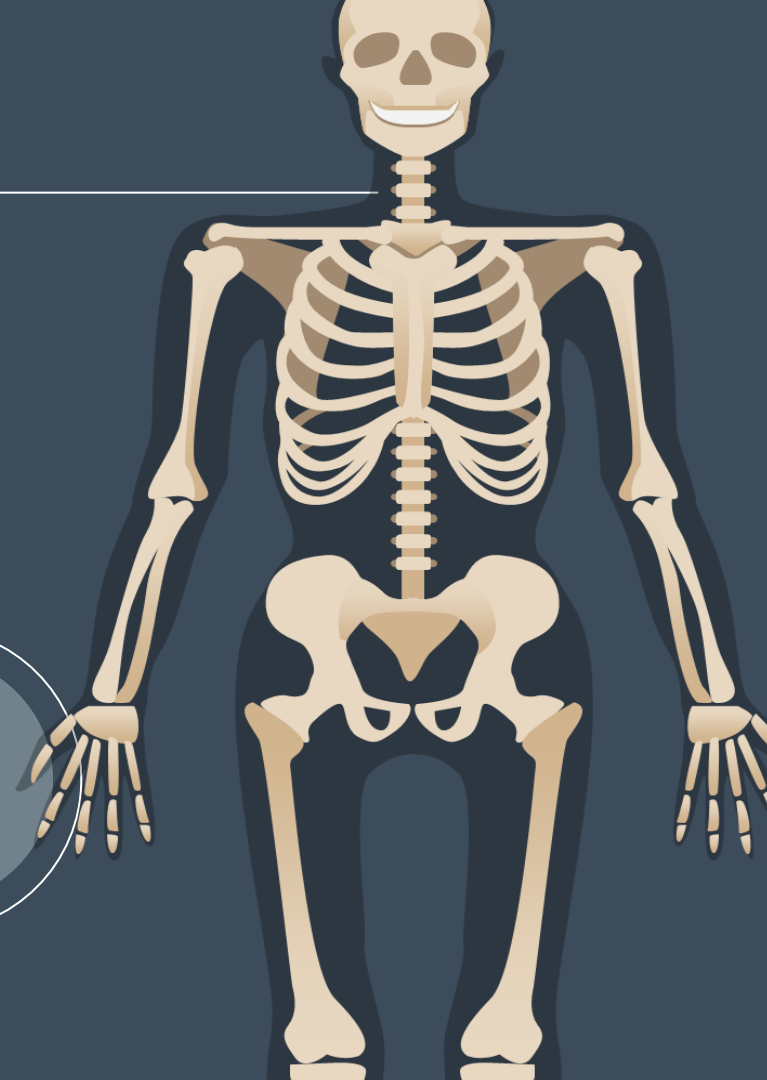
Body systems

Our bodies consist of a number of biological systems that carry out specific functions necessary for everyday living.

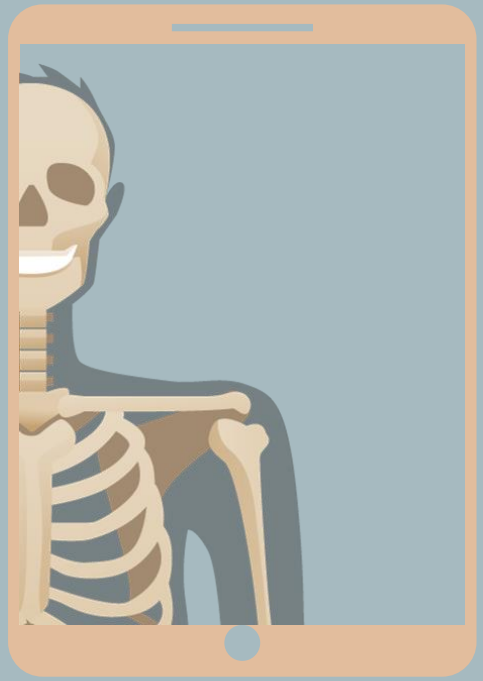


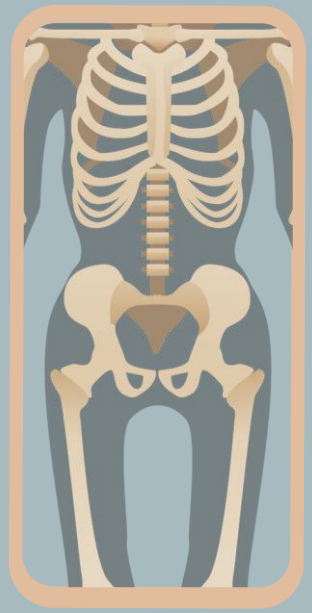
01

Skeletal system



Skeletal system





- About 206 bones in the humans body.
- Inckluds:
- Bones (عظام,)
- Ligaments (الأربطة)connect bones to bones.
- Cartilage :(غضروف)provides cushion between the bones.
- Red Marrow (النقي الأحمر)makes blood.

Skeletal system

Functions

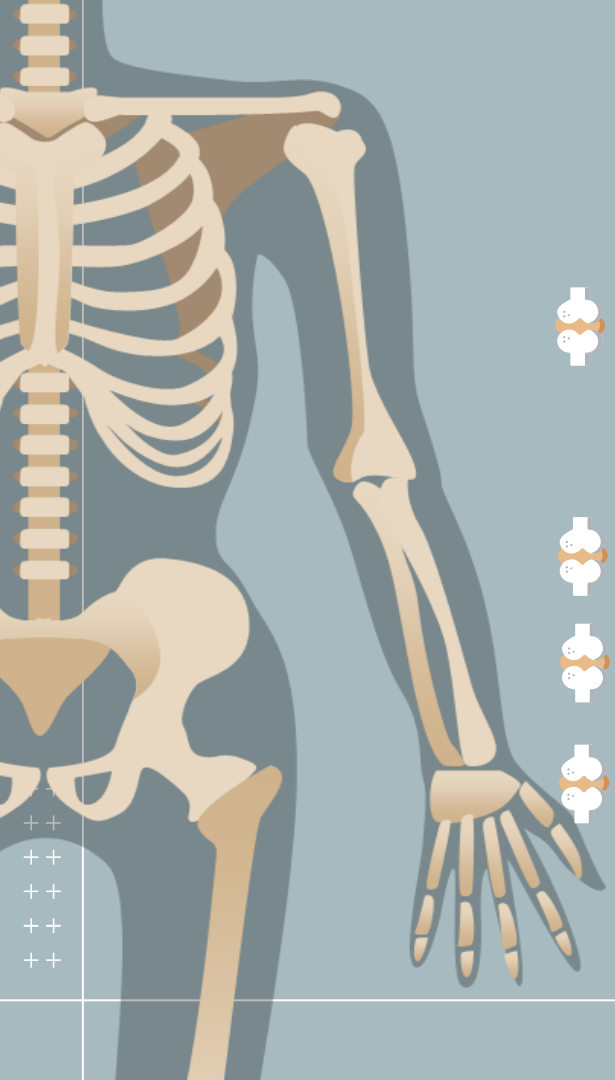
The skeleton protects the soft body parts:

The bones of the cranium surround the brain to make it less vulnerable to injury

Vertebrae surround and protect the spinal cord

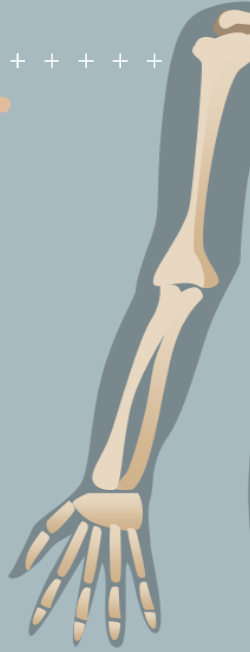
The bones of the rib cage help protect the heart and lungs of the thorax.

Skeletal system



Functions

- The skeleton supports the body against the pull of gravity.
- Makes blood cells.
- Gives the body the shape.
- Helps the body to move.



02

Muscular system

Muscular system

The muscular system is composed of specialized cells called **muscle fibers**.

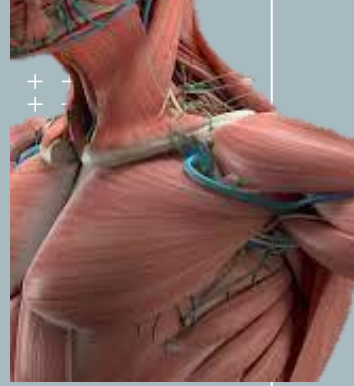
Consists of about 650 muscles that aid in movement, blood flow and other bodily functions.

Muscle Types

03 Types

Skeletal Muscle

Smooth Muscle



Cardiac Muscle

Muscle Types

Skeletal Muscle

- Attached to bones.
- It is responsible for skeletal movements.
-These muscles are under **conscious**, or **voluntary**, control:

facial expressions, eye movements.

Smooth Muscle

- Found in the walls of the hollow internal organs such as blood vessels, the gastrointestinal tract, bladder, and uterus.

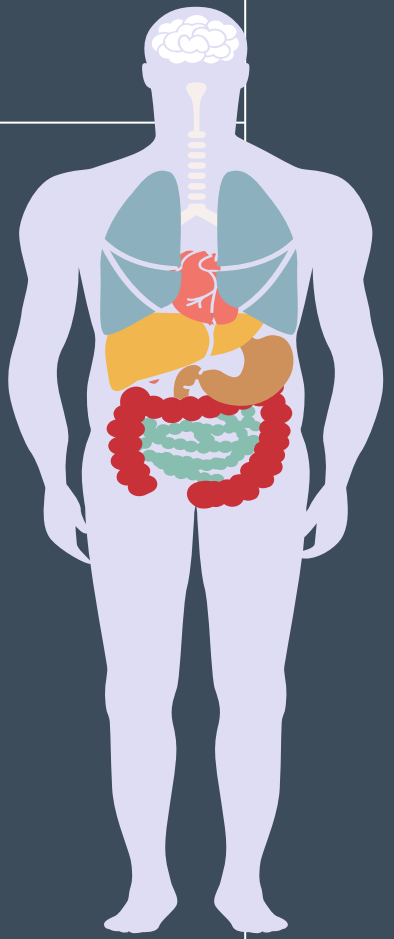
- Smooth muscle cannot be controlled consciously and thus acts involuntarily.
- Muscle cell is spindle-shaped and has one central nucleus.

Cardiac Muscle

-Found in the walls of the heart.
- The contraction of cardiac muscle is involuntary, strong, and rhythmical.
- The cardiac muscle cell is rectangular in shape and has one central nucleus.

03

Digestive system

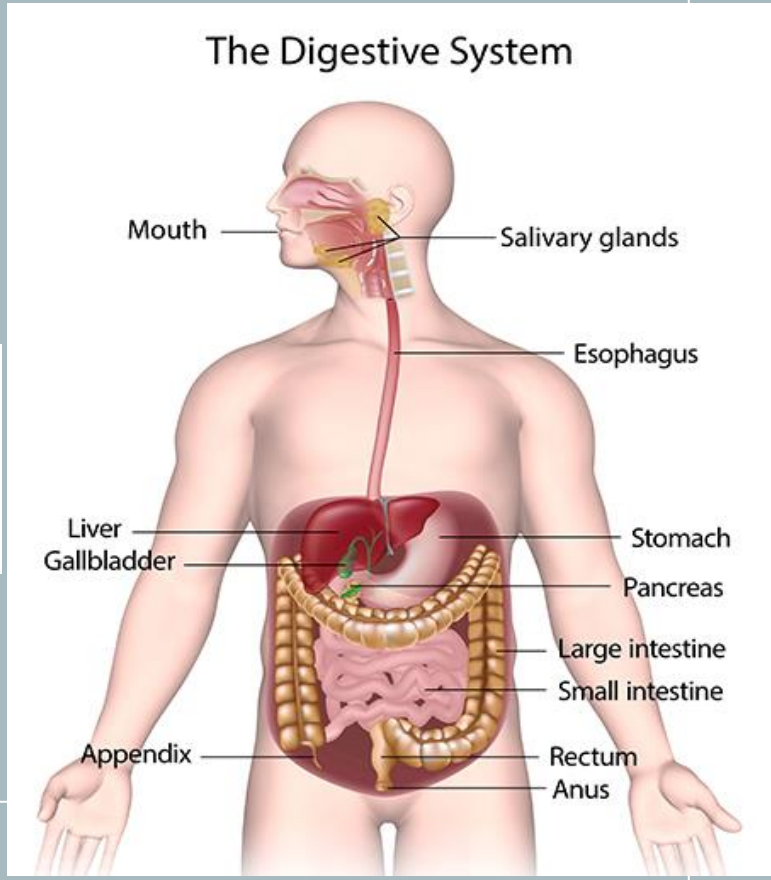


Digestive system

It consists of a long continuous tube that extends from the mouth to the anus. It includes the mouth,pharynx, esophagus, stomach, small intestine, and large intestine

The tongue and teeth are accessory structures located in the mouth.

The salivary glands, liver, gallbladder, and pancreas are major accessory organs that have a role in digestion These organs secrete fluids into the digestive tract.



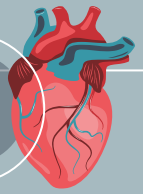
Digestive system

Food undergoes three types of processes in the body:

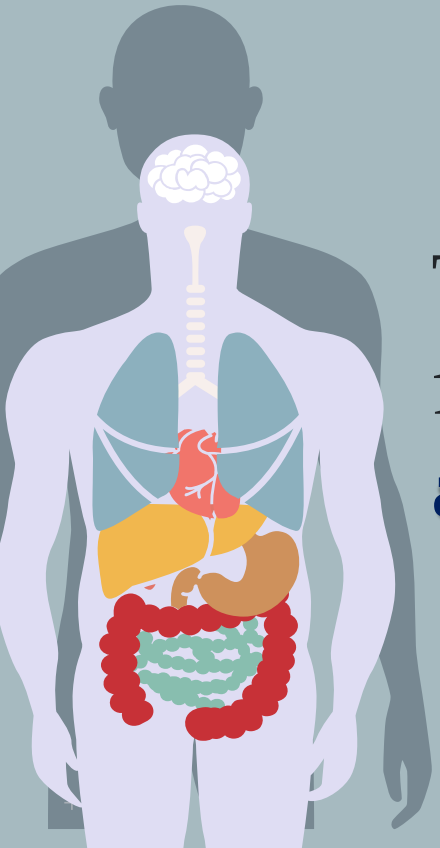
A Digestion

B Absorption

C Elimination



Digestive system



The digestive system prepares nutrients for utilization by body cells through **six activities, or functions**:

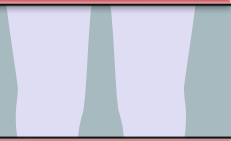
1- Ingestion: take in food through the mouth.

2- Mechanical Digestion: The large pieces of food that are ingested have to be broken into smaller particles by : (**chewing or mastication**

3- Chemical Digestion: The complex molecules of carbohydrates, proteins, and fats are transformed by chemical digestion into smaller molecules that can be absorbed and utilized by the cells.

4- Movements: Mixing movements occur in the stomach as a result of smooth muscle contraction.

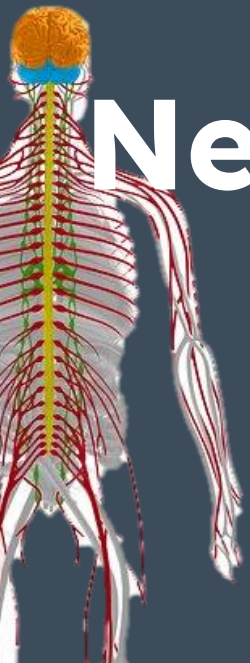
5- Absorption: The simple molecules that result from chemical digestion pass through cell membranes of the lining in the small intestine into the blood.

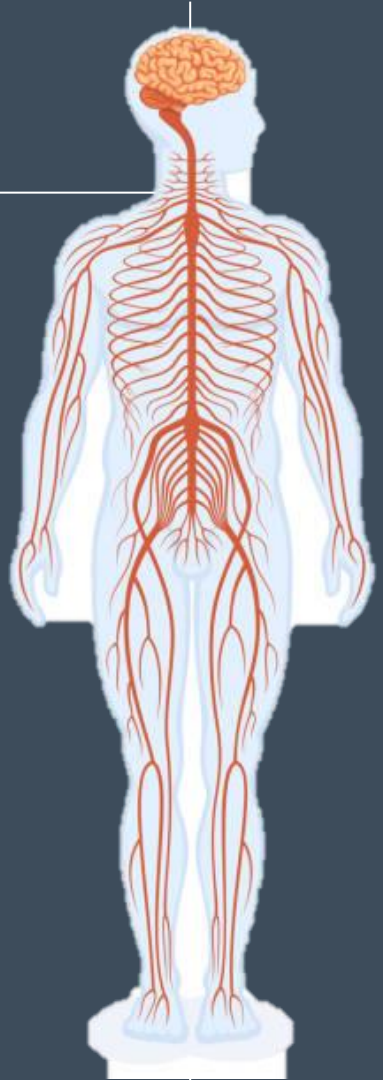


6- Elimination: The food molecules that cannot be digested or absorbed need to be eliminated from the body. The removal of indigestible wastes through the anus, in the form of feces.

04

Nervous system



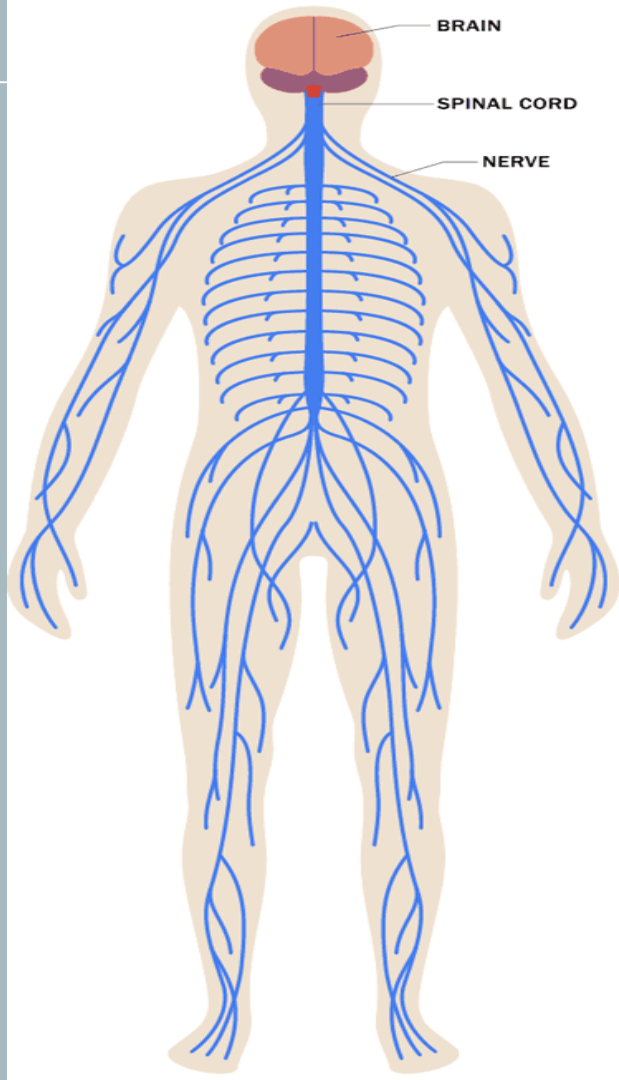


Nervous system

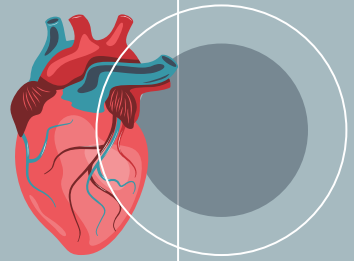
The nervous system is the major controlling, regulatory, and communicating system in the body.

It is the center of all mental activity including thought, learning, and memory.

Through its receptors, the nervous system keeps us in touch with our environment, both internal and external .



Nervous system



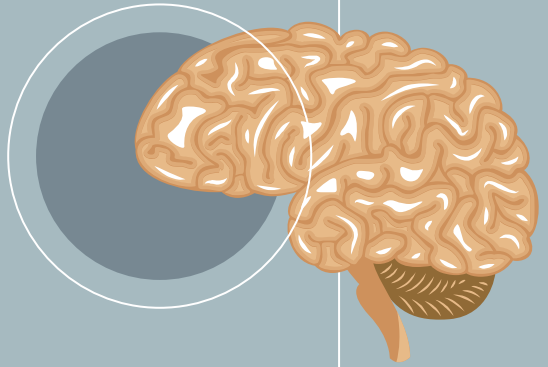
The nervous system is composed of organs, principally:

The brain,

Spinal cord,

Nerves,

Ganglia.

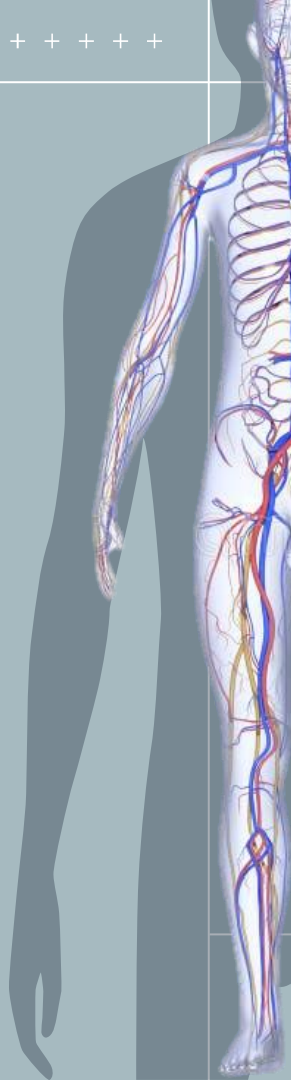


Nervous system

It consists of various tissues,
including **nerve**, **blood**, **and connective tissue**.

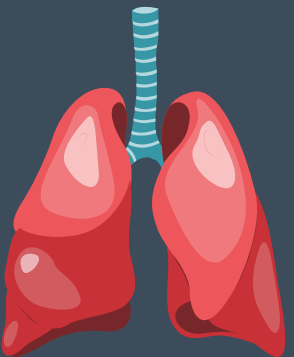
Together these carry out the complex activities of the nervous system.

Controls both:
* **voluntary action**
* **involuntary actions**

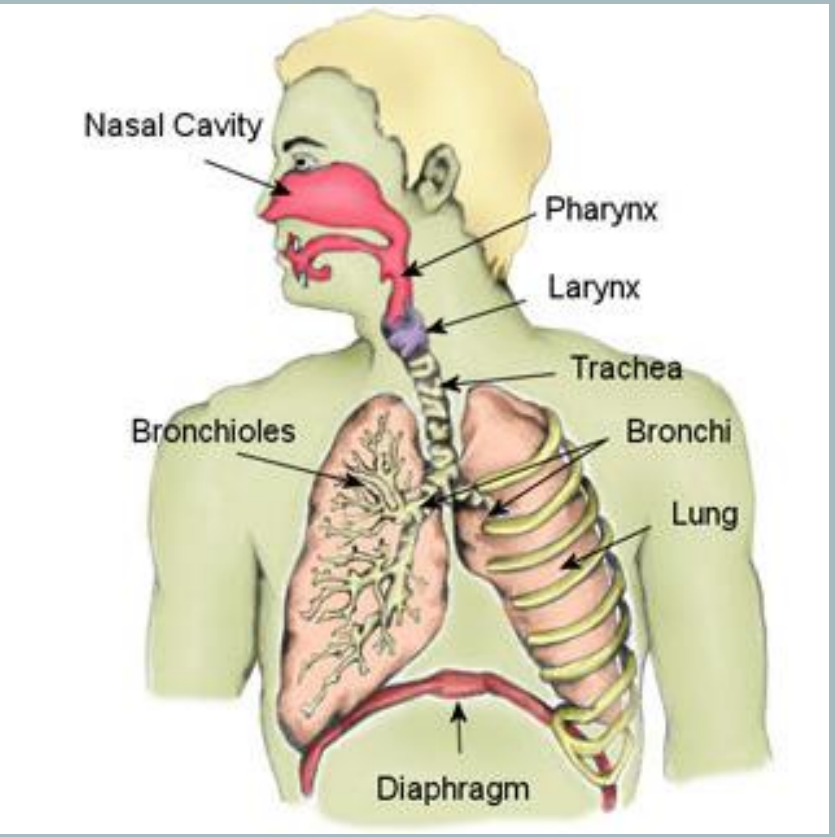


05

Respiratory system



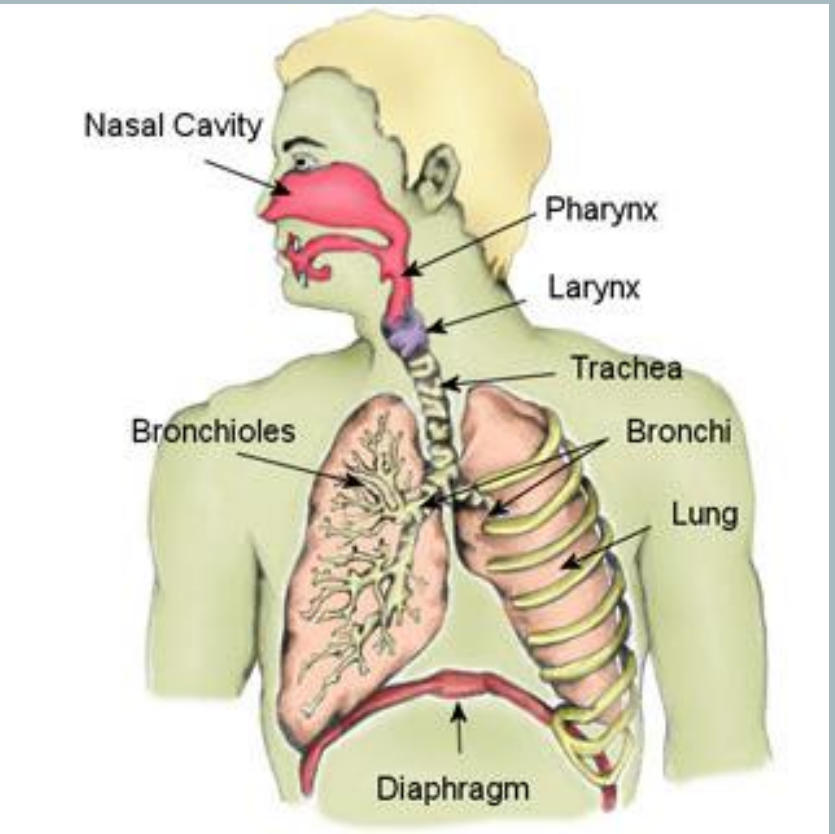
Respiratory system



Upper respiratory system

Nasal cavity **Pharynx**

Respiratory system



Lower respiratory system.

Larynx

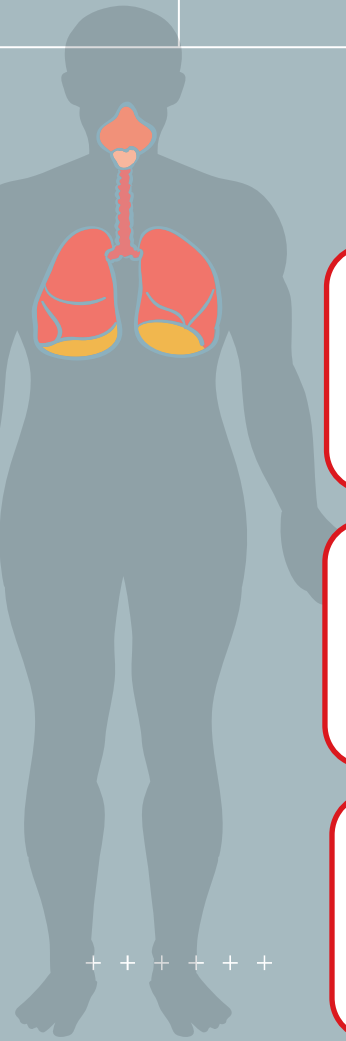
Trachea

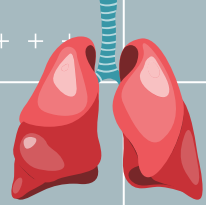
Bronchi

Bronchioles

Lungs

Respiratory system





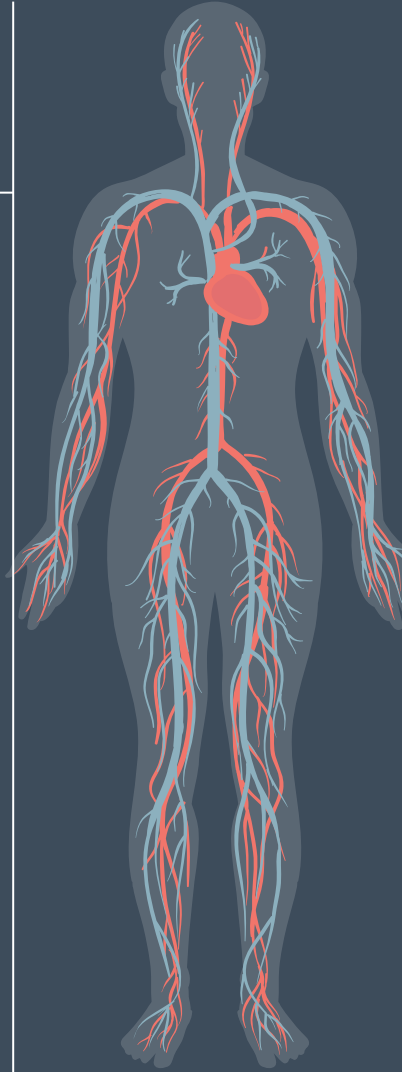
The respiratory system is responsible for **breathing**, which is the controlled movement of air in and out of the body **(ventilation)**

It also moves oxygen and carbon dioxide into and out of the bloodstream **(respiration)**

Helps regulate the body's **pH balance**, or the body's balance of acids and bases.

06

Circulatory system

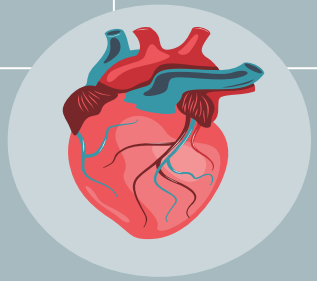


Circulatory system

It moves blood, nutrients, oxygen, and hormones, around the body.

It also carries away carbon dioxide and other waste products

In order for blood to make it everywhere it needs to go, the circulatory system maintains the blood flow within a certain pressure range.



Circulatory system

Blood pressure that's too high puts extra stress on other organs and tissues.

Low blood pressure means the blood and its nutrients won't make it to where it needs to go.

Circulatory system

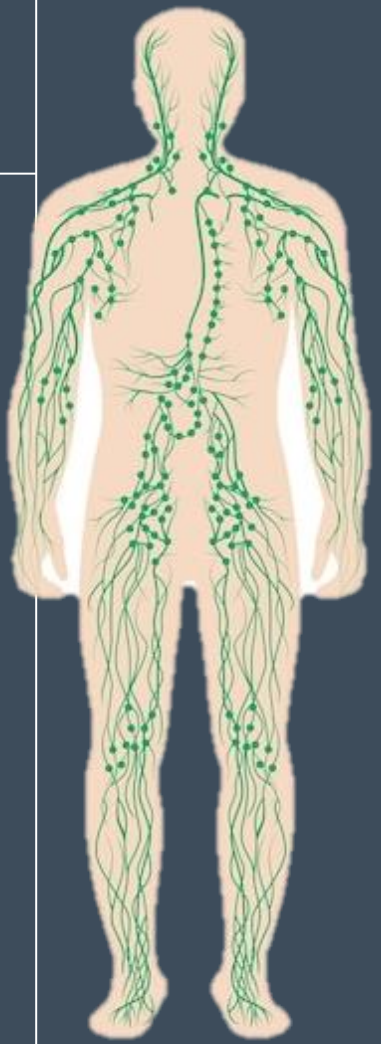
It consists of **the heart**, **blood, blood vessels (arteries** and **veins).**

Arteries are blood vessels responsible for carrying oxygen-rich blood away from the heart to the body.

Veins are blood vessels that carry blood low in oxygen from the body back to the heart for reoxygenation.

07

Lymphatic system



Lymphatic system

The lymphatic system consists of :

Fluid (lymph)

* Lymph is a fluid similar in composition to blood plasma.

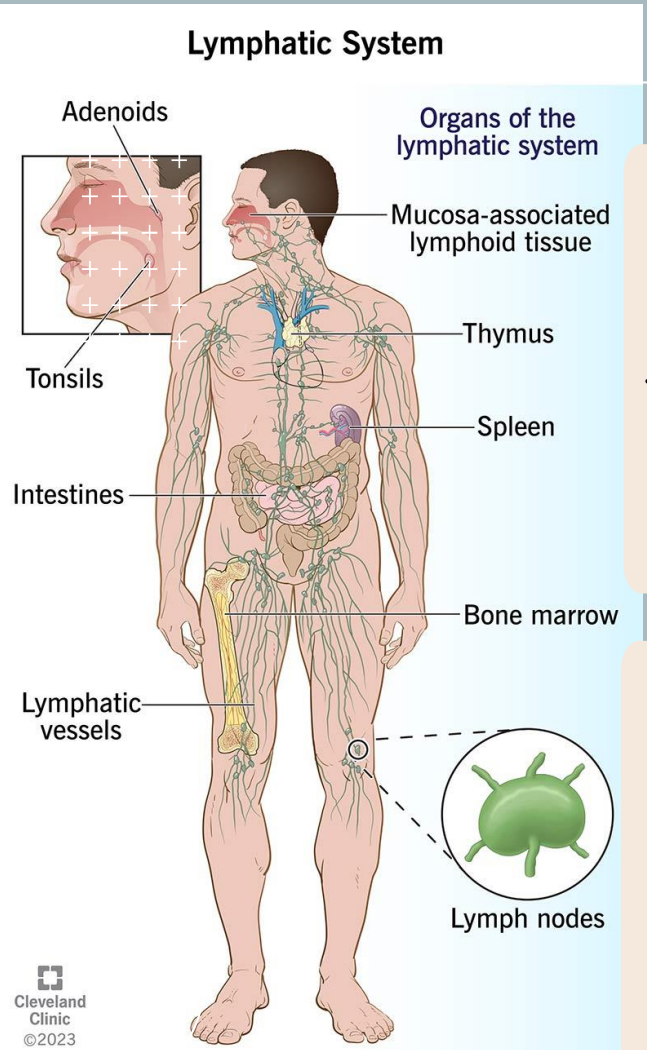
Vessels

* Lymphatic vessels, unlike blood vessels, only carry fluid away from the tissues to deliver it back into the blood's circulation.

Lymphatic organs

- Bone marrow
- Thymus
- Spleen
- Lymph nodes.
- Mucosa-associated lymphoid tissue
- Tonsils
- Adenoids.

Lymphatic system



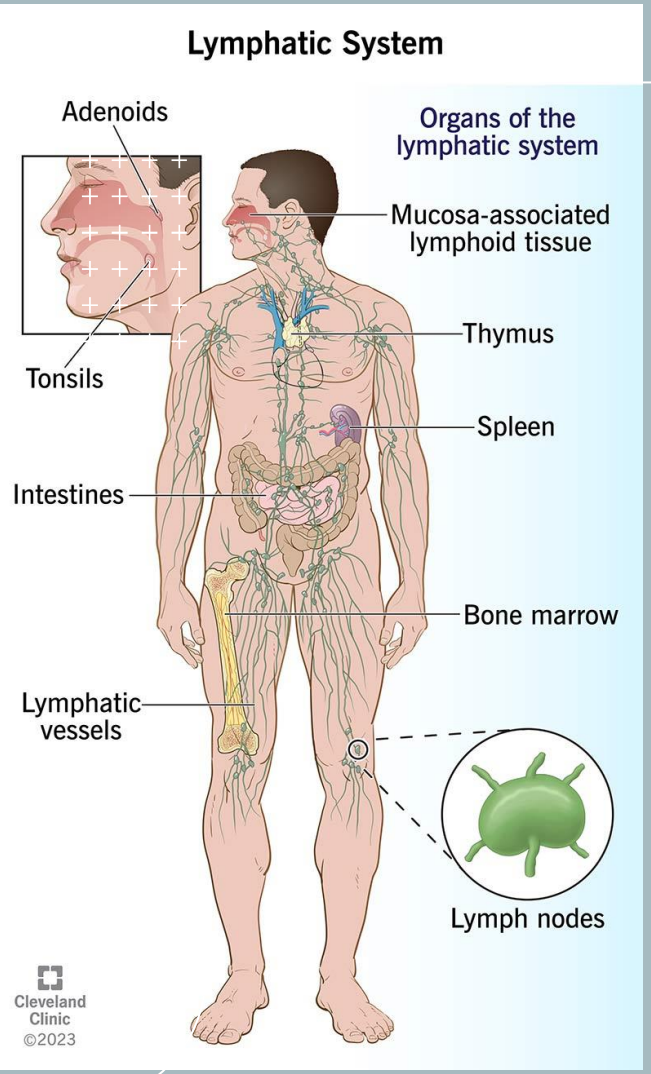
Lymphatic organs

Thymus:
It's where T-cells (a type of white blood cell) fully mature. T-cells help your body fight off invaders

Mucosa-associated lymphoid tissue (MALT):
-It lines your tonsils, airways, small intestine and appendix. MALT looks for and destroys germs that could harm you.

Spleen:
-Filters the blood and removes cells that are old or not working properly.
-It also keeps red blood cells and platelets available in case the body needs them.

Lymph nodes:
-Clear out damaged cells and cancer cells.
-Store lymphocytes and other immune system cells



Lymphatic system

Lymphatic organs

- **Tonsils and adenoids**.

- The tonsils are in the back of the throat. The adenoids are just behind the nasal cavity but are only active during childhood.
-These structures trap pathogens from the food you eat and the air you take in.
-They’re part of the body’s first line of defense against invaders.

Lymphatic system

The lymphatic system has three primary functions:

1- This organ system carries excess fluid, proteins, fats, bacteria, and other substances away from the cells and spaces between cells, and return it to the blood.

2- The second function of the lymphatic system is the absorption of fats and fat-soluble vitamins from the digestive system .

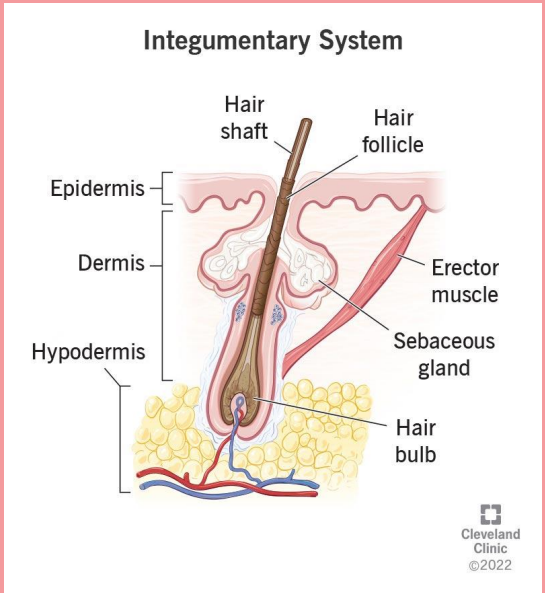
Lymphatic system

3- Your lymphatic system is part of your immune system. It produces and releases lymphocytes (a type of white blood cell) and other immune cells. These cells look for and destroy invaders — such as bacteria, viruses, parasites and fungi — that may enter your body.

09

Integumentary system

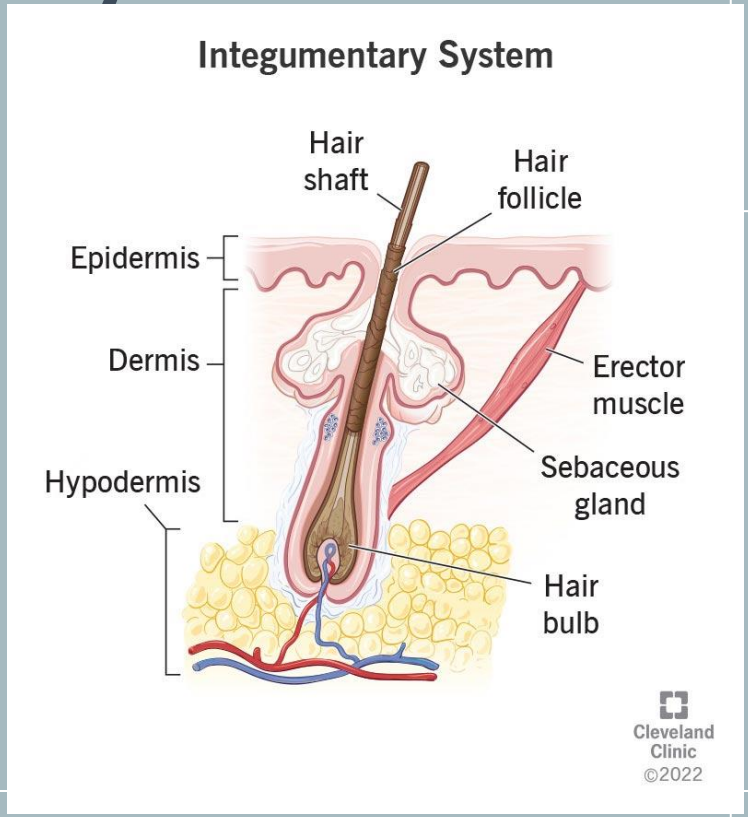
Integumentary system



- It is the body’s outer layer.
- It acts as a physical barrier — protecting the body from bacteria, infection, injury and sunlight.
- It also helps regulate your body temperature and allows you to feel skin sensations like hot and cold.

Integumentary system

Your integumentary system is an organ that consists of a few main structures: skin, nails, hair and glands, along with the nerves and blood vessels that support them.



Integumentary system

SKIN

The skin is the body's largest organ.
It is composed of three layers, with nerves that recognize different sensations in each layer:

Epidermis

The top layer of the skin.
It’s made up of three types of cells: melanocytes, keratinocytes and Langerhans.
It gives your skin its color and provides a waterproof barrier.

Dermis

The middle layer of the skin.
This layer is the thickest.
It contains sweat and oil glands and hair follicles.

Hypodermis

The bottom layer of the skin.
It’s the fatty layer of the skin that helps insulate your body.

Integumentary system

NAILS

They protect the ends of your fingers and toes

HAIR

-The hair on the head helps keep heat in the body.
-The eyelashes and eyebrows help protect the eyes from dirt and water.
-The hair is made of a protein called keratin.

GLANDS

They release materials like water, salt or oil from under the skin to the surface of your skin.
It consists of the following glands:

Integumentary system

GLANDS

Sudoriferous glands

These are the glands that secrete sweat through the skin.

Sebaceous glands

These glands produce sebum (oil) and give the face its oil.

Ceruminous glands

These are the glands in the ear that secrete ear wax.

Mammary glands

These are the glands on a person’s chest. The produce milk after giving birth.

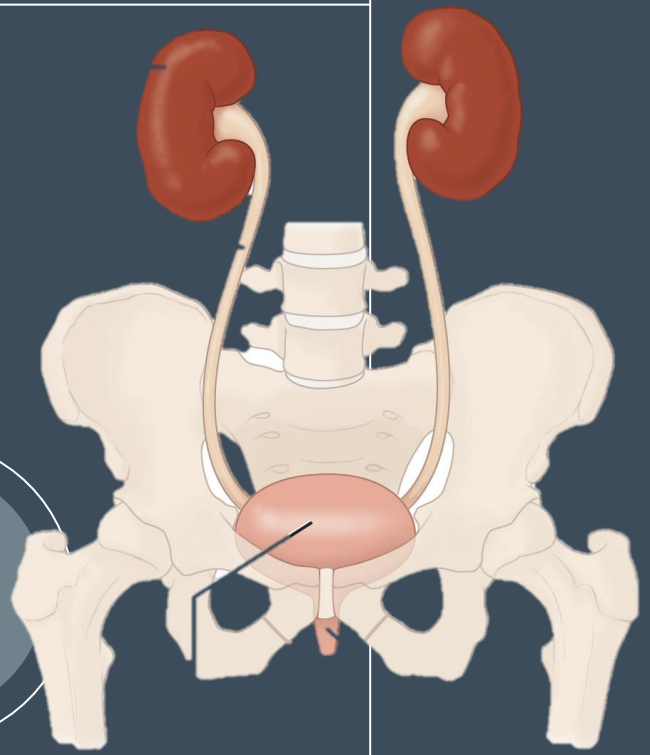
Integumentary system

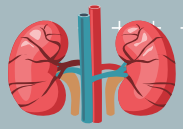
The integumentary system has many important functions. It:

- Provides physical protection against bacteria and germs.
- Cushions and protects your body from infection.
- Protects you from the sun’s ultraviolet (UV) rays and sunburn.
- Excretes sebum, sweat and other waste from your body.
- Regulates your body temperature and allows you to stay cool.
- Helps you feel heat, cold and detect other sensations.
- Synthesizes vitamin D.

10

Urinary system



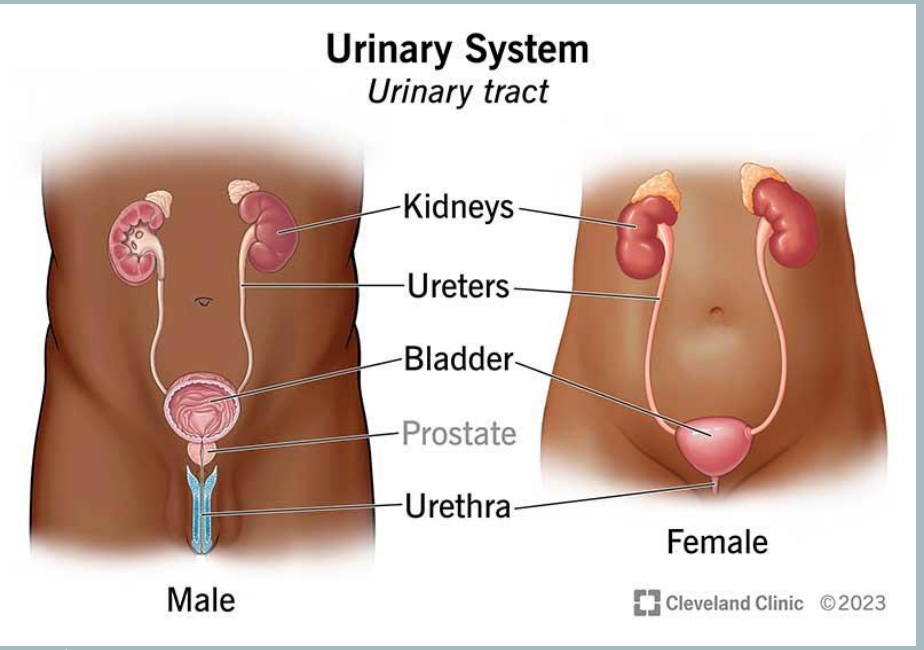


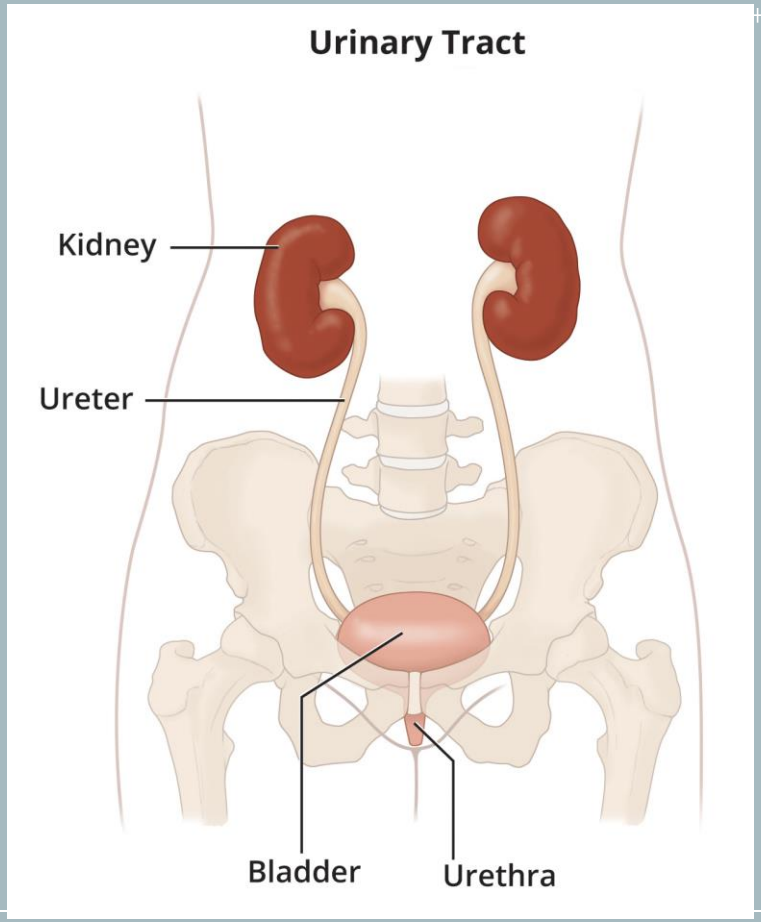
Urinary system

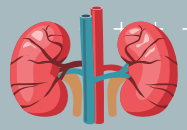
The urinary system (or urinary tract) works as your body’s filtration system.

When your urinary system removes toxins and wastes from your body, it comes out as urine.

To be able to urinate, your body must pass this waste through a series of organs, ducts and tubes.


Urinary System
Urinary tract
Kidneys
Ureters
Bladder
Prostate
Urethra
Male
Female
Cleveland Clinic ©2023


Urinary Tract
Kidney
Ureter
Bladder
Urethra



Urinary system

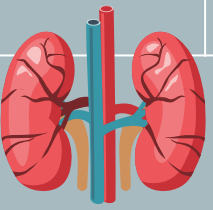
The main organs in your urinary system are:

Two kidneys : blood-filtering organs.

Two **ureters:** ducts that connect the kidneys to the bladder

A bladder: an organ that holds the urine.

A urethra: a tube connected to the bladder that allows urine to leave the body.



Urinary system

The main function of the urinary system

- Filtering blood.
- Separating the toxins you don’t need from the nutrients you do need.
- Storing and carrying urine out of the body.

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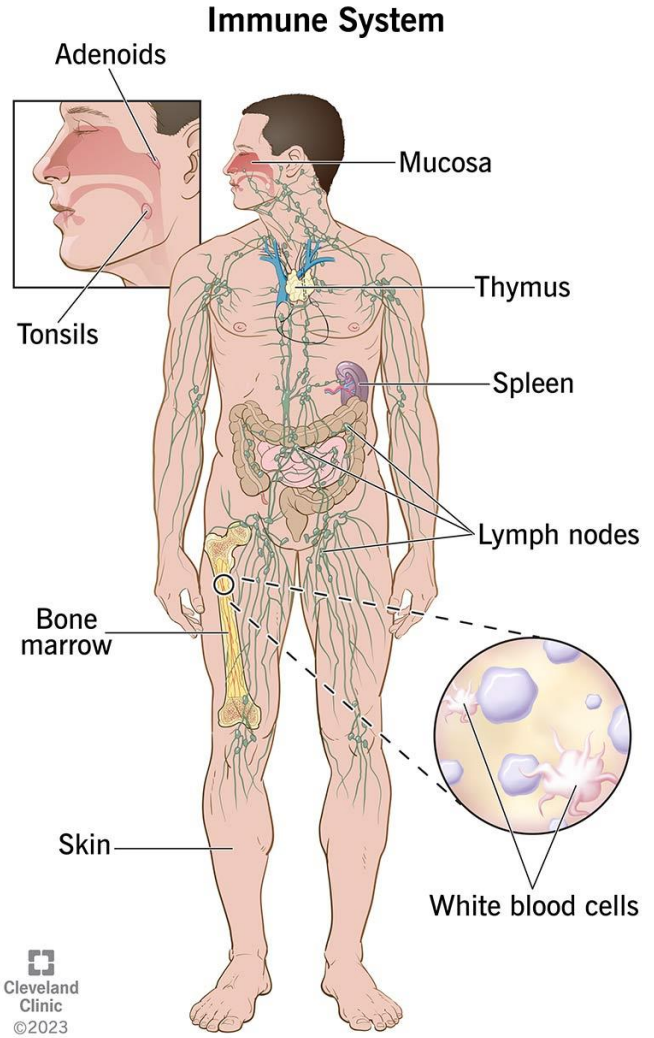
Immune system

Immune system

The immune system is a large network of organs, cells, proteins and chemicals. These parts all work together to protect you from germs and other invaders



Immune system

Parts of the immune system

- **White blood cells** include lymphocytes (such as B-cells, T-cells
- **Antibodies**

Complement system is made up of proteins whose actions complement the work done by antibodies.

- **lymphatic system**
- **spleen**
- **bone marrow**
- **thymus.**

Immune system

The body's other defences against microbes

- **Skin** – a waterproof barrier that secretes oil with bacteria-killing properties
- **Lungs** – mucous in the lungs (phlegm) traps foreign particles, and small hairs (cilia) wave the mucous upwards so it can be coughed out
- **Digestive tract** – the mucous lining contains antibodies, and the acid in the stomach can kill most microbes
- Other defences – body fluids like skin oil, saliva and tears contain anti-bacterial enzymes that help reduce the risk of infection.

Immune system

Fever

IT is an immune system response

A rise in body temperature, or **fever**, can happen with some infections. This is actually an immune system response. A rise in temperature can kill some microbes.

Immune system

How does the immune system work?

When your immune system is working properly, it:

- Tells the difference between cells that are yours and those that don't belong in your body.
- Activates and mobilizes to kill germs that may harm you.
- Ends an attack once the threat is gone.
- Learns about germs after you've had contact with them and develops antibodies against them.
- Sends out antibodies to destroy germs that try to enter your body in the future.