The basic of human body

The physical substance of the human organism, composed of living cells and extracellular materials and organized into tissues, organs, and systems

And it also means that each of our lives, thinks, worries, and daydreams with, and within, that most complex and marvelous of possessions

The number of humans in the world now is over 7.9 billion.

More than 123 000 000 babies are born in the 2021 year, while over 51,000 000 people die.

The increase of population still encreasing. How this rate of growth translates into the living conditions on the planet can be observed by any of us.

This course aims to introduce the absolute basics about the human body. It is designed as a whole, so that we develop a basic understanding of our body.

These minimal basics of the body should be known by anyone who wants to take their tactical development up a level.

Characteristic of life

Response to their environment

Living things know what is going on around them, and respond to changes in the environment

An adaptation refers to the process of becoming adjusted to an environment.

Adaptations may include: structural, physiological, or behavioral traits that improve an organism's likelihood of survival, and thus, reproduction.

Growth and Change

All living organisms have the ability to grow and change.

Reproduction

All living organisms must have the ability to reproduce. Living things make more organisms like themselves. Whether the organism is a rabbit, or a tree, or a bacterium, life will create more life. If a species cannot create the next generation, the species will go extinct.

Reproduction is the process of making the next generation and may be a sexual or an asexual process.

Sexual reproduction involves two parents and the fusion of gametes, haploid sex cells from each parent. Sexual reproduction produces offspring that are genetically unique and increases genetic variation within a species.

Asexual reproduction involves only one parent. It occurs without a fusion of gametes and produces offspring that are all genetically identical to the parent.

Have Complex Chemistry

All living organisms have complex chemistry. A flower has a complicated and beautiful structure. So does a crystal. But if you look closely at the crystal, you see no change. The flower, on the other hand, is transporting water through its petals, producing pigment molecules, breaking down sugar for energy, and undergoing a large number of other biochemical reactions that are needed for living organisms to stay alive. The sum of all the chemical reactions in a cell is metabolism.

Maintain Homeostasis

A human body has a temperature of 37 degrees Celsius, (about 98.6 degrees Fahrenheit). If you step outside on a cold morning, the temperature might be below freezing. Nevertheless, you do not become an ice cube. You shiver and the movement in your arms and legs allows you to stay warm. Eating food also gives your body the energy it needs to keep warm. Living organisms keep their internal environments within a certain range (they maintain a stable internal condition), despite changes in their external environment.

This process is called homeostasis and is an important characteristic of all living organisms.

Built of Cells

If you look closely at any organism you can see that it is made of structures called cells. Organisms that are very different such as ferns, fish, and elephants all look similar at the cellular level. A cell is the basic unit of structure and function of all living organisms. All living organisms are made of one or more cells: a simple bacterium will consist of just one cell, whereas you are made of trillions of cells.

Summarizing:

The characteristics of life are: respond to their environment, grow and change, reproduce and have offspring, have complex chemistry, maintain homeostasis, built structures called cells, pass their traits onto their offspring.

Human Anatomy

(ana- = “up”, tome = “to cut”) is often defined as the study of structures in the human body. Anatomy focuses on the description of the form, or how body structures at different levels look.

Gross anatomy studies macroscopic structures (the body, organs, and organ systems)

Histology studies microscopic structures (tissues, cells, and organelles).

Human Physiology

(physio = “nature”; -logy = “study”) studies the “nature” of the human body, nature in the sense of how structures at different levels work. Physiology focuses on function, or how structures at different levels work.

Anatomy and physiology are intimately related. A hand is able to grab things (function) because the length, shape, and mobility of the fingers (form) determine what things a hand can grab (function), etc.

Body structure functions depend on their form. The way structures work depends on the way they are organized. So understanding Physiology requires an understanding of Anatomy, and vice versa.

Levels of Organization of the Body

Atom - the smallest unit (of course there are subatomic particles, but for is enough an atom is the smallest unit.)

Molecules - combined atoms to form and they are the building blocks to all structures in the human body.

- Small molecules – for example, O2, CO 2
- Medium molecules - for example, C6H12O6 – glucose, C12H22O11 – sugar,…
- Large molecules– for example, proteins are made of hundreds of atoms.

Cells - made of all living structures, which are made of many different molecules.

Cells are the smallest independent living thing in the human body.

The body is made of many different cell types, each with a particular function, (for example muscle cells contract to move something and red blood cells carry oxygen).

Organelles - groups of macromolecules used to carry out a specific function in the cell.

There are many types of organelles, each with a particular function (for example, organelles called mitochondrion to provide energy to a cell).

Tissue is a group of similar cells that work together to perform a specific function.

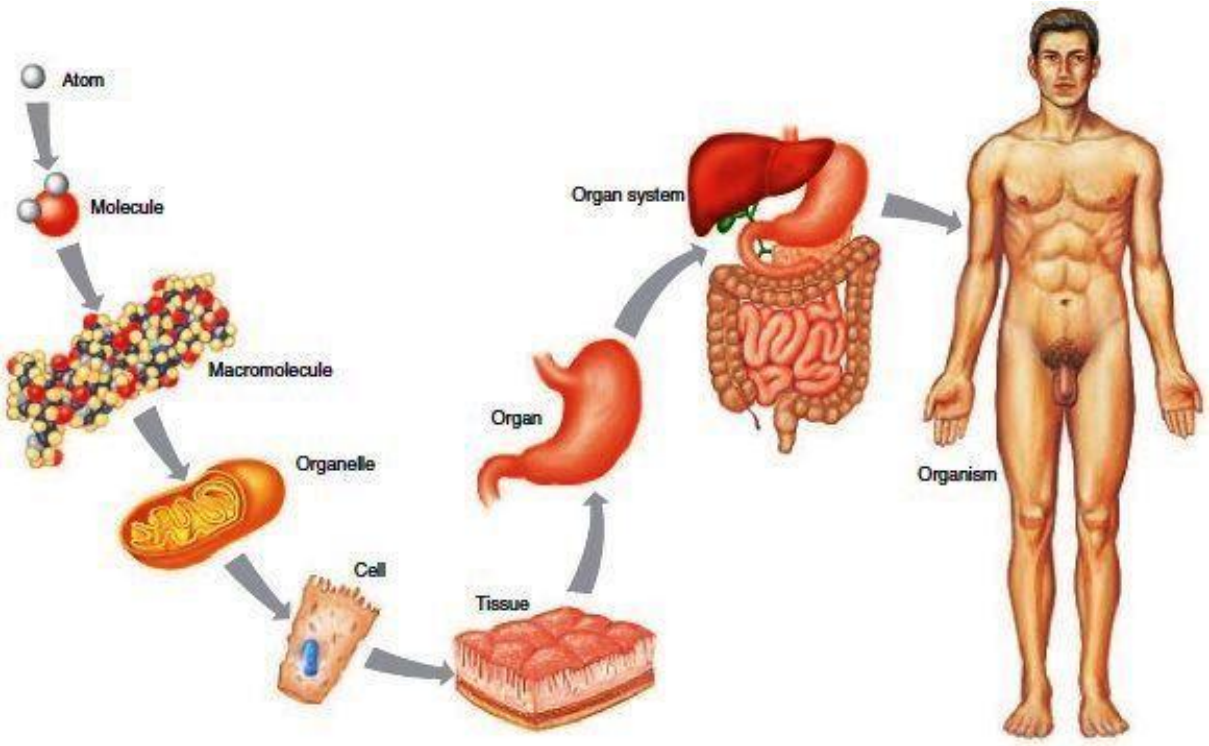
4 main tissue types in humans:

- muscular
- epithelial
- nervous
- connective

The organ is an identifiable structure of the body composed of two or more tissues types.

An organ system is a group of organs that work together to perform a specific function.

An Organism - the most complex level of organization and it is composed of many organ systems that work together to perform the functions of an independent individual.



Summarizing:

The major levels of organization in the body, from the simplest to the most complex are: atoms, molecules, organelles, cells, tissues, organs, organ systems, and the human organism.

Homeostasis

(homeo- = "like, resembling, of the same kind"; stasis = “standing still”) means to maintain body functions within specific livable ranges, adjusting to internal and external changes.

Temperature, nutrient concentration, acidity, water, sodium, calcium, oxygen, as well as blood pressure, heart rate, and respiratory rate are some of the internal body variables that must remain within a certain range.

When the body fails to maintain internal body variables within a certain range, normal function is interrupted, and disease or illness may result.

All organisms must maintain a constant internal environment to function properly:

• Temperature

• pH (acidic or basic)

• Salinity (salt level)

• Fluid levels

Control system

- anything that must be maintained in the body within a normal range.

A control system consists of 4 components:

Stimulus, or physiological variable that changes, is the item to be regulated. Variable in the broad sense is a value that varies or changes.

Two examples of variables that change are body temperature and blood glucose. Anything that can be measured and varies is a variable.

Sensor, or sensory receptor, is the cell, tissue, or organ that senses the change in the stimulus or physiological variable. For example, sensory nerve cell endings in the skin sense a rise in body temperature, and specialized cells in the pancreas sense a drop in blood glucose. The sensory receptor or sensor provides input to the control center.

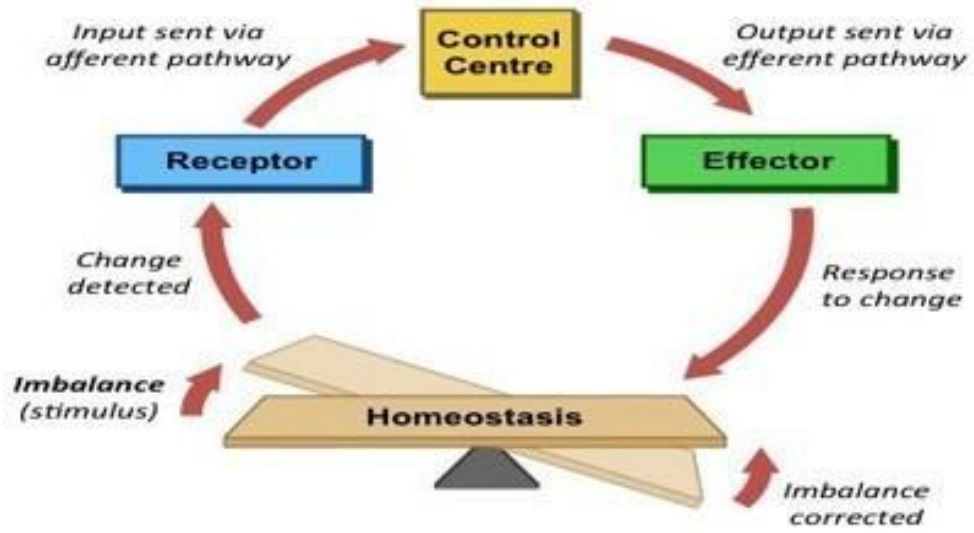
The Control center is the body structure that determines the normal range of the variable or set point.

For example, an area of the brain called the hypothalamus determines the set point for body temperature (around 37°C, or 98.6°F), and specialized cells in the pancreas determine the set point for blood glucose (around 70-100mg/dL).

To maintain homeostasis, the control center responds to the changes in the stimulus received from the sensor by sending signals to effectors.

Effector is the cell, tissue, or organ that responds to signals from the control center, thus providing a response to the stimulus (a physiological variable that changed) in order to maintain homeostasis.

For example, sweat glands (effectors) throughout the body release sweat to lower body temperature; and cells of the liver (effectors) release glucose to raise blood glucose levels.



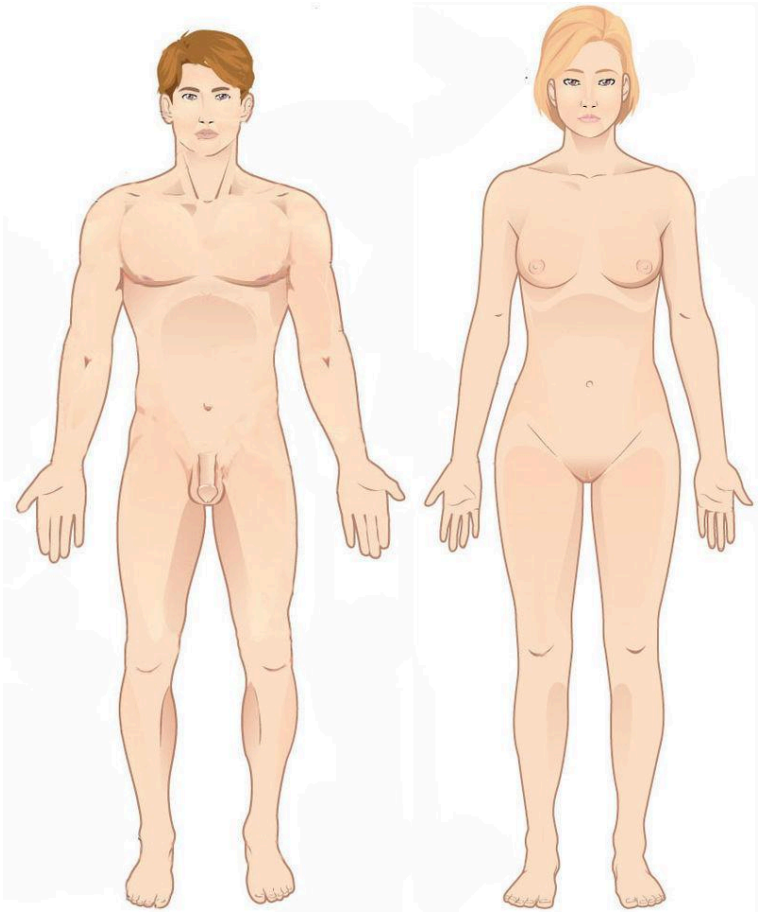
Summarizing:

Homeostasis is a challenging large-scale topic. For now, it will be enough for us to know that all organisms must maintain a constant internal environment to function properly: temperature, pH, salinity, fluids levels.

Standard anatomical terms of location

These terms are used to unambiguously describe the anatomy of humans. The terms derived from Latin or Greek roots describe something in its standard anatomical position. This position provides a definition of what is at the front ("anterior"), behind ("posterior"), and so on. As part of defining and describing terms, the body is described through the use of anatomical planes and anatomical axes.

Standard anatomical position:

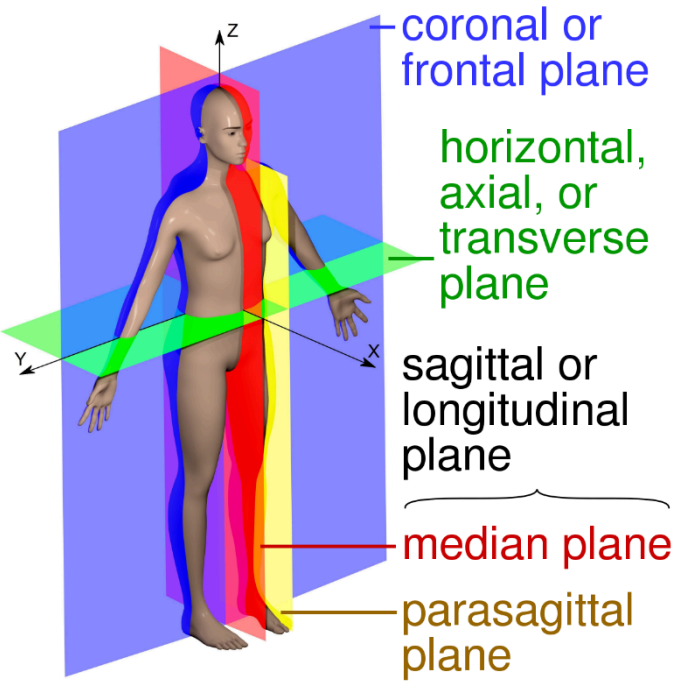


It doesn't matter whether you are looking from the front or from the back, from the side, etc. We always base the description on the standard anatomical position.

Anatomical plane

Anatomical terms describe structures with relation to four main anatomical planes:

- **The median plane** - divides the body into left and right. This passes through the head, spinal cord, navel.
- **The sagittal planes** - are parallel to the median plane.
- **The frontal plane**, also called the **coronal plane** - divides the body into front and back.
- **The horizontal plane**, also known as **the transverse plane** - is perpendicular to the other two planes.



Prefixes

- **Sub -** (from Latin sub 'preposition beneath, close to, nearly etc') is used to indicate something that is beneath, or something that is subordinate to or lesser than.
- **Hypo** - (from Ancient Greek ὑπό „under“) is used to indicate something that is beneath.
- **Infra** - (from Latin infra „under“) is used to indicate something that is within or below.
- **Inter** - (from Latin inter „between“)is used to indicate something that is between.
- **Super**- or **Supra** - (from Latin super, supra „above, on top of“) is used to indicate something that is above something else.

Suffixes, added to the end of words:

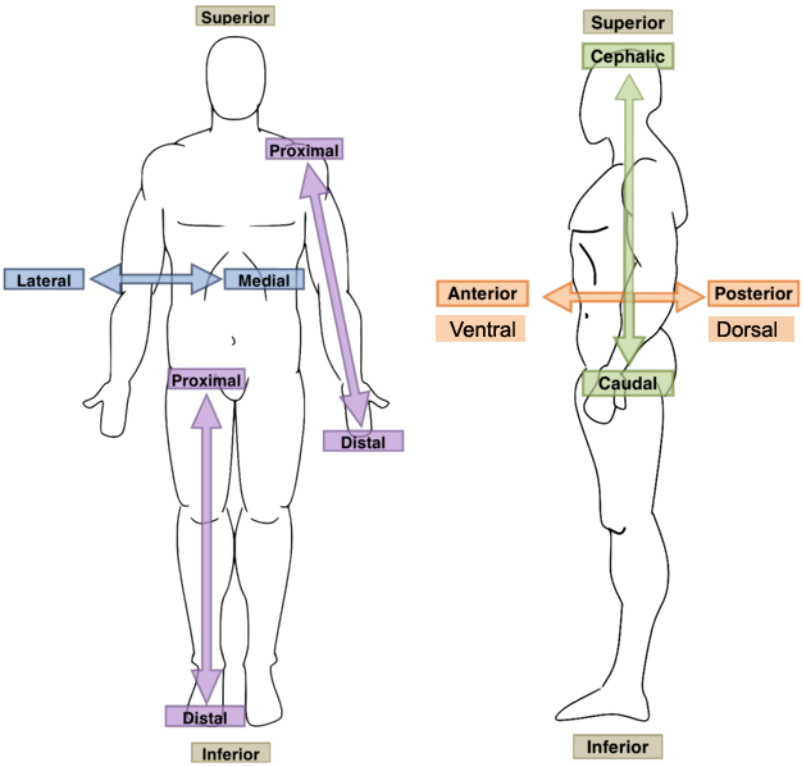
- **ad** (from Latin ad „towards“)
- **ab** (from Latin ab)

These suffixes are used to indicate that something is towards (-ad) or away from (-ab) something else.

Main terms

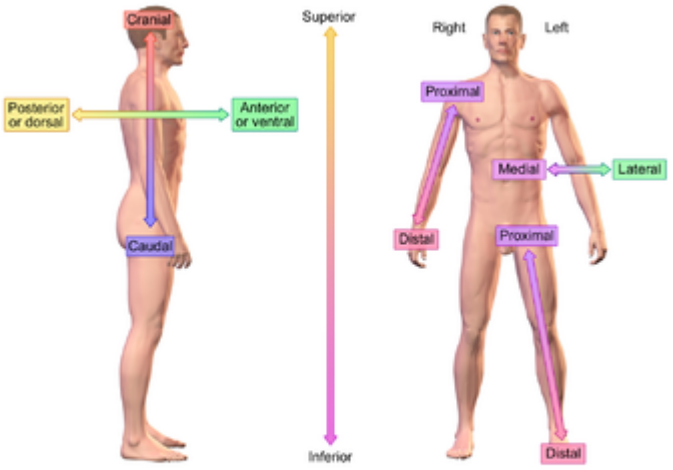
- **Superior** (from Latin super „above“) describes what is above something
- **inferior** (from Latin inferus „below“) describes what is below it.

- **Anterior (**from Latin ante „before“) describes what is in front.
- **posterior** (from Latin post „after“) describes what is to the back of something.
- **Lateral** (from Latin lateralis „to the side“) describes something to the sides of an animal, as in "left lateral" and "right lateral".
- **Medial** (from Latin medius „middle“) describes structures close to the midline, or closer to the midline than another structure.
- **Dexter** - “right“
- **Sinister** - “left“



- **Contralateral** (from Latin contra „against“): on the side opposite to another structure.
- **Ipsilateral** (from Latin ipse „same“): on the same side as another structure.
- **Bilateral** (from Latin bis „twice“): on both sides of the body.
- **Unilateral** (from Latin unus „one“): on one side of the body.
- **Proximal** (from Latin proximus „nearest“)
- **Distal** (from Latin distare „to stand away from“)
- These terms are used to describe parts of a feature that are close to or distant from the main mass of the body, respectively.Thus the upper arm in humans is proximal and the hand is distal.
- **Central** (from Latin centralis) describes something close to the center.
- **Peripheral** (from Latin peripheria, originally from Ancient Greek) describes something further away from the center of something.

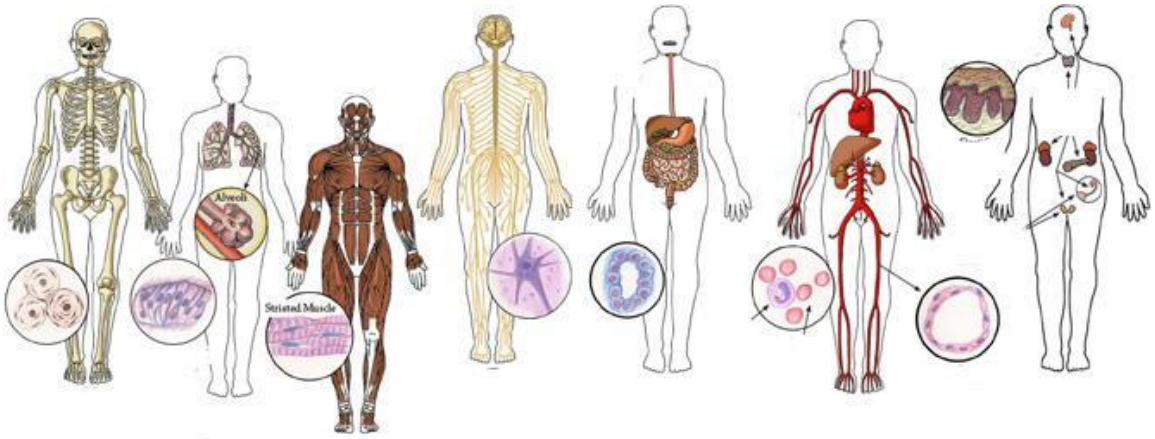
- **Superficial** (from Latin superficies „surface“) describes something near the outer surface of the organism..
- **Dorsal** (from Latin dorsum „back“) surface of an organism refers to the back, or upper side, of an organism. If talking about the skull, the dorsal side is the top.
- **Ventral** (from Latin venter „belly“) surface refers to the front, or lower side, of an organism.
- **Cranial** (from Greek κρανίον „skull“) or **cephalic** (from Greek κεφαλή „head“) describes how close something is to the head of an organism.
- **Caudal** (from Latin cauda „tail“) describes how close something is to the trailing end of an organism.



Directional References

The body systems

- Integumentary (skin)
- Muscular
- Skeletal
- Nervous
- Circulatory
- Lymphatic,
- Respiratory
- Endocrine
- Urinary/Excretory
- Reproductive
- Digestive



All of your body systems have to work together to keep you healthy. If any system in your body isn't working properly, other systems are affected.

Skeletal system

is composed of **bones** and **cartilages**.

<u>There are two parts of the skeleton:</u>

- **axial**
- **appendicular**

<u>The axial skeleton consists of:</u>

- **bones of the head**
- **trunk**

<u>The appendicular skeleton consists of:</u>

- **bones within the limbs,**
- **pectoral girdles**
- **pelvic girdles**

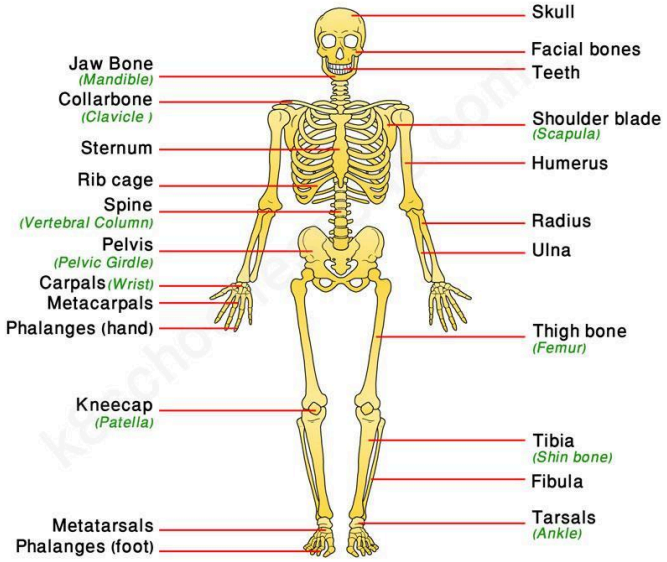
There are 206 bones in an adult human body. The place at which two bones are fitted together is called the joint or articulation.

Joints are supported by **cartilages** and reinforced with **ligaments**.

Functions of the skeletal system are:

- **mechanical support**
- **movement, protection**
- **blood cell production**
- **calcium storage**
- **endocrine regulation**

Elements of the skeletal system are adjusted to the function of the body part they support.



Muscular system

consists of all the body muscles.

There are 3 muscle types:

- **smooth**
- **cardiac**
- **skeletal**

Smooth muscle is found within walls of blood vessels and hollow organs such as the stomach or intestines.

Cardiac muscle cells form the heart muscle, also called the **myocardium**.

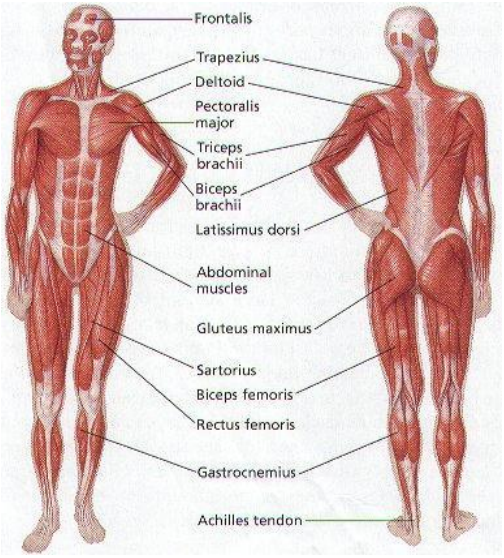
Skeletal muscles attach to the bones of the body. Among these three, only skeletal muscles can be controlled consciously and enable us to produce body movement, while the function of the other two muscle types is regulated by the autonomic nervous system and is absolutely unconscious.

Skeletal muscles

The skeletal muscles are the main functional units of the muscular system. There are more than 600 muscles in the human body. They vary greatly in shape in size, with the smallest one being the stapedius muscle in the inner ear, and the largest one being the quadriceps femoris muscle in the thigh.

The skeletal muscles of the human body are organized into 4 groups for every region of the body:

- **Muscles of the head and neck**, which include the muscles of the facial expression, muscles of mastication, muscles of the orbit, muscles of the tongue, muscles of the pharynx, muscles of the laryn, and muscles of the neck
- **Muscles of the trunk**, which include the muscles of the back, anterior and lateral abdominal muscles, and muscles of the pelvic floor
- **Muscles of the upper limbs**, which include muscles of the shoulder, muscles of th arm, muscles of the forearm and muscles of the hand
- **Muscles of the lower limbs**, which include hip and thigh muscles, leg muscles and foot muscles



Cardiovascular system

<u>The cardiovascular system is comprised of:</u>

- **heart**
- **circulatory system of blood vessels.**

<u>The heart is composed of four chambers</u>

- **two atria**
- **two ventricles**

Blood enters the heart through **the upper chambers of the left** and **right atria** and **exits via the left and right ventricles**. Heart valves prevent the backflow of blood.

The **heart** acts as a **two-way pump**.

The right side of the heart pumps deoxygenated blood into **the pulmonary circulation of the lungs**, where the **blood is reoxygenated** again.

While the **left side of the heart** simultaneously **pumps oxygenated blood into the systemic circulation**, distributing it to the peripheral tissues.

The regular pumping, or heartbeat, is controlled by **the conduction system of the heart**.

The circulatory system, also **called the vascular system**, consists of:

- arteries
- veins
- capillaries

They all comprise a continuous network of vessels that act to carry blood around the body.

Blood leaves the heart via **arteries**, these progressively reduce in size to continue as smaller arterial vessels called **arterioles**. Arterioles end in a web of even smaller vessels called **capillaries.**

The exchange of gases and nutrients occurs through the capillary walls.

Small veins, called **venules**, leave from capillaries and gradually increase their lumen on the way to the heart to end as veins.

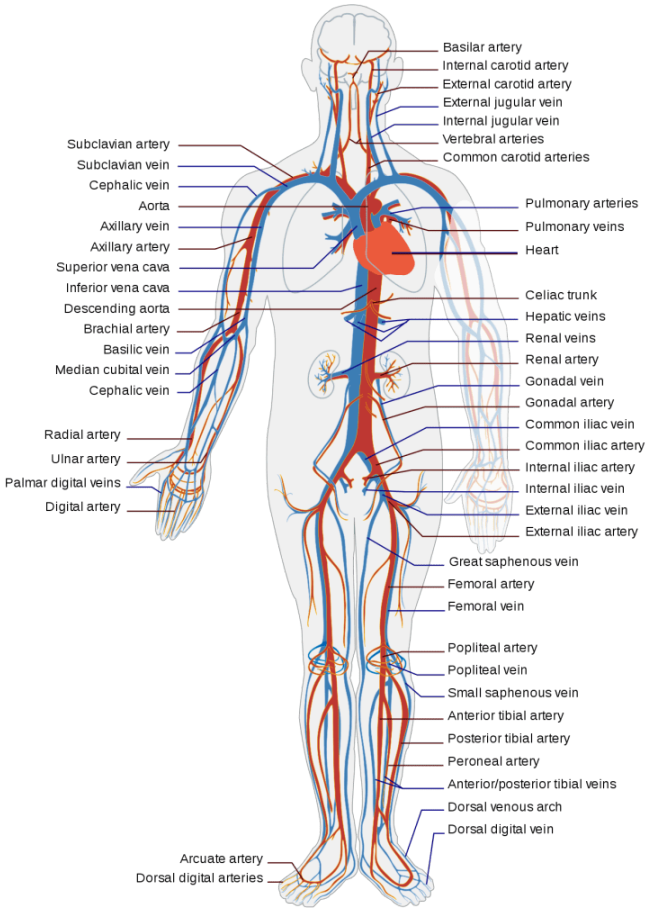
There is a certain histological difference between arteries and veins, but their main functional difference reflects the direction in which they conduct blood: the arteries convey blood from the heart to the periphery, whereas the veins convey blood from the periphery to the heart.

There are **3 separate circuits** to the circulatory systém:

- **The pulmonary circulation** which carries blood between the heart and the lungs;
- **The coronary circulation** which supplies blood to the muscle of the heart;
- **The systemic circulation** which carries blood to the rest of the body.

Major arteries within the systemic circulatory system are the **aorta** and its branches.

The **main representatives of the veins** are the **superior vena cava** and **inferior vena cava**.



Respiratory system

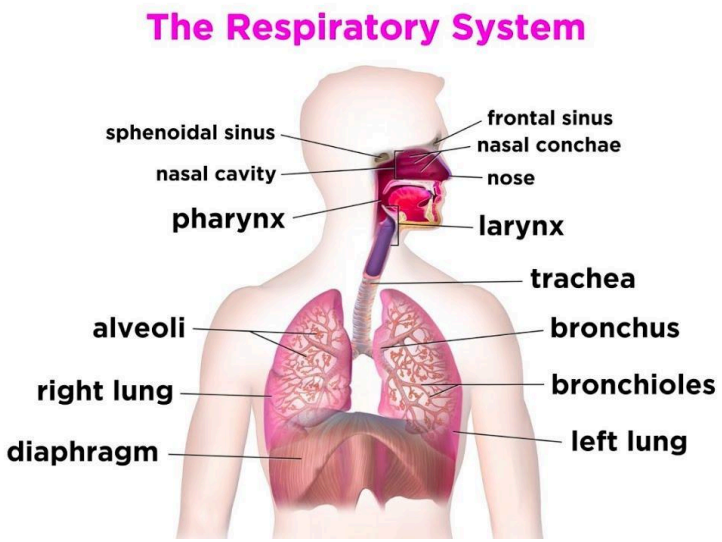
consists of a series of organs:

- **nasal cavity**
- **pharynx**
- **larynx**
- **trachea**
- **bronchi**
- **bronchioles**
- **lungs (alveoli)**

The nasal cavity and pharynx are together called **the upper respiratory system**, while **the remainder of the organs** comprises **the lower respiratory system**.

Respiratory system organs, with the exception of the alveoli, function to conduct air into the lungs aided by the muscles of respiration (mainly the **diaphragm** and **intercostal muscles**).

Once air is in the lungs it enters **alveoli** (the site of gas exchange) and interacts with blood transported by **the pulmonary circulation**. Here carbon dioxide is removed from, and oxygen returned to, the blood.



Nervous system

controls how we interact with and respond to our environment, by controlling the function of the organs in our other body systems.

The nervous system organs are:

- **brain**
- **spinal cord**
- **sensory organs**

These are connected by neurons, which act to transmit neural signals around the body.

Morphologically and topographically, the nervous system is divided into:

- **central (CNS)**
- **peripheral (PNS) nervous systems**

By functionally, the nervous system is considered as 2 parts:

- **somatic (SNS) or voluntary nervous system,**
- **autonomic (ANS) or involuntary nervous system**

Central nervous system

The definition is that it receives information from the body's environment and generates instructions, thereby controlling all the activities of the human body.

This two-way information flows into, and out of, the CNS is conveyed by the peripheral nervous system.

The **CNS** consists of:

- **brain**
- **spinal cord**

The brain is placed within the **neurocranium**, and is formed from:

- **cerebrum**
- **cerebellum**
- **brainstem (pons and medulla oblongata)**

The central parts of the CNS are occupied by spaces called ventricles filled with cerebrospinal fluid (CSF).

The spinal cord is placed within the **vertebral column**. The spinal canal extends through the central part of the spinal cord. It is also filled with CSF and it communicates with the ventricles of the brain.

Peripheral nervous system

The definition is that it conducts information from the CNS to the target tissues, and from the target tissues to the CNS. It consists of nerves and their ganglia.

The Ascending, afferent, or sensory nerve fibers are nerves that carry information from peripheral sense organs (for example eye, tongue, nasal mucosa, ear, skin) to the CNS.

The descending, efferent, motor, or secretory nerve fibers carries information from the CNS to the periphery (muscles and glands).

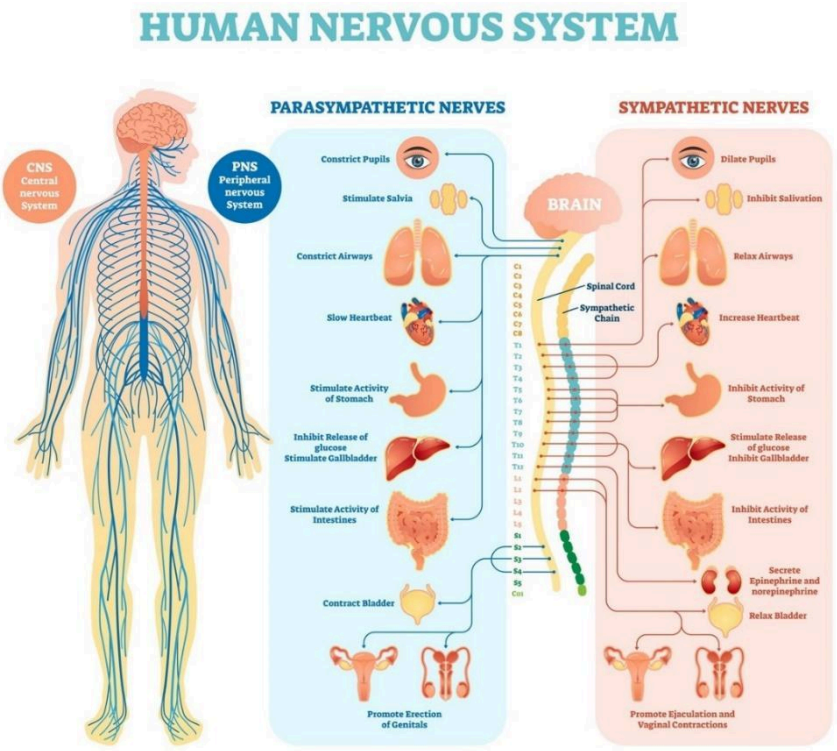
Somatic and autonomic nervous systems

The somatic nervous system (SNS) and autonomic nervous system (ANS) are divisions of the peripheral nervous system, with information conveyed through the cranial and spinal nerves.

Definition of SNS is that it allows voluntary control over our movements and responses. It conveys sensory and motor information between the skin, sensory organs, skeletal muscles, and the CNS; establishing communication of the human body with its environment and response to outside stimuli.

Major somatic peripheral nerves include:

- **median nerve**
- **sciatic nerve**
- **femoral nerve**



Digestive system

The function is to degrade food into smaller and smaller compounds until they can be absorbed into the body and used as energy. It consists of a series of gastrointestinal tract organs and accessory digestive organs.

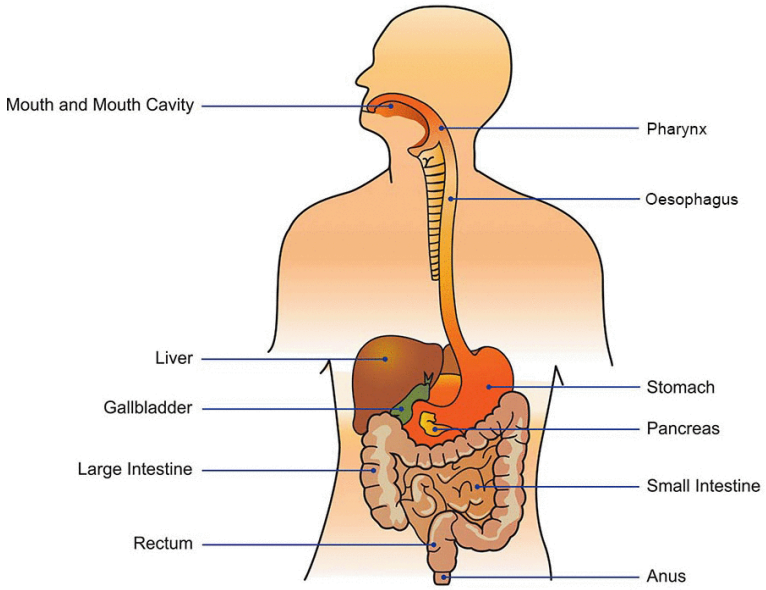
The digestive system organs spread from the mouth to the anal canal.

- **mouth**
- **pharynx**
- **esophagus**
- **stomach**
- **small intestine**
- **large intestine**
- **anal canal**

Accessory digestive organs assist with the mechanical and chemical food breakdown:

- **tongue,**
- **salivary glands**
- **pancreas**
- **liver**

- **gallbladder**



Urinary system

This is a body drainage system comprised of a group of organs that produce and excrete urine.

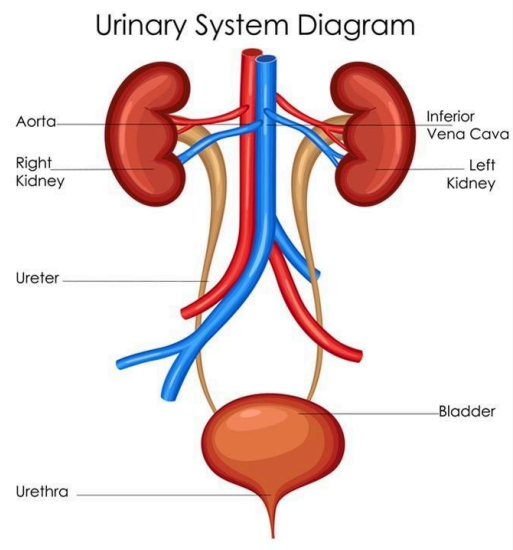
It consists of:

- kidneys
- ureters
- urinary bladder
- urethra

Kidneys are paired bean-shaped organs placed retroperitoneally and have a rich blood supply provided by the renal artery.

Nephrons within the kidneys filter the blood that passes through their web of capillaries (glomerulus). The blood filtrate then passes through a series of tubules and collecting ducts, eventually forming the final ultrafiltrate, urine. Urine passes into the **ureters**, tubes of smooth muscle that convey urine from the kidneys to the **urinary bladder**.

The bladder is a hollow muscular organ that collects and stores urine before disposal by urination (micturition). Functions of the urinary system include; elimination of body waste, regulation of blood volume and blood pressure, regulation of electrolyte levels and blood pH.



Endocrine system

Is a collection of glands. These glands secrete a variety of hormones, which travel to specific target organs via the bloodstream. Hormones have specific functions such as regulating growth, metabolism, temperature, and reproductive development. Like the nervous system, the endocrine system acts as a signaling pathway, although hormones are slower acting than nerve impulses.

Endocrine signals can last from a few hours to a few weeks.

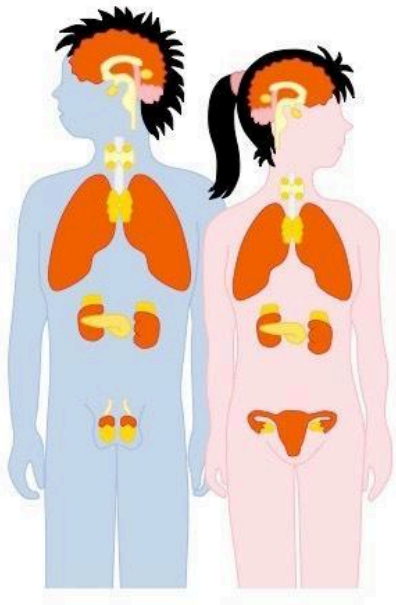
The main control center for the organs in the endocrine system is the hypothalamus in the brain. The field of medicine concerned with the endocrine system is known as endocrinology.

Endocrine glands tend to be vascular and do not have ducts. Ducts are instead found in exocrine glands, which produce hormonal signals outside of the body. The hormones of endocrine glands are stored in vacuoles or granules, ready to be released.

Endocrine glands are found throughout the body and have a variety of different roles.

<u>The key endocrine glands and organs are:</u>

- **Hypothalamus**
- **Pineal gland**
- **Pituitary gland**
- **Thyroid gland**
- **Parathyroid gland**
- **Ovaries**
- **Testes**
- **Pancreas**
- **Adrenal glands**
- **Gastrointestinal tract**



Gland	Hormone	Target Organ	Function
Pineal gland	melatonin	many	biological clock
Pituitary gland	FSH / LH ADH growth hormone oxytocin prolactin	ovaries kidneys many uterus breast tissue	menstrual cycle osmoregulation growth & division birth contractions milk production
Thyroid gland	thyroxin	liver	metabolic rate
Adrenal glands	adrenaline cortisol	many many	fight or flight anti-stress
Pancreas	insulin / glucagon	liver	blood sugar levels
Ovaries	estrogen / progesterone	uterus	menstrual cycle
Testes	testosterone	many	male characteristics

Lymphatic system

Is a network of lymphatic vessels that drains excess tissue fluid (lymph) from the intercellular fluid compartment, filters it through lymph nodes, exposes it to lymphocytes (white blood cells) of the immune systém, and returns the fluid to the circulatory system.

<u>It consists of:</u>

- **lymph**
- **lymphatic plexuses**
- **lymphatic vessels**
- **lymph nodes**
- **lymphoid organs**

<u>The function is:</u>

- **convey and eliminate toxins and waste from the body**
- **recirculate proteins**
- **defend the body from microorganisms**

Lymph is a watery tissue fluid with a similar consistency to blood plasma.

Lymphatic system organs are divided into **primary** and **secondary organs**.

Primary lymphatic organs produce lymphocytes and release them into lymphatic vessels. primary lymphoid organs are:

- **thymus**
- **red bone marrow**

Secondary lymphatic organs include:

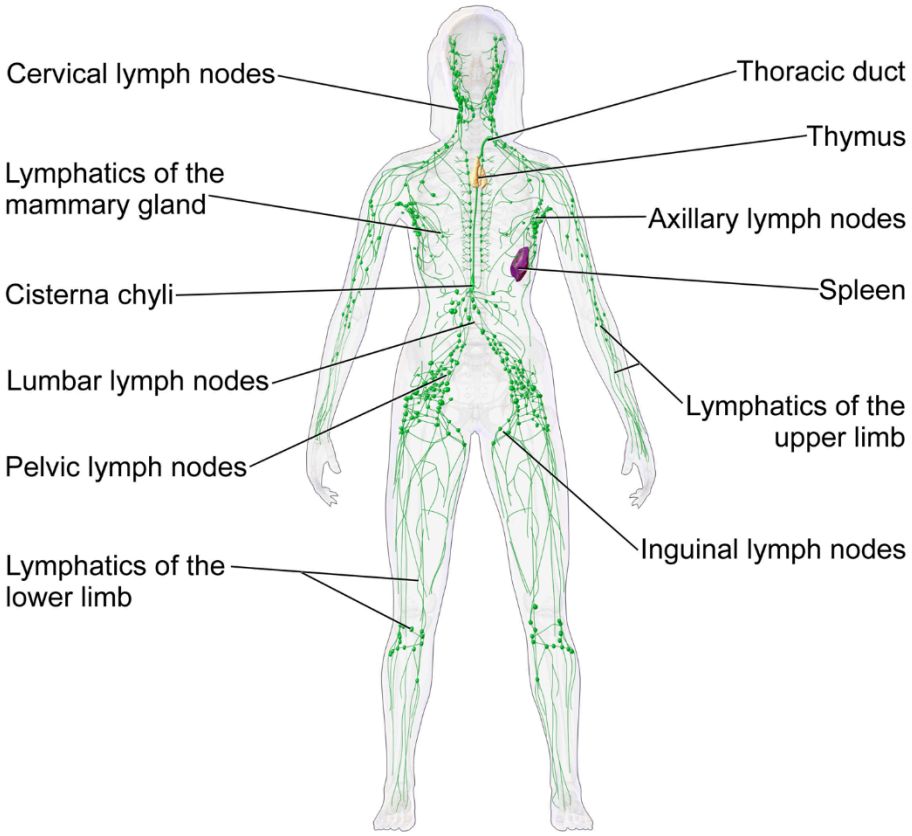
- **lymph nodes**

- **tonsils**
- **appendix**
- **spleen**

Lymph nodes are masses of lymphocytes containing lymphoid tissues, attached to lymphoid vessels. Lymph nodes function to filter cellular debris, foreign pathogens, excess tissue fluid and leaked plasma proteins.

There are aggregations of lymph nodes at key points around the body:

- **cervical**
- **axillary**
- **tracheal**
- **inguinal**
- **femoral**
- **deep nodes related to the aorta**



Reproductive system

The reproductive system, or genital system, is a system of internal and external sex organs which work together to contribute towards the reproduction process. Unlike other systems of organs, the genital system has significant differences among sexes.

The **external female** sex organs, also known as the **genitals**:

- the vulva (the labia, clitoris, and vaginal opening)

The **internal** sex organs are:

- **the ovaries**
- **fallopian tubes**
- **uterus**
- **vagina**

The vulva provides an entry to, and protection, for the vagina and uterus, as well as the proper warmth and moisture that aids in its sexual and reproductive functions. In addition, it is important for sexual arousal and orgasm in females.

The **external male** sex organs are:

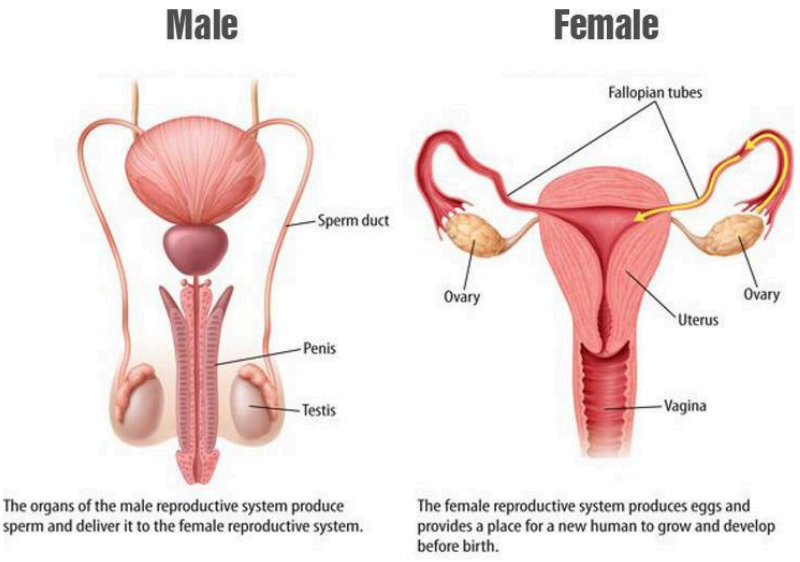
- **testes**
- **penis**

The **internal** male sex organs

- **epididymis**
- **vas deferens**
- **accessory glands**

Functionally, they can be grouped into 3 categories.

- **1st category** is for **sperm production** (the testes), and **storage** (epididymis).
- **2nd category** organs produce **ejaculatory fluid**; the vas deferens and the accessory glands (seminal vesicles and prostate).
- **3rd category** is those used for **copulation** and **deposition of the sperm**, these include the penis, urethra and vas deferens.



Integumentary system

The integumentary system is the set of organs that forms the external covering of the body. It includes

- the skin,
- skin appendages
- sweat glands
- sensory receptors

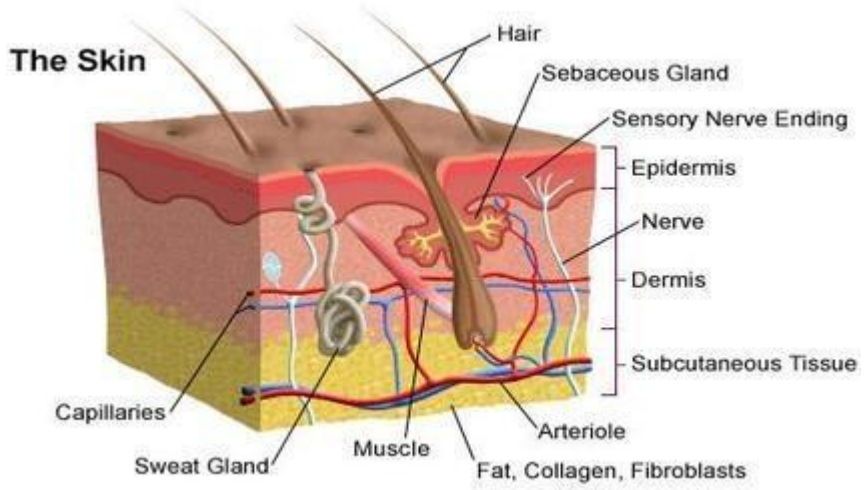
The skin is **the largest organ** of the body.

It has three layers

- **epidermis** - is a thick keratinized epithelium made of multiple cell layers.
- **dermis** - a layer of connective tissue that contains blood vessels and nerves that supply the skin
- **hypodermis** consists of fat, connective tissue, and skin appendages (hair, nails, sebaceous, and sweat glands).

The integumentary system functions are various.

It forms a continuous layer that protects the body from various damaging events, such as external injuries, loss of water and heat, and the carcinogenic effects of UV rays. It also excretes waste, contains sensory receptors to detect pain, sensation, pressure, and temperature, and provides for vitamin D synthesis.



Summarizing:

Musculoskeletal system - mechanical support, posture, and locomotion.

Cardiovascular system - transportation of oxygen, nutrients, and hormones throughout the body and elimination of cellular metabolic waste

Respiratory system - exchange of oxygen and carbon-dioxide between the body and air, acid-base balance regulation, phonation.

Nervous system - initiation and regulation of vital body functions, sensations, and body movements.

Digestive system - mechanical and chemical degradation of food with the purpose of absorbing into the body and using it as energy.

Urinary system - filtration of blood and eliminating unnecessary compounds and waste by producing and excreting urine.

Endocrine system - production of hormones in order to regulate a wide variety of bodily functions (e.g. menstrual cycle, sugar levels, etc)

Lymphatic system - draining of excess tissue fluid, immune defense of the body.

Reproductive system - production of reproductive cells and contribution towards the reproduction proces.

Integumentary system - physical protection of the body surface, sensory reception, vitamin synthesis

THIS MATERIAL WAS CREATED BY BÁČA Mikuláš