

A blue-toned background featuring a stethoscope, several white pills, and a hand holding a pen. In the upper right, there is a faint anatomical diagram of a heart with labels for 'Inferior vena cava' and 'Right ventricle'.

Biology

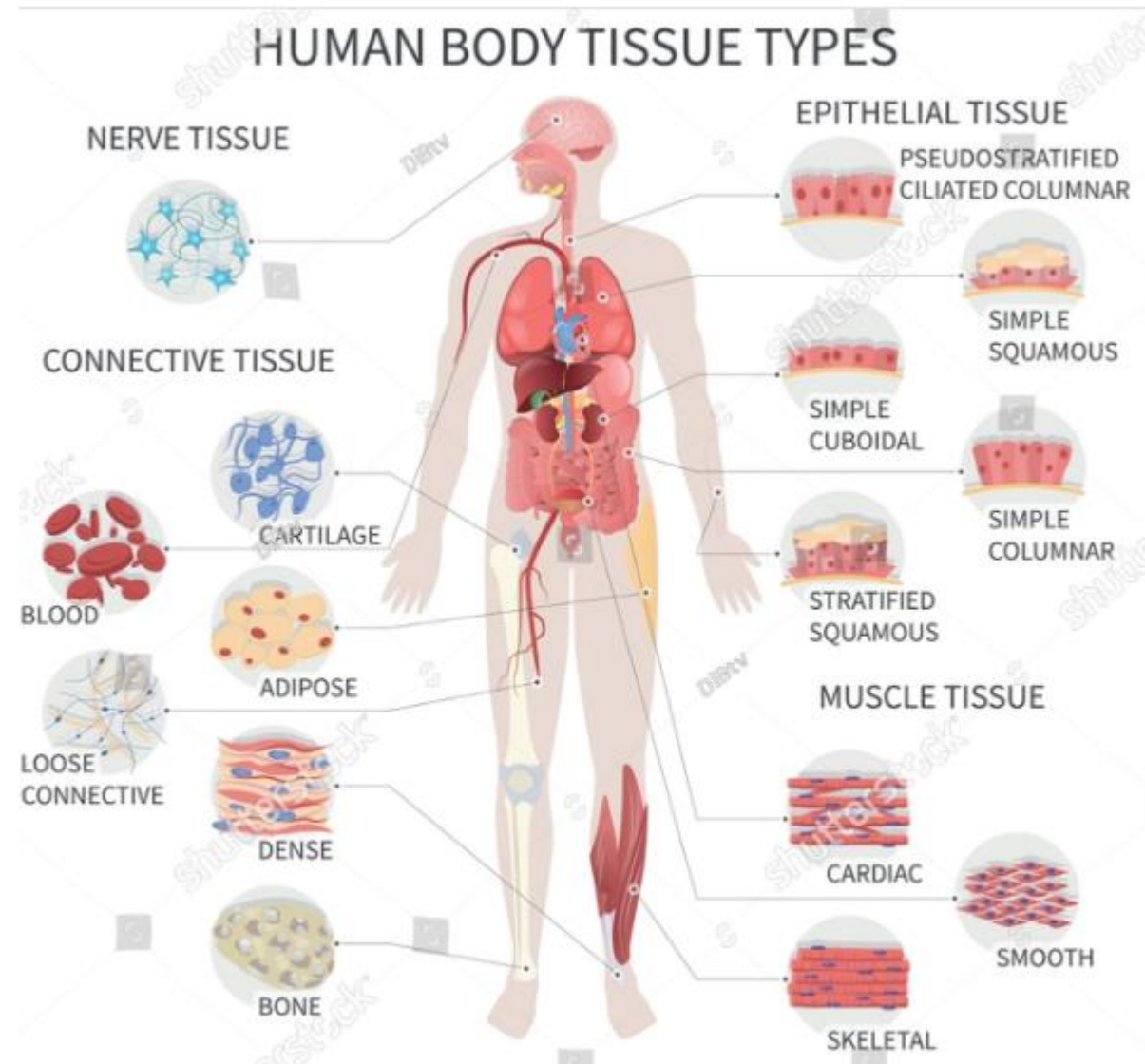
Tissue Types

A colorful background of molecular structures with spheres in blue, red, yellow, green, and purple connected by lines, set against a light green and white background with faint circular patterns.

Assis. Prof. Dr. Labeed Al - Saad

The objectives

- Overview.
- Epithelial tissue.
- Connective tissue.
- Muscular tissue.
- Nervous tissues.



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Overview

- The human body is composed of four primary types of tissues: **epithelial, connective, muscle, and nervous tissues**. Each type of tissue has distinct characteristics and functions that contribute to the overall structure and function of the body.
- **Epithelial Tissue:** This type of tissue covers the body surfaces, lines cavities and organs, and forms glands. Epithelial tissue serves as a **protective barrier, regulates the exchange of materials, and can be specialized for functions such as secretion and absorption.**

Overview

- **Connective Tissue:** Connective tissue provides support and structure to the body. It includes a wide variety of tissues such as bone, cartilage, adipose tissue, blood, and various types of fibrous connective tissue. Connective tissue also plays a role in providing mechanical support, connecting and separating tissues and organs, and transporting nutrients and waste products.

Overview

- **Muscle Tissue:** Muscle tissue is responsible for movement and generating force. There are three types of muscle tissue: **skeletal muscle** (voluntary movement), **cardiac muscle** (involuntary contraction of the heart), and **smooth muscle** (involuntary movement of hollow organs). Muscle tissue enables locomotion, maintains posture, and facilitates the movement of substances within the body.

Overview

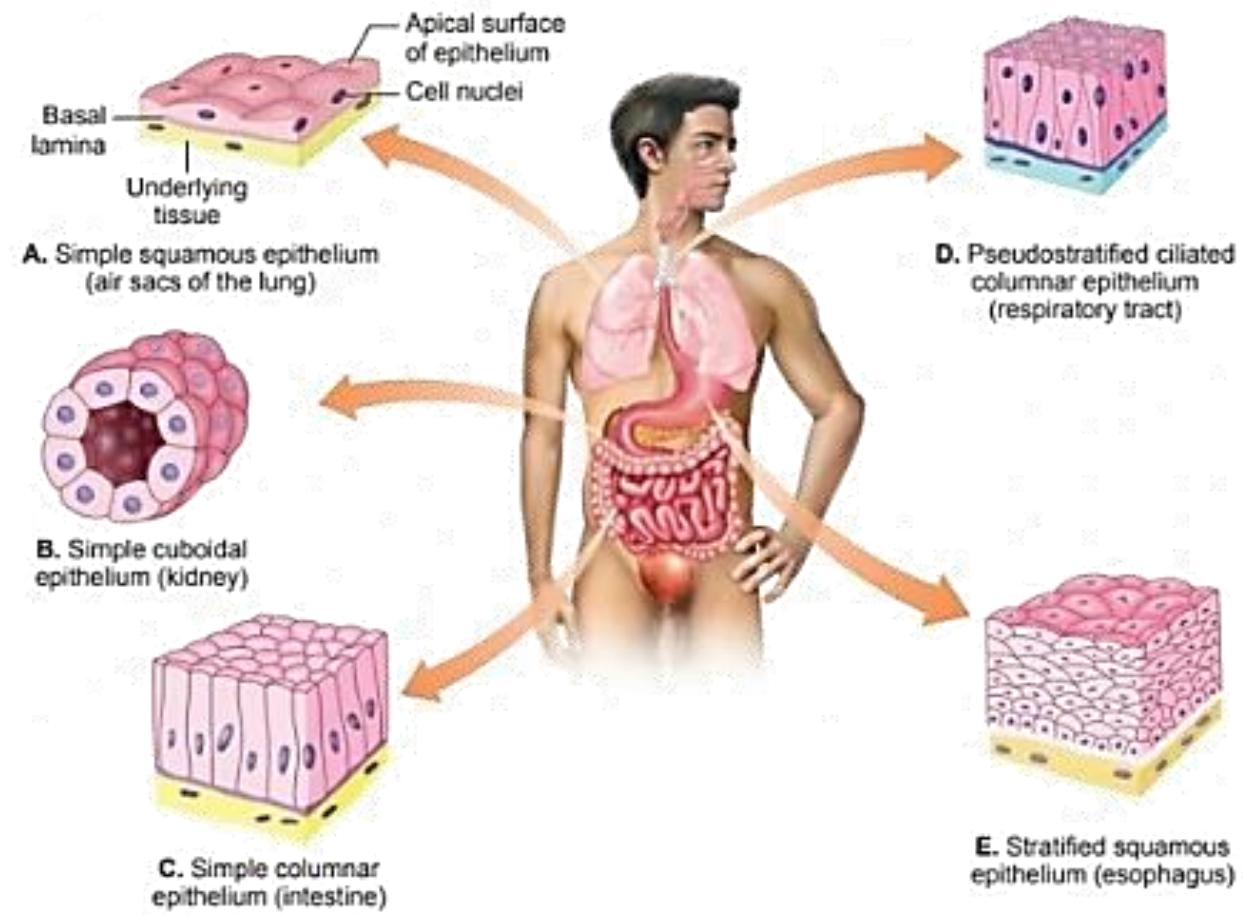
- **Nervous Tissue:** Nervous tissue is composed of neurons and neuroglia cells, and it forms the brain, spinal cord, and nerves. Nervous tissue is specialized for the transmission of electrical signals and the integration of sensory information. It plays a crucial role in controlling and coordinating bodily functions, as well as in processing and responding to stimuli.

Overview

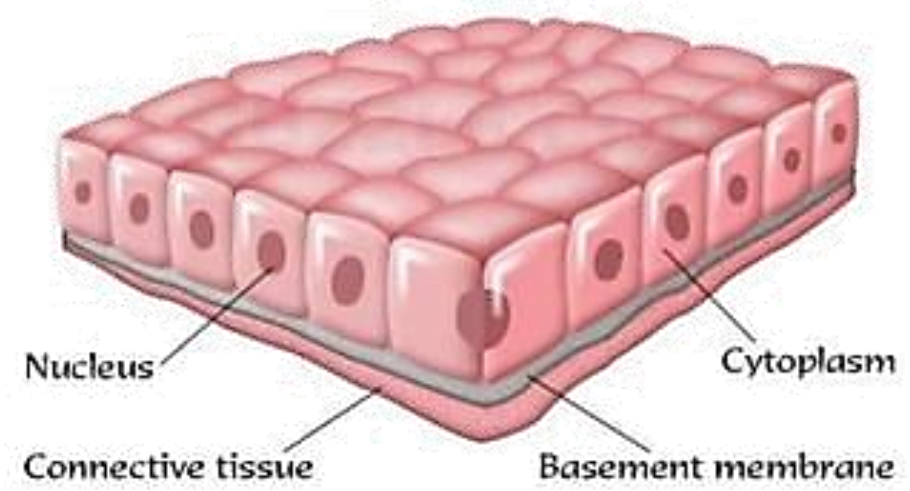
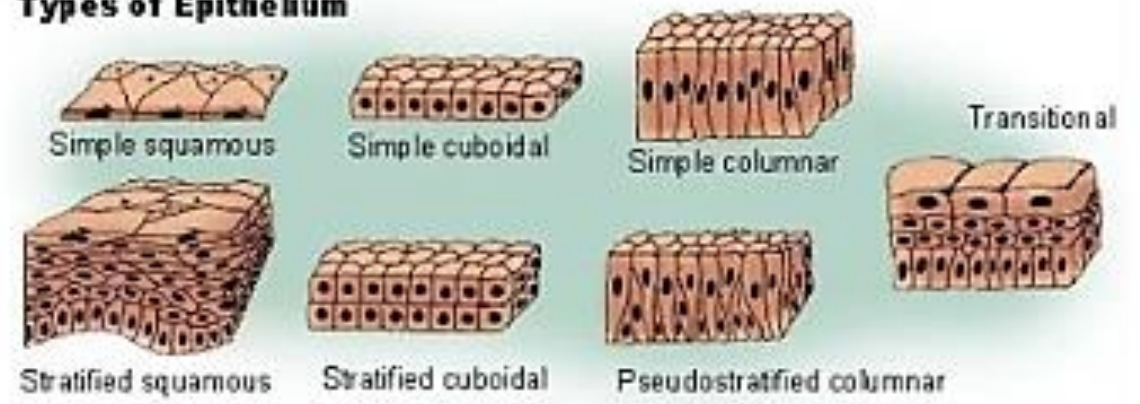
Understanding the characteristics and functions of these tissue types is essential for comprehending the structure and function of the human body, as well as for diagnosing and treating various medical conditions. Each tissue type contributes to the overall homeostasis and functioning of the body, and their interactions are vital for maintaining health and well-being.

Epithelial Tissue

- Epithelial tissue is a type of tissue that lines the surfaces of the body, including the skin, and forms the lining of cavities and organs.
- It also plays a role in the formation of glands.
- Epithelial tissue serves a variety of functions, including protection, secretion, absorption, and sensation.



Types of Epithelium



<https://www.labtestsguide.com/epithelial-tissue>

Epithelial Tissue

- The cells of epithelial tissue are closely packed together and form continuous sheets.
- They are arranged in single or multiple layers, and the shape of the cells can vary, from flat (squamous), to cube-shaped (cuboidal), to tall and narrow (columnar).
- The arrangement and shape of the cells contribute to the specific functions of the epithelial tissue in different parts of the body.

Epithelial Tissue

- Epithelial tissue acts as a protective barrier, preventing the entry of pathogens and harmful substances, and it also regulates the exchange of materials between the body and its environment.
- Additionally, certain types of epithelial tissue are specialized for the secretion of substances such as hormones, enzymes, and mucus, as well as for the absorption of nutrients and other essential molecules.

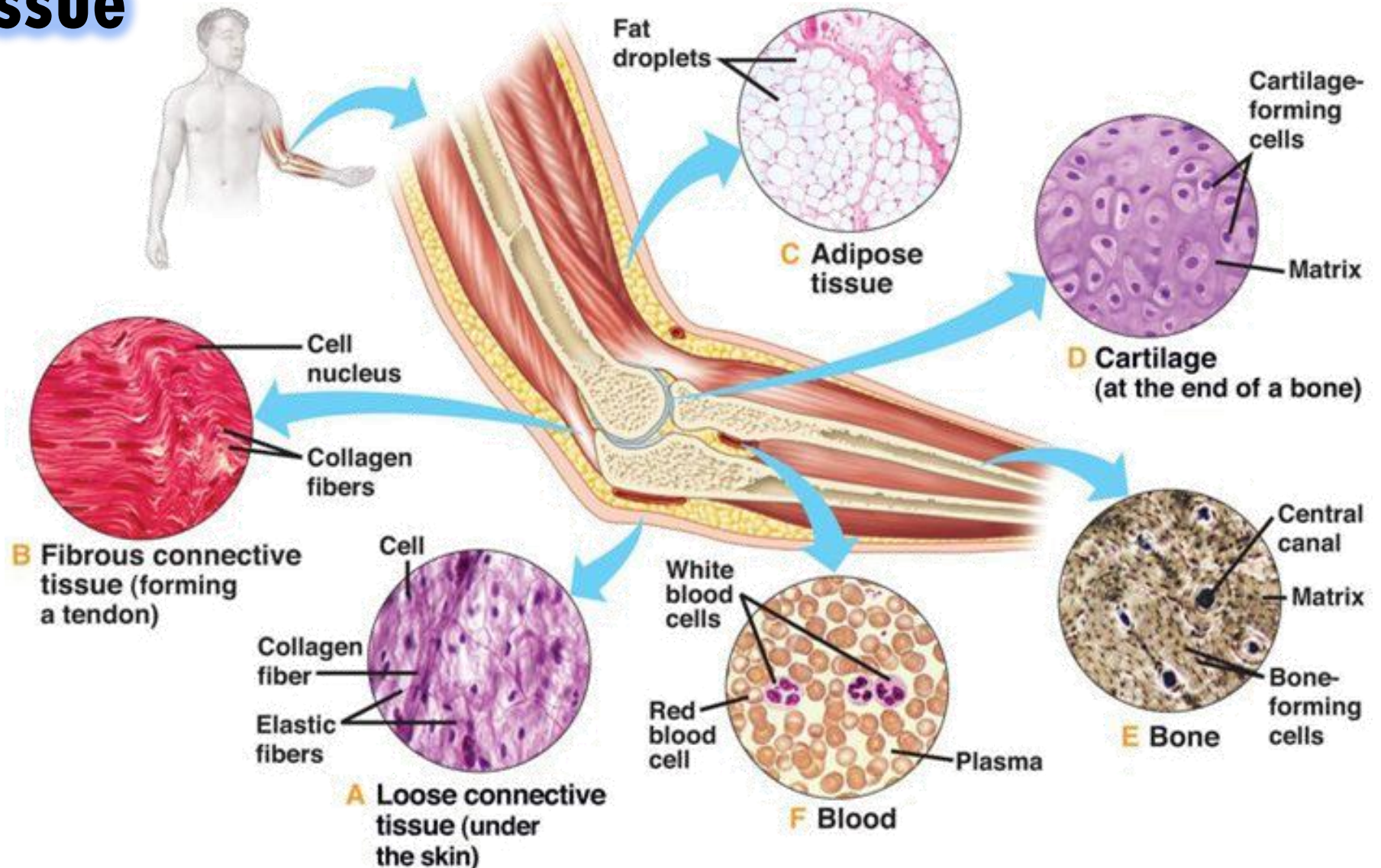
Epithelial Tissue

Overall, epithelial tissue is essential for maintaining the integrity and function of organs and body systems, and it is crucial for the overall health and well-being of an organism.

Connective Tissue

- **Connective tissue:** is a type of tissue found throughout the body that provides support, structure, and connection between different tissues and organs.
- Connective tissue is composed of cells, fibers, and a gel-like substance called the extracellular matrix. The cells in connective tissue include fibroblasts, adipocytes (fat cells), macrophages, mast cells, and others, and they play various roles in maintaining the tissue's function and structure.

Connective Tissue



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Connective Tissue

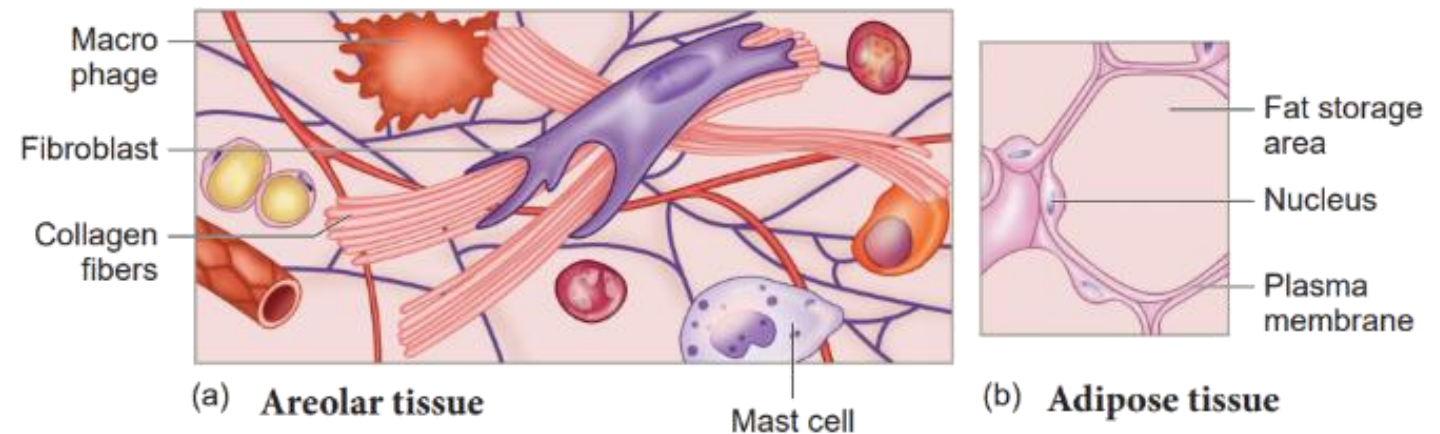
- The extracellular matrix of connective tissue contains fibers such as collagen, elastin, and reticular fibers, which provide strength, elasticity, and support to the tissue.
- This matrix also contains ground substance, a gel-like material that fills the space between cells and fibers, providing a medium for nutrient and waste exchange.

Connective Tissue

- Connective tissue has diverse forms and functions, including providing structural support and protection, connecting and anchoring organs and tissues, storing energy in the form of fat, and transporting nutrients and waste products.
- There are several types of connective tissue, including loose connective tissue, dense connective tissue, adipose tissue, cartilage, bone, and blood.

Type of connective tissue

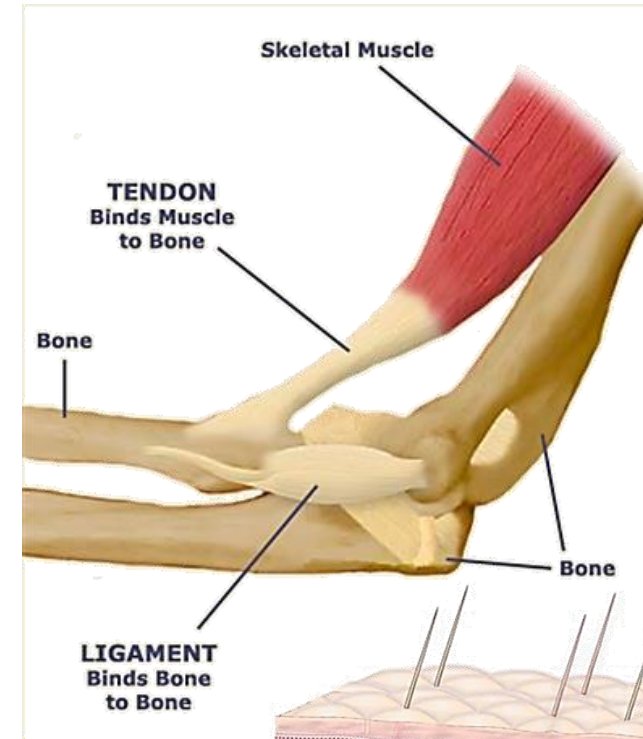
- **Loose Connective Tissue:** This type of connective tissue is characterized by loosely arranged collagen and elastic fibers, with cells such as fibroblasts scattered throughout. It provides support and elasticity and is found in areas such as the skin, mucous membranes, and around blood vessels and nerves.



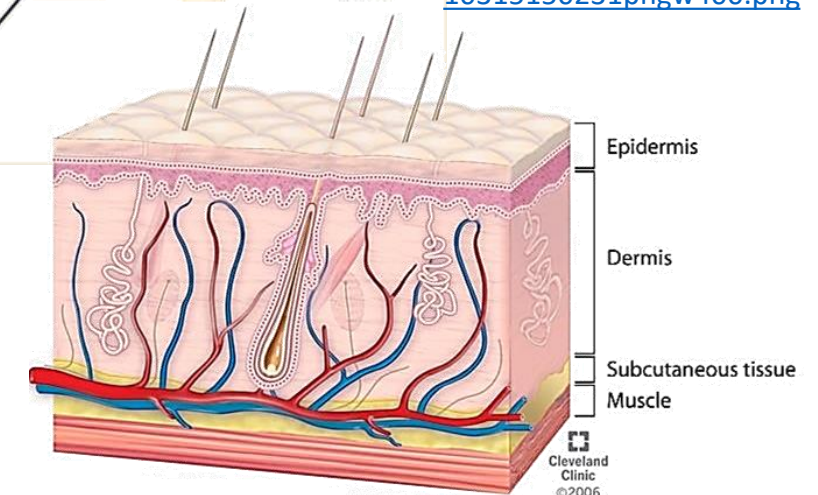
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Type of connective tissue

- Dense Connective Tissue:** Dense connective tissue has a higher density of collagen fibers and fewer cells compared to loose connective tissue, providing greater strength and support. It is found in tendons, ligaments, and the dermis of the skin.



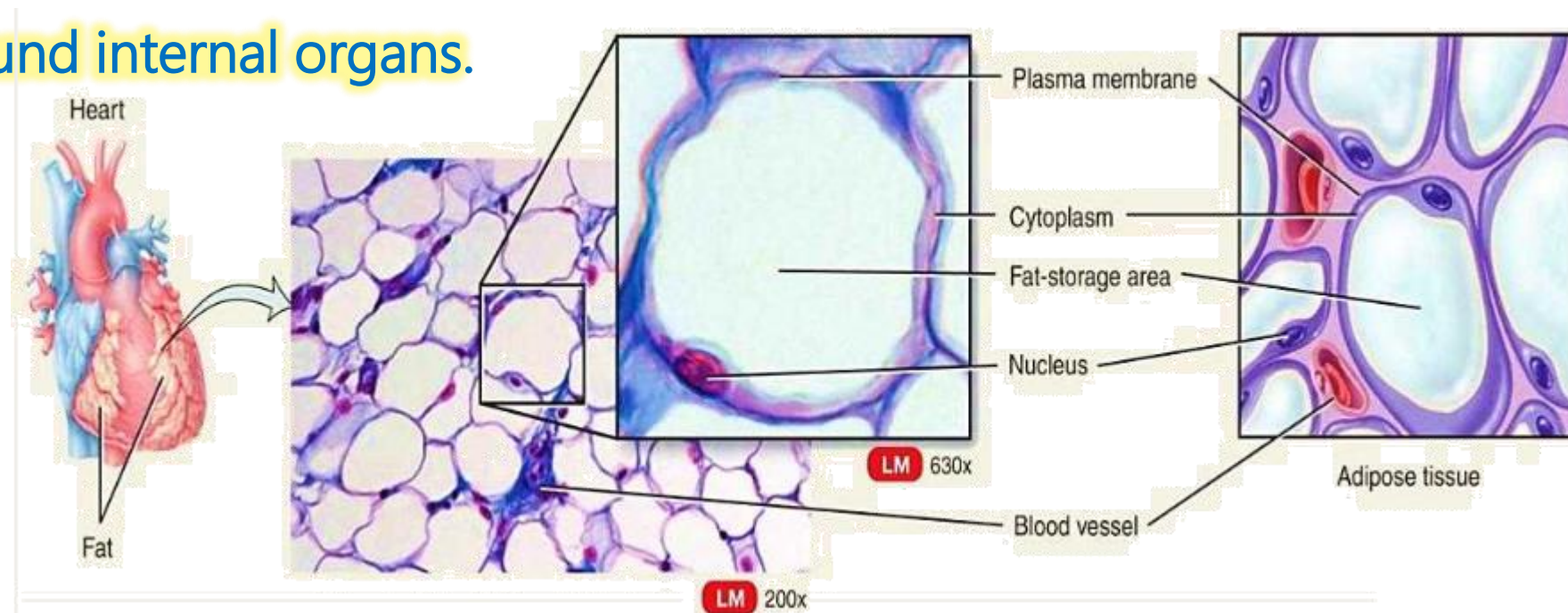
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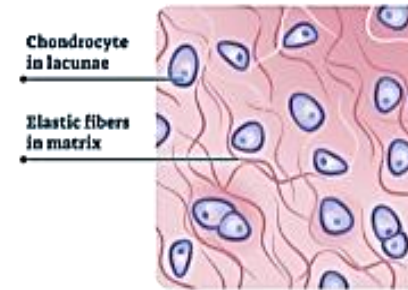
Type of connective tissue

- **Adipose Tissue:** Adipose tissue, commonly known as fat tissue, is a specialized type of connective tissue that stores energy in the form of fat. It also provides cushioning and insulation. Adipose tissue is found throughout the body, primarily beneath the skin and around internal organs.



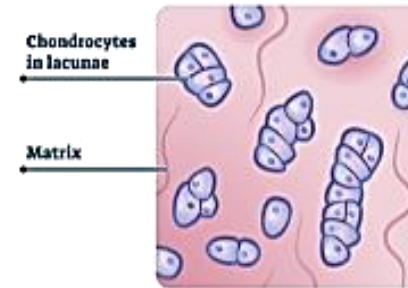
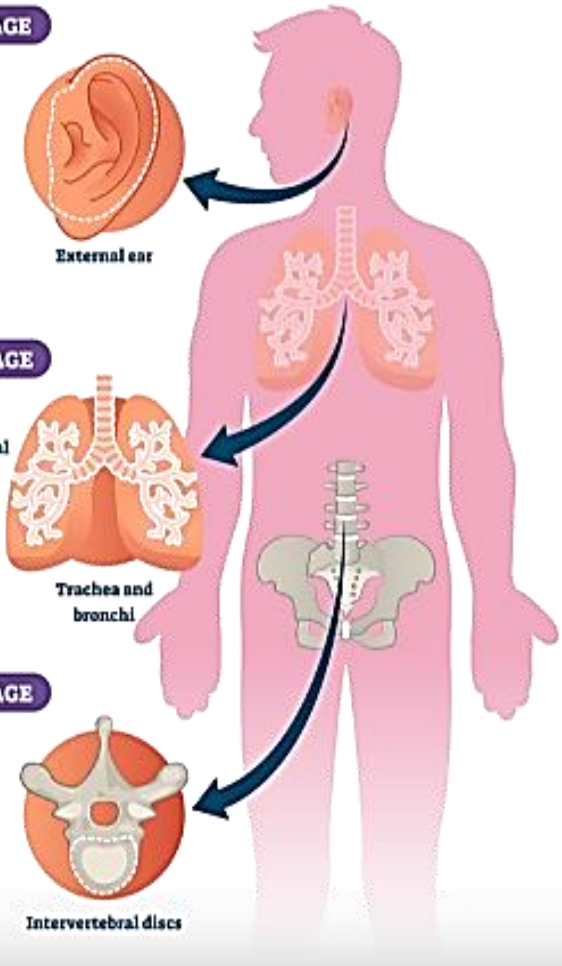
Type of connective tissue

- Cartilage:** Cartilage is a firm, flexible type of connective tissue that provides support and cushioning in joints and other structures. There are three main types of cartilage: **hyaline cartilage**, **elastic cartilage**, and **fibrocartilage**, each with distinct properties and locations in the body.



ELASTIC CARTILAGE

- Auricle of external ear
- Epiglottis
- Auditory tube
- Cuneiform cartilages of larynx



HYALINE CARTILAGE

- Between tips of ribs and bones of sternum
- Bone surfaces at synovial joints
- Supporting larynx
- Trachea and bronchi
- Part of nasal septum



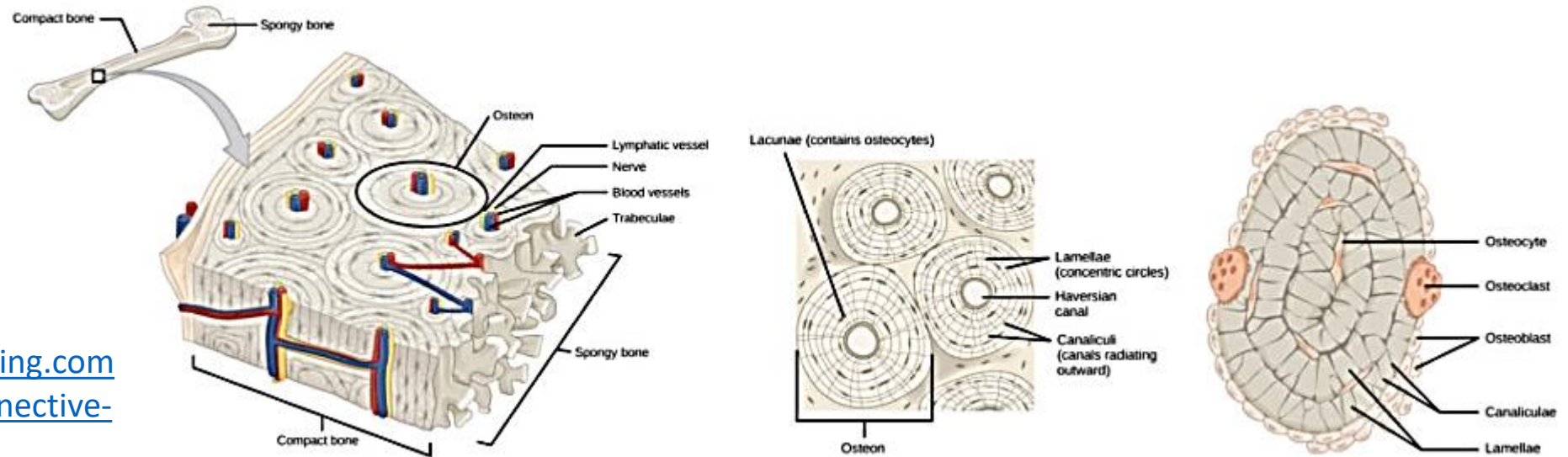
FIBROUS CARTILAGE

- Pads within knee joint
- Between pubic bones of pelvis
- Intervertebral discs

<https://www.yaclass.in/p/science-state-board/class-9/organisation-of-tissues-5860/animal-tissues-5884/re-da0522ae-9b4a-4cd8-9c6f-94a938e791a9>

Type of connective tissue

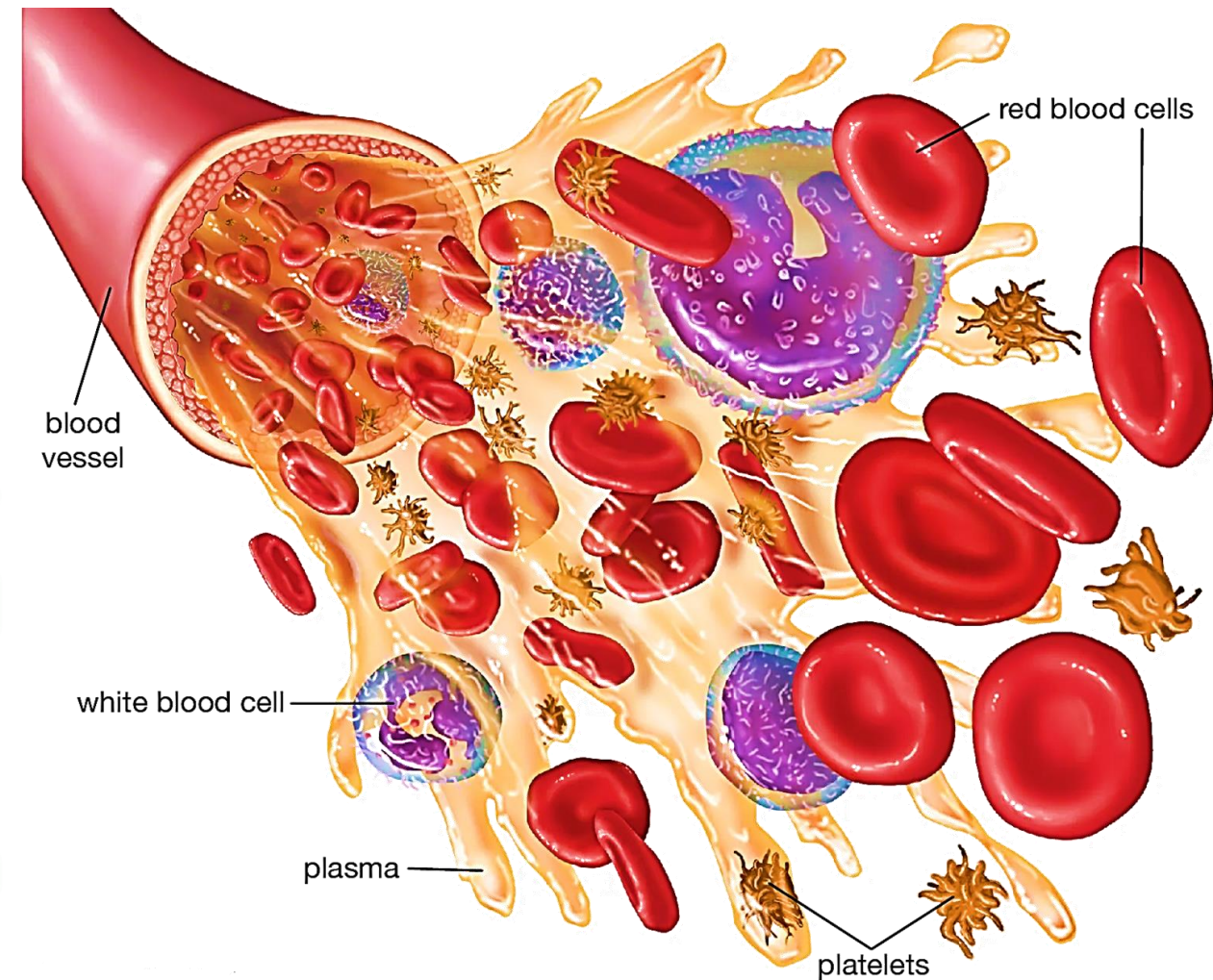
- Bone Tissue:** Bone tissue is a rigid type of connective tissue that provides support, protection, and mineral storage. It is composed of mineralized matrix, collagen fibers, and bone cells. Bones also play a role in blood cell production and mineral homeostasis.



<https://courses.lumenlearning.com/wm-biology2/chapter/connective-tissues/>

Type of connective tissue

- **Blood:** Blood is a fluid connective tissue that consists of **plasma, red blood cells, white blood cells, and platelets**. It transports nutrients, oxygen, waste products, and hormones throughout the body, and it plays a crucial role in immune function and clotting.



https://aloeloveet.life/product_details/6329256.html

Connective Tissue

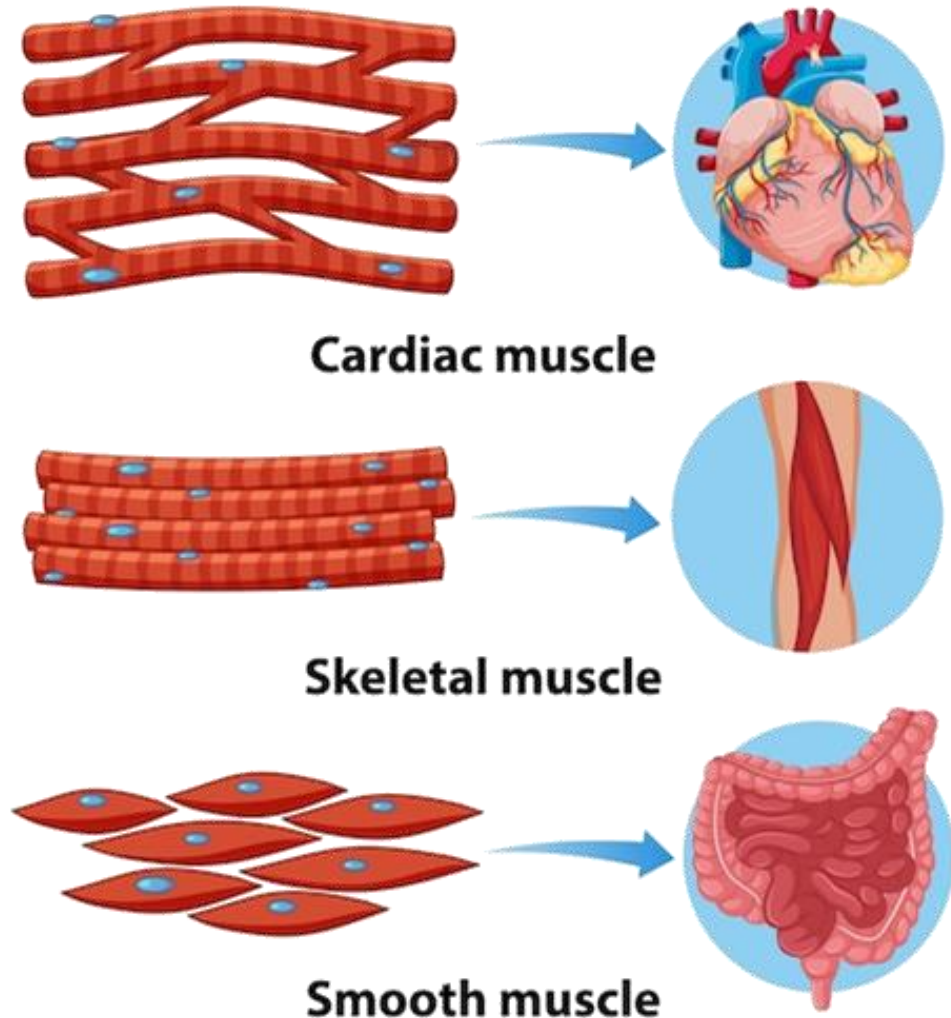
Overall, connective tissue is essential for maintaining the structural integrity and function of the body, and it contributes to various physiological processes such as wound healing, immune response, and overall homeostasis.

Each type of connective tissue has unique characteristics and functions, contributing to the overall structure and function of the body. Understanding these tissues is essential for comprehending the body's physiology and for diagnosing and treating various medical conditions.

Muscle tissue

- **Muscle tissue** is a type of tissue in the body that is specialized for contraction, allowing for movement, stability, and other physiological functions.

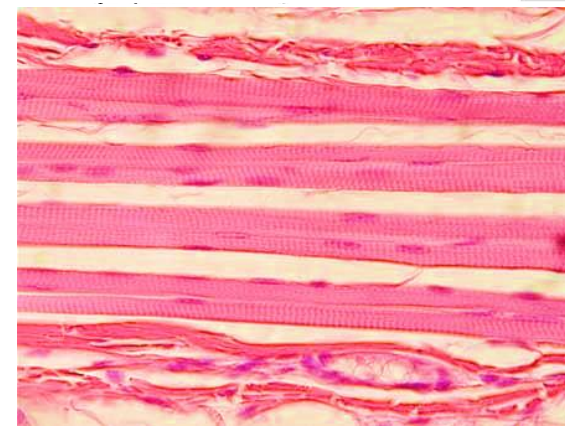
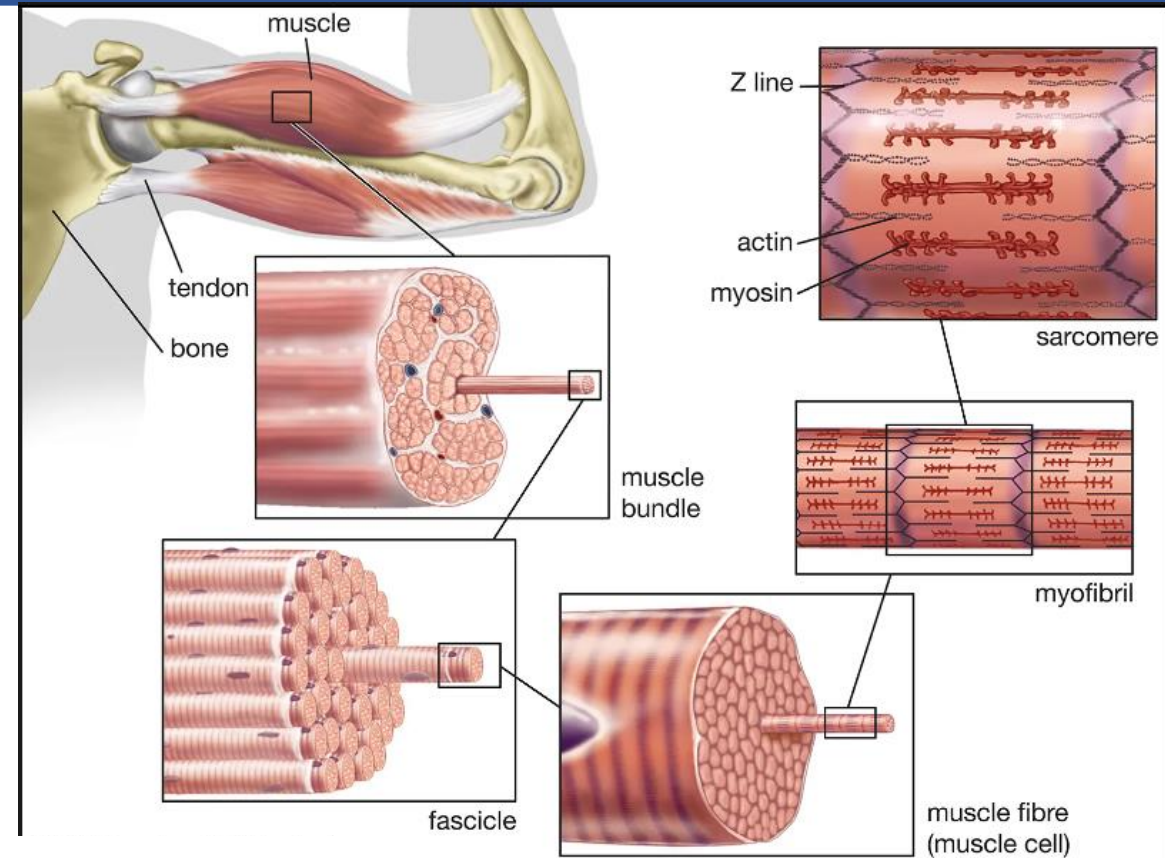
There are three primary types of muscle tissue:



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Muscle tissue

- Skeletal Muscle Tissue:** Skeletal muscle tissue, also known as striated muscle, is attached to the skeleton and is responsible for voluntary movements such as walking, running, and lifting. It is characterized by its striated (striped) appearance under a microscope and is under conscious control.

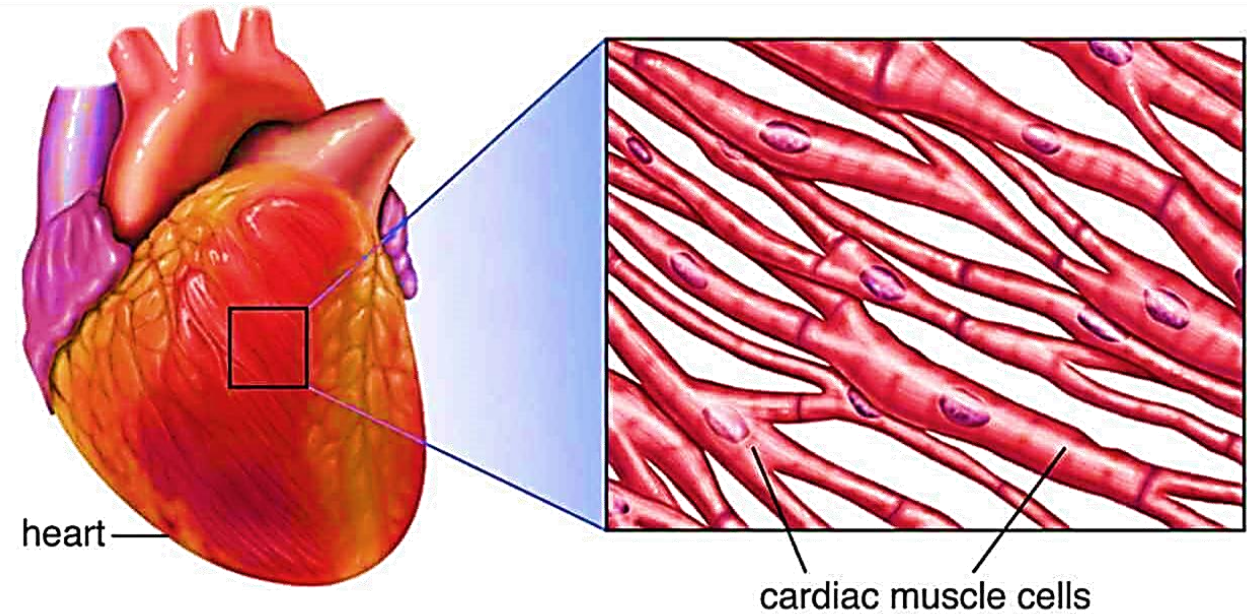


<https://www.britannica.com/science/skeletal-muscle>

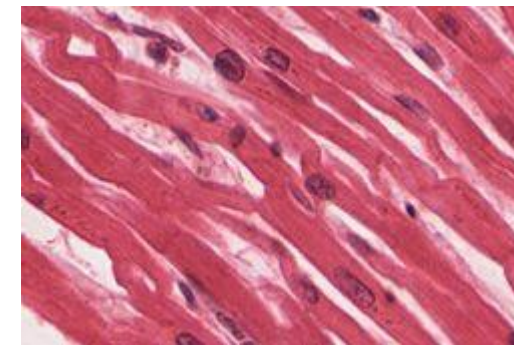
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Muscle tissue

- **Cardiac Muscle Tissue:** Cardiac muscle tissue is found exclusively in the heart. It is also striated, like skeletal muscle, but it is involuntary, meaning it contracts without conscious control. Cardiac muscle tissue is responsible for the rhythmic contractions of the heart that pump blood throughout the body.



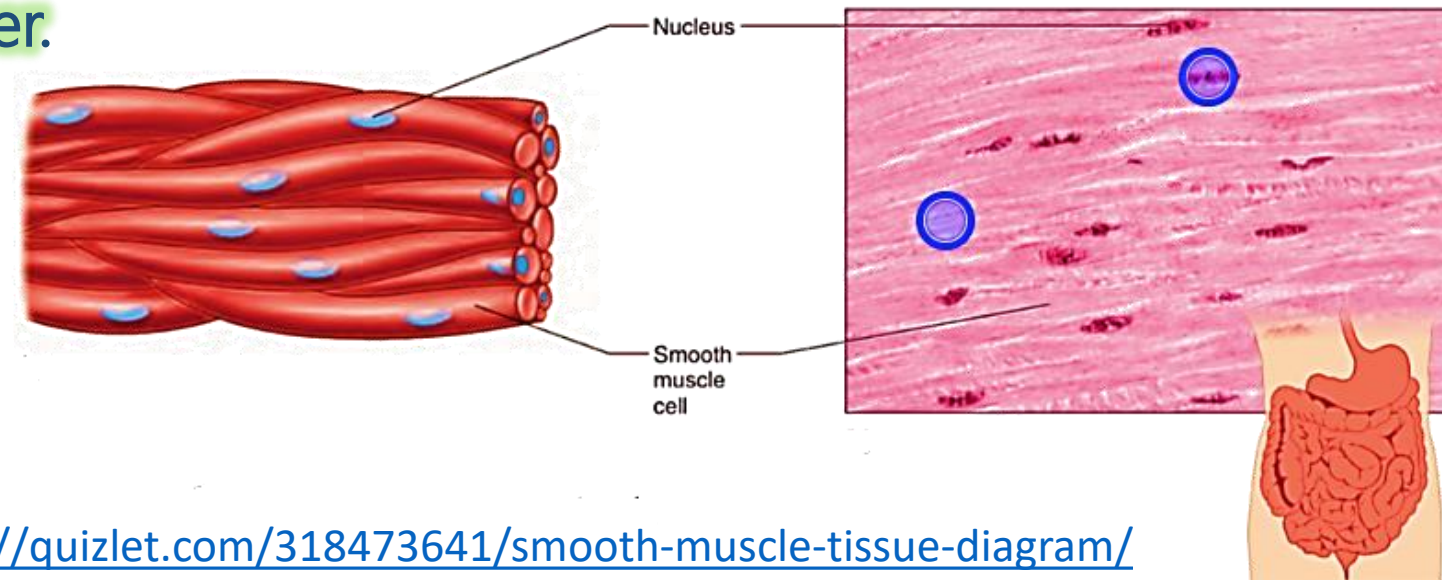
<https://rajusbiology.com/wp-content/uploads/2022/04/Cardiac-Muscle-Function.jpg>



https://upload.wikimedia.org/wikipedia/commons/thumb/d/d5/414c_Cardiacmuscle.jpg/250px-414c_Cardiacmuscle.jpg

Muscle tissue

- **Smooth Muscle Tissue:** Smooth muscle tissue is found in the walls of internal organs, blood vessels, and other structures. It lacks striations and is under involuntary control. Smooth muscle tissue is involved in various involuntary processes, such as peristalsis in the digestive system, regulation of blood flow, and control of airway diameter.



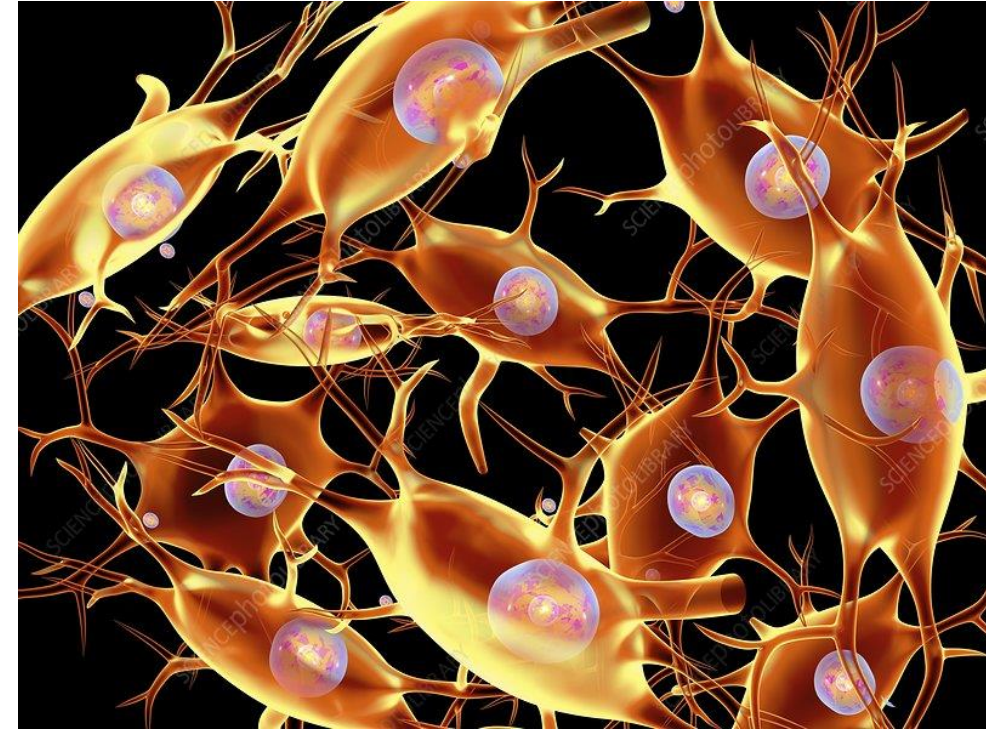
<https://quizlet.com/318473641/smooth-muscle-tissue-diagram/>

Muscle tissue

Each type of muscle tissue has unique structural and functional characteristics, and they work together to facilitate the movement and function of the body. Understanding the differences between these muscle types is essential for understanding human physiology and for diagnosing and treating various medical conditions related to muscle function.

Nervous Tissue

- Nervous tissue is a specialized type of tissue found in the nervous system, including the brain, spinal cord, and peripheral nerves.
- It is responsible for transmitting and processing electrical and chemical signals, allowing for communication within the body and coordination of various physiological functions.

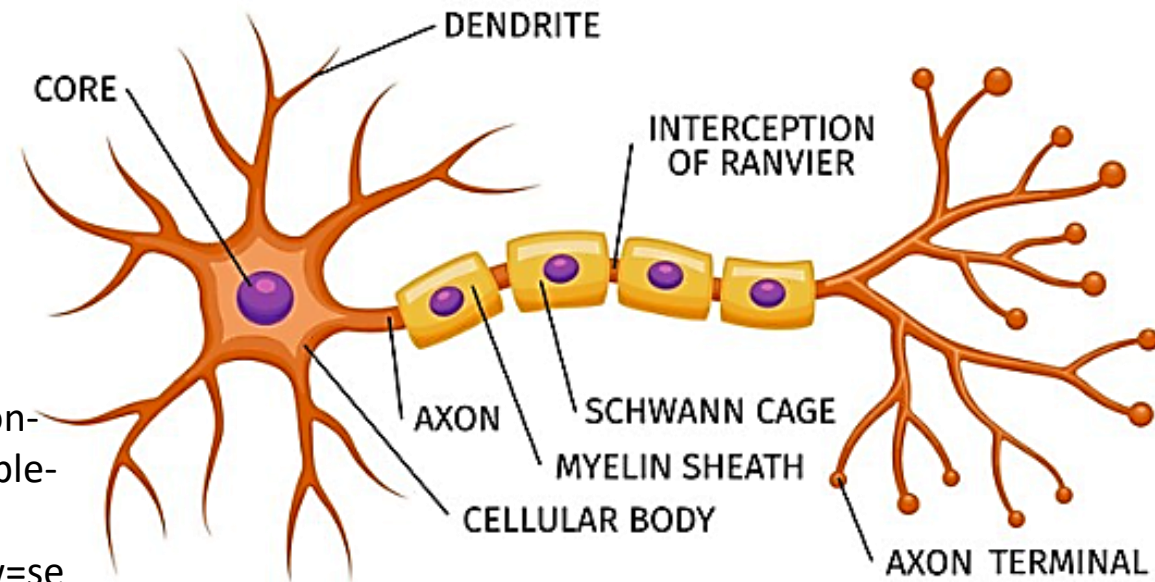


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Nervous Tissue

Nervous tissue is composed of two main types of cells:

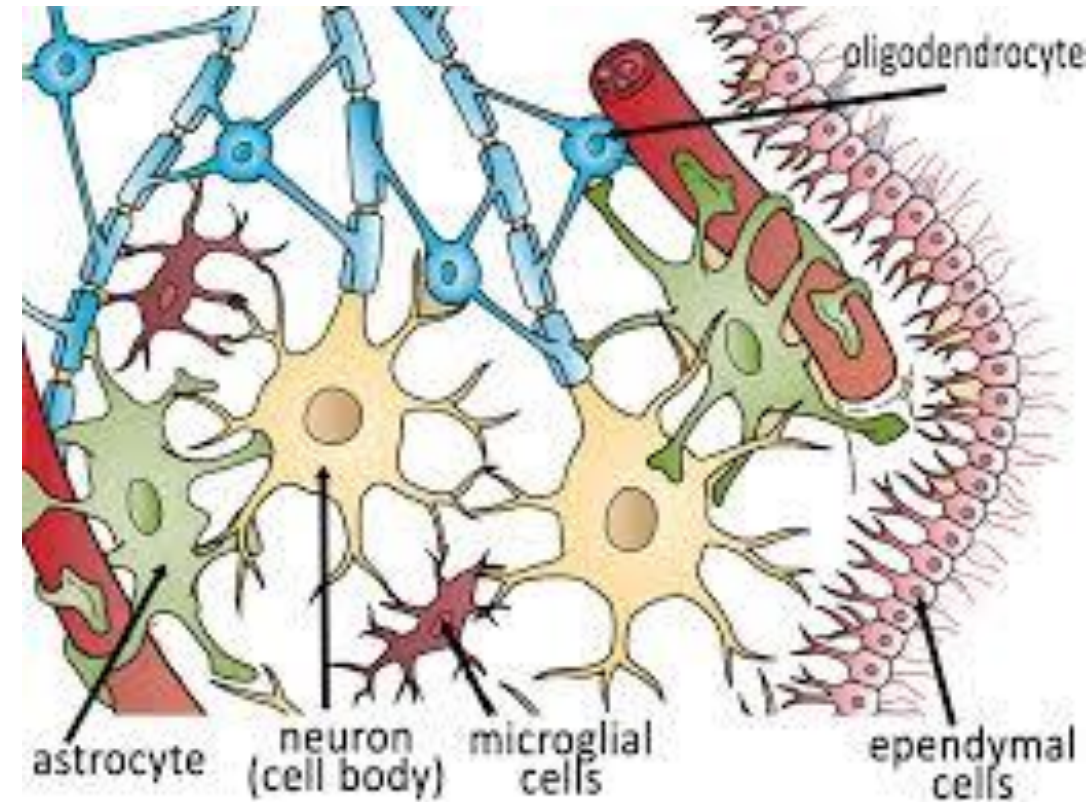
- **Neurons:** Neurons are the functional units of the nervous system and are responsible for transmitting electrical signals. They have a cell body, dendrites (which receive signals from other neurons), and an axon (which transmits signals to other neurons or to target cells).



https://www.freepik.com/free-vector/neuron-anatomy-composition-with-educational-structure-brain-cell-with-colored-elements-editable-text-captions-vector-illustration_43869050.htm#query=Neuron&position=4&from_view=search&track=sph&uuid=54c3cb18-de7a-43af-941a-efa821083ff9

Nervous Tissue

- **Neuroglia (or glial cells):** Neuroglia are supportive cells that provide physical support, insulation, and nutrients to neurons. They also play a role in modulating the extracellular environment and supporting the functions of neurons.



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Nervous Tissue

Nervous tissue is organized into complex networks and circuits that enable the integration and processing of sensory information, coordination of motor responses, and regulation of various bodily functions such as heart rate, breathing, and digestion. The nervous system also plays a critical role in higher functions such as cognition, memory, and emotion.

Understanding nervous tissue is crucial for understanding the function of the nervous system as a whole and for diagnosing and treating neurological disorders and injuries.

THANK YOU!