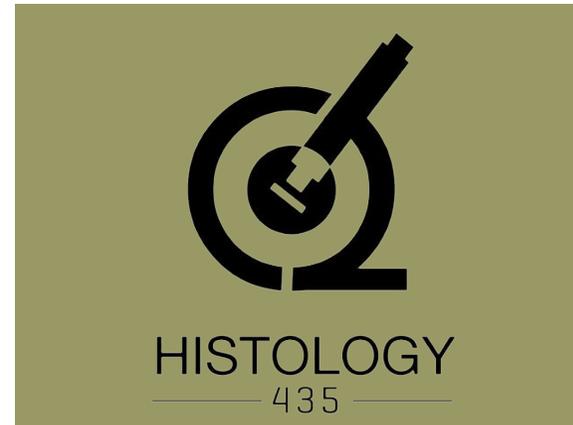


+ Motivational Corner:

People too weak to follow their own dreams will always find a way to discourage yours.



Objectives:

By the end of the lecture, the student should be able to describe the microscopic structure of:

1. Wall of the heart:

- Endocardium.
- Myocardium.
- Epicardium.

2. Cardiac valves.

Wall of the heart and cardiac valves

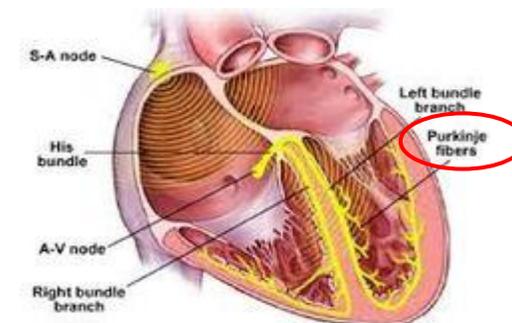
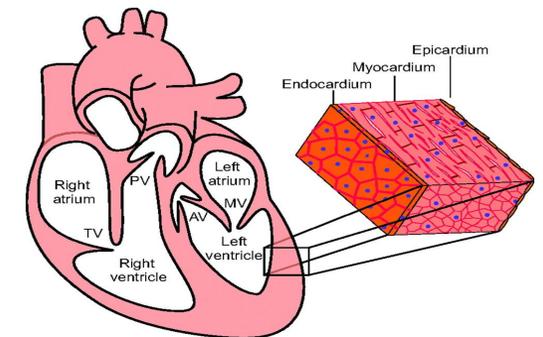
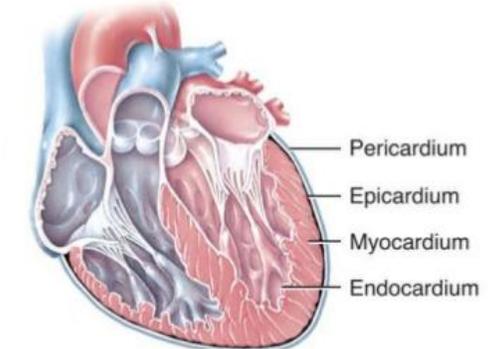
Extra notes: Gray
Important notes: Red

+

WALL OF THE HEART

YouTube

| Endocardium | Myocardium | Epicardium (Visceral layer of pericardium) |
|--|---|---|
| <p>1- Endothelium: simple squamous epithelium.</p> <p>2- Subendothelial C.T. layer</p> <p>3- Dense C.T. layer</p> <p>4- Subendocardial layer:</p> <p>Loose C.T. layer that contains Purkinje fibers (modified cardiac muscles, faster than normal muscles, and they are not nerves), small blood vessels & nerves. It attaches to the endomysium of the cardiac muscle.</p> | <ul style="list-style-type: none"> - It is the middle layer. - It is the most thick layer. - It contains cardiac muscle cells with endomysium (loose C.T.). <p>Note: the cardiac muscles is in the myocardium (Check the next slide)</p> | <p>Mesothelium: simple squamous epithelium.</p> <p>Subepicardial C.T. layer: Loose C. T. contains the coronary vessels, nerves, ganglia & fat cells.</p> <p>Make sure you don't mistake epicardium for pericardium.</p> <p><i>The word "pericardium" means around the heart. The outer layer of the pericardium is called the parietal pericardium. The inner part of the pericardium that closely envelops the heart is, as stated, the epicardium; it is also called the visceral pericardium.</i></p> |



- + **CARDIAC MUSCLES** - Found in the **myocardium**.
- Striated and involuntary.

L.M. Picture of Cardiac Muscle Fibers:

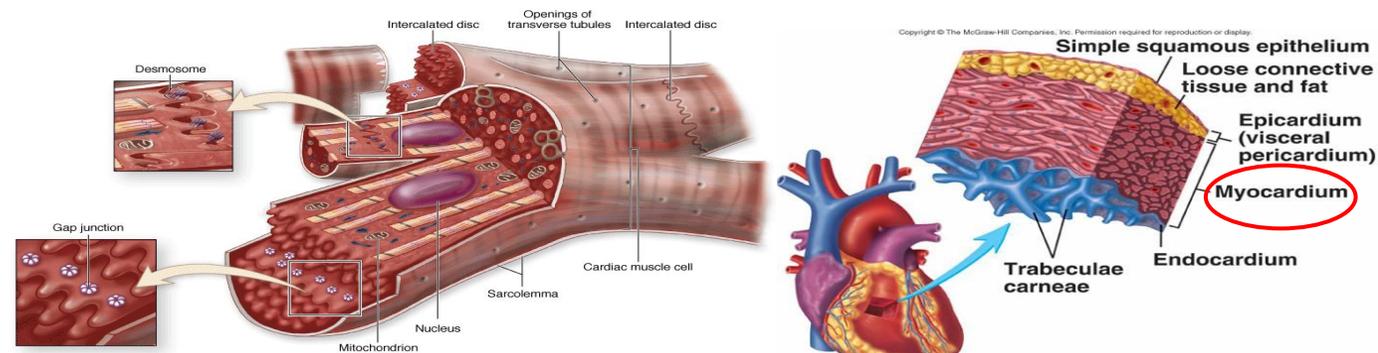
- **Cylindrical** in shape.
- **Intermediate** in diameter between skeletal and smooth muscle fibers.
- **Branch** and anastomose.
- Covered by a thin sarcolemma.
- **Mononucleated**. Nuclei are oval and **central**.
- Sarcoplasm is **acidophilic** and shows **non-clear striations** (fewer myofibrils).
- Divided into short segments (cells) by the **intercalated discs**.

Cardiac muscle Fibers E.M. Picture:

- Few myofibrils.
- Numerous mitochondria.
- Less abundant **SR**. (SR = Sarcoplasmic Reticulum)
- **T-tubules** come in contact with only one cisterna of SR forming "**Diads**" (not triads).
- Glycogen & myoglobin.
- **Intercalated discs**: are formed of the two cell membranes of 2 successive cardiac muscle cells, connected together by **junctional complexes** (**desmosomes** and **gap junctions**).

Note:

branching gives each cardiac muscle more sites for attachment to each other. This creates an overall network of inter-connected cardiac fibres, which will give the muscle increased strength. furthermore, the branching will also ensure rapid spread of depolarisation for initiation of cardiac contraction. This will make sure that the muscles are able to contract in sync.





HEART VALVES (CARDIAC VALVES)

“A ONE WAY DOOR.”

- Each leaflet (cusp) of heart valve is formed of:

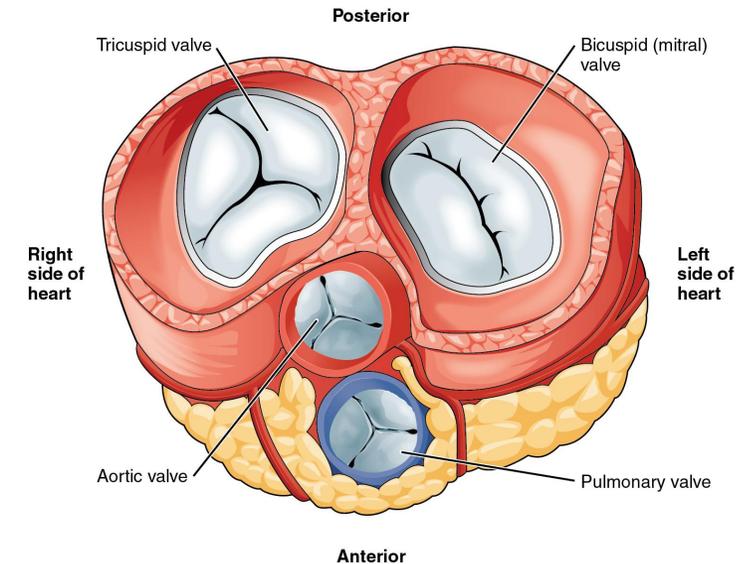
(1) A core of Dense irregular C.T.

(2) This core is covered by: **Endocardium.**

- The leaflets of the heart valves are normally **AVASCULAR.**
- Blood capillaries can be found only in the base or root of the leaflet.

Note:

If the heart valve got infected or injured it won't heal easily because it is avascular (Remember from MSK block if the bone had poor vascularity and it got a fracture it won't heal as easy as the ones that are more vascular.)





MCQs

1- Which layer of the heart is composed of cardiac muscle?

- a. Epicardium
- b. Pericardium
- c. Myocardium
- d. Endocardium
- e. Endomysium

2- Where is endothelium located?

- a. Epicardium
- b. Pericardium
- c. Myocardium
- d. Endocardium
- e. Endomysium

3- Where are the blood vessels which supply the heart located?

- a. Epicardium
- b. Pericardium
- c. Myocardium
- d. Endocardium
- e. Endomysium

4- The heart valve is vascular

- a. true
- b. false

5- Purkinje fibers are found in:

- a. Epicardium
- b. Pericardium
- c. Myocardium
- d. Endocardium
- e. Endomysium

6- What is NOT true about muscle cell:

- a. Mononucleated.
- b. Branched.
- c. Basophilic.
- d. Central nucleus.



For any question or suggestion:
histology435@gmail.com

Done by:
Areeb AIOgael

Edited by:
Shadn AIOmran

Team leaders:
Areeb AIOgael
Hazim Bajri

Thanks for checking
our work, Good
luck.

-Team histology



1-C
2-D
3-A
4-B
5-D
6-C