

Cardiovascular Block
Histology Team

Lecture (1)
Wall of the Heart and Cardiac Valves

By: Rana Al Ohaly
Lulu Alobaid
Mohammad Adel

Teams

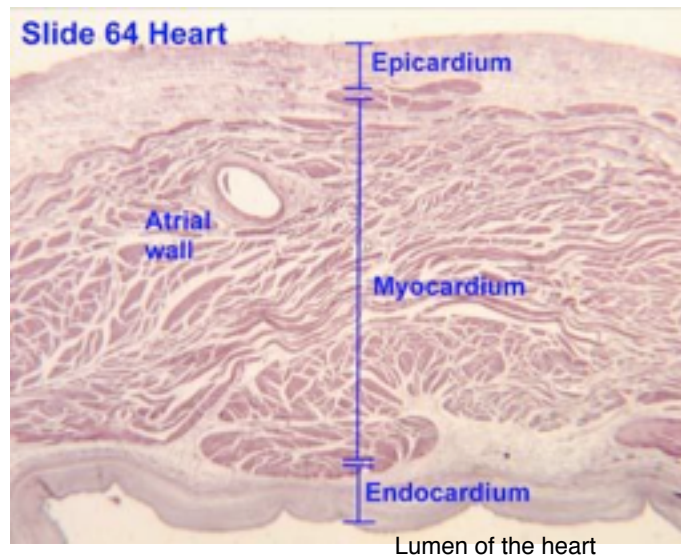
Learning Objectives:

The student should be able to describe the microscopic structure of:

- Wall of the heart:
 - (i) Endocardium
 - (ii) Myocardium
 - We've inserted the team work from musculoskeletal block to remind you*
 - (iii) Epicardium
- Cardiac Valves

Wall of the Heart

<p>Endocardium</p> <p><i>acts as a barrier between the blood in the heart's lumen and the cardiac muscles</i></p>	<p>(1)Endothelium Simple squamous epithelium</p>
	<p>(2)Subendothelial connective tissue <i>contains the blood vessels that nourish the endothelium</i></p>
	<p>(3)Dense connective tissue layer</p>
	<p>(4)Subendocardial connective tissue Loose connective tissue layer that contains: <ul style="list-style-type: none"> •Purkinje fibers •Small blood vessels •Nerves It is continuous with the endomysium of the cardiac muscle</p>
<p>Myocardium</p>	<p>It is the:</p> <ul style="list-style-type: none"> •middle layer •thickest layer <p>It contains:</p> <ul style="list-style-type: none"> •cardiac muscles •endomysium (loose connective tissue)
<p>Epicardium</p> <p><i>it's part of the pericardium</i></p>	<p>(1)Mesothelium Simple squamous epithelium</p>
	<p>(2)Subpericardial connective tissue layer loose connective tissue containing the: <ul style="list-style-type: none"> •Coronary vessels •Nerves •Ganglia •Fat cells also continuous with the endomysium of the cardiac muscle</p>



Heart Valves (Cardiac Valves)

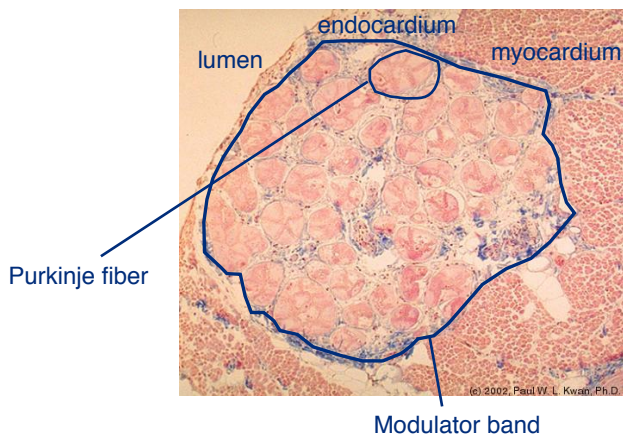
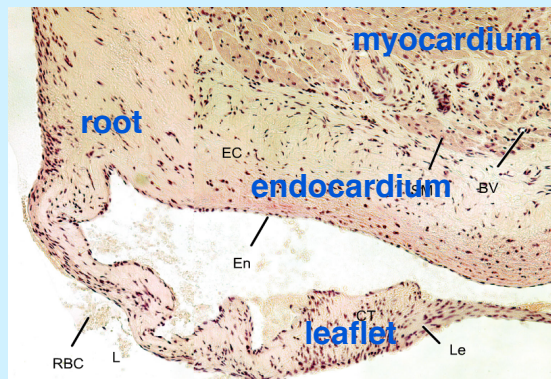
Each leaflet (cusp) is formed of:

- (1) A core of dense irregular connective tissue
- (2) The core is covered by endocardium

it's like an extension of the endocardium

Blood vessels:

- the leaflets are normally **avascular**
- blood capillaries can be found **only in the base** (root) of the leaflet



Extra Notes:

There are three serous membranes in the body:

- * Pericardium (inner epicardium (visceral) and outer parietal layers)
- * Pleura (inner visceral and outer parietal layers)
- * Peritoneum

(3 Ps)

Extra Notes:

Purkinje fibers are modified cardiac muscle cells that form atrioventricular bundles and allow fast passing of the impulses (will be discussed in physiology)

The difference between the moderator bundle and the pericardium:

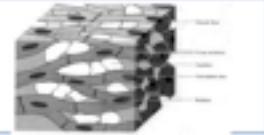
- The Purkinje fibers in the moderator bundle are larger in diameter than the cardiac muscle fibers
- The moderator band's stain is paler
- The nuclei of the Purkinje fibers are peripheral whereas those of the cardiac muscle fibers are central
- There are no intercalated discs in the moderator band

Information we've taken about cardiac muscles:

Cardiac Muscle

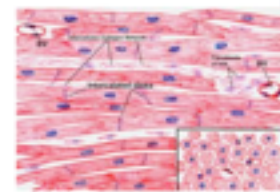
Features of Cardiac Muscle Fibers:

- Found in the myocardium
- Striated and involuntary



L.M. Picture:

- **Cylindrical** in shape
- **Intermediate** in diameter between skeletal and smooth muscle fibers
- **Branch** and anastomose
- **Mononucleated**: Nuclein are oval and central
- Sarcoplasm shows **non-clear striations** (fewer myofibrils)
- Divided into short segments (cells) by the **intercalated discs**



E.M. Picture:

- Few myofibrils
- Numerous mitochondria
- Less abundant Sarcoplasmic reticulum
- Glycogen & myoglobin
- **DIADS**: T-tubules come in contact with only **one** cisternae of sarcoplasmic reticulum forming (not triads)
- **Intercalated discs**: the junctional complexes (desmosomes and gap junctions) that connect the two cell membranes of two successive muscle cells

