

The Heart

(Lec. 4)

Heart is Center of the circulatory system is a muscular organ that contracts rhythmically, pumping the blood through the circulatory system.

The heart is composed of four chambers:

The upper chambers are right and left atria, while the lower chambers are right and left ventricles.

- Blood flows through the heart in only one direction regulated by valves.

The heart wall is divided into three major layers:

1- Inner most layer is called Endocardium

2- Middle layer is (Myocardium)

3- The outermost layer is (Epicardium)

The endocardium: Is composed of:

1- Endothelial cells : a single layer of simple squamous cells .

2-Subendothelial layer: a thin layer of loose connective tissue containing elastic and collagen fibers as well as some smooth muscle cells.

There is a layer called subendocardial,

It is an additional layer of connective tissue that connect endocardium to the myocardium .

The myocardium :Is the thickest of the tunics consists of cardiac muscle cells arranged in layers that surround the heart chambers in a complex spiral manner.

The myocardium is much thicker in the ventricles than in the atria.

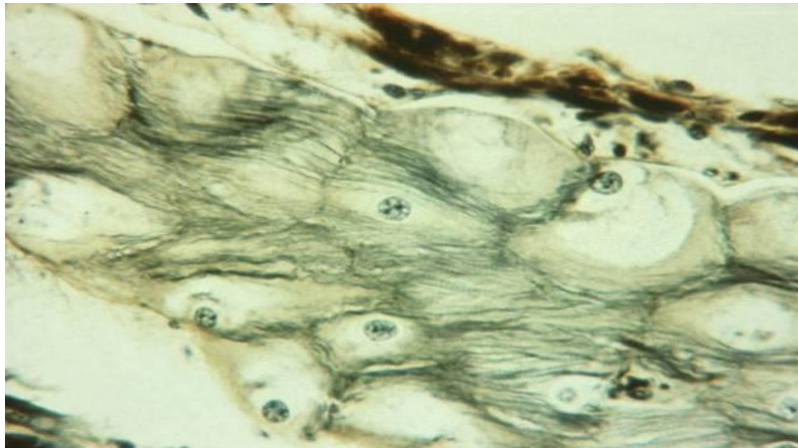
The arrangement of these muscle cells in sections are seen to be oriented in many directions.

Purkinje fibers : are specialized bundles of cardiac muscle fibers, extend into myocardium of both ventricles.

They cause the ventricles to contract.

These are pale-staining fibers, larger than the adjacent contractile muscle fibers.

Purkinje fiber cells

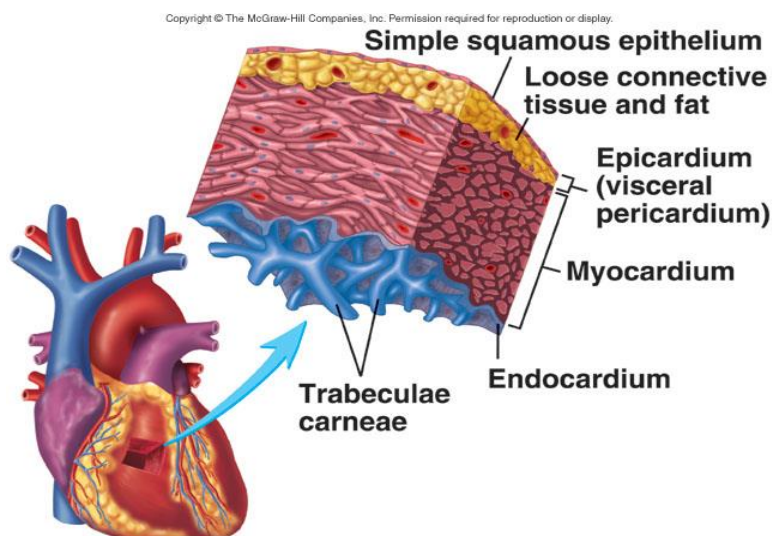


The epicardium:

The heart is covered externally by simple squamous epithelium (mesothelium) supported by a thin layer of connective tissue.

The epicardium is a protective sac which is divided into two layers :
the visceral and parietal pericardial layers.

The space between the pericardium's visceral layer (epicardium) and its parietal layer there is lubricant fluid that facilitates the heart's movements



The lymph vascular system:

Thin-walled channels that collect excess interstitial fluid called lymph from the tissue spaces and return it to the blood.

The lymph vascular system consists of

blind-ended capillaries (lymphatic capillaries) connected to (lymphatic vessels) .

Three types of lymph vessels can be distinguished based on their size and morphology :

The lymphatic capillaries

Are thin, closed-ended vessels that consist of single layer of endothelium and an incomplete basal lamina.

Medium-sized lymphatic vessels:

Tunica intima - thin; endothelium surrounded by few collagen and elastic fibers; may be folded to form valves

Tunica media - thin; helically arranged smooth muscle, elastic fibers

Tunica adventita - thicker; collagen and elastic fibers, few smooth muscle cells

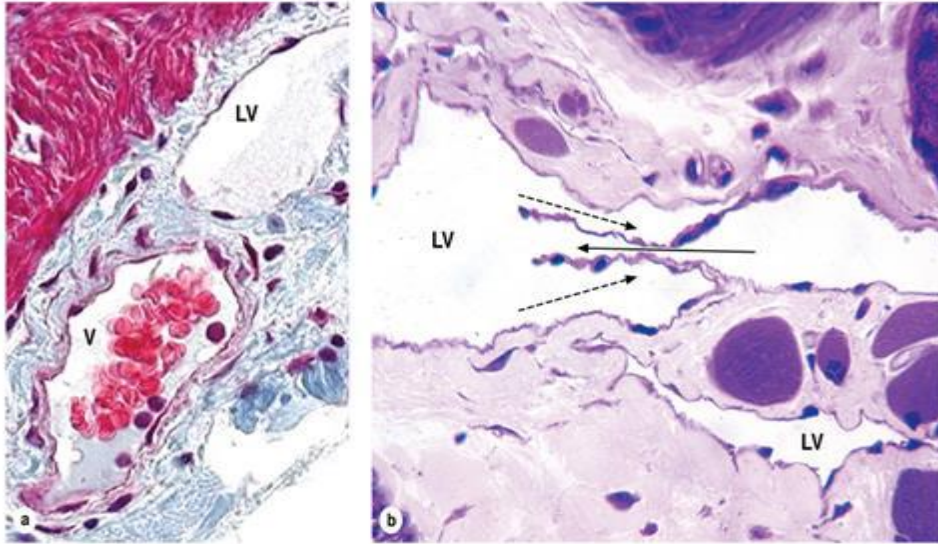
Large lymphatic vessels thoracic duct and right lymphatic duct.

Tunica intima – thin is composed of:

- Endothelium
- Subendothelial layer composed of collagen and elastic fibers, some longitudinal smooth muscle

Tunica media - thickest; longitudinal and circular arranged smooth muscle bundles, and loose fibro-elastic connective tissue.

Tunica adventita - not well developed; coarse collagen fibers, and few longitudinal smooth muscle



Note: See the related figures in your text book .