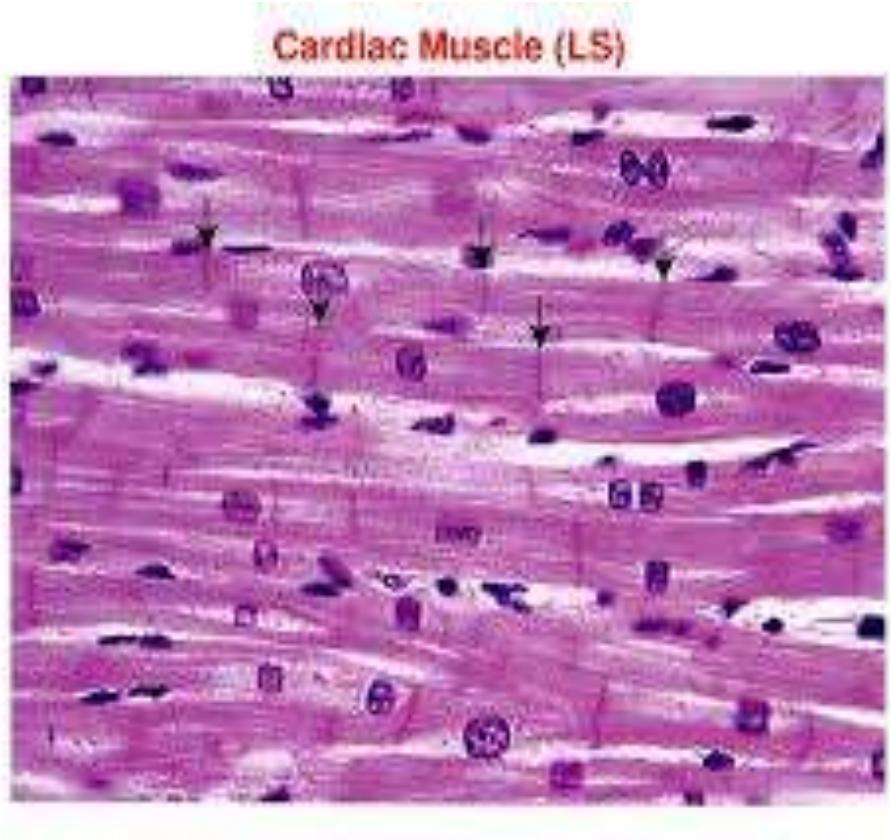
# Practical CVS

# Cardiac muscle

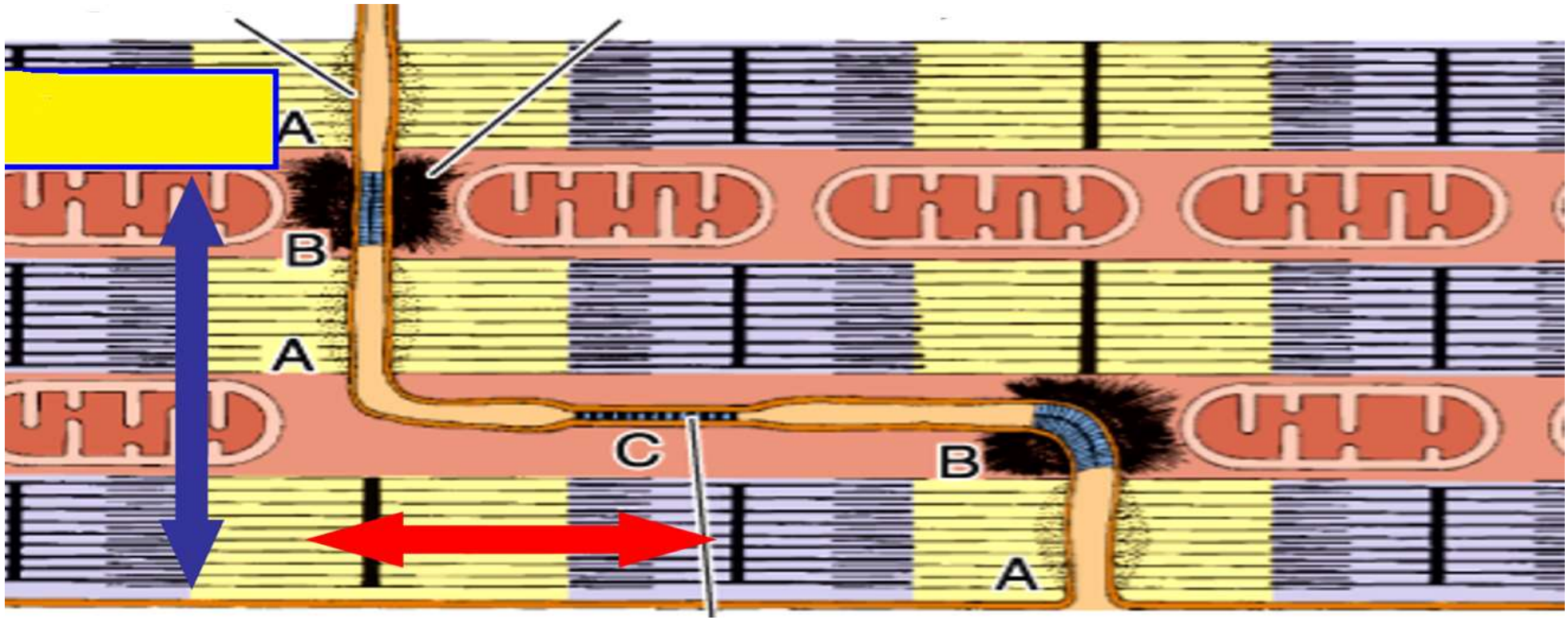



**LM:** Intercalated discs

The true /false about picture is?

- Shorter than skeletal muscle
- Cylindrical in shape
- Branched. Striated. Faint
- Has one nucleus in the center of the cell.
- Adjacent cells are interconnected end–to- end by **intercalated discs**.

# Intercalated discs Comportments:




## ❑ Intercalated discs

### ➢ Transverse Part:

- **zonula (fasciae ) adherents** A
- **desmosomes (macula adherentes)** B

**prevent the cells from pulling apart** under the strain of contraction

### ➢ Lateral Part: C

- **Gap junctions (nexus)** - for **impulse transfer** providing ionic continuity between adjacent myocytes (**electrical commtiunicaon** between cardiac muscle cells)

# Diad in cardiac muscle at Z- line

اهم نقطتين : ١.intercalated discs
٢، القلب بشتغل دايما لهيك يحتاج كالسيوم

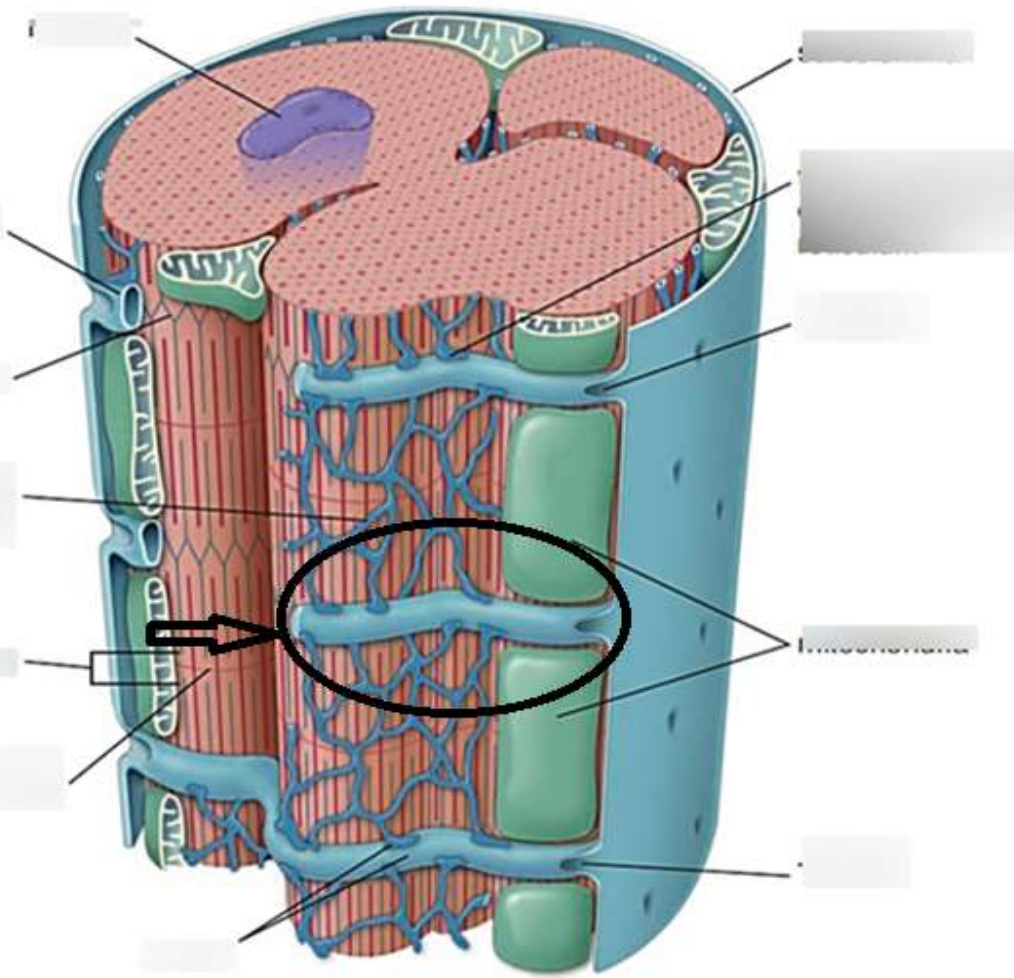
## ❑ T- tubules :

تساهم بالكالسيوم لانه sarcoplasmic not mature enough

- Larger than those in skeletal m
- At Z –line instead of A-I Junction in skeletal M

## ❑ Sarcoplasmic reticulum :

- Not well developed as in skeletal m
- Irregular and narrow with no terminal cisternae this arrangement is known as **diads**
- **In skeletal m at A-I junction called triad**



# Purkinje fibers

In ventricle

The true about photo is?

**Site :**

❑**Subendocardium**.

❑ Present in group **2 or more**

❑ They are often binucleated cells.

❑ Purkinje fibers are shorter, larger, **pale** .

❑They are **larger** than cardiomyocytes with **fewer myofibrils** at the periphery and many mitochondria.

❑ Purkinje fibers take up stain differently from the surrounding muscle cells because of having relatively **fewer myofibrils** than other cardiac cells.

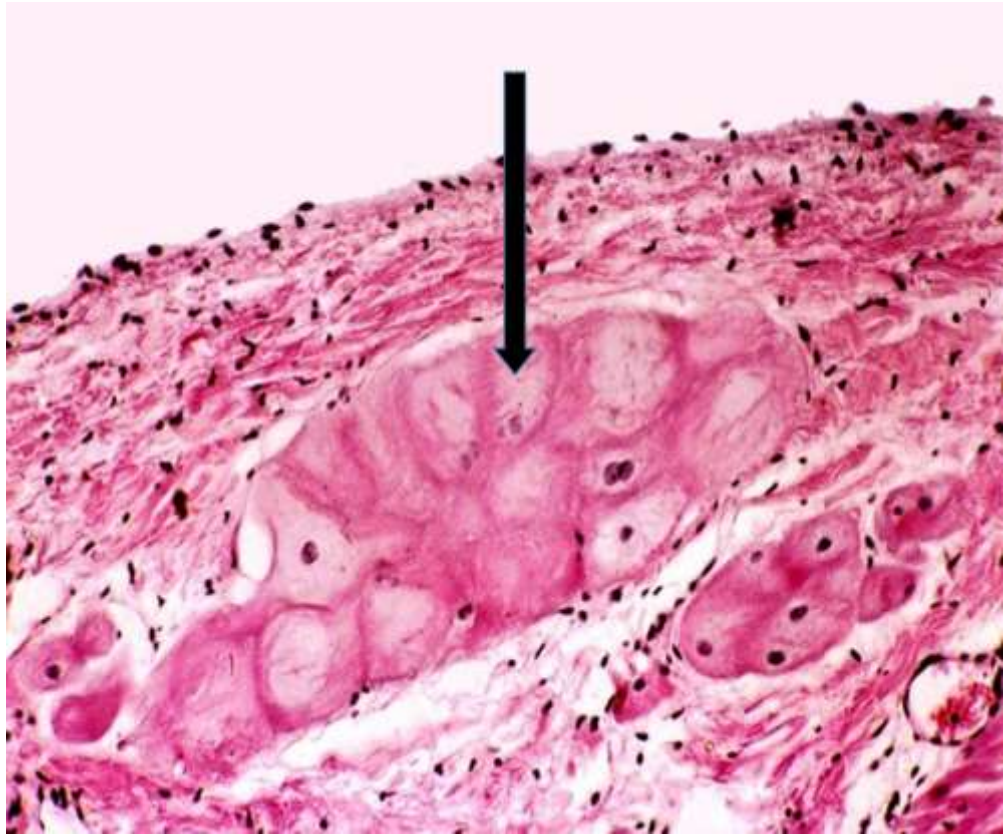
I

The cause

II

❑ The presence of **glycogen** around the nucleus causes

And it dissolve

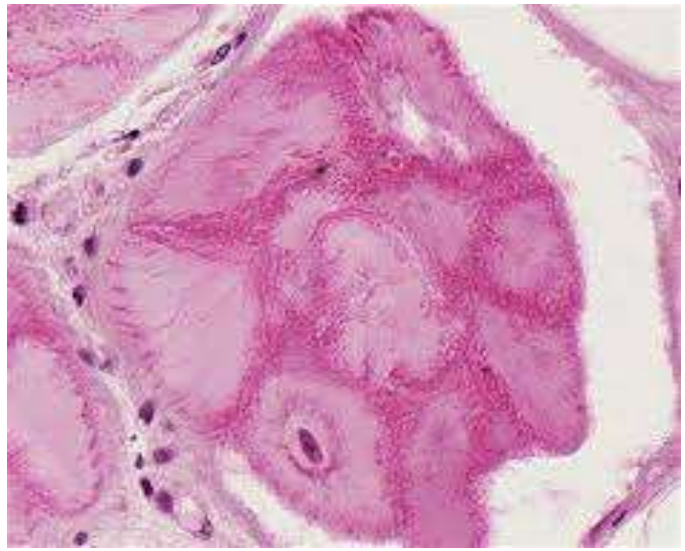


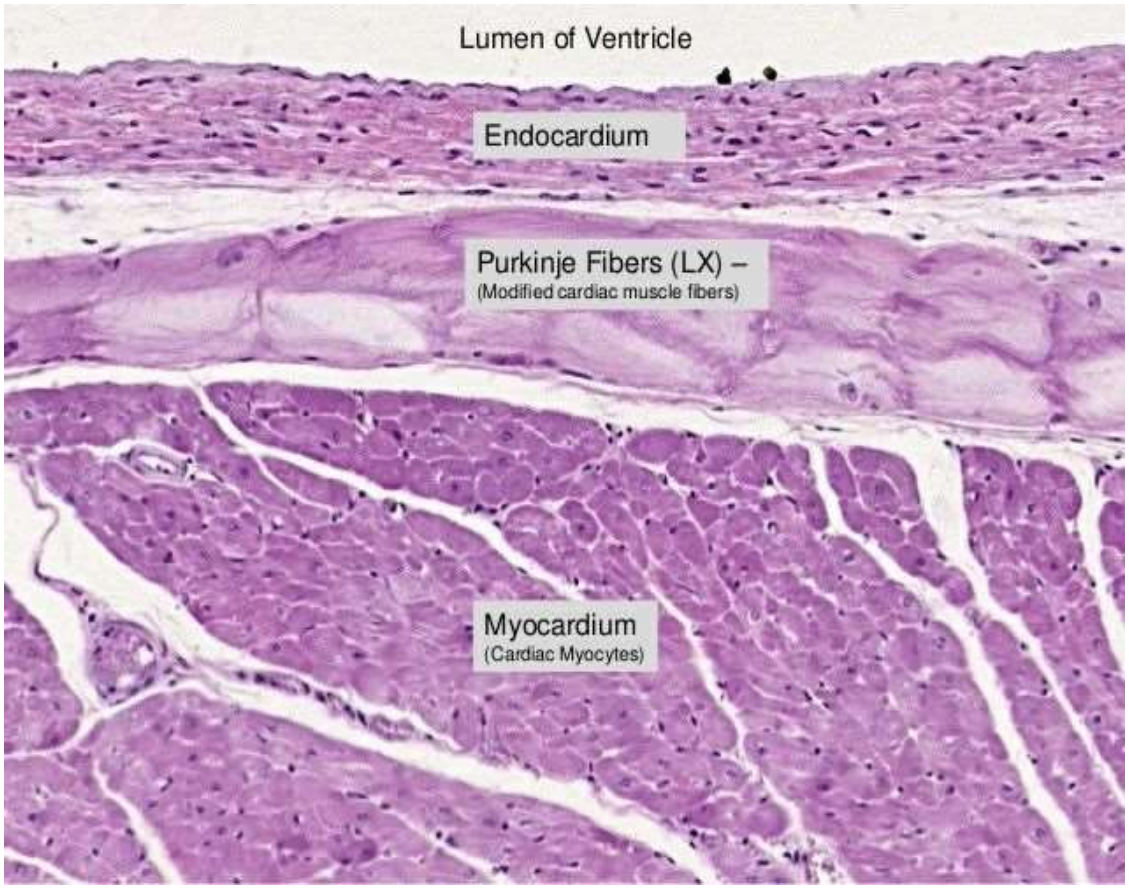
❑**Not** contain T- tubules or **intercalated discs**

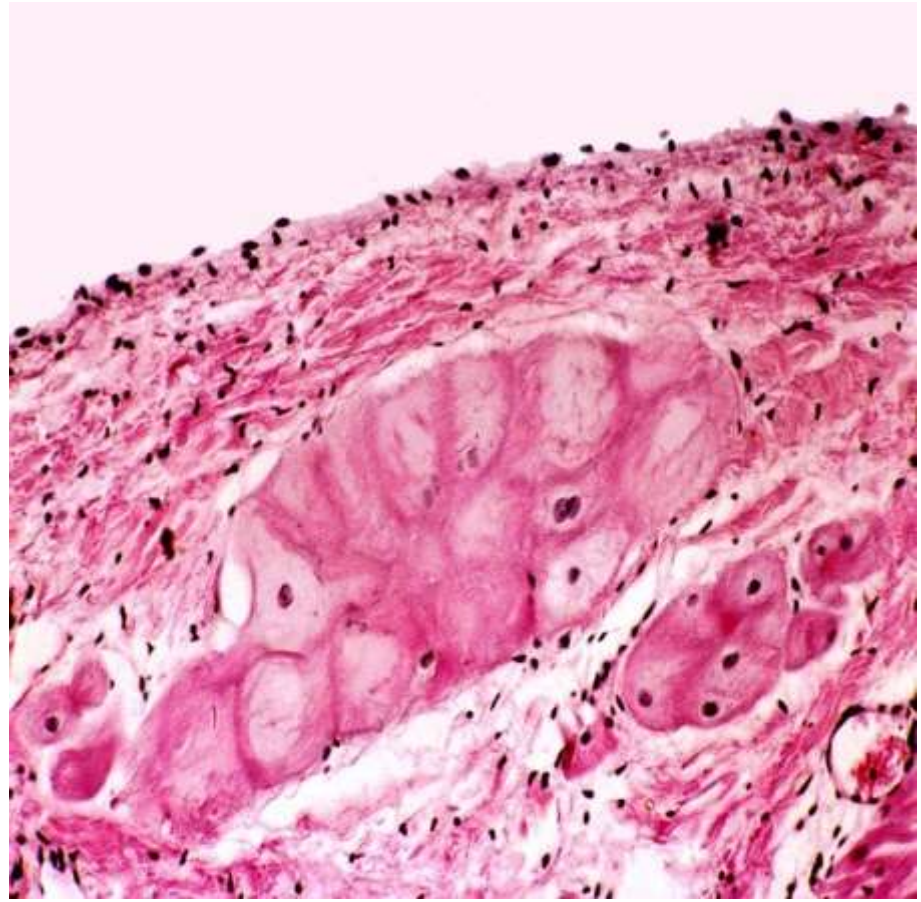
The important thing

**Function :**

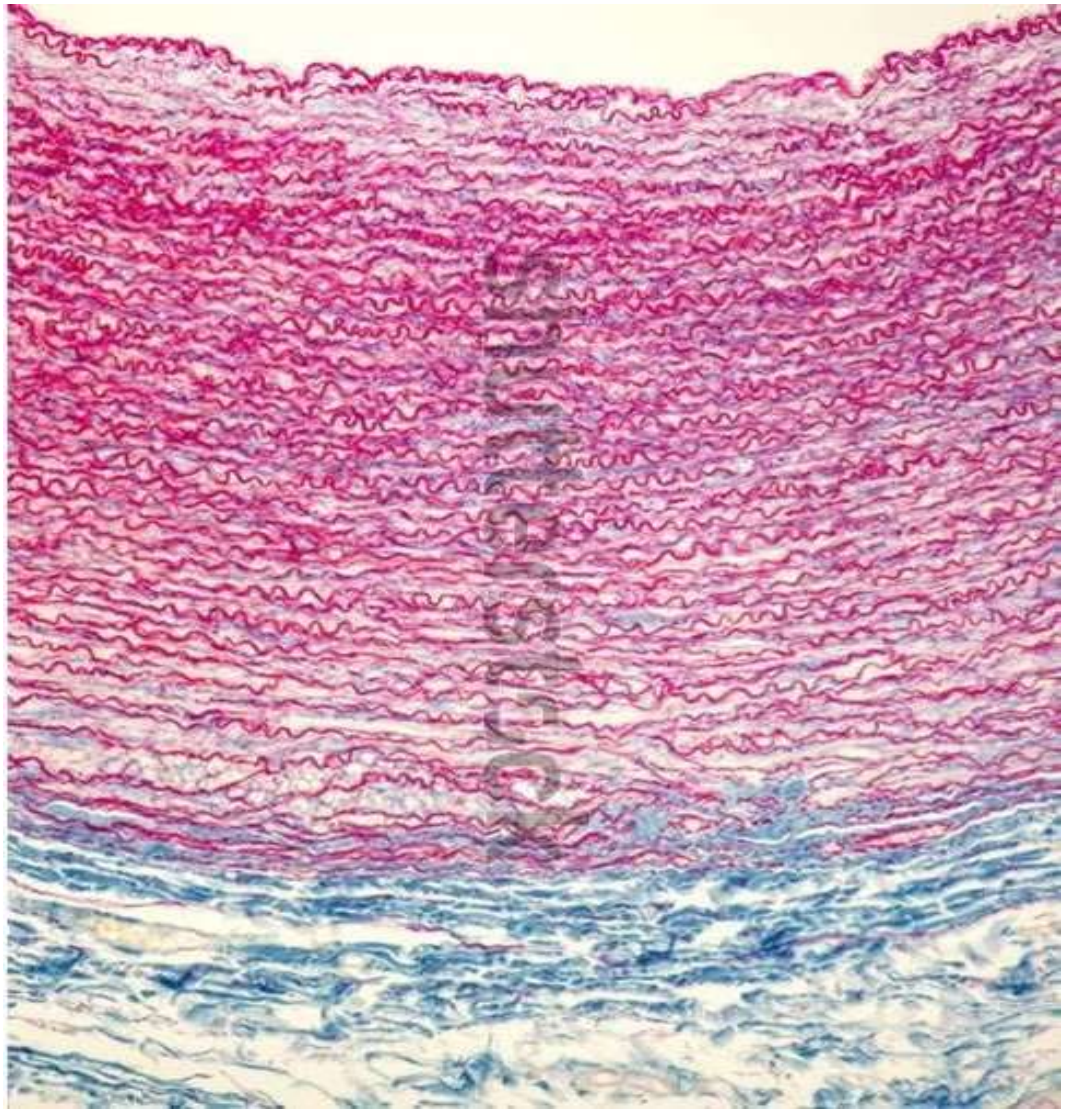
❑They conduct cardiac action potentials **more quickly** than any other cells in the heart.

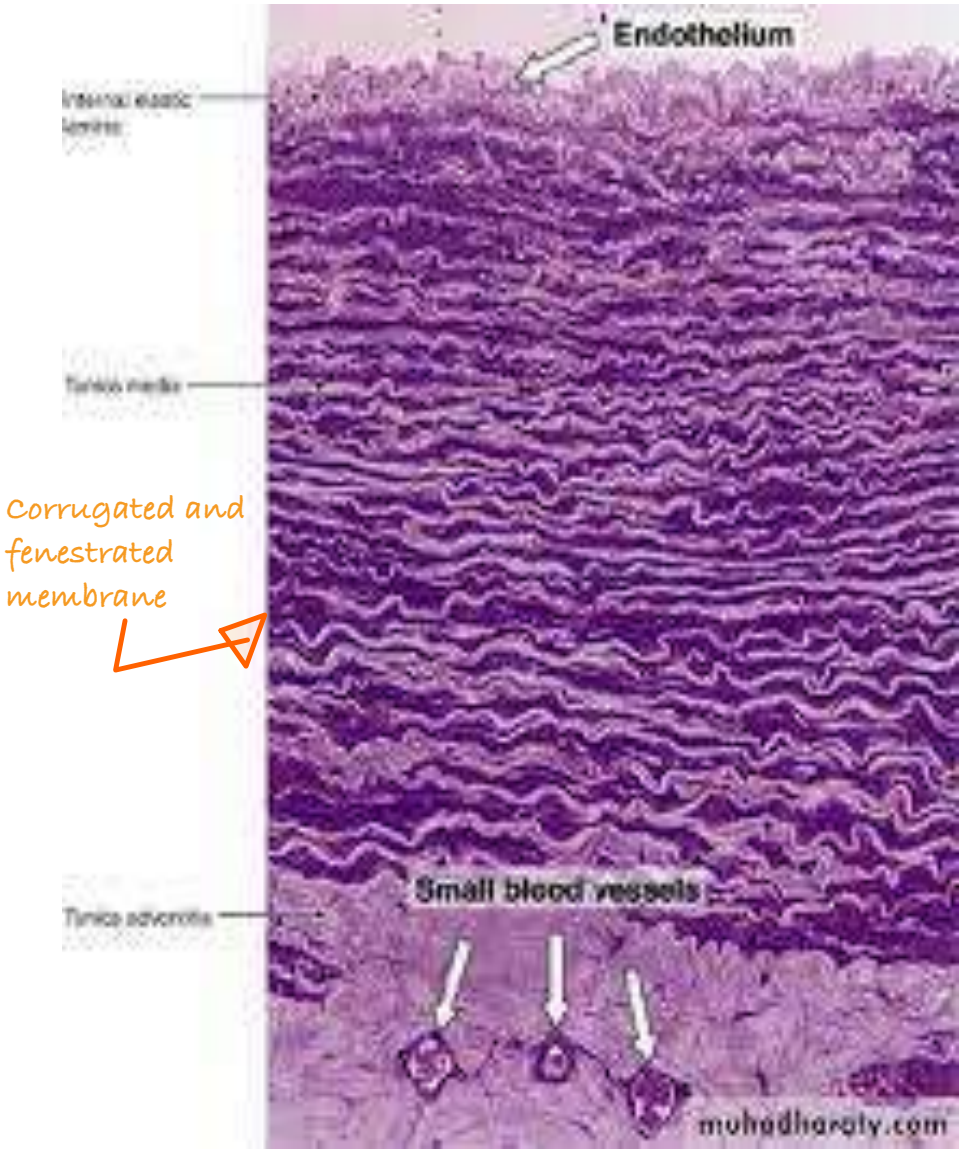



Lumen of Ventricle
Endocardium
Purkinje Fibers (LX) –
(Modified cardiac muscle fibers)
Myocardium
(Cardiac Myocytes)



# Conducting or Elastic Arteries 90% elastic






Corrugated and fenestrated membrane

# Conducting or Elastic Arteries (large arteries)

- These are large arteries closest to the heart with very high blood pressure **e.g.** aorta, pulmonary, branches of the aorta.
- Elastic arteries are those nearest to the heart and because of the large content of elastic tissue they are **EXPANSIBLE.** As blood is pumped from the heart during contraction the walls of the elastic arteries expand; when the heart relaxes the **elastic recoil** of these vessels force the blood onward at the time when no pumping force is exerted by the heart.

**Tunica intima** **10 %** of elastic arteries is **thicker** than in other arteries

- **Endothelium** with **Weibel-Palade** bodies **rod-like** inclusions that have a containing glycoprotein **von Willebrand factor** (facilitate platelets **coagulation, (carry factor VIII**), stored **only** in arteries and manufactured by most **endothelial** cells
- **Subendothelial CT**
- **Internal elastic** lamina is **less prominent**

**Tunica media 70 %** which constitutes most of the wall.

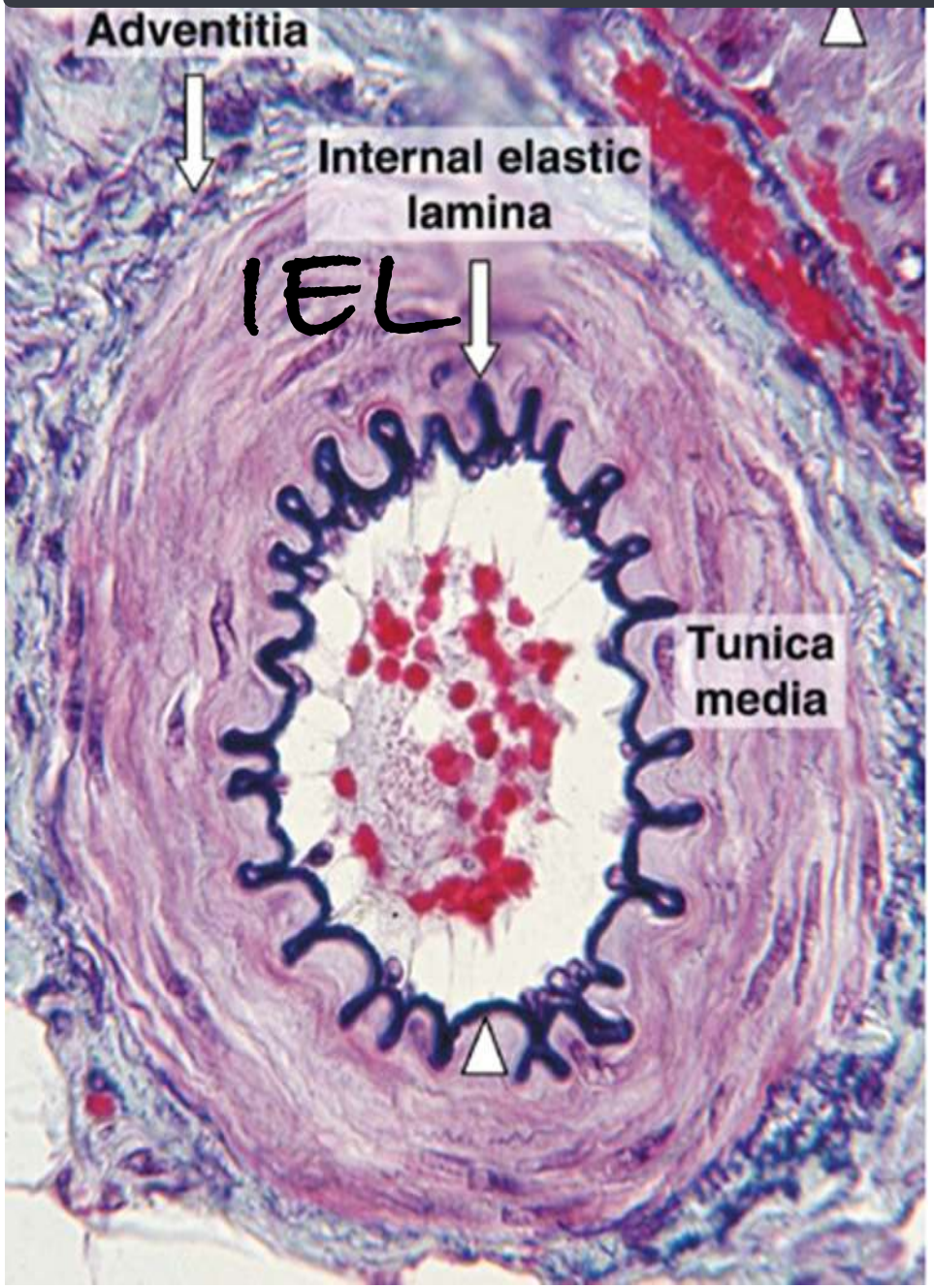
- ❖Distension (with the increase in **systolic blood** pressure) of the walls is facilitated by **concentric fenestrated lamellae of elastic fibers** in a thick tunica media
- ❖**Smooth muscle** cells and **collagen fibers** (collagen **type III**) are present between the layers of elastic fibers.
- ❖**Indistinct external elastic lamina**

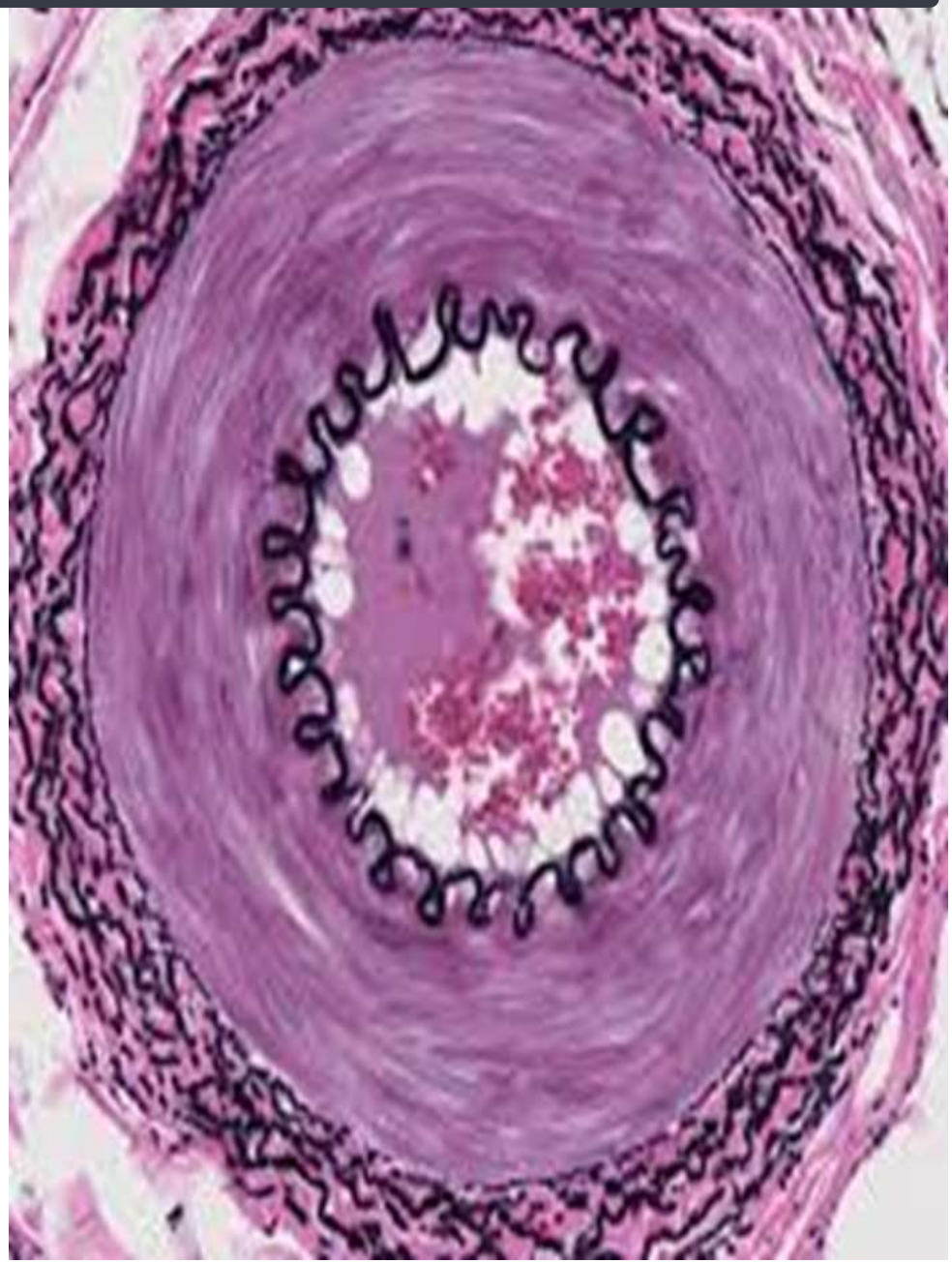
**Tunica adventitia 20 %** composed of elastic and collagen fibers and is provided with **vasa vasorum** and lymphatics

- The walls of these large arteries are **so thick** that their peripheral parts cannot derive enough oxygen and nutrients from the blood of the vessel. Larger vessels are therefore accompanied by smaller blood vessels which supply the tunica adventitia and, in the largest vessels, the outer part of the tunica media of the vessel wall. These blood vessels are called **vasa vasorum**.

# Medium size artery = muscular artery

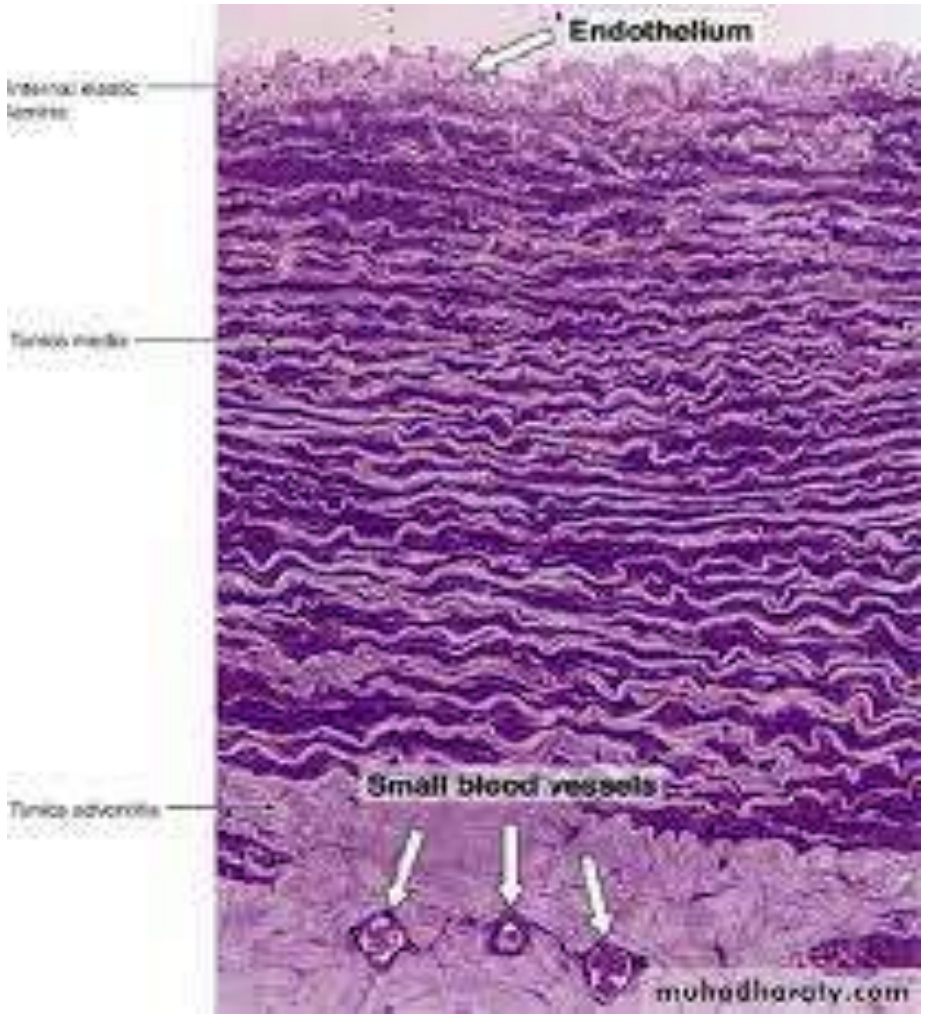
Why IEL & EEL is well demarcated here?
The underlying muscles is different than large artery & contraction of these muscles help it to demarcate

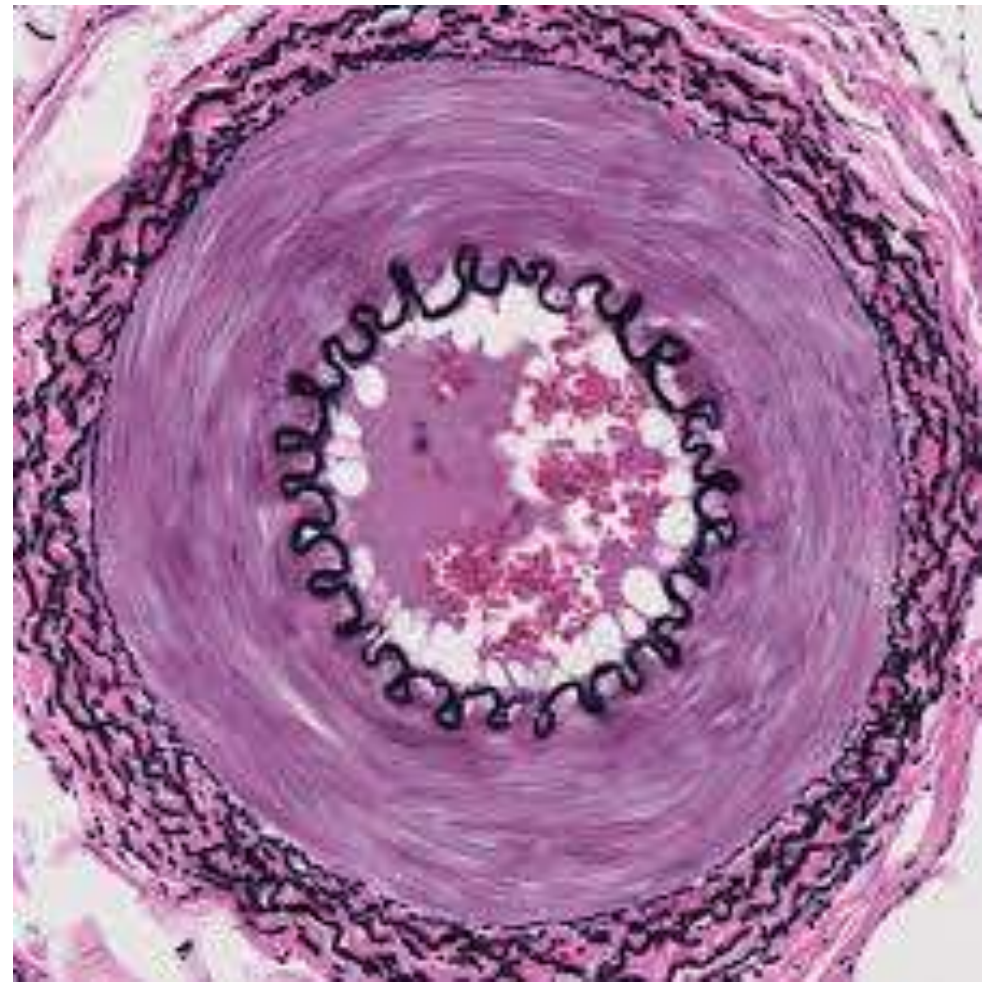


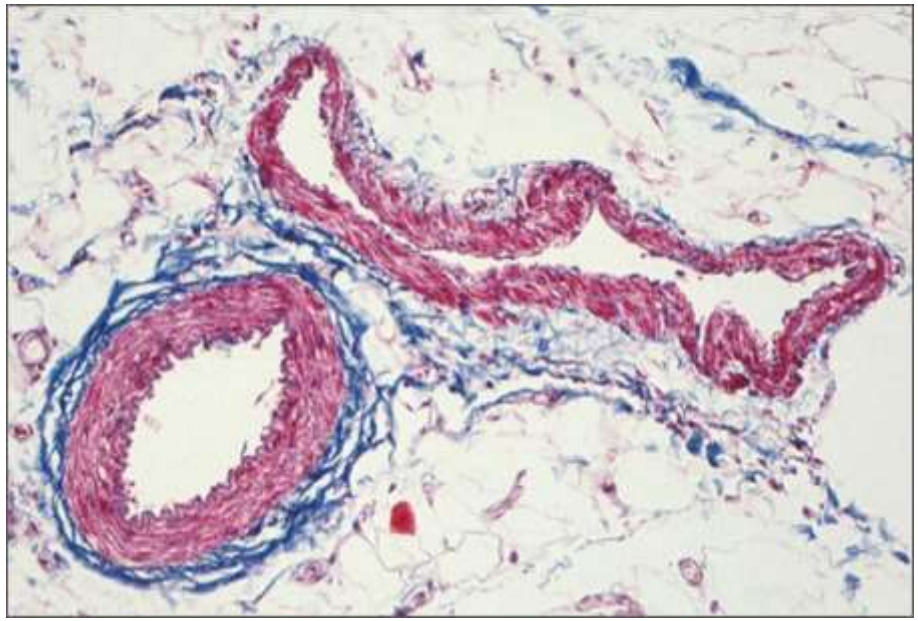
# Large & medium size arteries

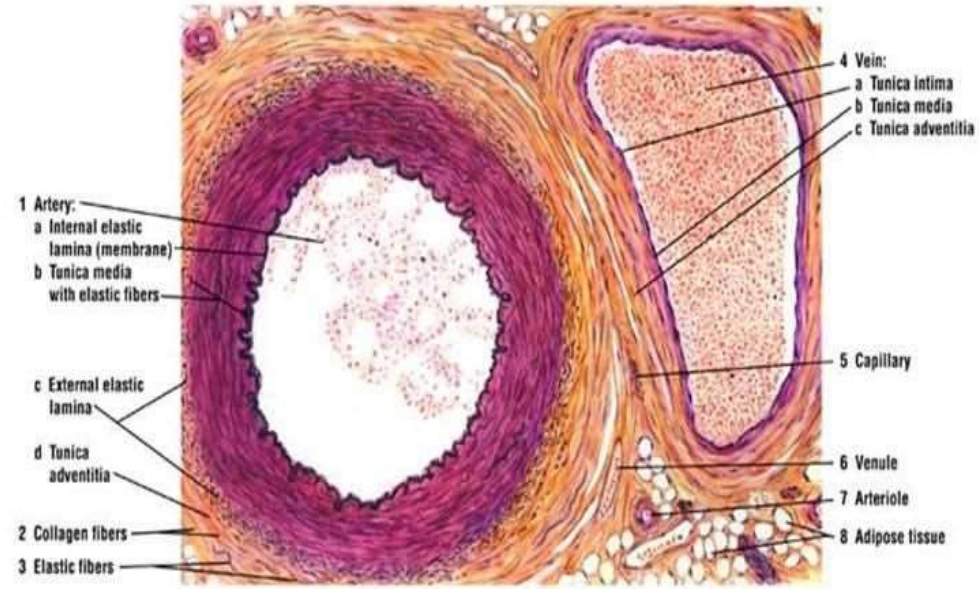
Always with vein

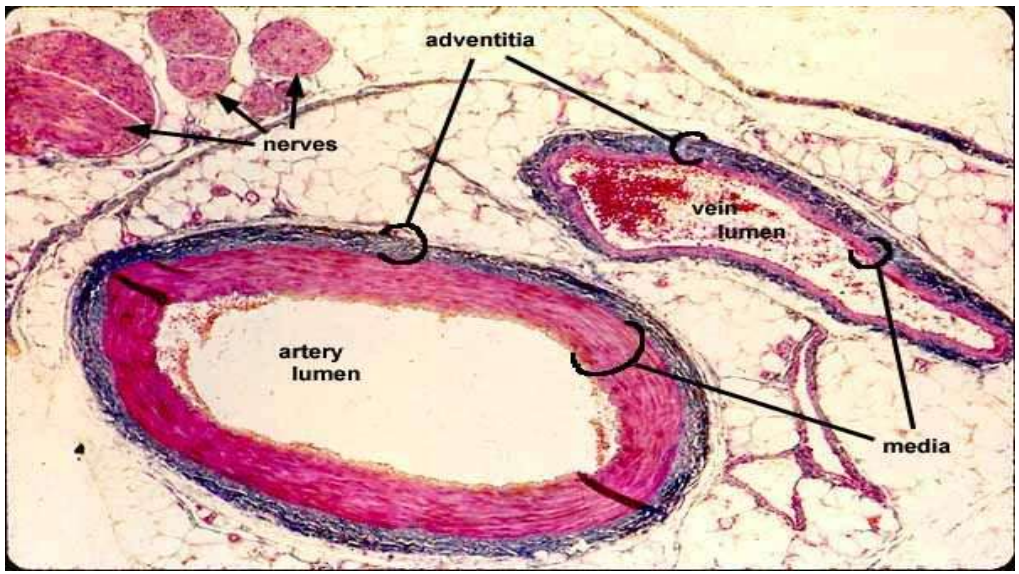


Vein is has few elastic so when it stretches, can't return to normal





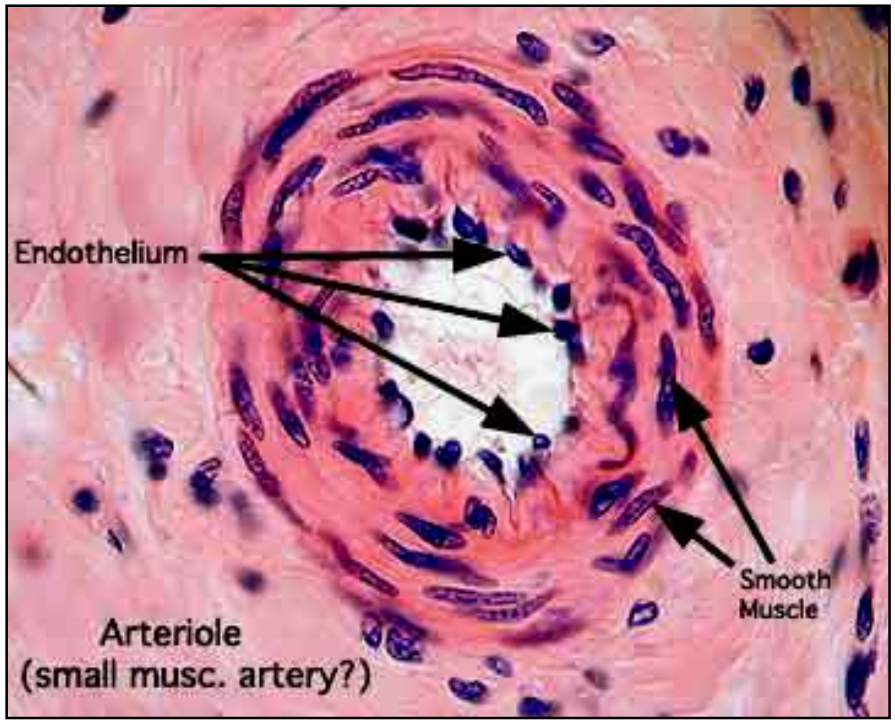


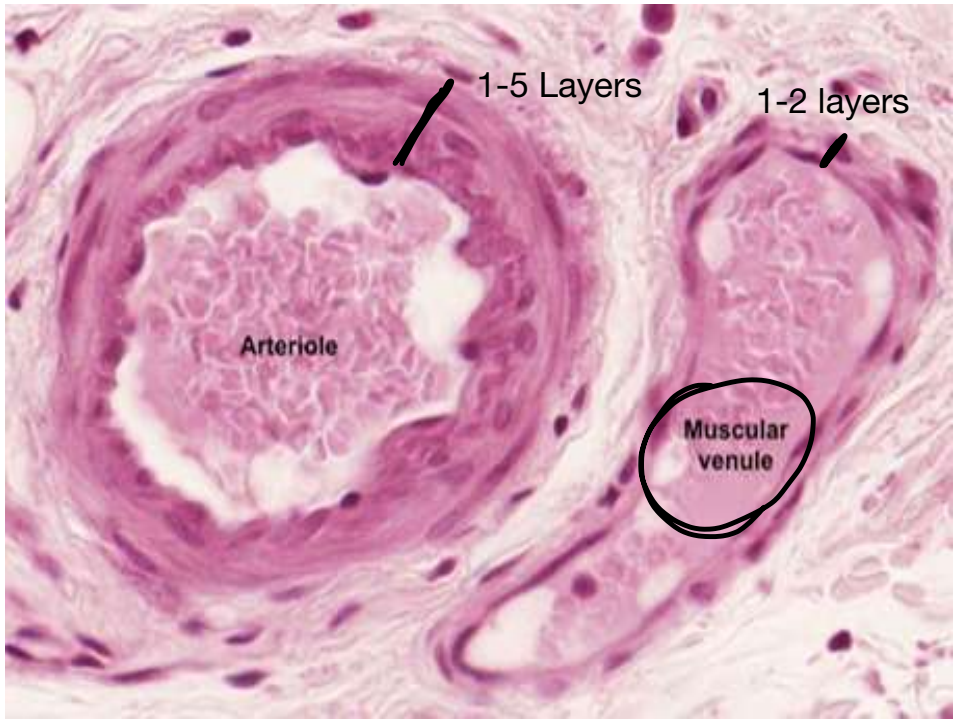
We differentiates between artery and vein by IEL & EEL ,, VEINS don't have them

Artsy thicker than veins but smaller

# Arteriole

100 micron and become 50 in capillaries

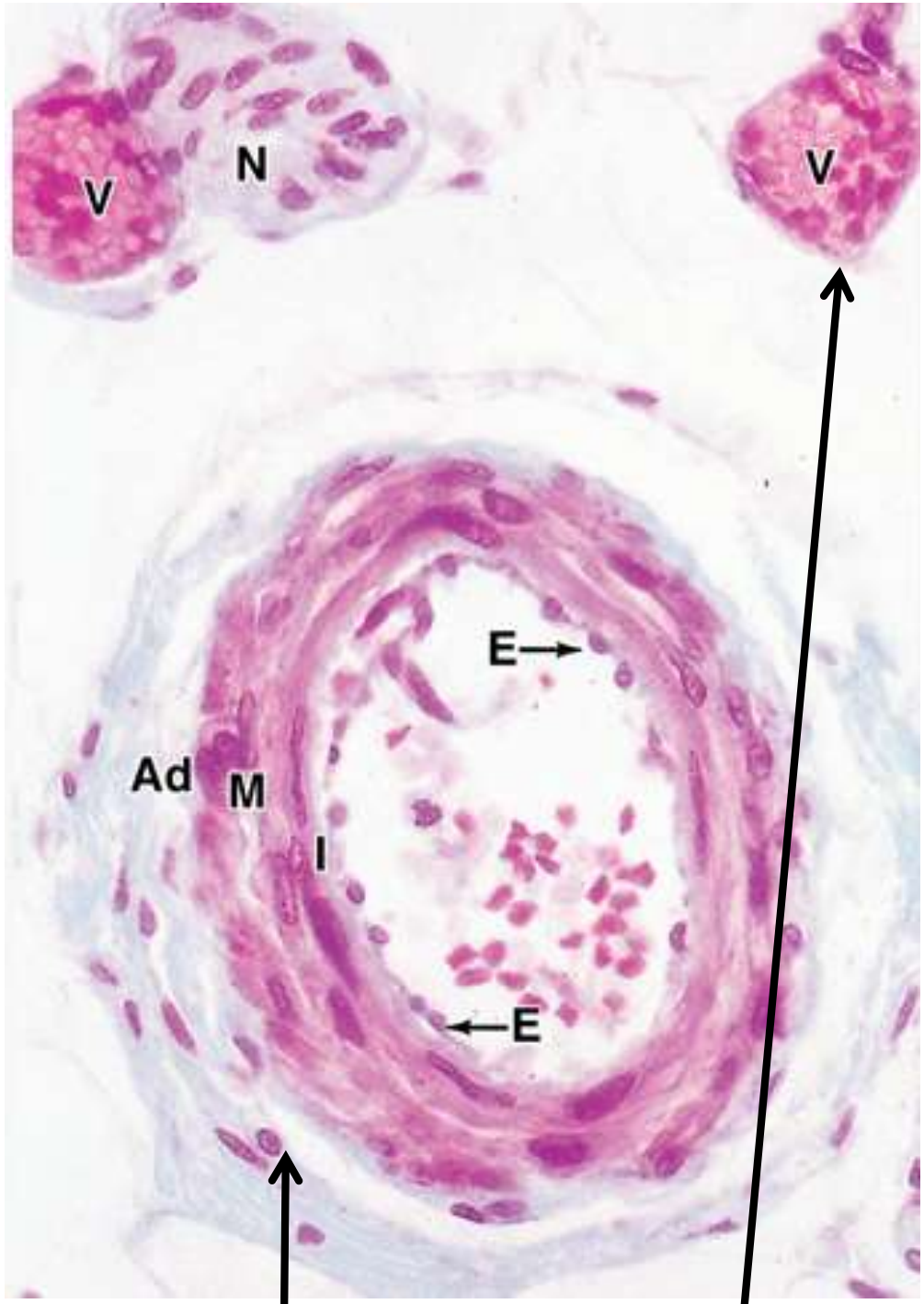



**Tunica intima** is smaller with **endothelium** and internal elastic lamina which may be **incomplete** and (absent in small and terminal arteriole but present in large arterioles)

**Tunica media** is made up of **circular smooth muscles** i.e. single smooth muscle layer in small arterioles; **2-4 layers in large arterioles**

**Tunica adventitia** posses **autonomic** nerve fibres to control the size of the lumen which is responsible **peripheral resistance** necessary to control arterial **blood pressure**

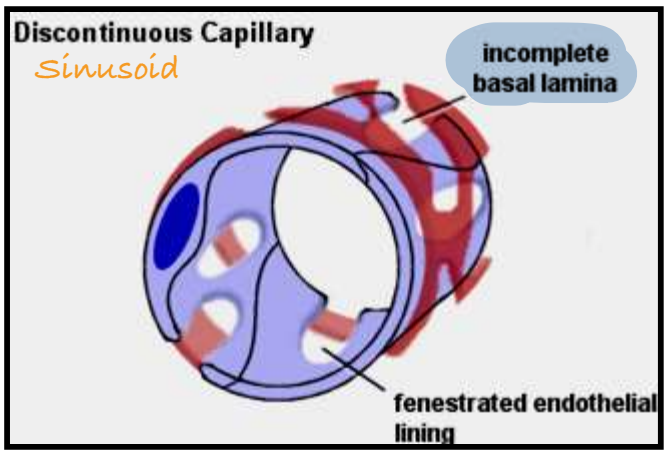



Collapsed or stagnated blood because they have a thin layer of

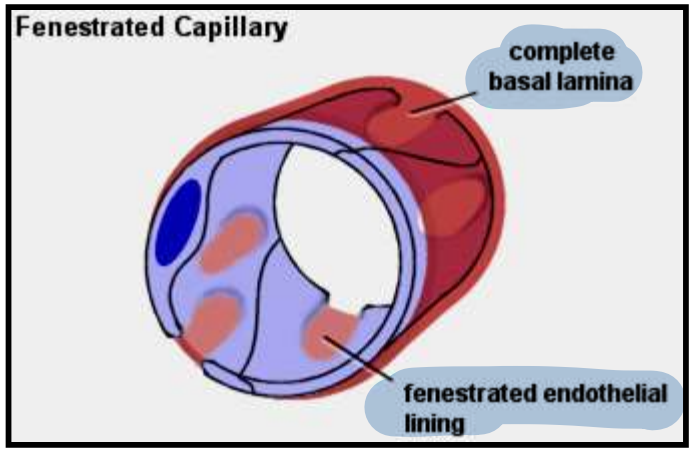
Arterioles and venules

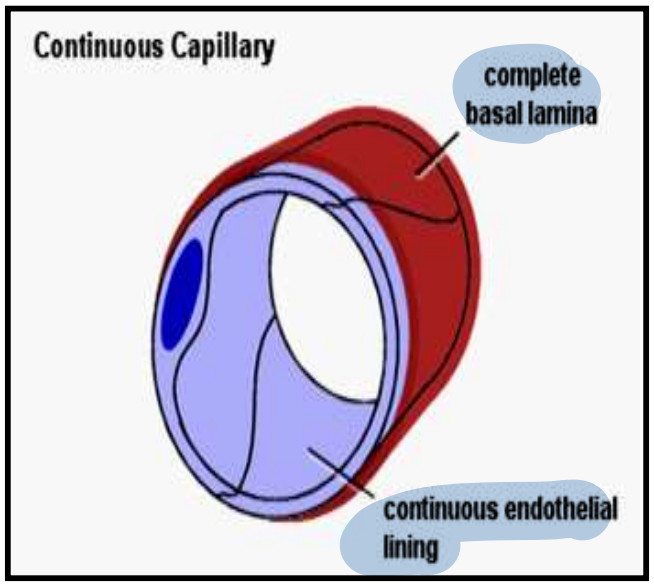
حكت ما رح تهتم بيهم كثير و لكن عقبت عليهم بشكل سريع

# Types of capillaries

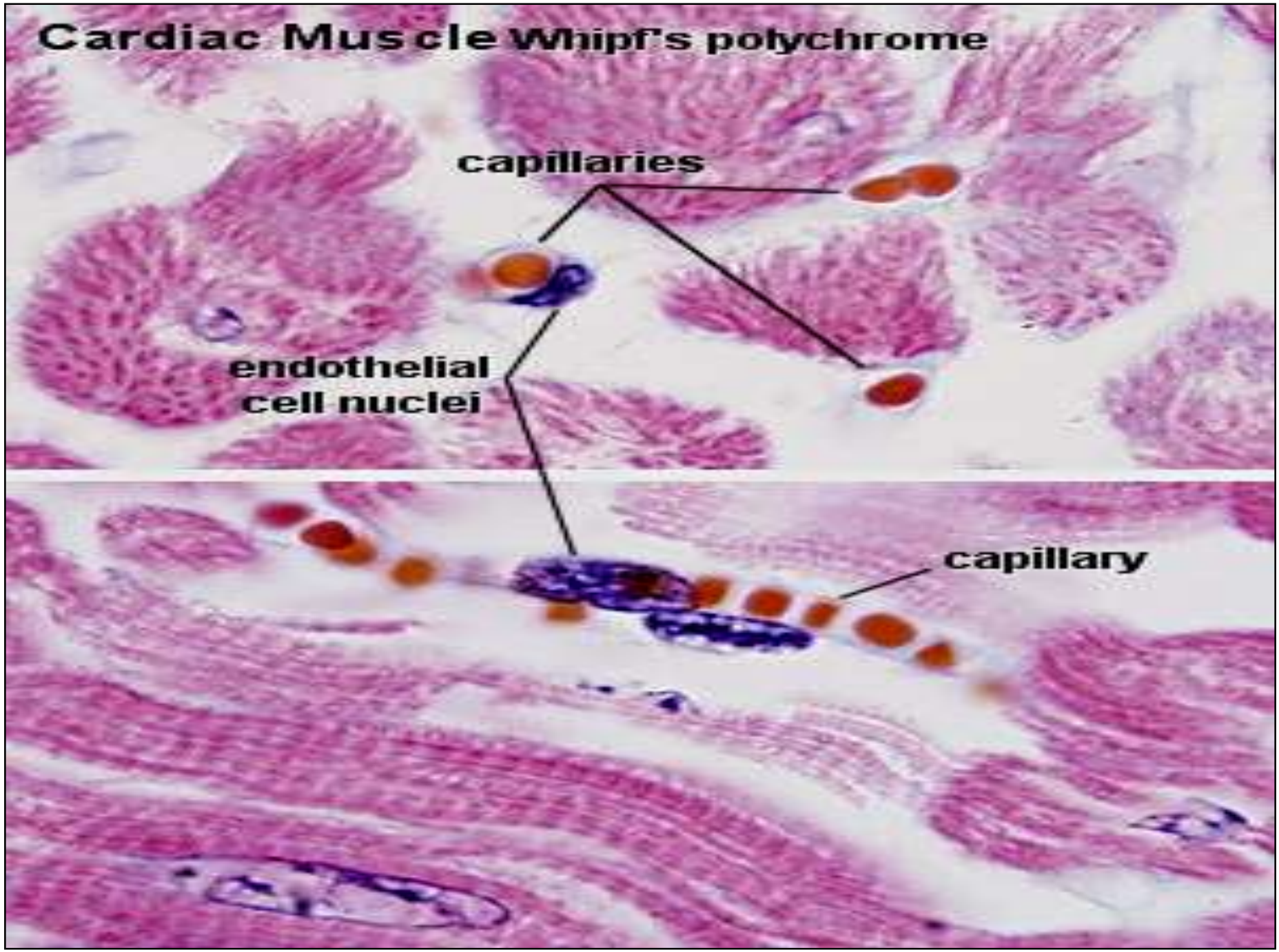



Have macrophages

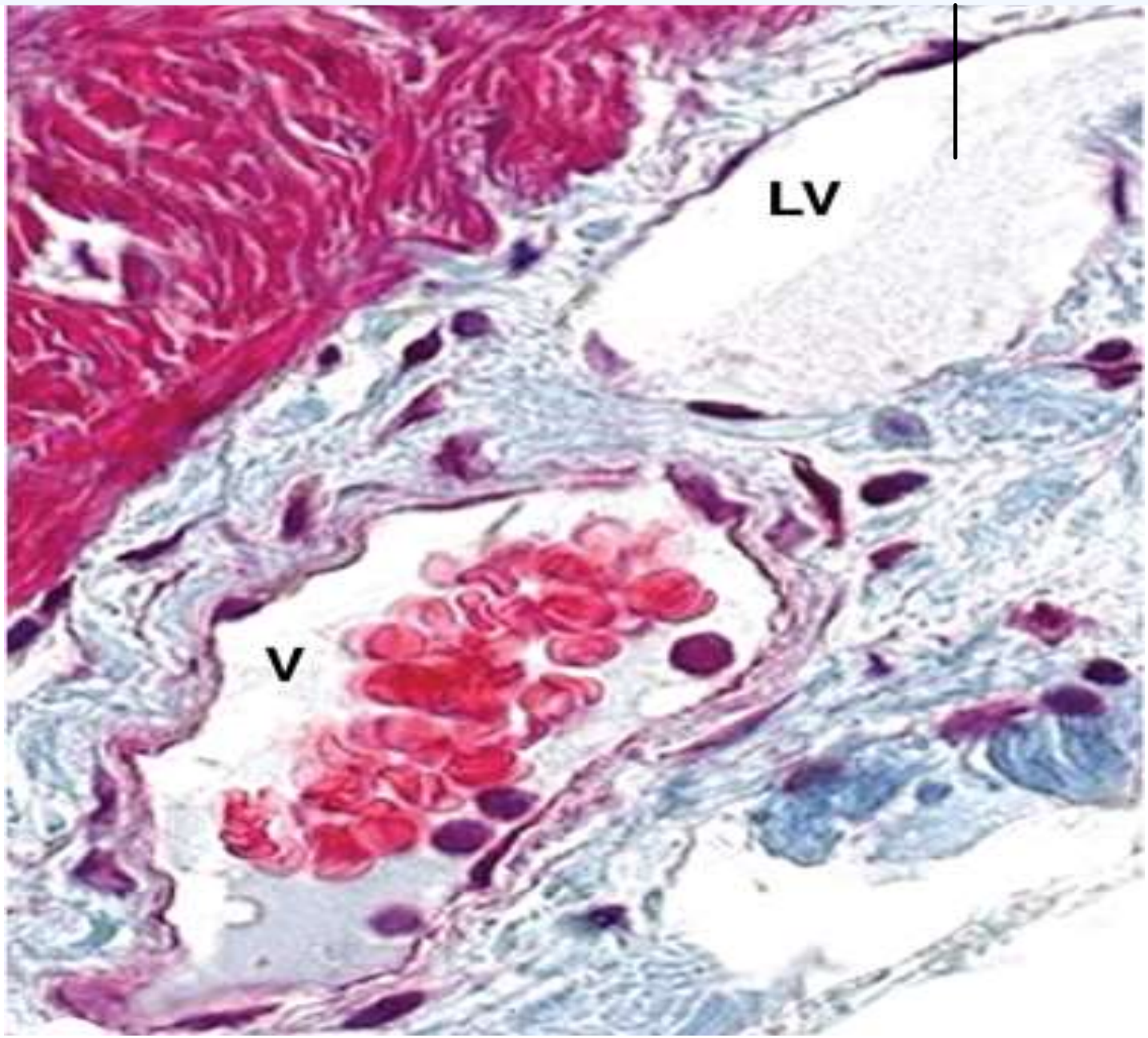



Have preicytes


Cardiac Muscle Whipf's polychrome
capillaries
endothelial
cell nuclei
capillary

Don't have sphincter to change its diameter so surrounding tissue compresses on it to deliver the lymph fluid




Venule and lymphatic vessel