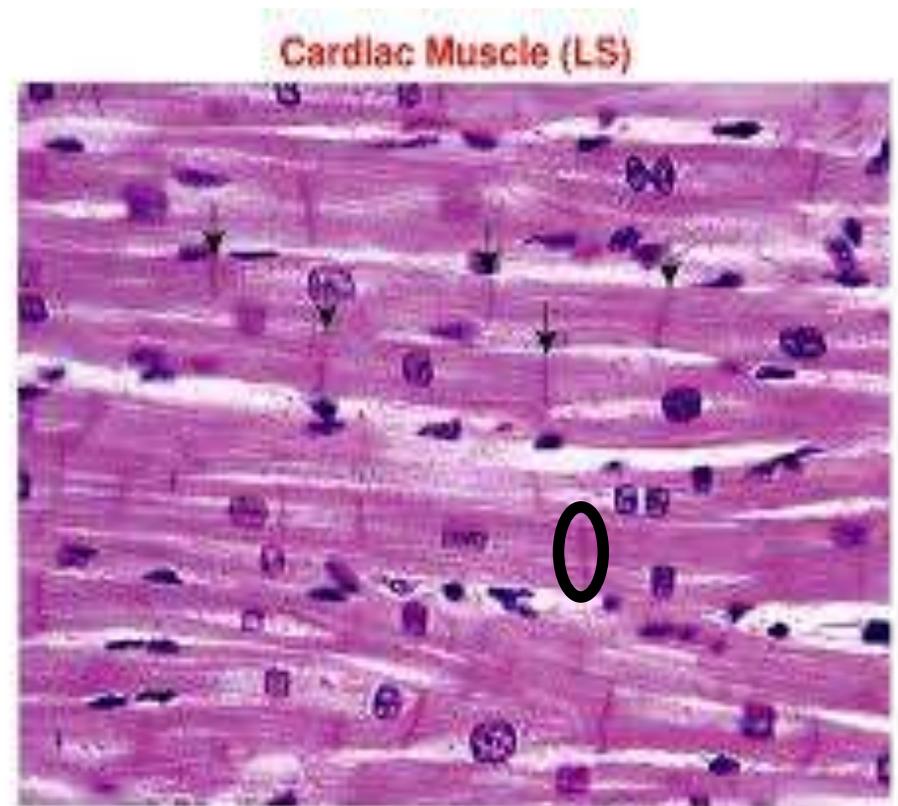
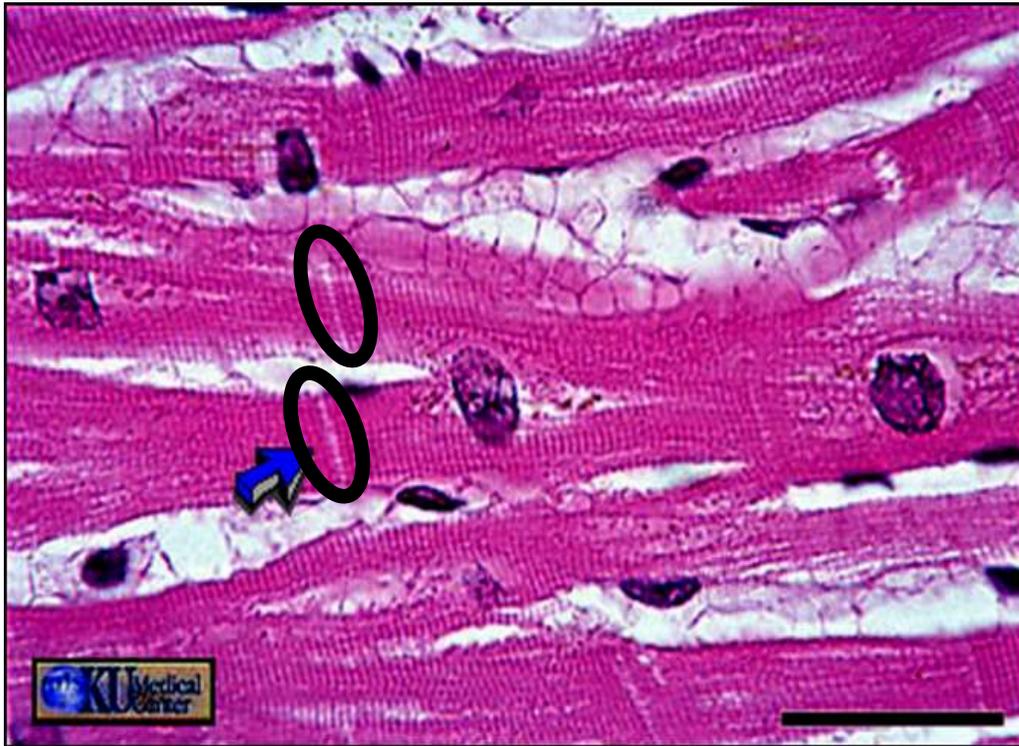


# Cardiac muscle

Muscle fiber  
 + acidophilic  $\leftarrow$  oxyhemoglobin in sarcoplasm  
 + oval nucleus.



## LM:

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

**O** → Refers to intercalated discs // type of cell junction

# Transverse part

- 1) zonula adherents
- 2) macula adherents

# lateral part

Gap junction

## The heart consists of 3 layers

- 1) endocardium ~> lining w/ endothelium + sub endothelial CT rich in elastic fibers ~> condensed to form internal elastic membrane ~> To separate endocardium from myocardium
- Valve ~> core of CT
- 1) collagen
  - 2) elastic fibers
- + covered by endothelium

## Types of cardiac muscle

Three main types :

Contractile

Endocrine (ANF) = modified cardiac in Rt atrium ~> affect kidney tubules

Myocardium of conduction system

SA node ~> intermodal fibers ~> AV node ~> Bundle of His (AV bundle)

Rt & Lt bundle branches ~> Purkinje fibers

Secret directly into the blood

## Site :

❑ **subendocardium**. (Between endo. + myocardium)

❑ Present in group **2 or more**

❑ They are often binucleated cells.

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

❑ They are **larger** than cardiomyocytes with **1) fewer myofibrils** **2)** 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.

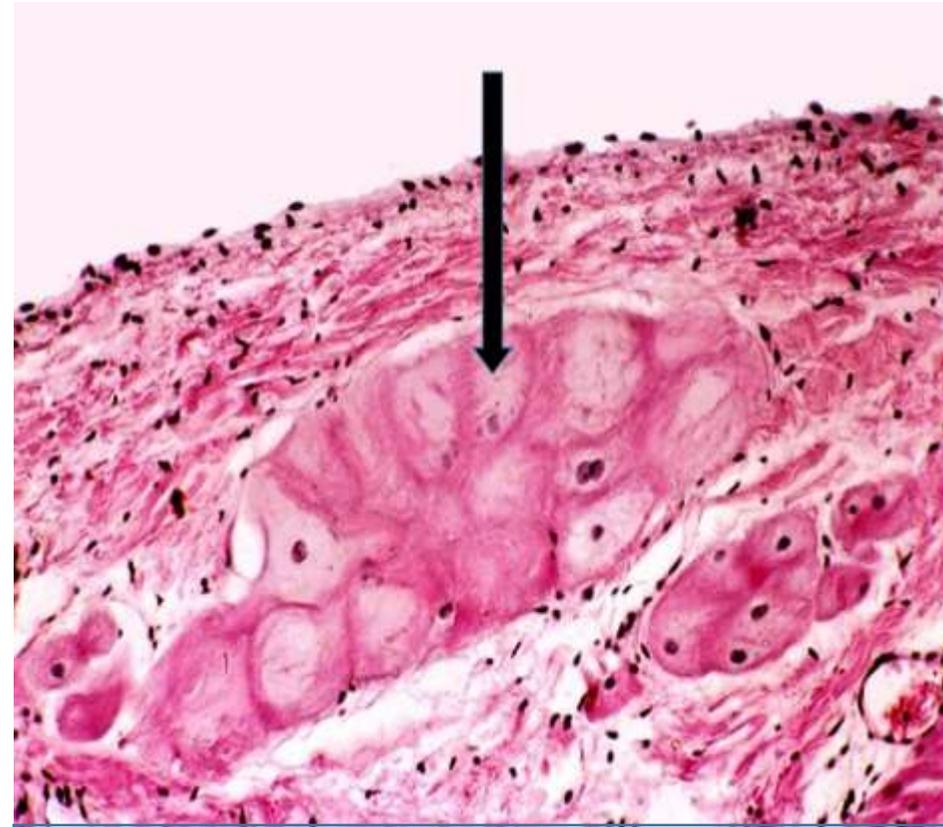
❑ The presence of **glycogen** around the nucleus causes **(3) glycogen: dissolved during preparing of slide)**

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

## Function :

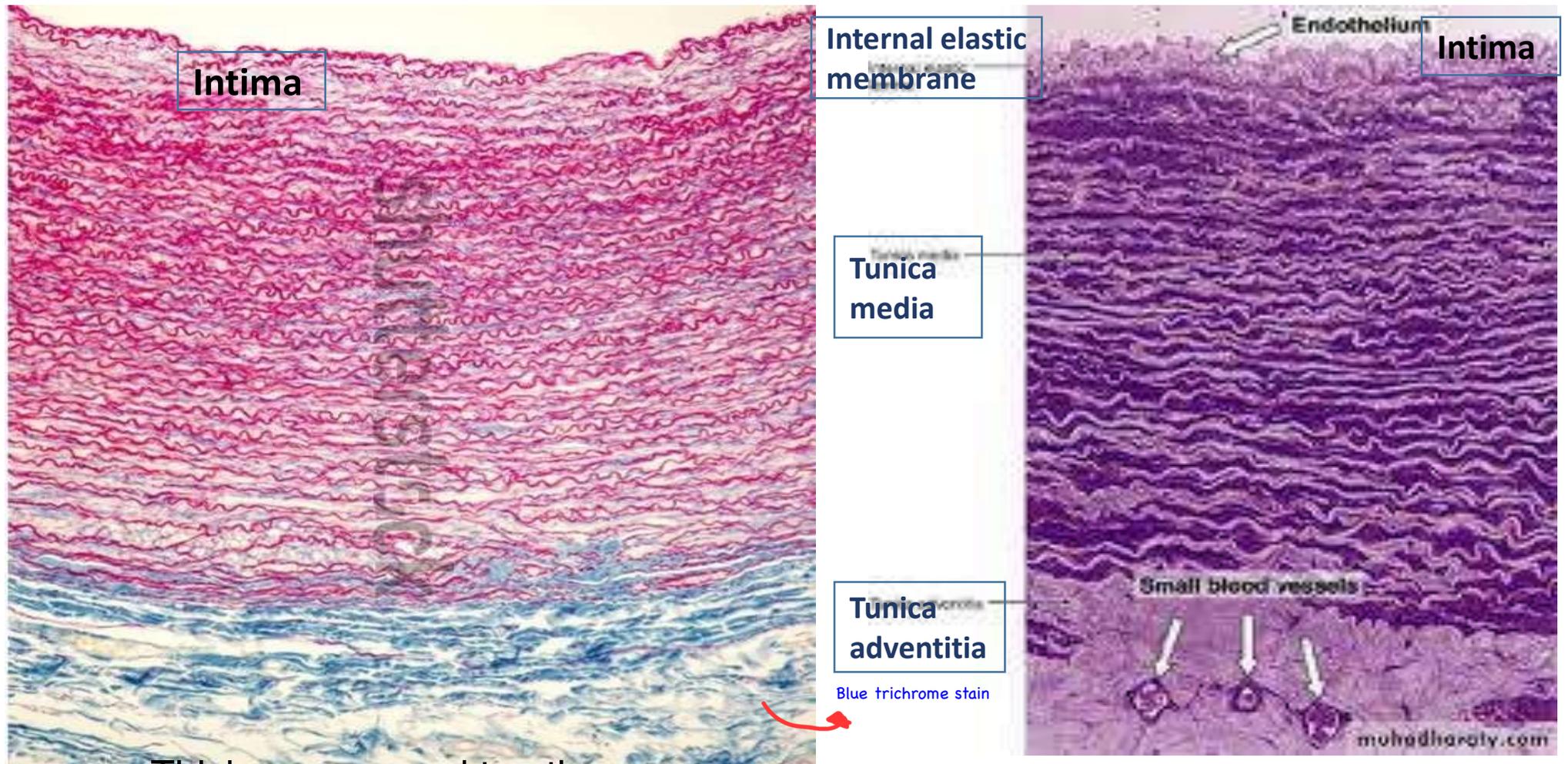
❑ They conduct cardiac action potentials **more quickly** than any other cells in the heart. (For that reason it has many mitochondria)

# Purkinje fibers



Pale, why?! Because of 1+ 2+3

# Conducting or Elastic Arteries (large arteries)



Thicker compared to other

- Tunica intima 10 %: Rich in elastic fibers which will condensate to form **INTERNAL** elastic membrane.
  - Tunica media 70 %: corrugated, Smooth muscles and collagen fibers are present between the layers of elastic fibres, elastic fibers will condensate to form **EXTERNAL** elastic membrane. Main variation
  - Tunica adventitia 20 %: CT contain elastic and collagen fibres, provided with vasa vasorum
- EXTERNAL+ INTERNAL** elastic membrane present but **NOT** evident.

Protection + nutrition

↓ small blood vessels ~ > disappear

The veins & arteries have the same structure (3 layers )  
Variation is of the function

Related to layers of the heart  
Endocardium ~> tunica intima  
Myocardium ~~~> tunica media  
Epicardium ~> tunica adventitious

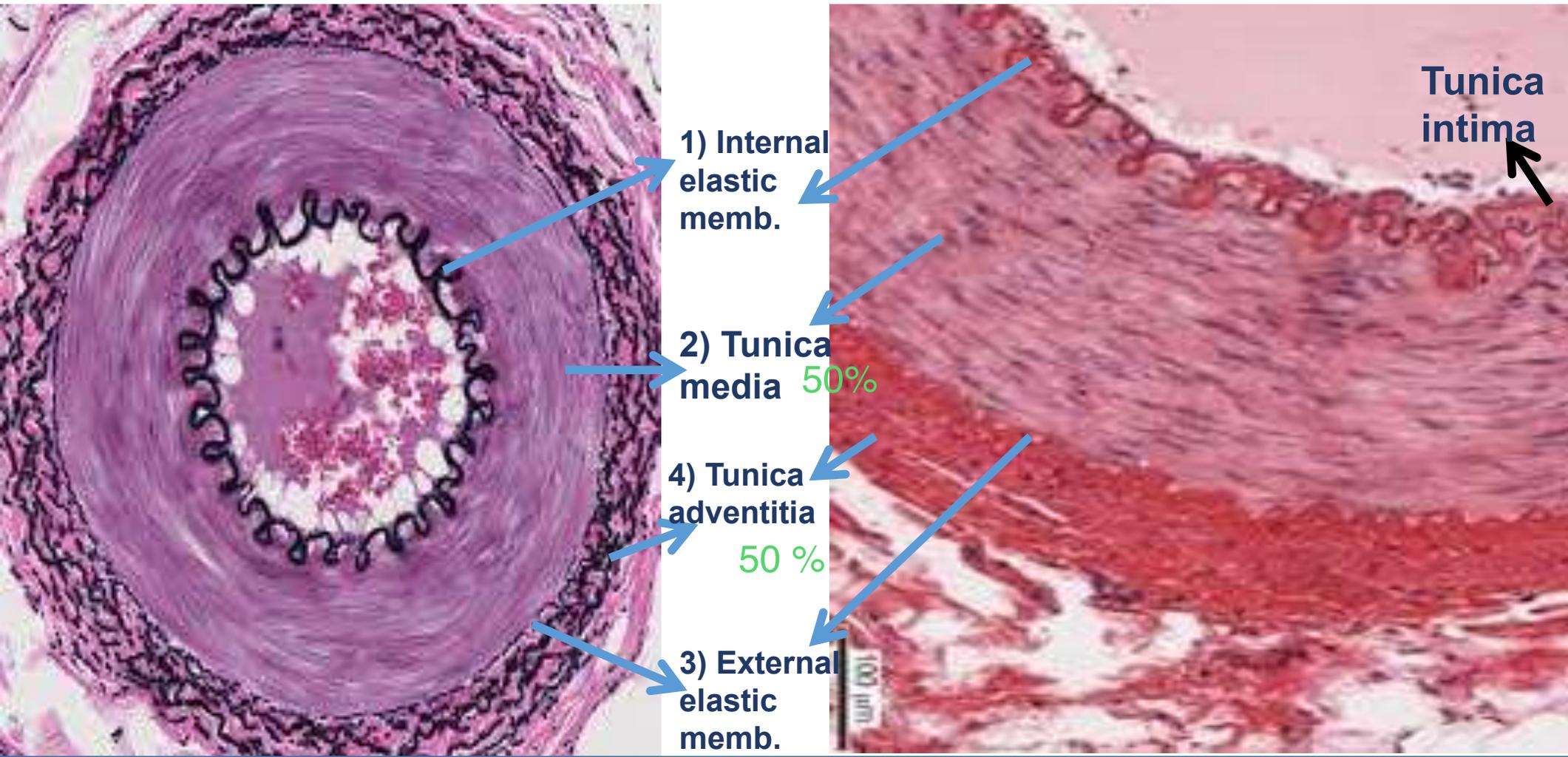
\* Elastic fibers ( 90% ) ~> concentric fenestrated lamellae in a thick tunica media

The smooth muscle in tunica media consider as important factor in pathogenesis of atherosclerosis ( inflammation of endothelium ~> entering lipids ~> smooth muscle accelerate these process)

Vasa vasorum ~ ~: supply the thick arteries

# Medium size artery = muscular artery

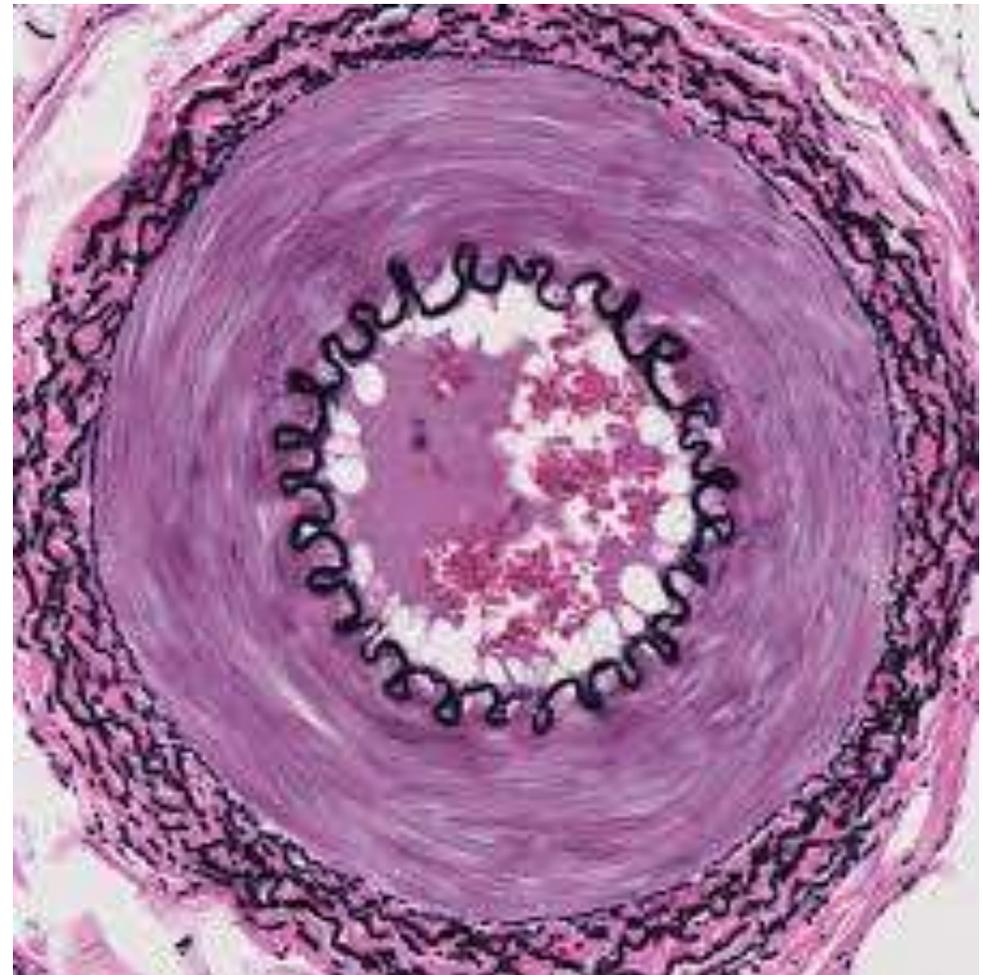
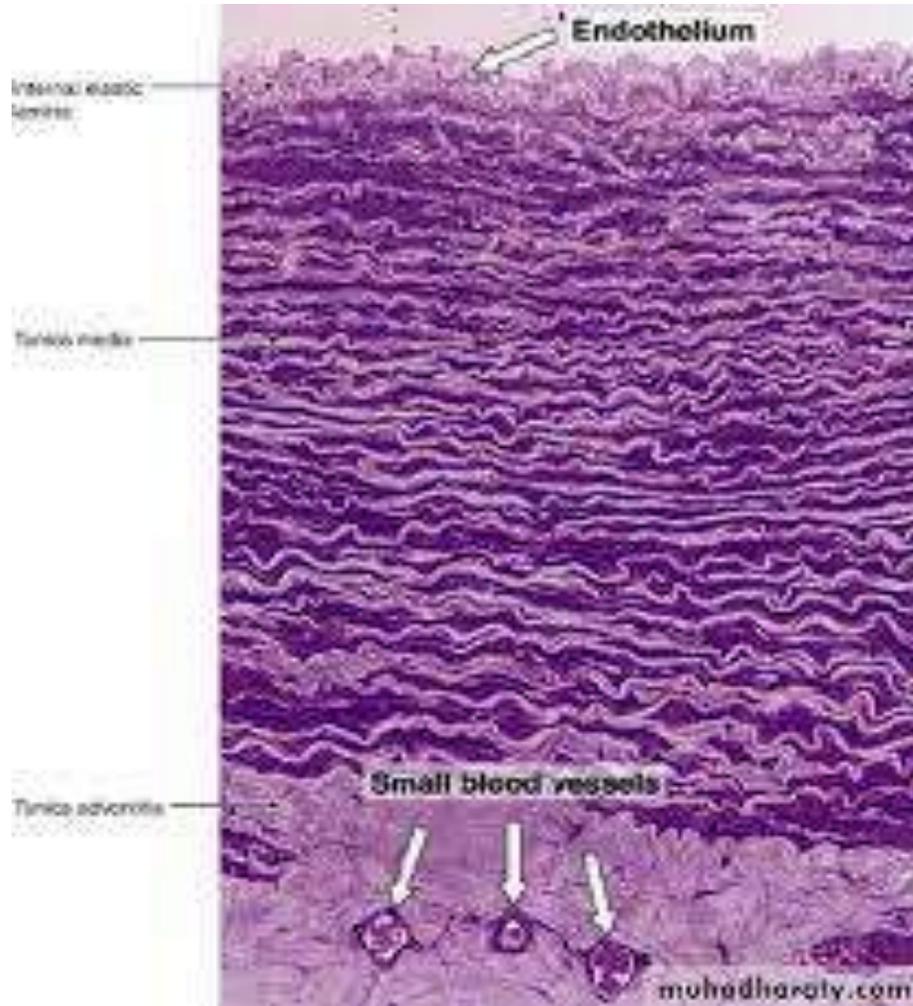
Distributing artery// naming

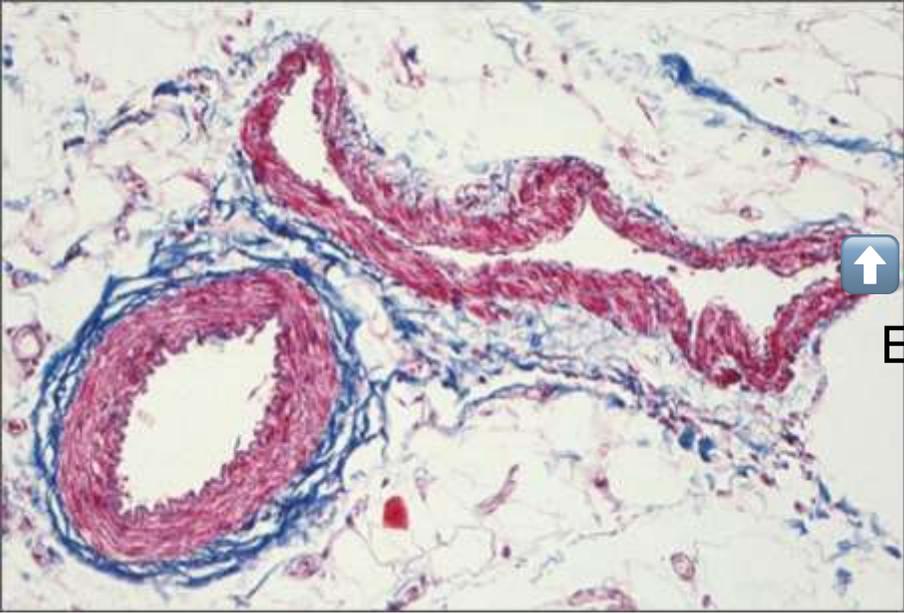


**Internal+ external elastic membrane:** corrugated and EVIDENT due to presence of smooth muscles in tunica media,

**When these smooth muscles contract the internal elastic membrane become corrugated.**

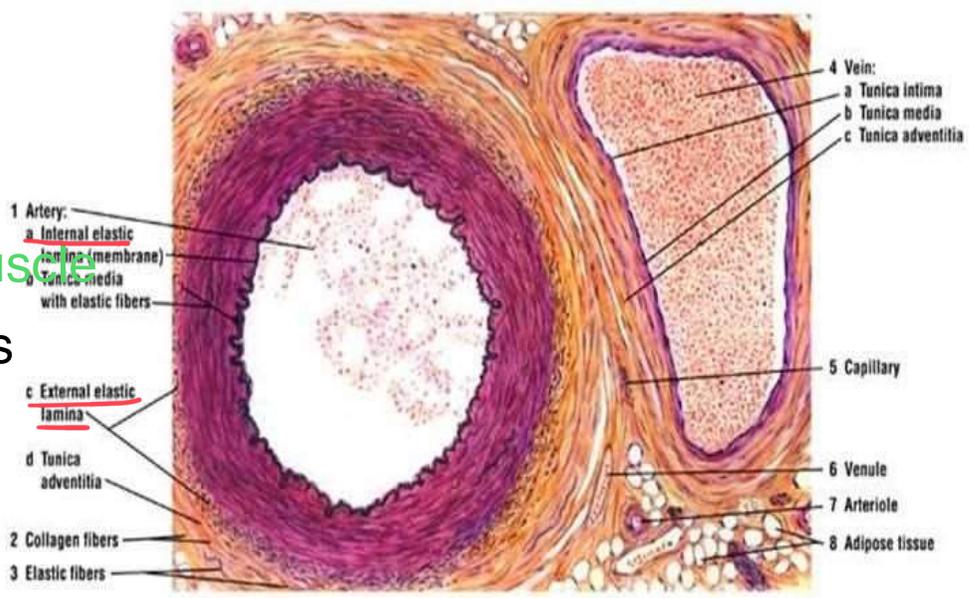
# Large & medium size arteries





Arteries  
 Small  
 Regular  
 Circular  
 Smooth muscle

Elastic fibers stain w/  
 1) H& E  
 2) VVG  
 3) orcein

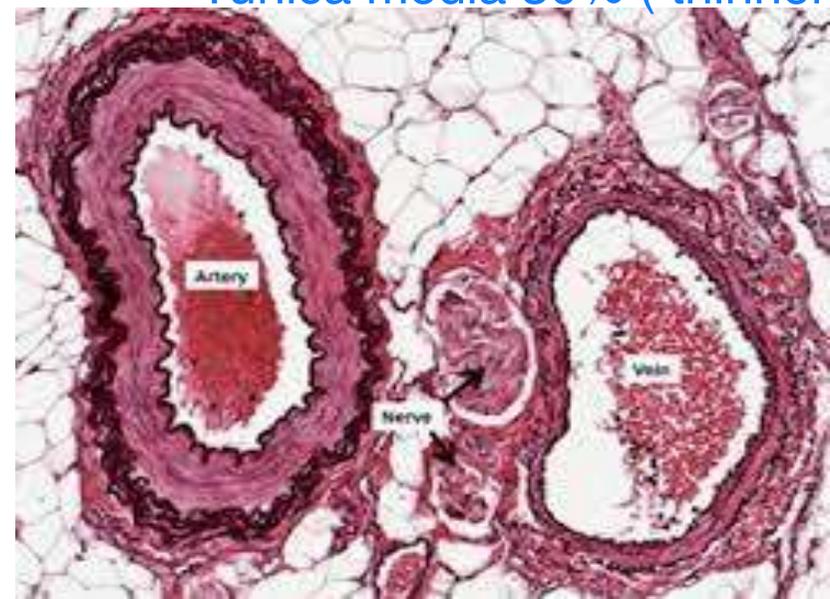
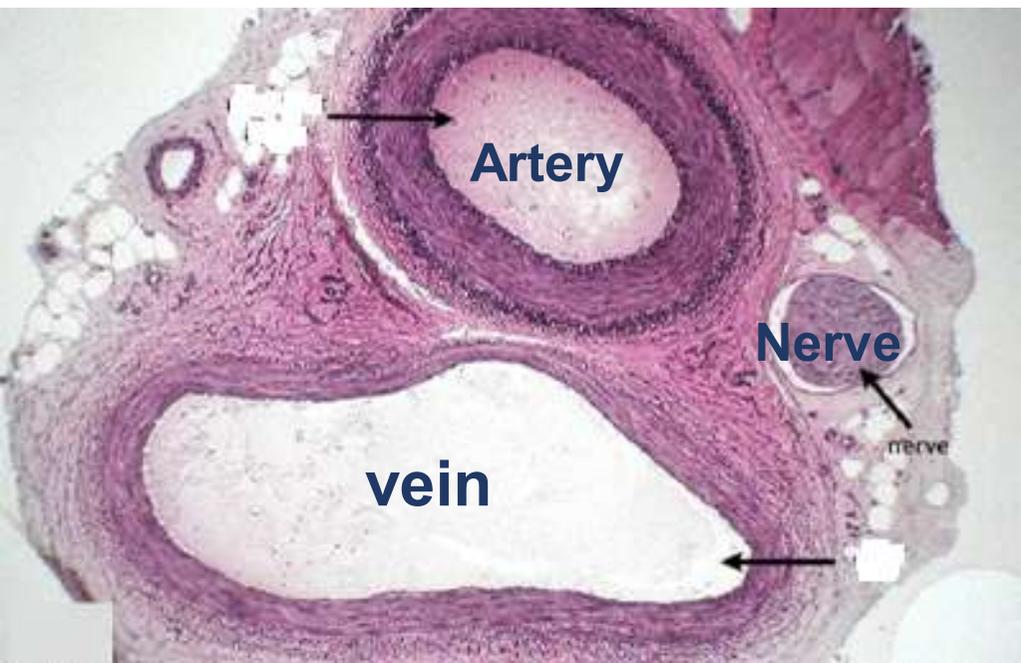


Veins  
 Thin  
 Large  
 Irregular

Mash // collapsed  
 Blood inside

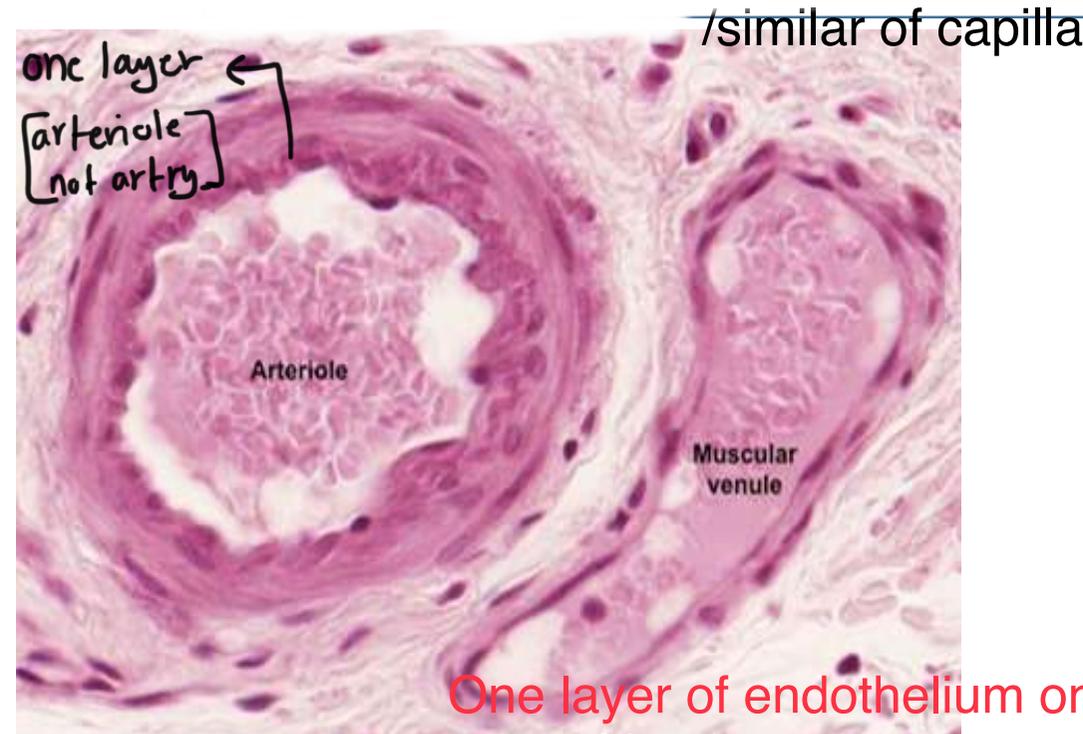
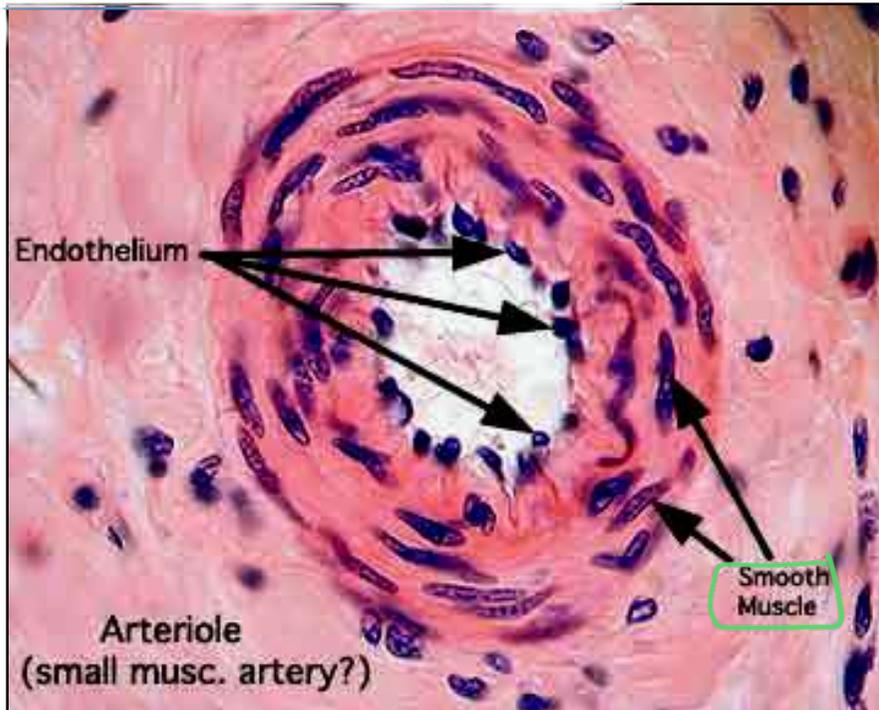
Tunica media 30% (thinner)

Large elastic arteries → دائماً بتمشي لحالها  
 Medium sized arteries → بتمشي بحزمة فيها  
 (Vein+ artery+ verve+ lymphatic) OR (artery+ 2 vena cmitants)



# Arteriole

Large artery + medium artery have developed elastic membrane  
Arteriole often absent



Large arteriole

One layer of endothelium on Basal lamina w/ pericytes

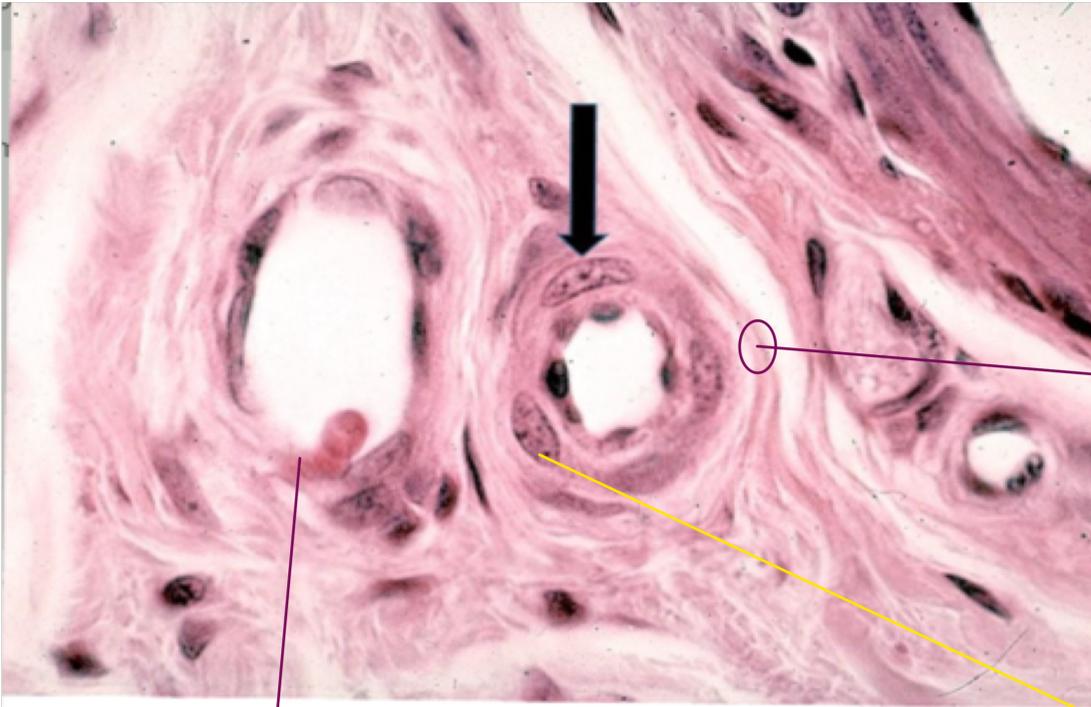
**Tunica intima** is smaller with **endothelium** and internal elastic lamina which may be **incomplete** and (absent in small and terminal arteriole but present in large arterioles)

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

Pericyte ; irregular, associated w/ venule capillary + post capillary venule , instead of smooth .m give tone contraction~~> control of resistance

- + Pericytes allow smooth muscle cells to regenerate and repair
- + Phagocytosis



Venules ~~thin / one layer of cell resting on basel lamina

Pericyte

Small arteriole  
Single layer of endothelium /  
absent of internal elastic  
lamina /one layer smooth . M