Human Histology Lab 1

1st stage

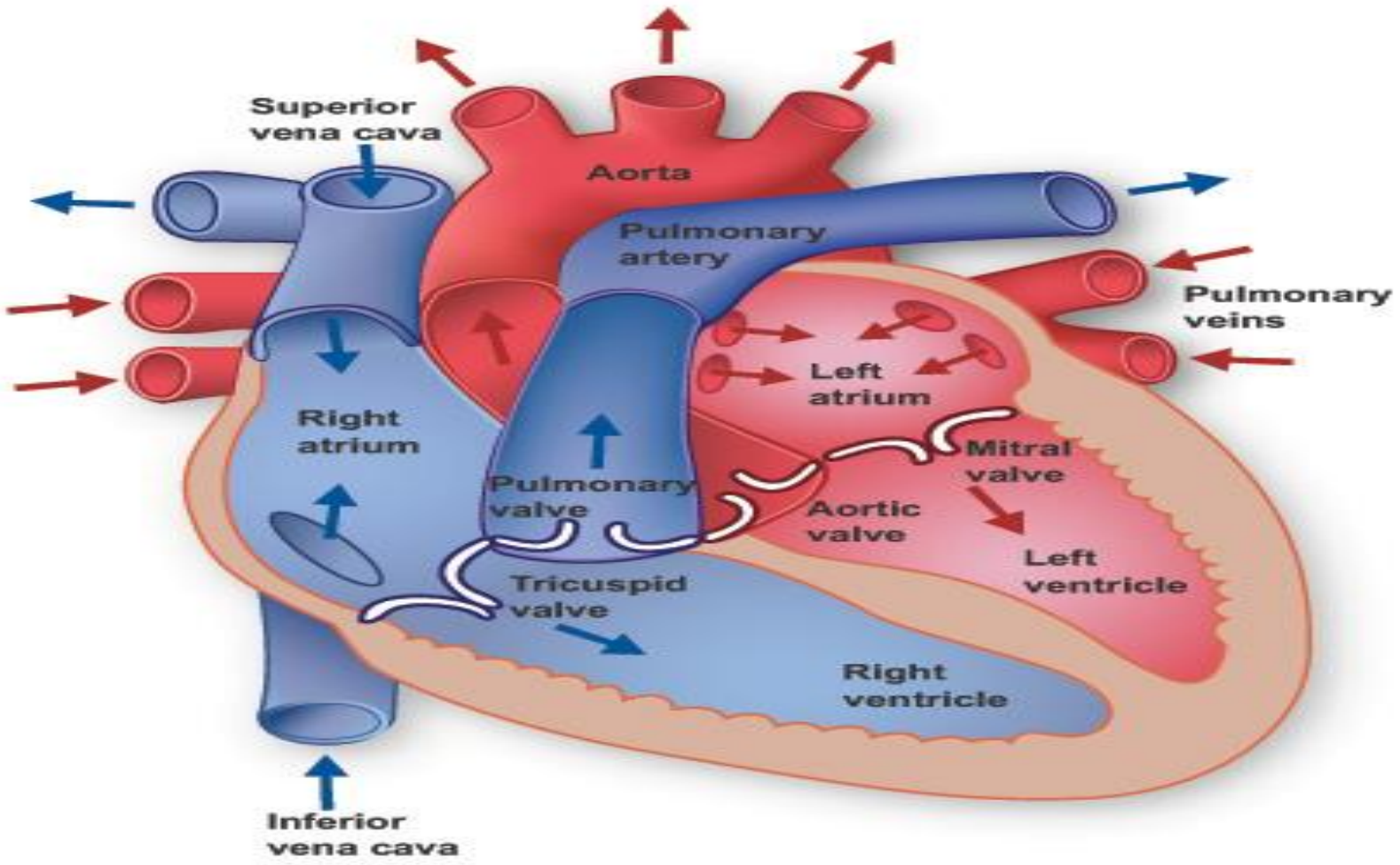
2020-2021 Cardiovascular system

LECTURER:Assisstant lecturer.Nabigh A Nagi M.Sc.

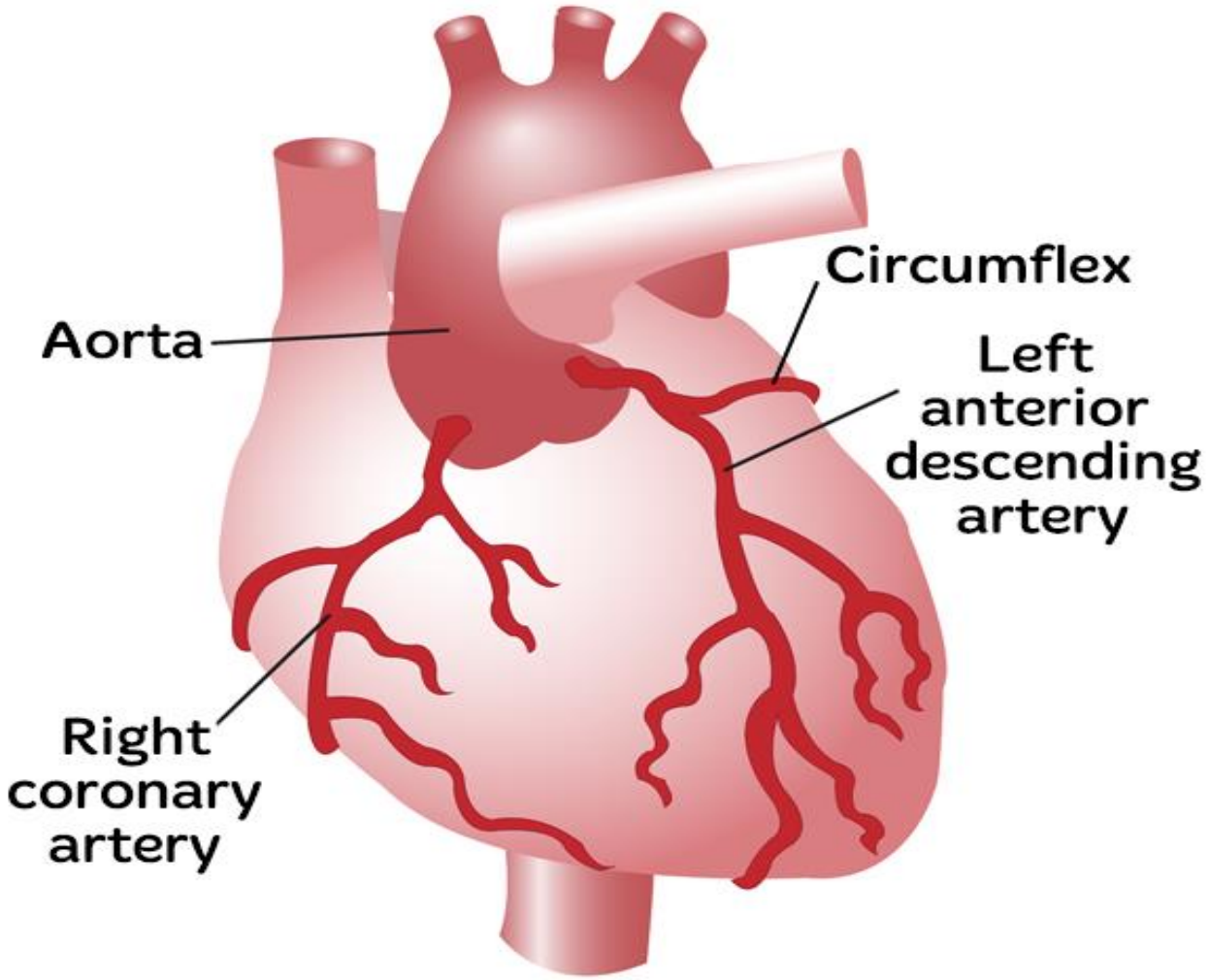
Layouts

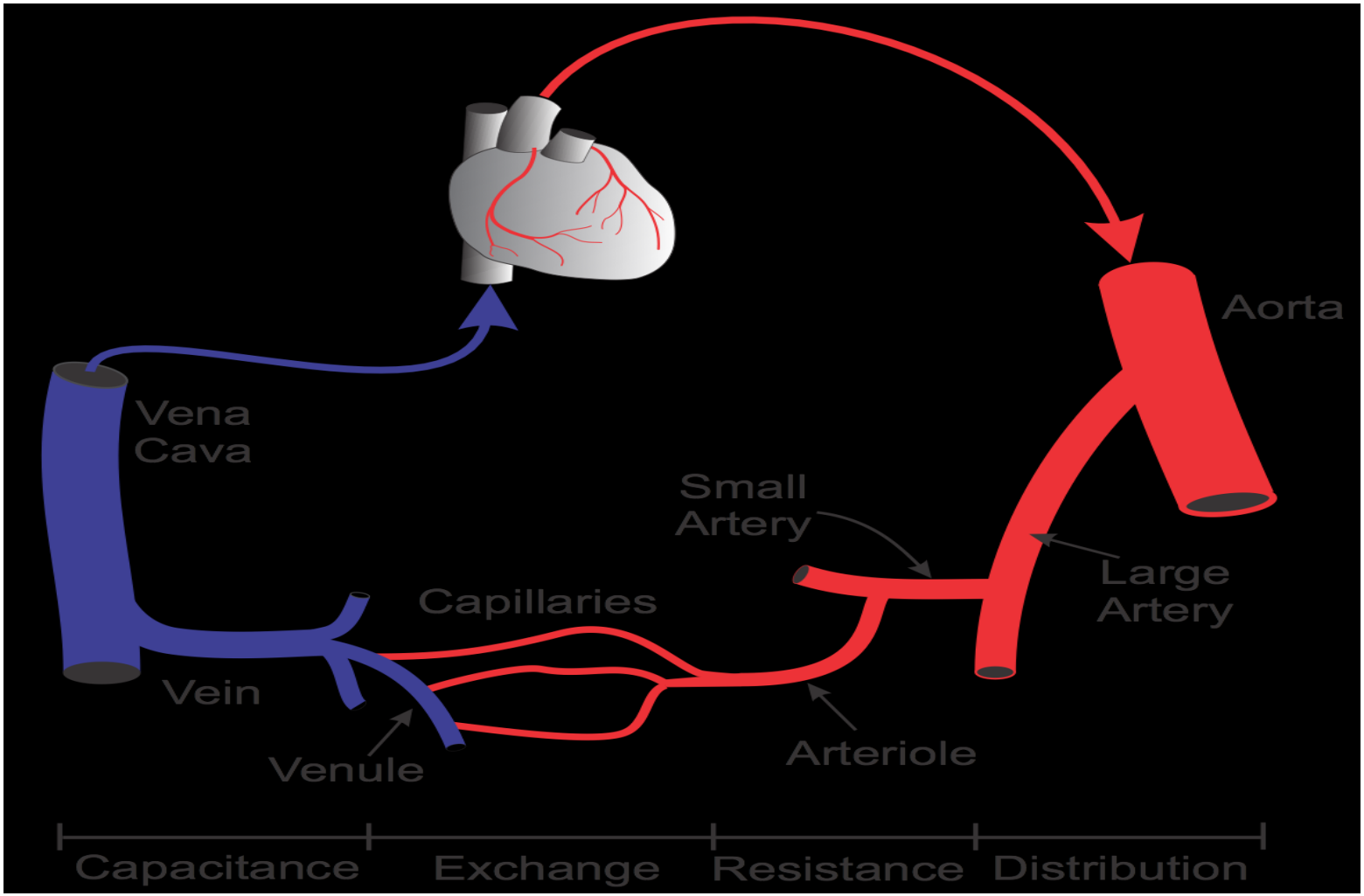
- Heart
- Artery vs.vein
- Layers of blood vessels wall
- Types of blood vessels
- Heart wall

Heart

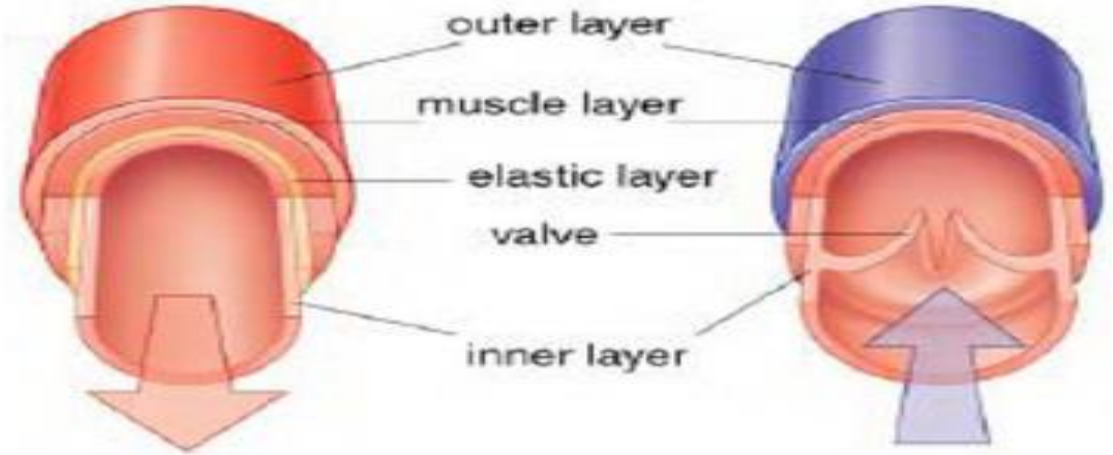

Superior vena cava
Aorta
Pulmonary artery
Pulmonary veins
Left atrium
Right atrium
Mitral valve
Pulmonary valve
Aortic valve
Left ventricle
Tricuspid valve
Right ventricle
Inferior vena cava

Heart


Aorta
Circumflex
Left anterior descending artery
Right coronary artery


Aorta
Vena
Cava
Small
Artery
Large
Artery
Capillaries
Vein
Venule
Arteriole
Capacitance
Exchange
Resistance
Distribution

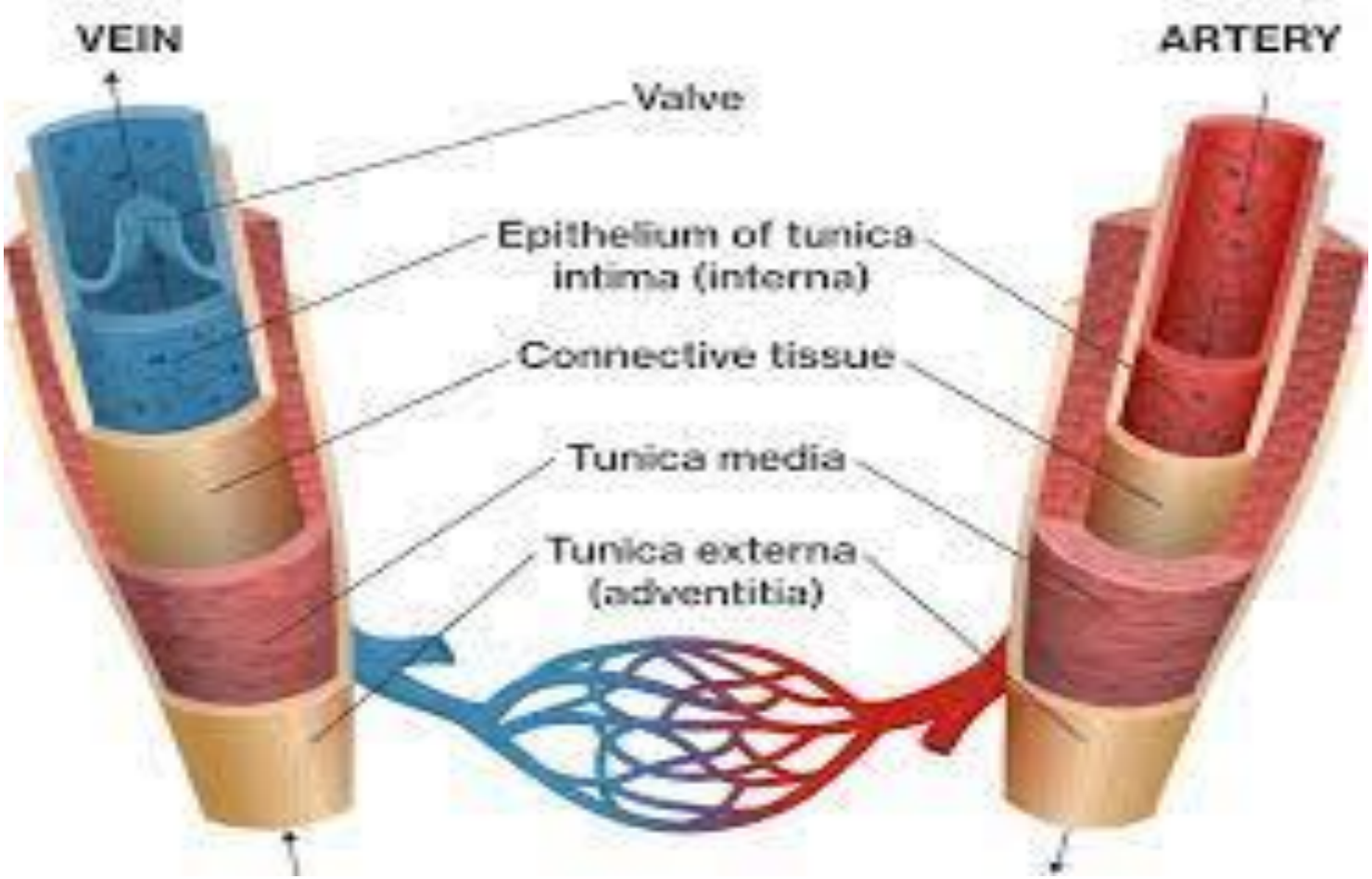
Artery VS. vein

	Arteries	Veins
Direction of Blood Flow	From the heart to the body	Back to the heart
Oxygen Concentration	Carry oxygenated blood (except pulmonary artery)	Carry deoxygenated blood (except pulmonary veins)
Pressure	High	Low
		
Anatomy	Thick outer walls, elastic and muscle layers	Thin outer walls, elastic and muscle layers
Location	Deeper in the body	Closer to the skin
Valves	No	Yes

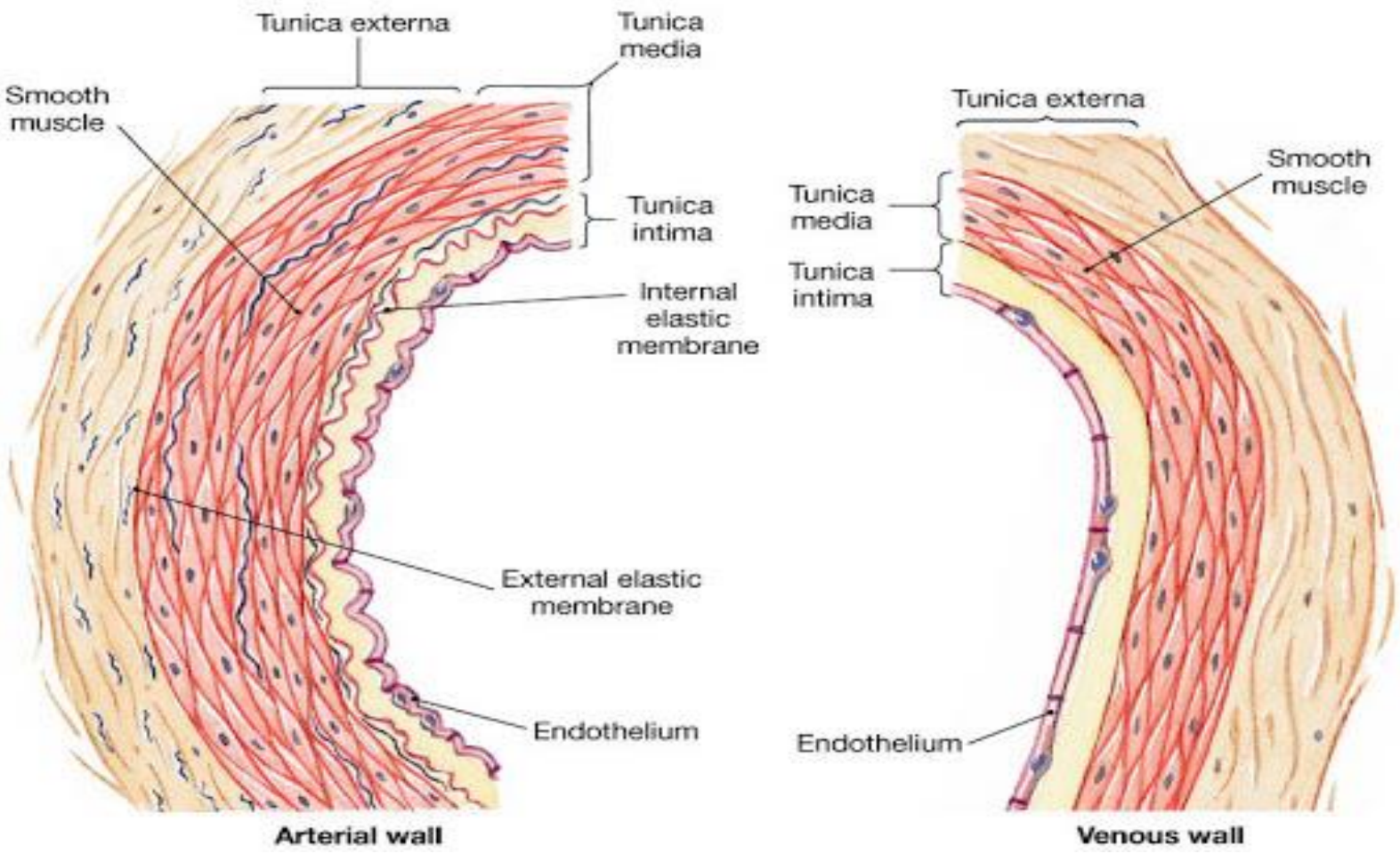
Layers of blood vessels wall

- **Tunica Intima**
- The inner layer (tunica intima) is the thinnest layer, formed from a single continuous layer of endothelial cells and supported by a subendothelial layer of connective tissue and supportive cells. The tunica intima is surrounded by a thin membrane comprised of elastic fibers running parallel to the vessel.
- **Tunica Media**
- Surrounding the tunica intima is the tunica media, comprised of smooth muscle cells and elastic and connective tissues arranged circularly around the vessel. This layer is much thicker in arteries than in veins.
- **Tunica Externa**
- The outermost layer is the tunica externa or tunica adventitia, composed entirely of connective fibers and surrounded by an external elastic lamina which functions to anchor vessels with surrounding tissues. The tunica externa is often thicker in veins to prevent collapse of the blood vessel and provide protection from damage since veins may be superficially located.

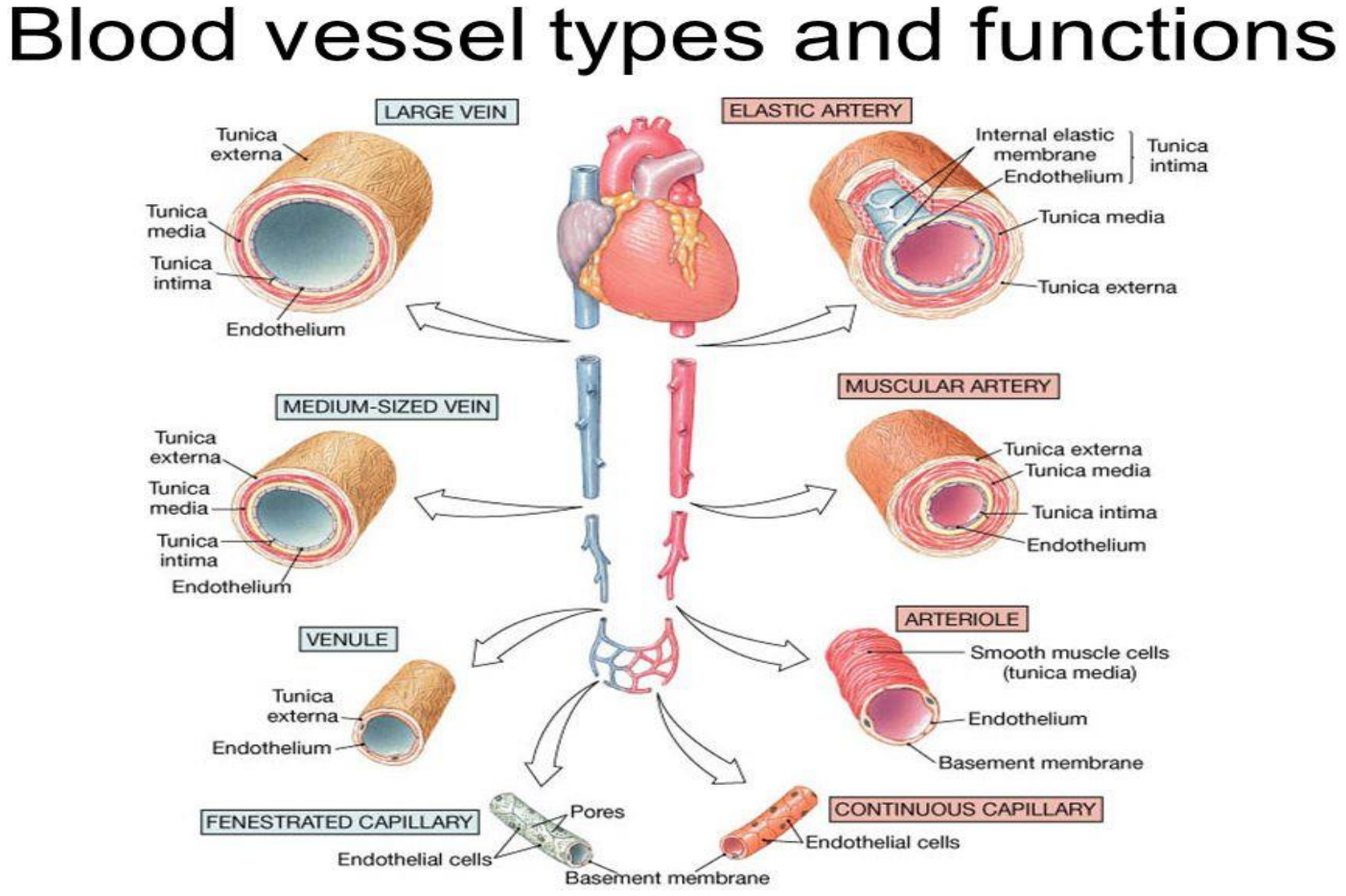
Layers of blood vessels wall



Layers of blood vessels wall



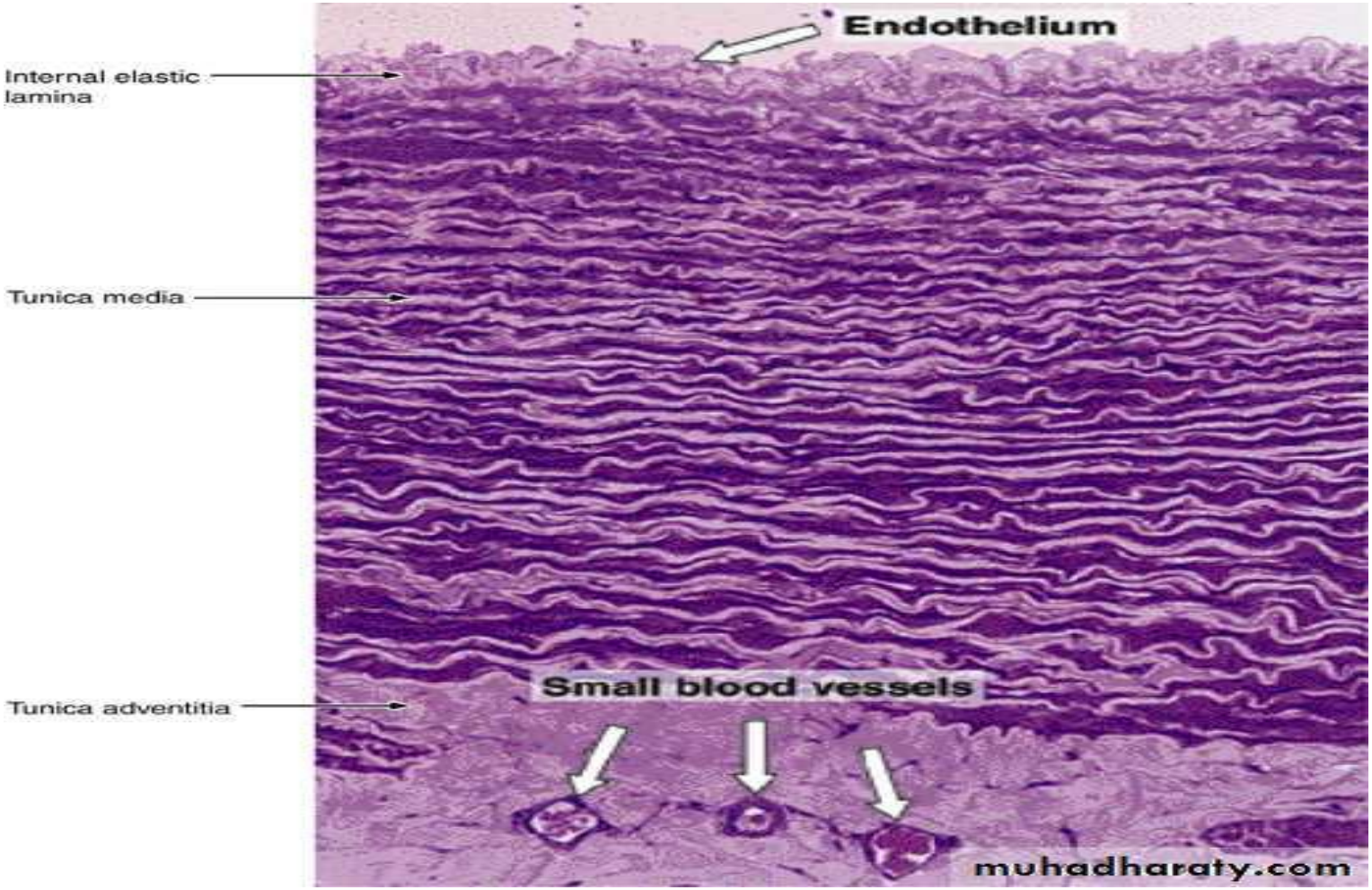
Types of blood vessels



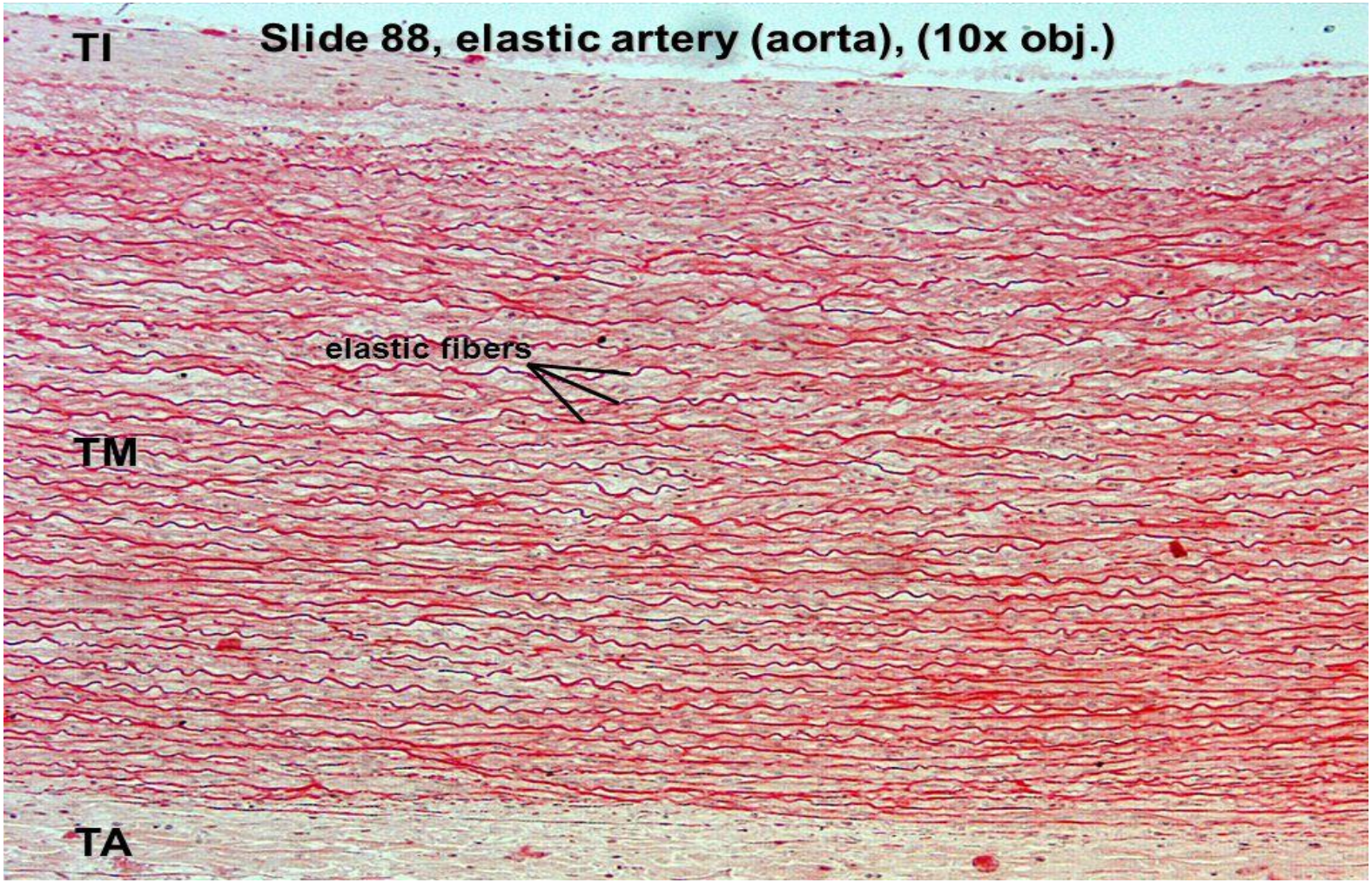
Types of blood vessels

- **elastic arteries**: An artery with a large number of collagen and elastin filaments, giving it the ability to stretch in response to each pulse.
- Elastic arteries include the largest arteries in the body, those closest to the heart(aorta and pulmonary).
- Elastic arteries differ from muscular arteries both in size and in the relative amount of elastic tissue contained within the tunica media.

Types of blood vessels



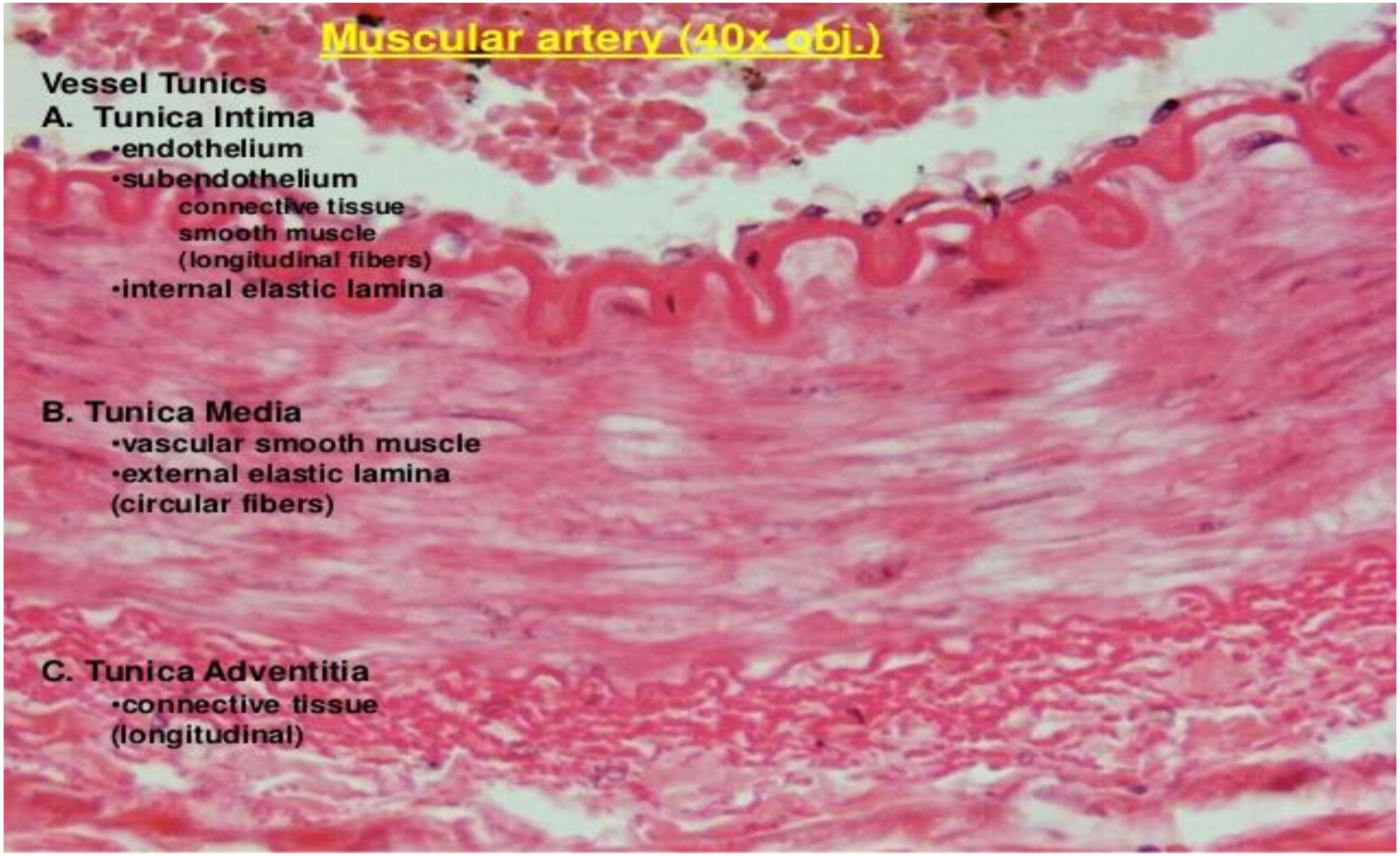
Types of blood vessels



Types of blood vessels

- A muscular artery (or distributing artery) is a medium-sized artery that draws blood from an elastic artery and branches into "resistance vessels" including small arteries and arterioles. Their walls contain larger number of smooth muscles than connective tissue, allowing them to contract and expand depending on peripheral blood demand.
- Muscular artery distribute blood to the skeletal muscles and internal organs.
- Example of muscular artery include radial artery, femoral artery and the splenic artery.

Types of blood vessels

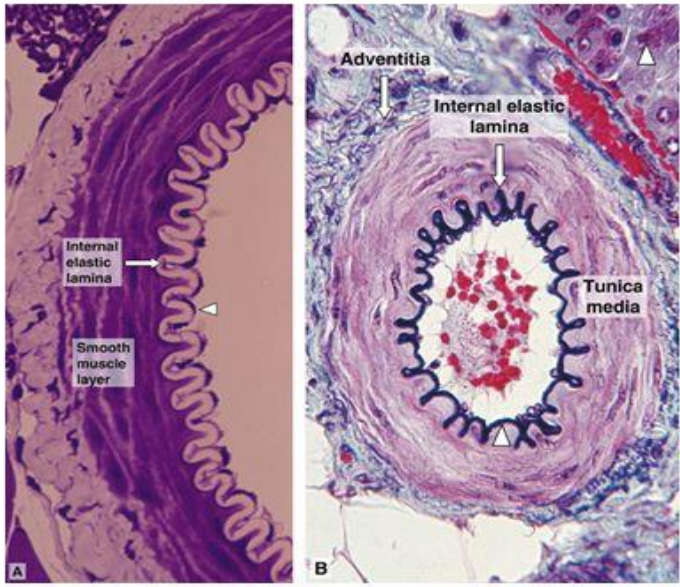


Types of blood vessels

Types of blood vessels

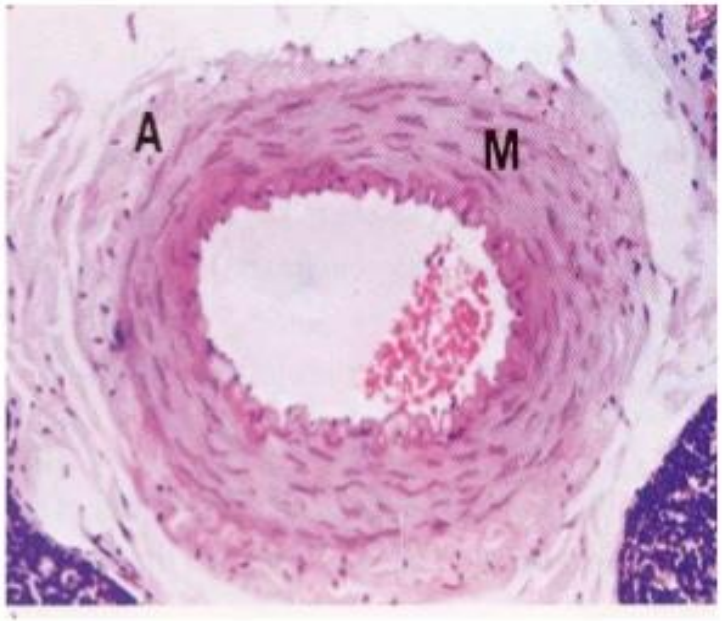
SMALL ARTERIES & ARTERIOLES

- <0.5mm lumen
- Thin subendothelial connective tissue
- Int. elastic lamina absent in small arterioles
- T. Media: smooth muscle layer
- Adventitia is thin

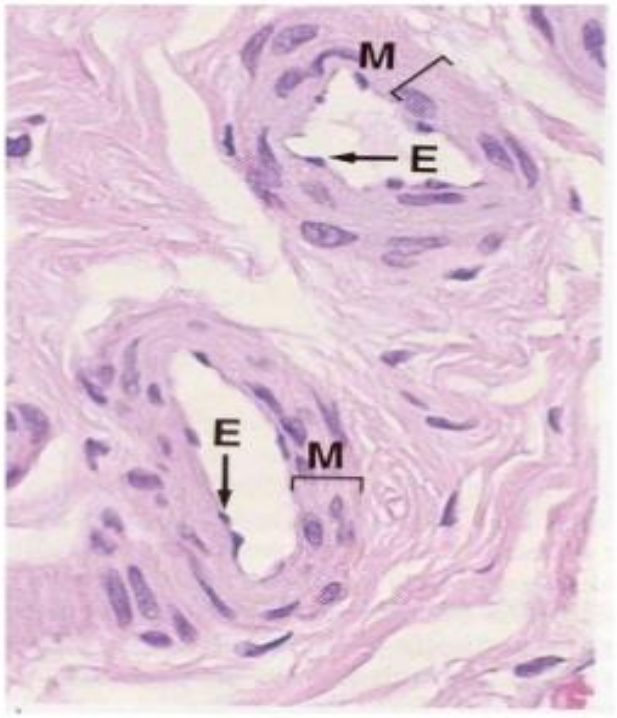


Types of blood vessels

Arteriole

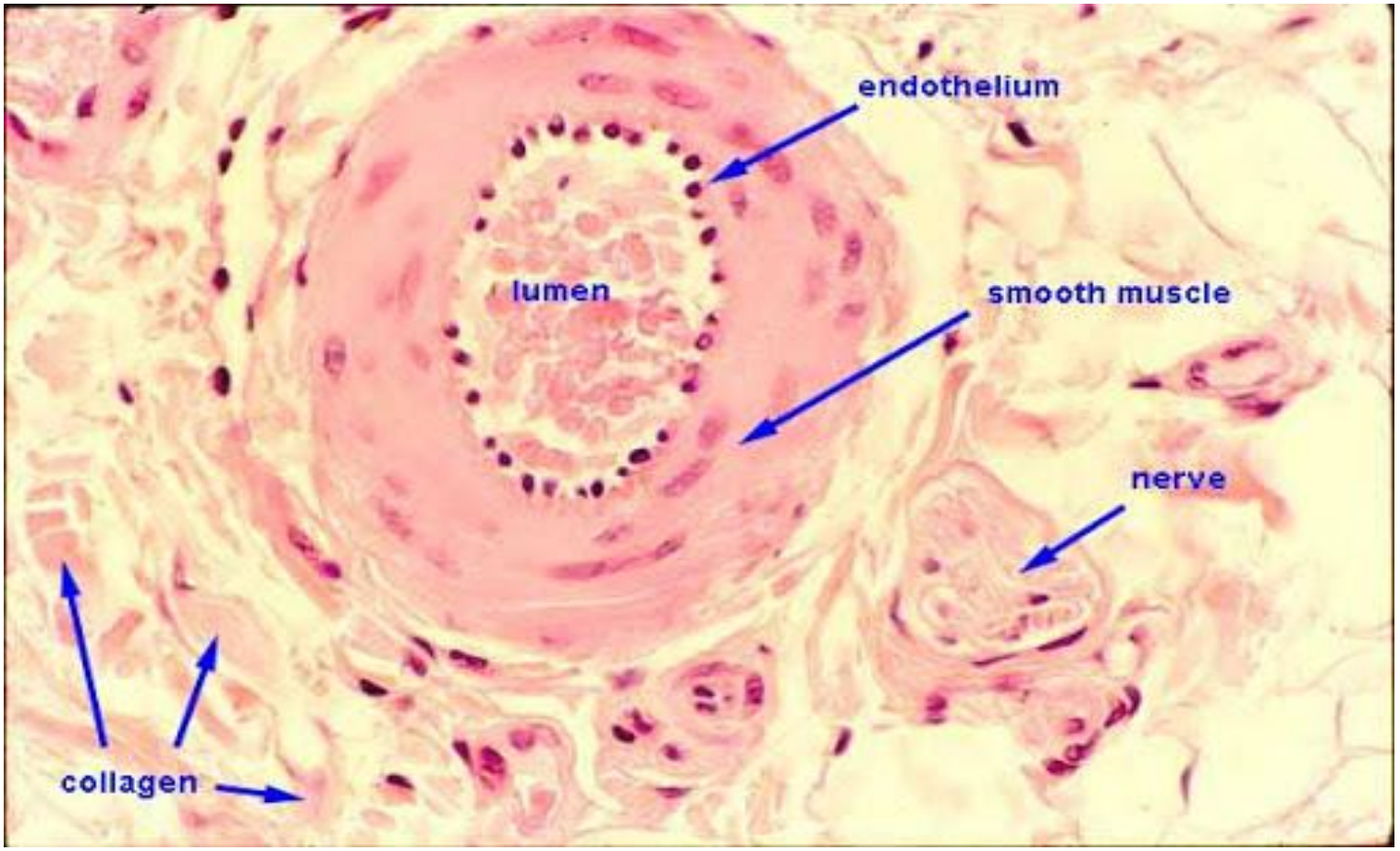


Large

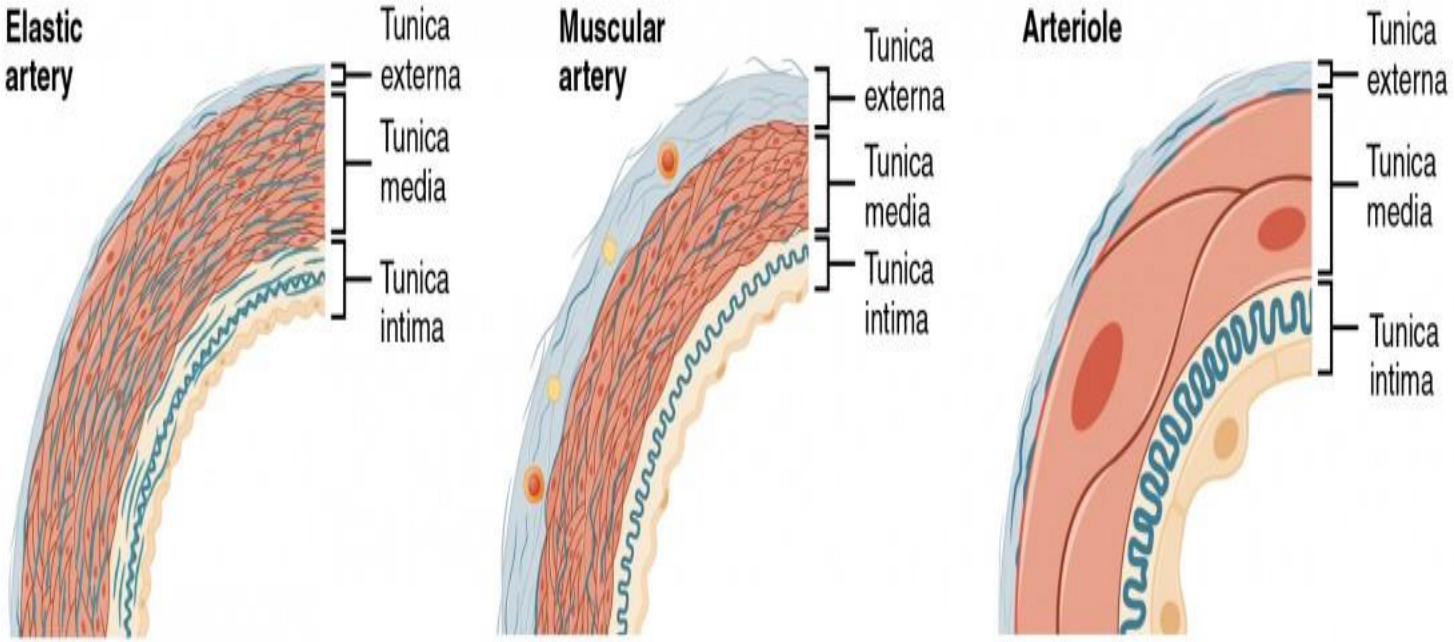


Small

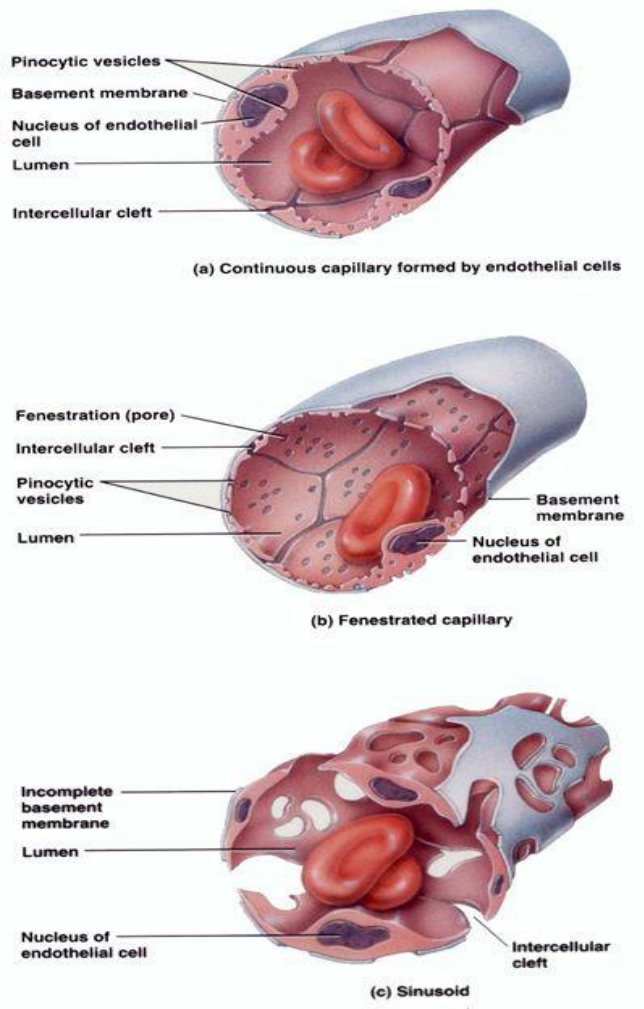
Types of blood vessels



Types of blood vessels



Types of Capillaries



TYPES OF CAPILLARIES:

1. CONTINUOUS

- Endothelial cells form a **continuous tube** except for **intercellular clefts**
  - Found in brain, lungs, skeletal & smooth muscle

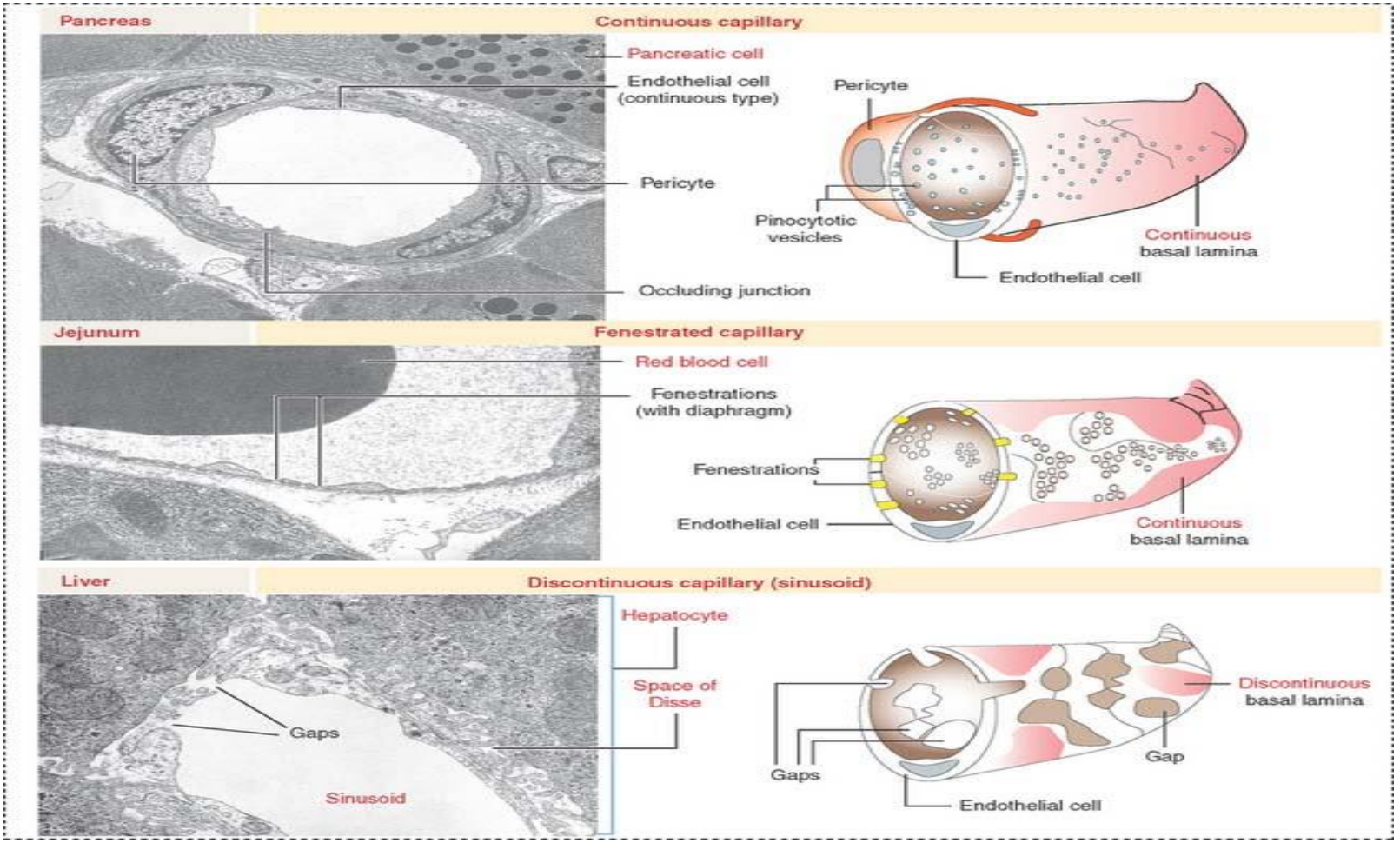
2. FENESTRATED (*'windowed'*)

- The plasma membrane has **fenestrations or pores**
  - Found in kidneys, villi of small intestine, choroid plexus in brain, endocrine glands

3. SINUSOID

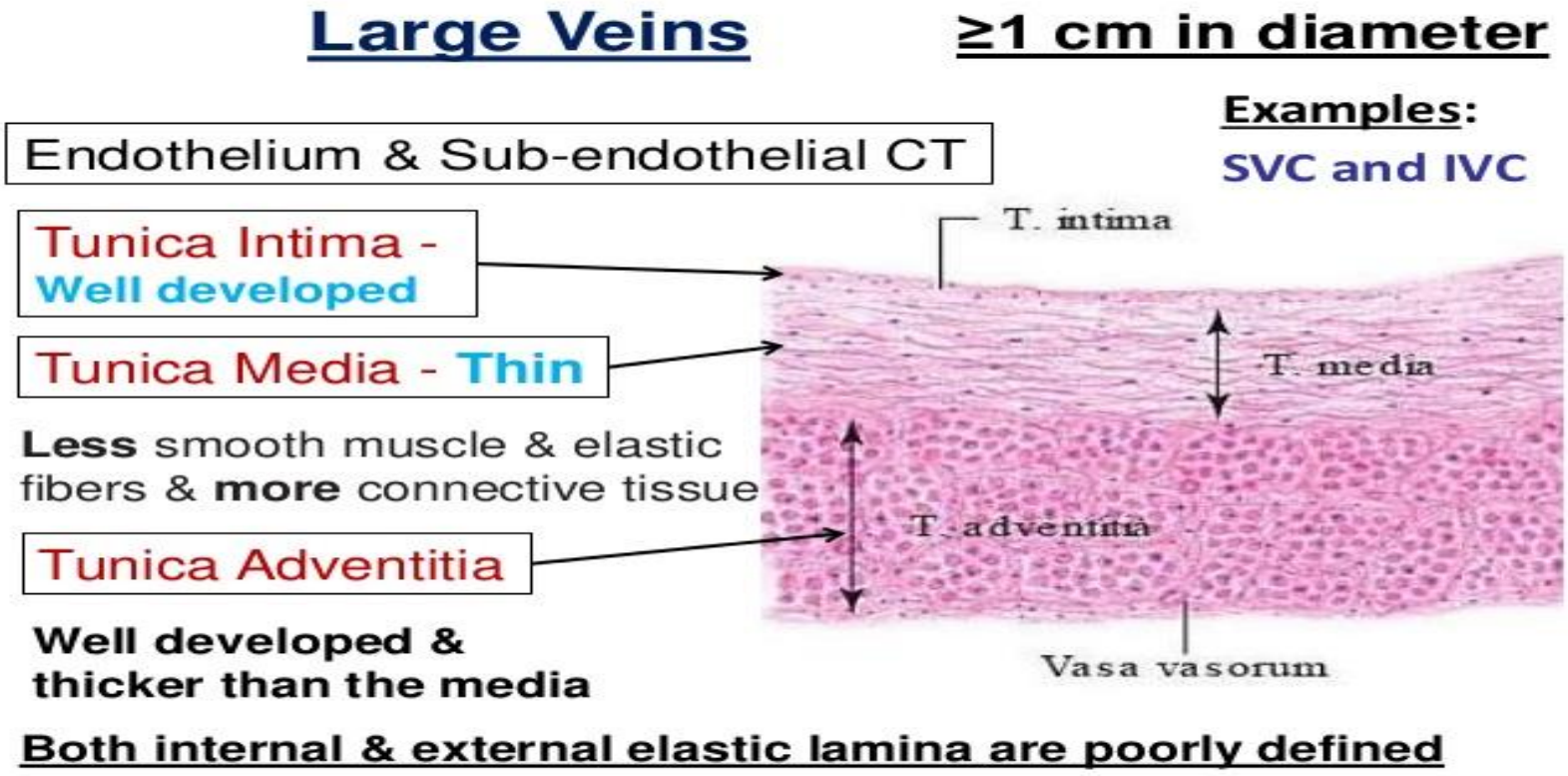
- Wider, more winding
- **Large fenestrations** and an incomplete basement membrane
- **Protein & RBCs can pass**
  - Found in red bone marrow, liver, spleen, anterior pituitary

Types of Capillaries



Types of blood vessels

- Large vein



Types of blood vessels

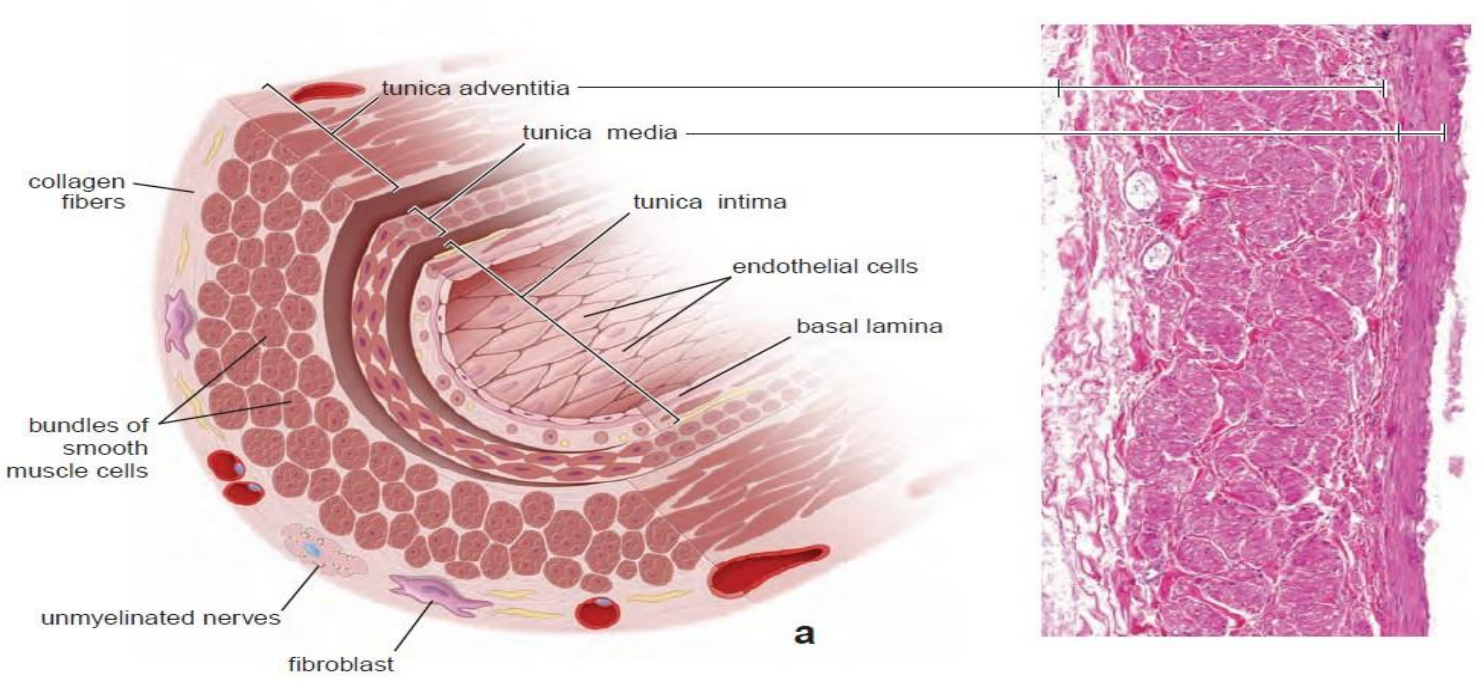
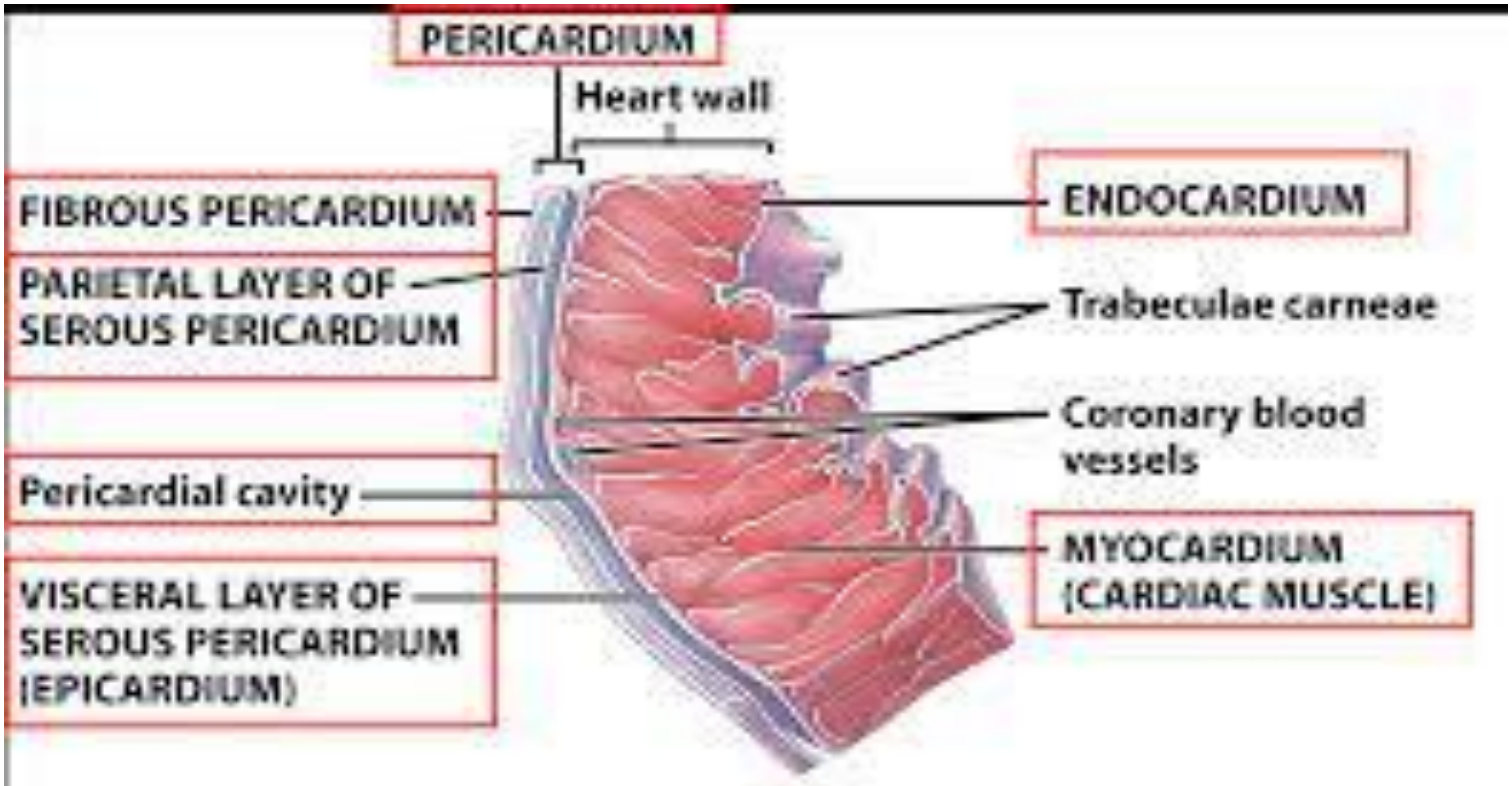


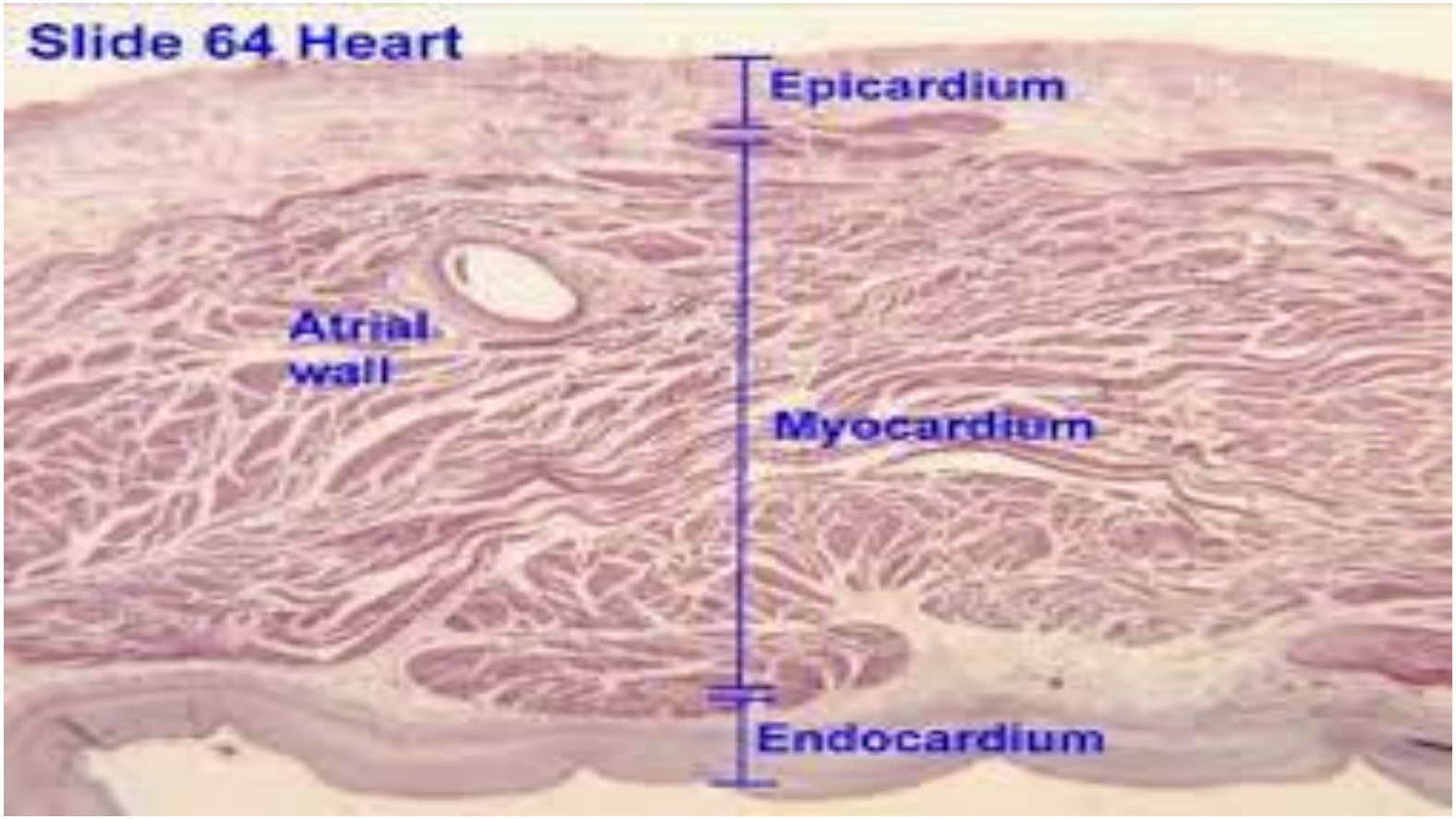
FIGURE 13.25 • Schematic diagram and photomicrograph of a large vein. a. The cellular and extracellular components are labeled. Note a thin layer of circumferentially arranged smooth muscles of tunica media and the tunica adventitia with a large amount of longitudinally arranged smooth muscle bundles. **b.** This photomicrograph shows a section through the wall of a human portal vein in a routine H&E preparation. The tunica intima is indiscernible at this magnification. The tunica media contains a layer of circumferentially arranged smooth muscle cells with collagen and elastic fibers. Note the thickest layer of this wall is the tunica adventitia. In addition to an extensive collagen and elastic fiber network, the tunica adventitia contains a broad layer of smooth muscle cells arranged in longitudinal bundles. These bundles are variable in size and separated from each other by connective tissue fibers. ×125. (Courtesy of Dr. Donald J. Lowrie Jr., University of Cincinnati College of Medicine.)

Heart wall

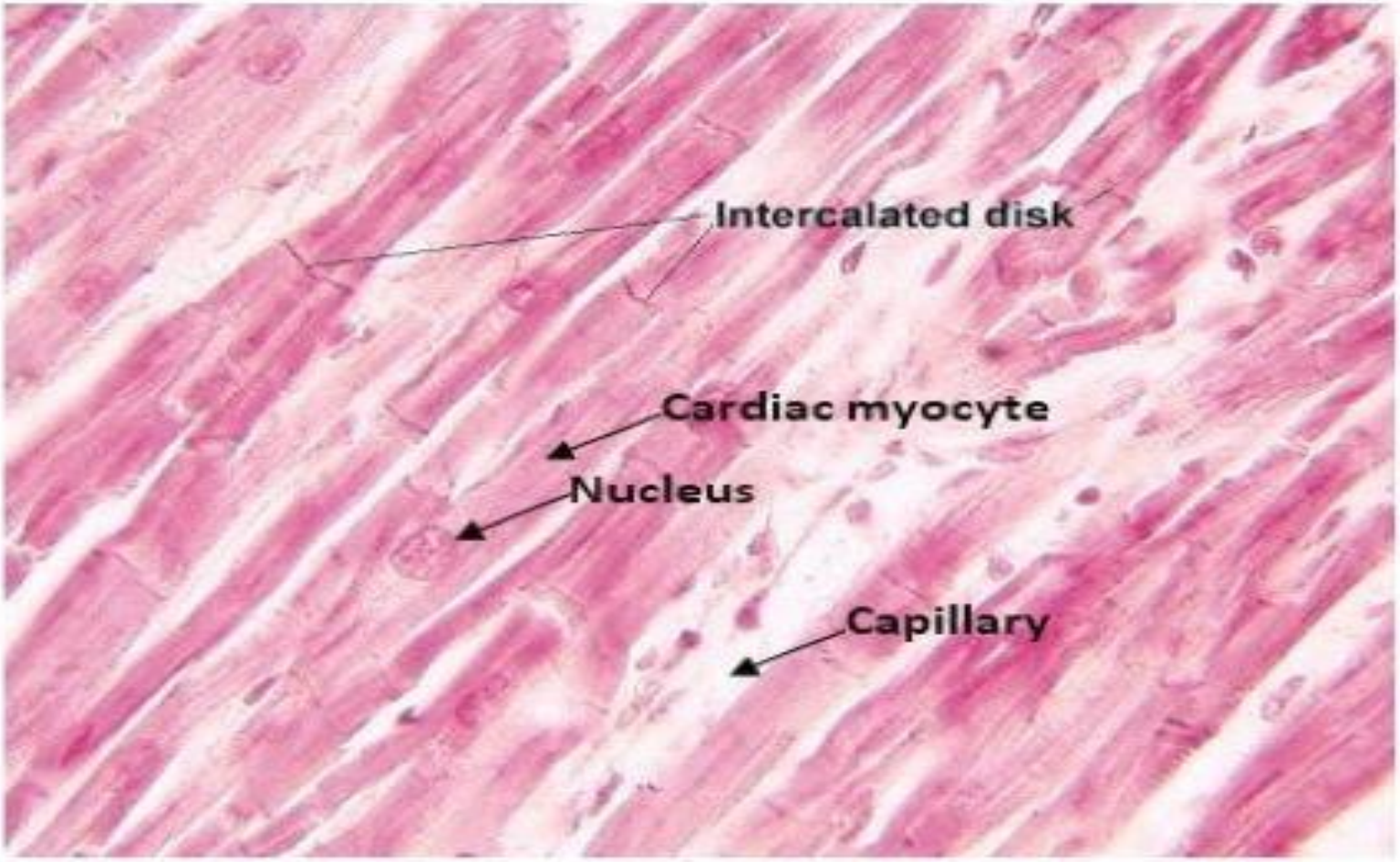


Portion of pericardium and right ventricular heart wall showing the divisions of the pericardium and layers of the heart wall

Heart wall


Slide 64 Heart
Epicardium
Atrial wall
Myocardium
Endocardium

Heart wall



END

- Thanks a lot for attention

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