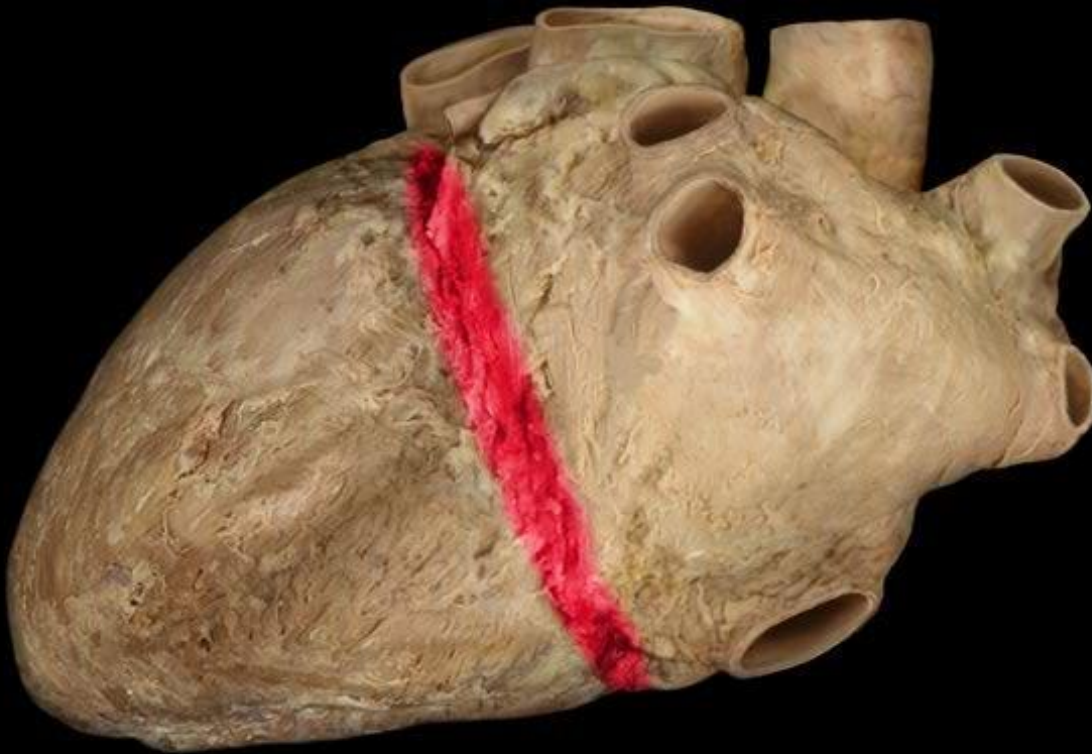


Heart

Sándor Katz M.D., Ph.D.

Coronary sulcus



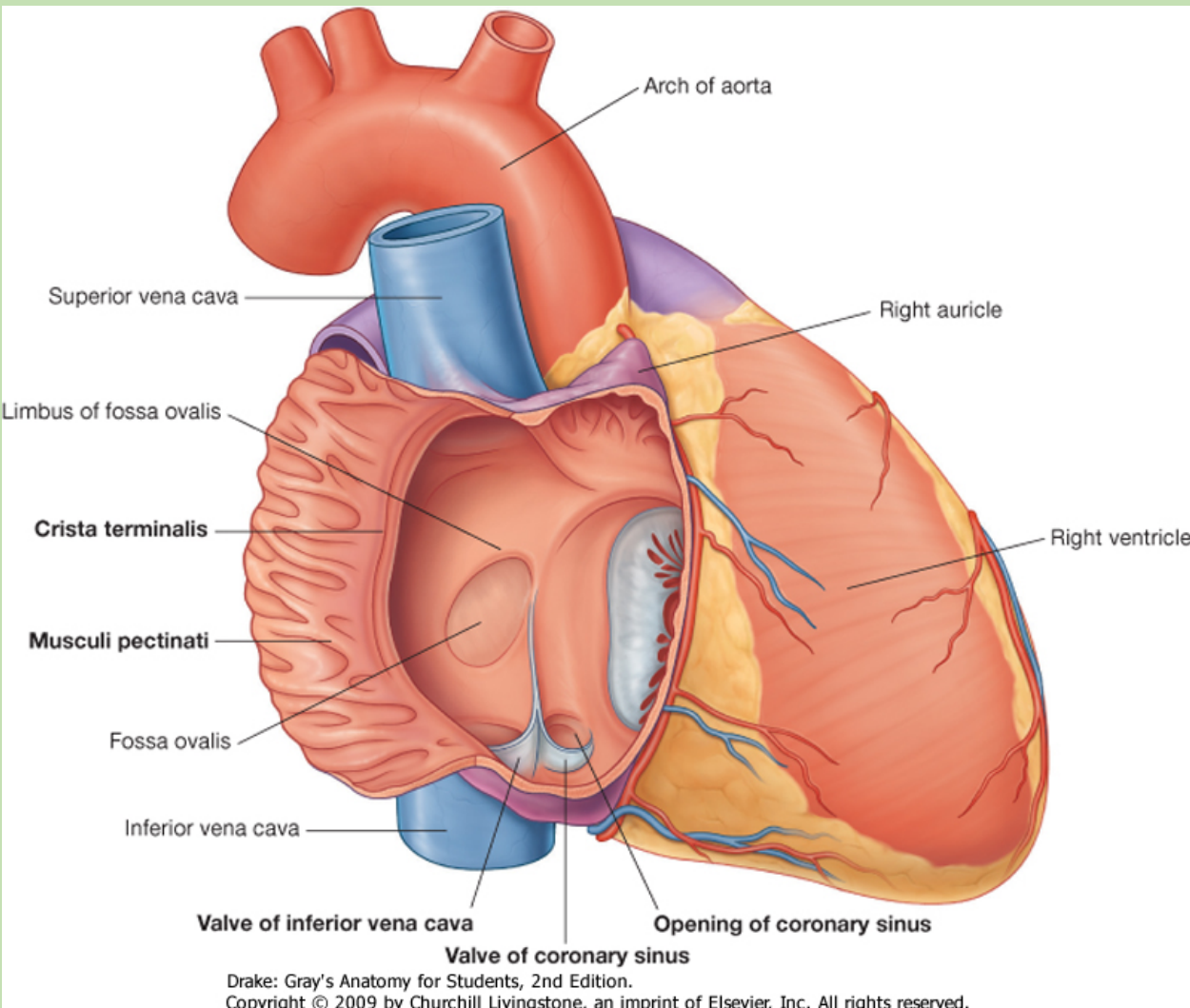
It separates atria from the ventricles, contains coronary arteries.

Right atrium

- It consists of the smooth-walled **sinus venarum** and pectinate muscles lined **proper right atrium**.

Parts:

- **Openings of the superior vena cava, inferior vena cava, coronary sinus;**
- **Terminal crest,**
- **Oval fossa,**
- **Right auricle.**



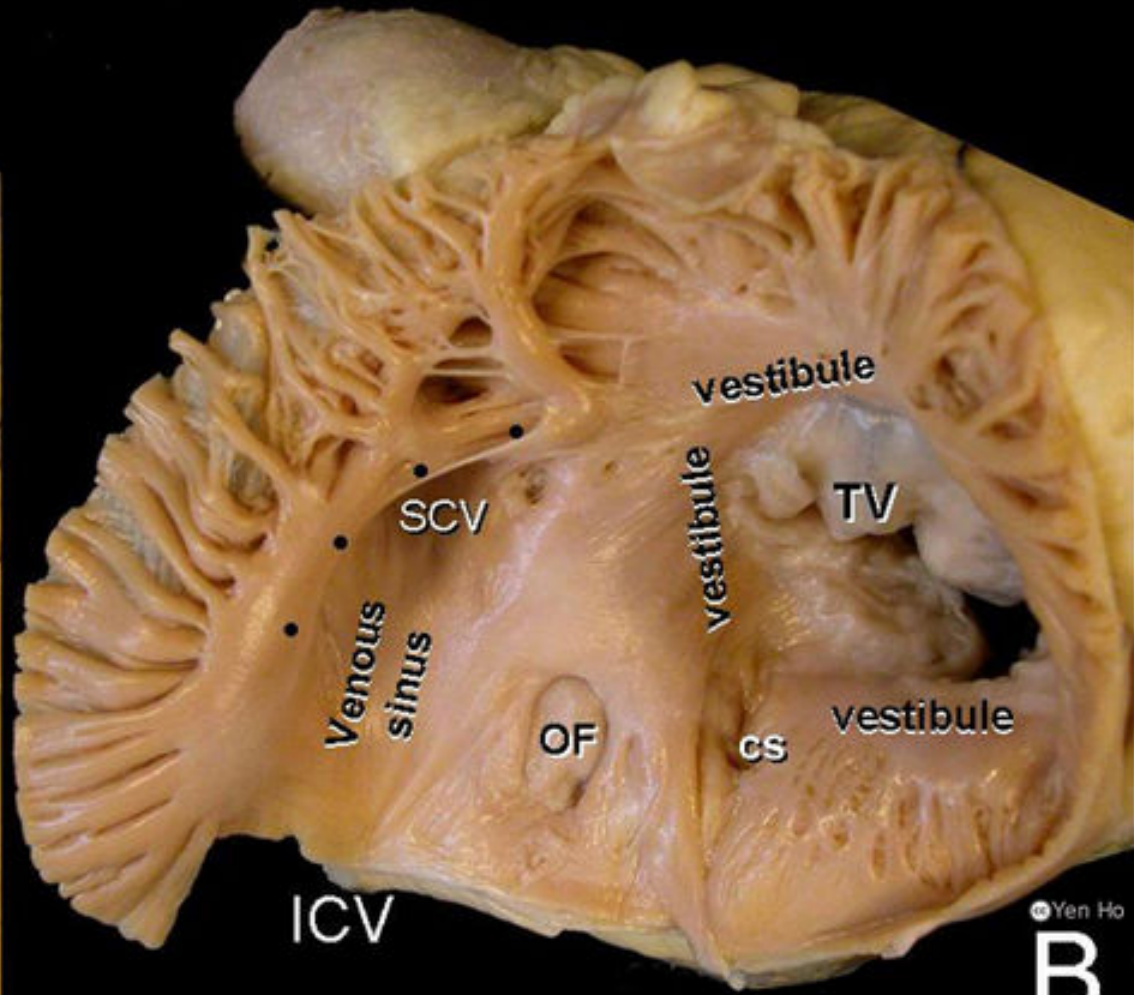
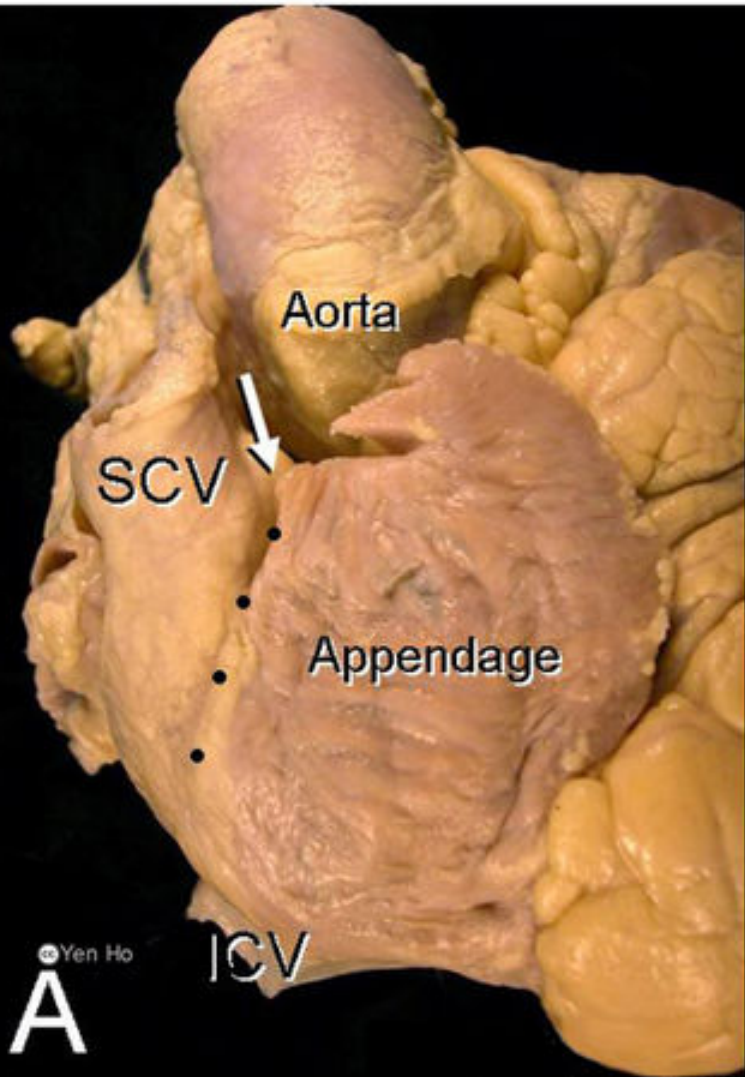
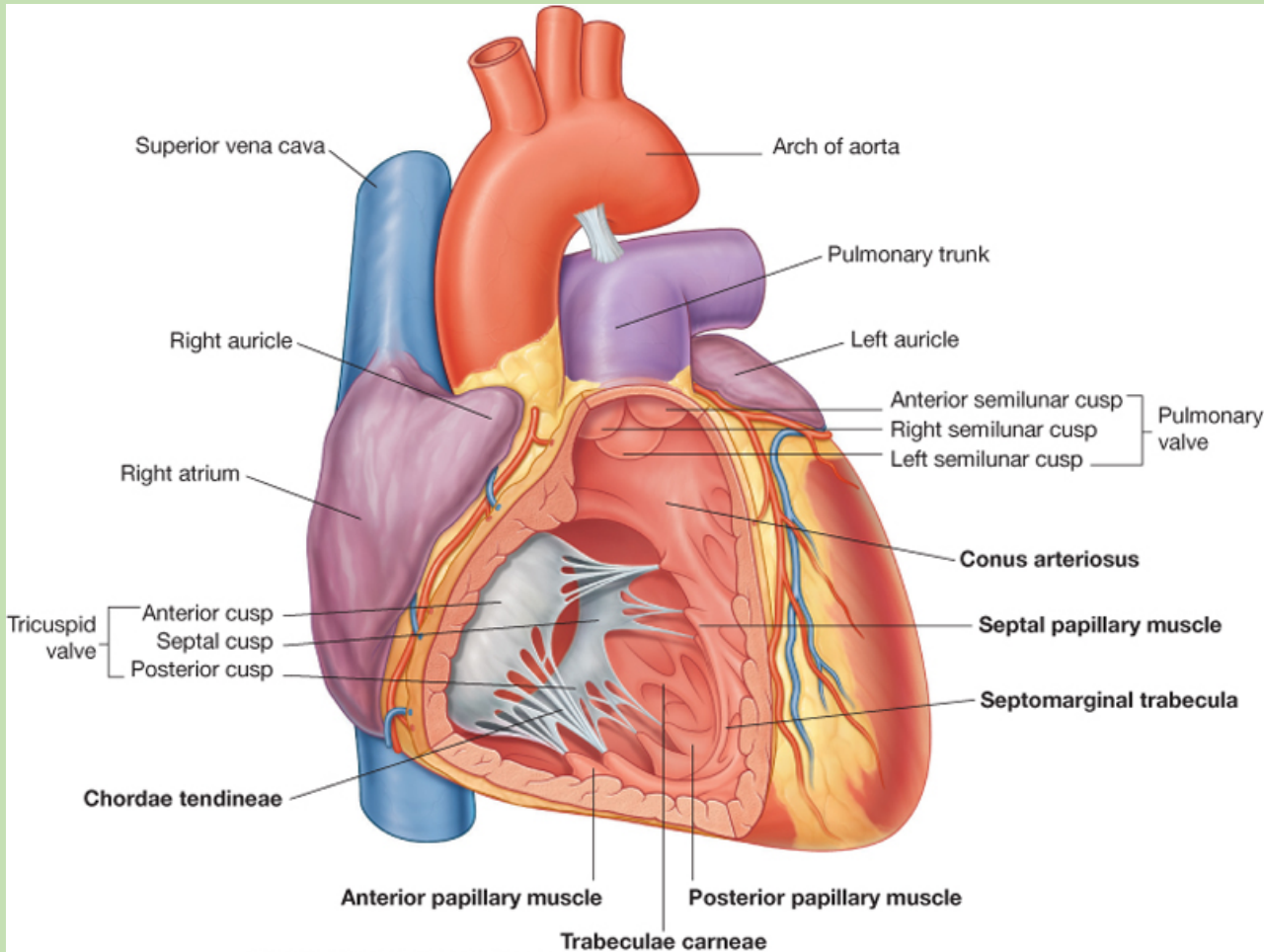


Image by Yen Ho © 2018 TextbookOfCardiology.org

right atrium

Right ventricle



- It is divided into two segments: the **inflow tract** posteroinferiorly and the **outflow tract** anterosuperiorly.

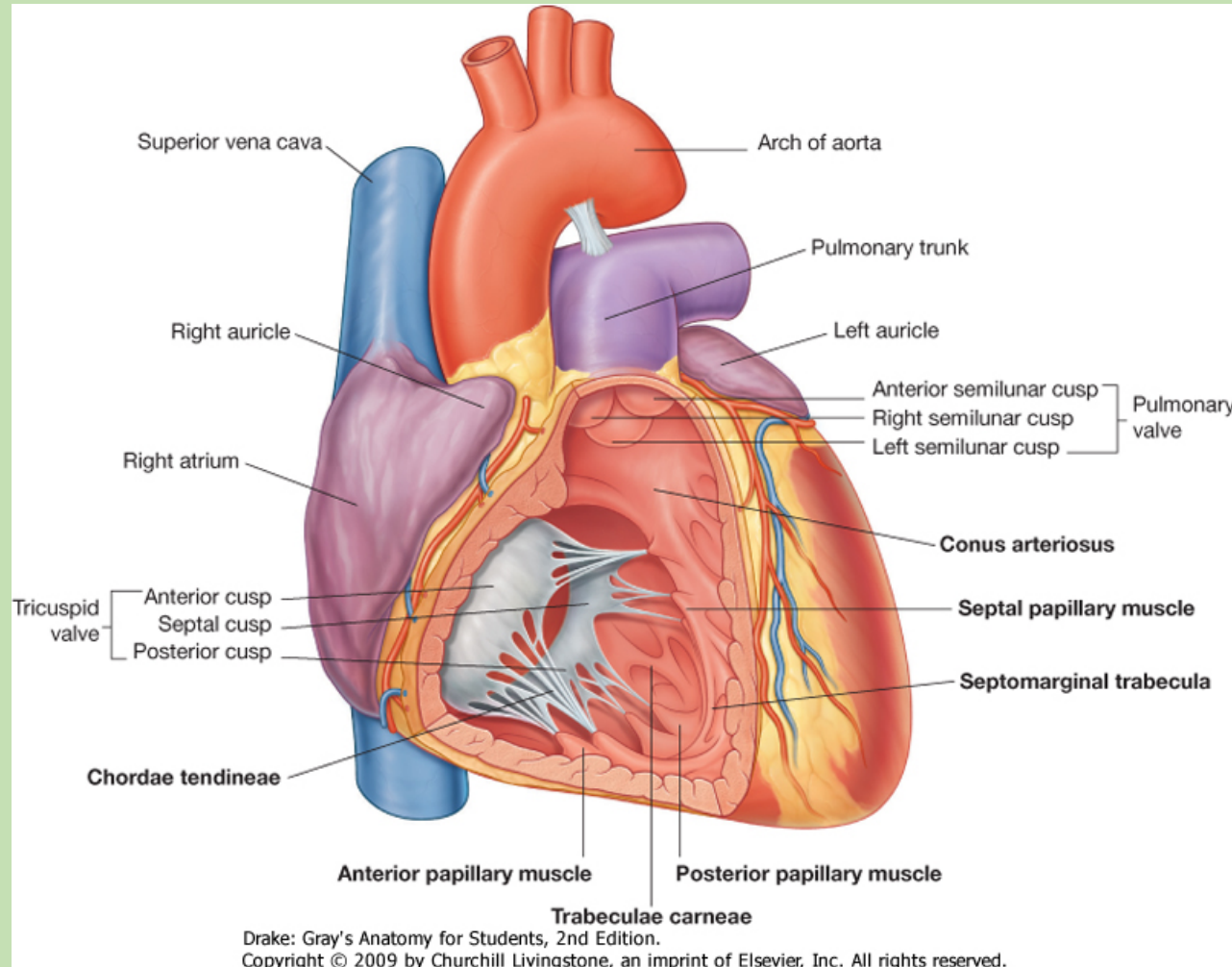
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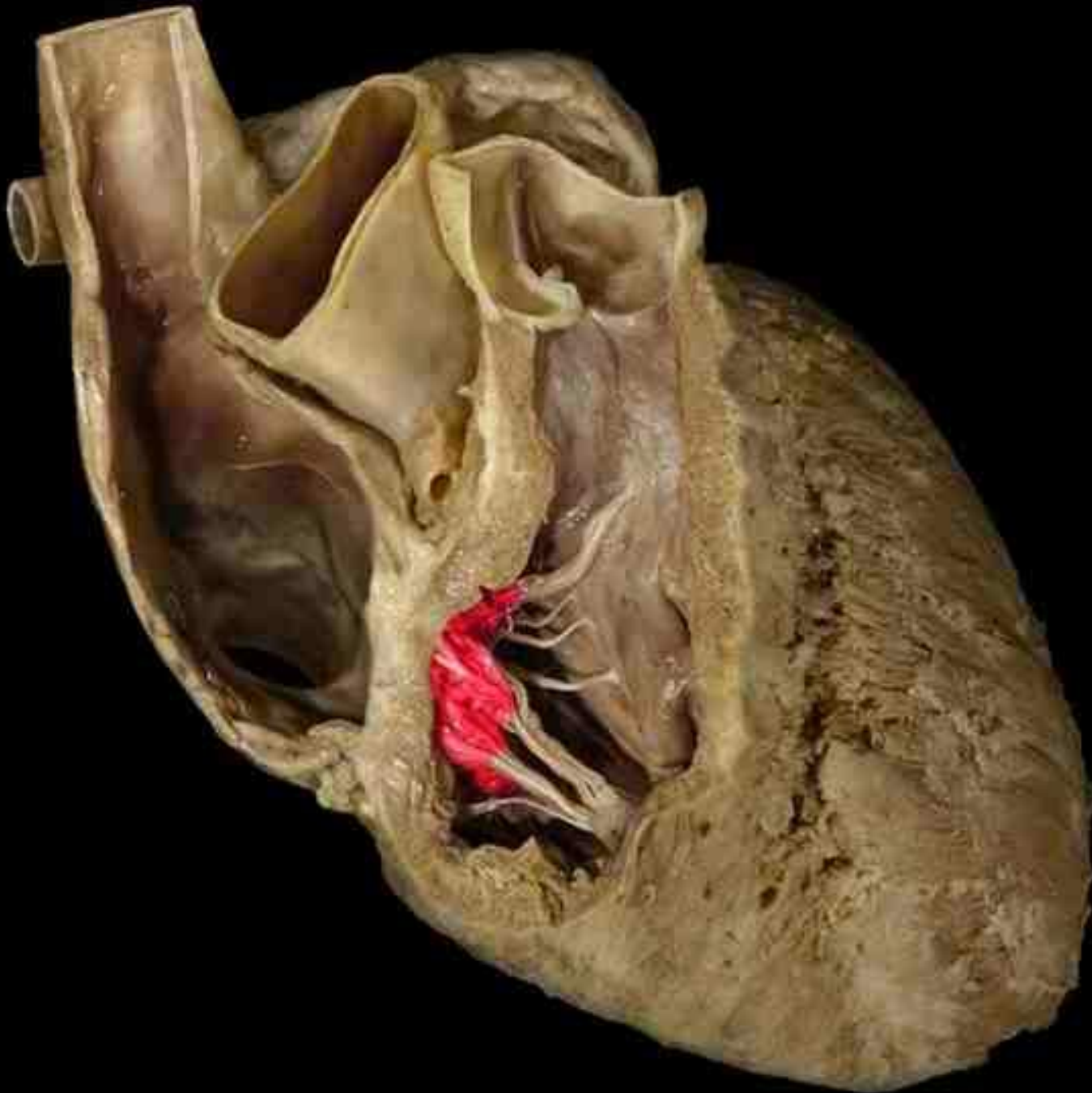
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Right ventricle

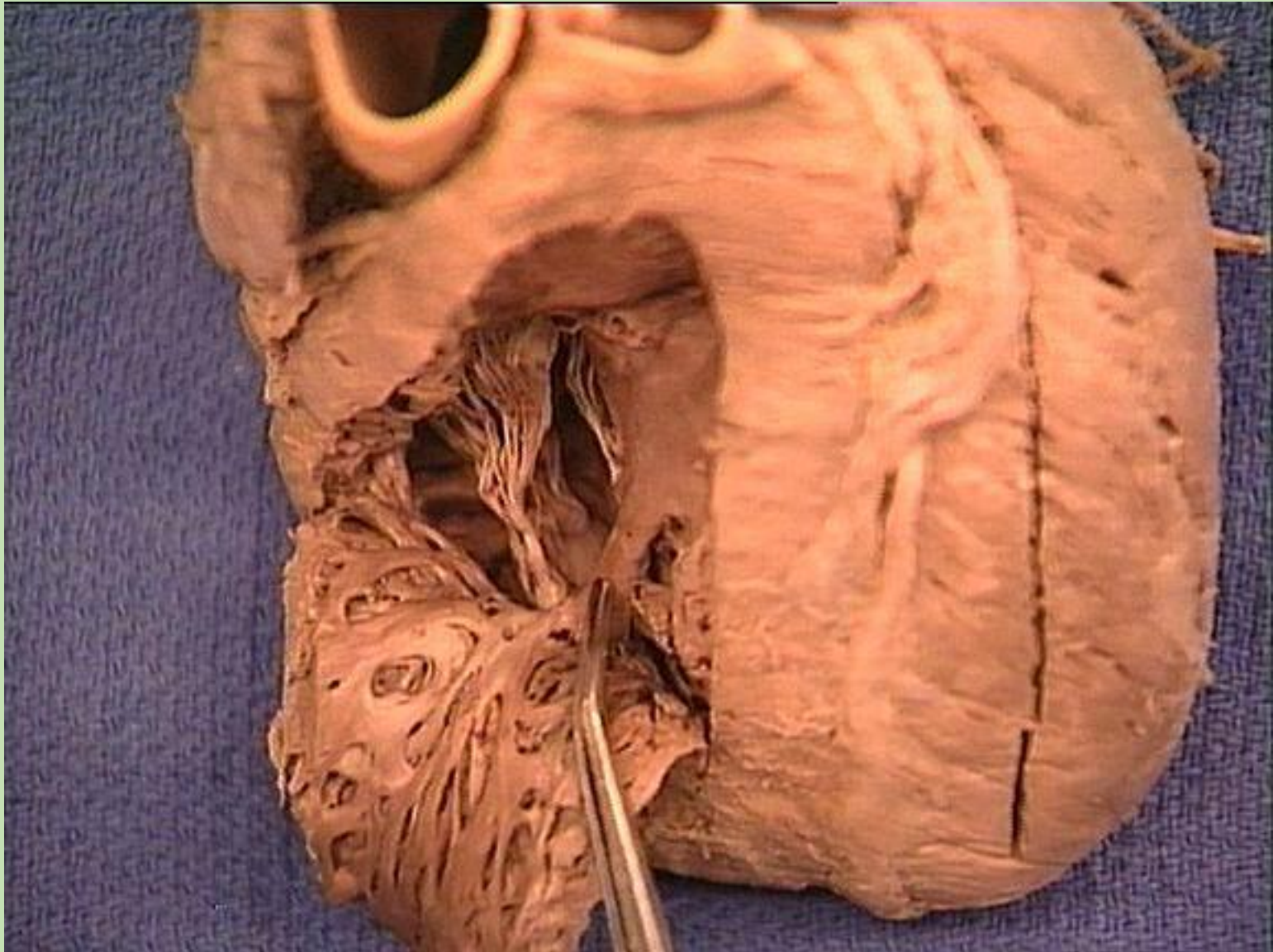
Parts:

- **Septomarginal trabecule** (moderator band),
- **Trabeculae carnae**,
- **Right atrioventricular valve=tricuspid valve** (papillary muscles, chordae tendinae, cusps)
- **Conus arteriosus**
- **Orifice of the pulmonary trunk** - guarded by the pulmonary valve.



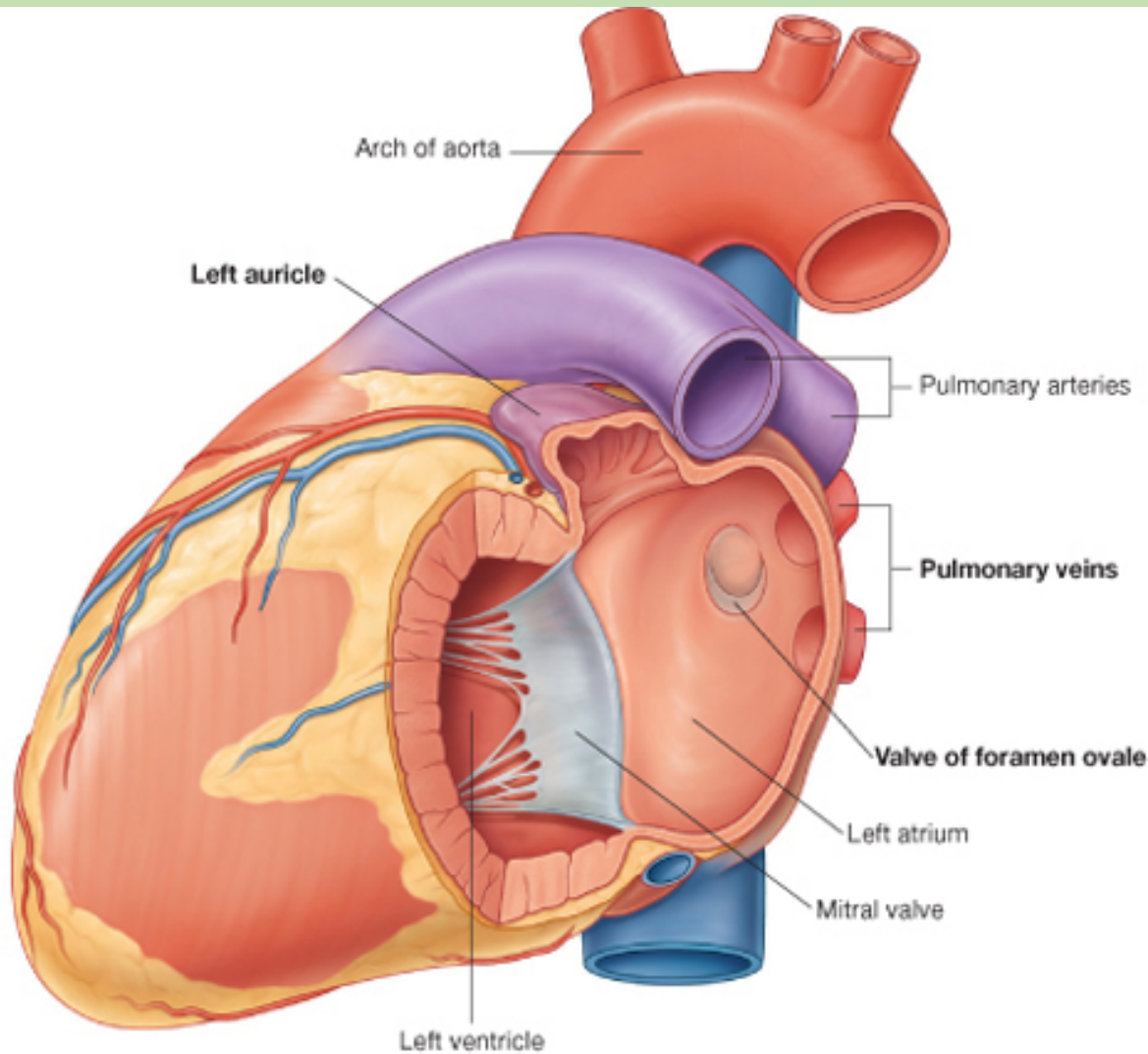


tricuspid valve

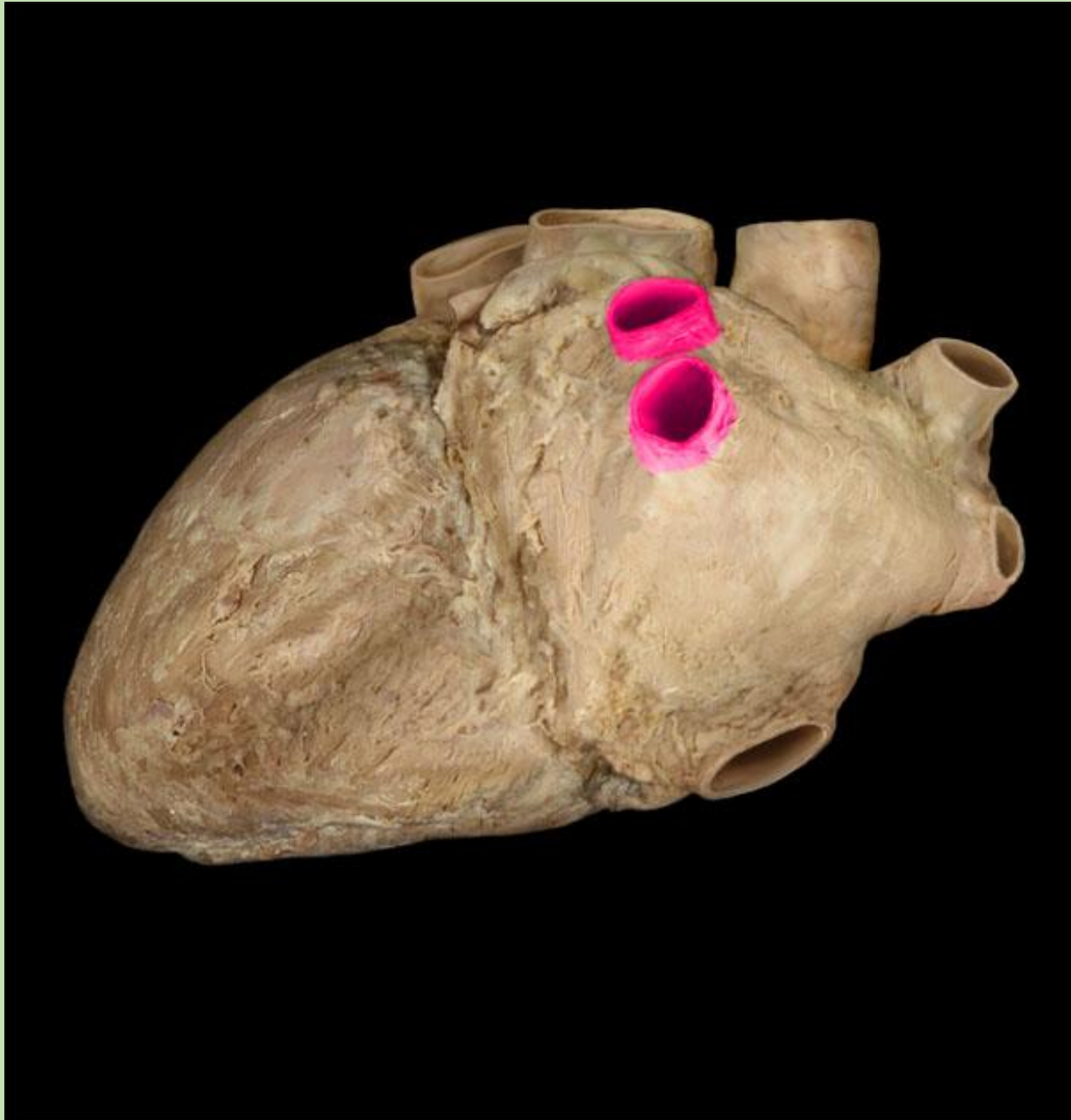


septomarginal trabecule

Left atrium

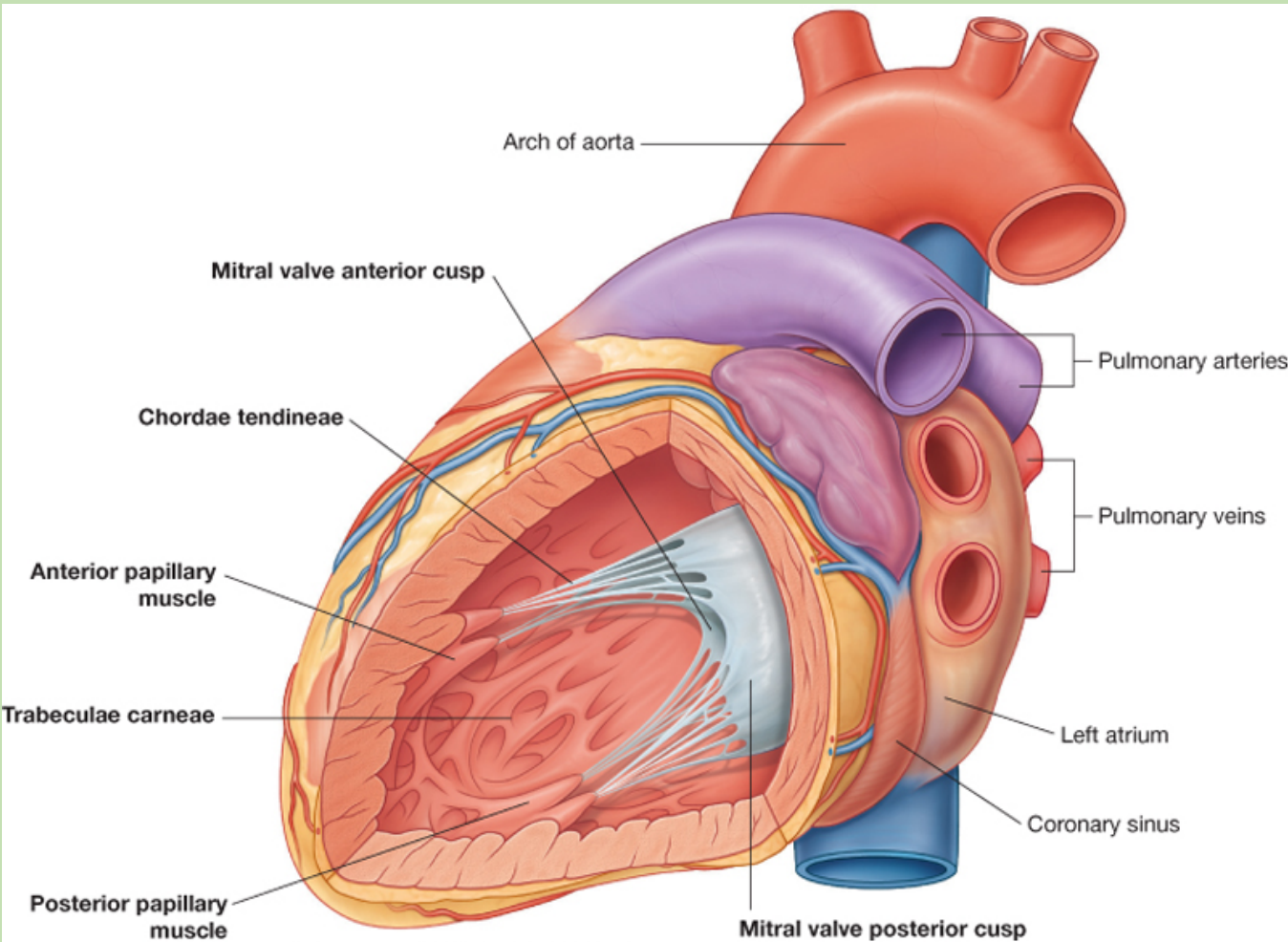


- Smooth wall, except in the **left auricle**
- **Four openings of the pulmonary veins**



pulmonary veins

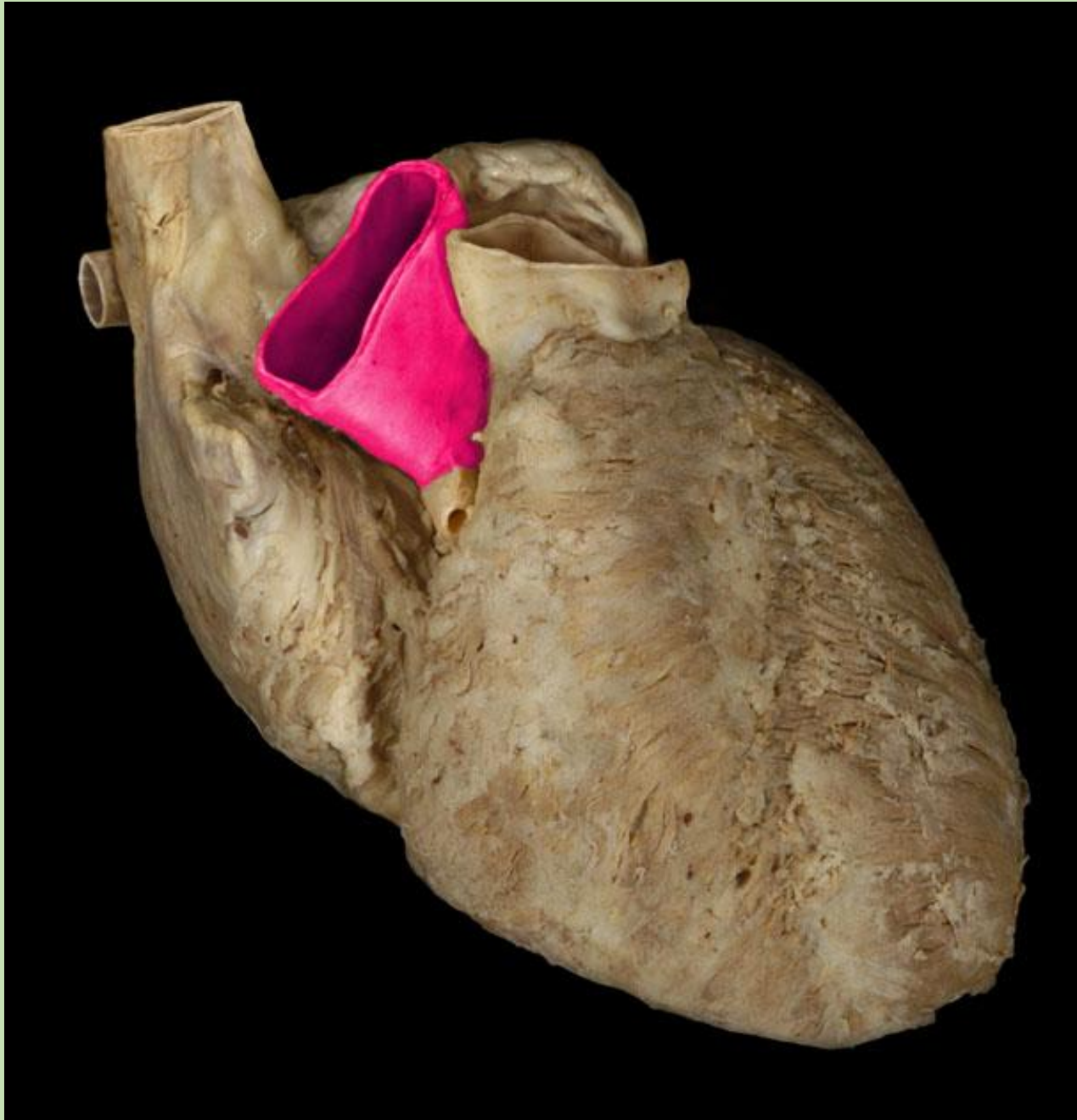
Left ventricle



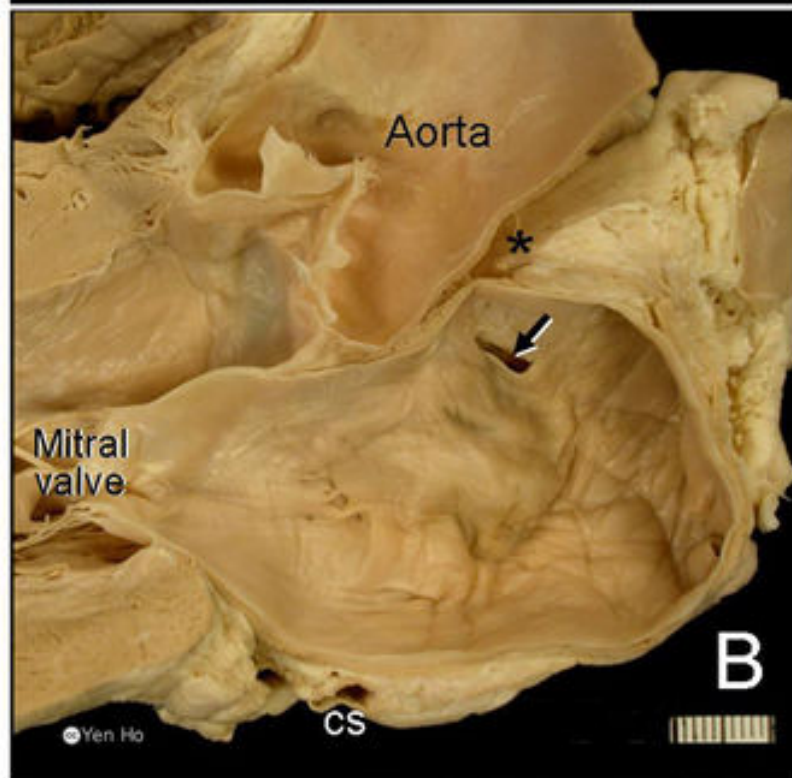
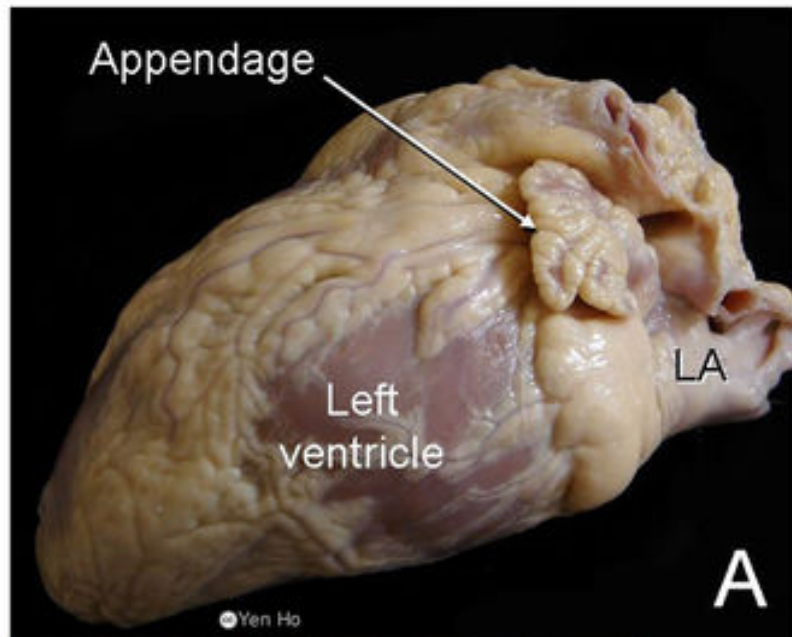
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Parts:

- **Trabeculae carneae,**
- Left atrioventricular valve=bicuspid valve=**mitral valve** (papillary muscles, chordae tendinae, cusps)
- **Orifice of the aorta** - guarded by the aortic valve.



aorta



Aortic semilunar valve



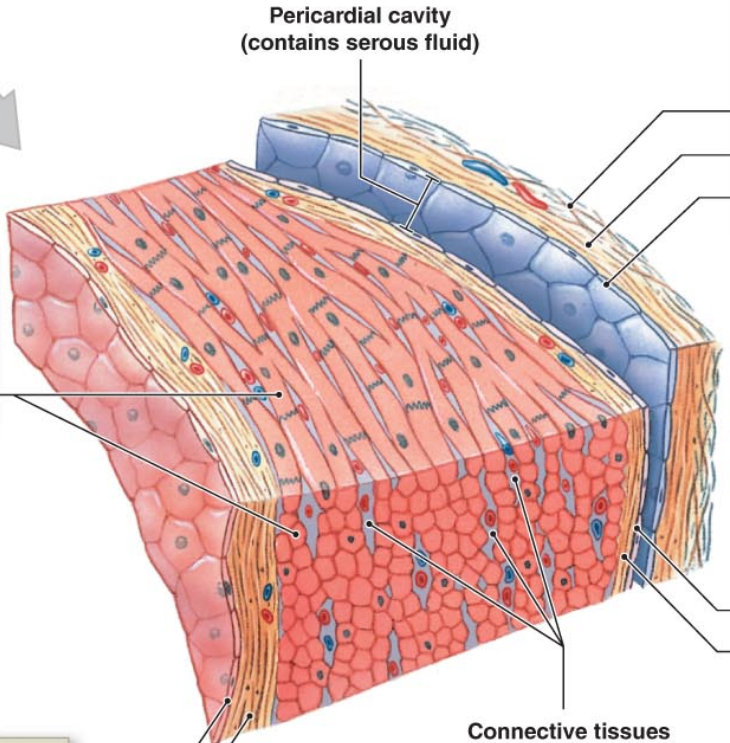
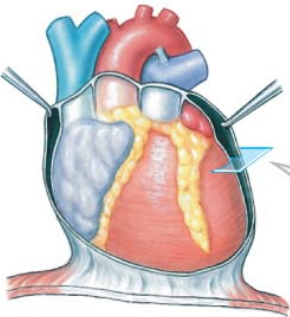
Open during contraction of left ventricle



Closed during relaxation of left ventricle

Cardiac wall

A section of the heart showing its three layers: epicardium, myocardium, and endocardium



Myocardium
Muscular wall of the heart consisting primarily of cardiac muscle cells

Parietal Pericardium
The serous membrane that forms the outer wall of the pericardial cavity; it and a dense fibrous layer form the pericardial sac surrounding the heart

Dense fibrous layer
Areolar tissue
Mesothelium

Epicardium
Covers the outer surface of the heart; also called the visceral pericardium

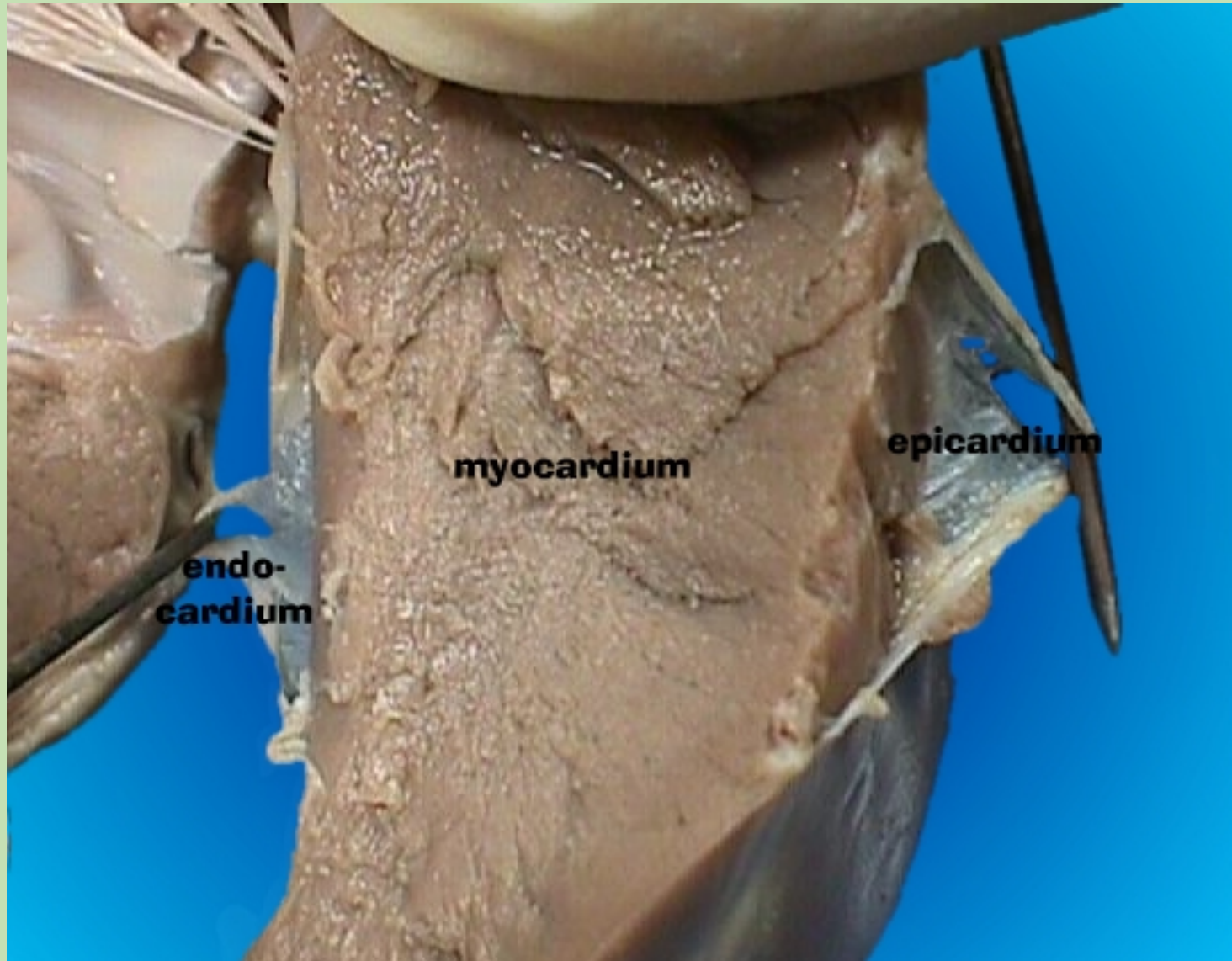
Mesothelium
Areolar tissue

Endocardium
Covers the inner surfaces of the heart

Endothelium
Areolar tissue

- *Endocardium*
- *Myocardium*
- *Epicardium*

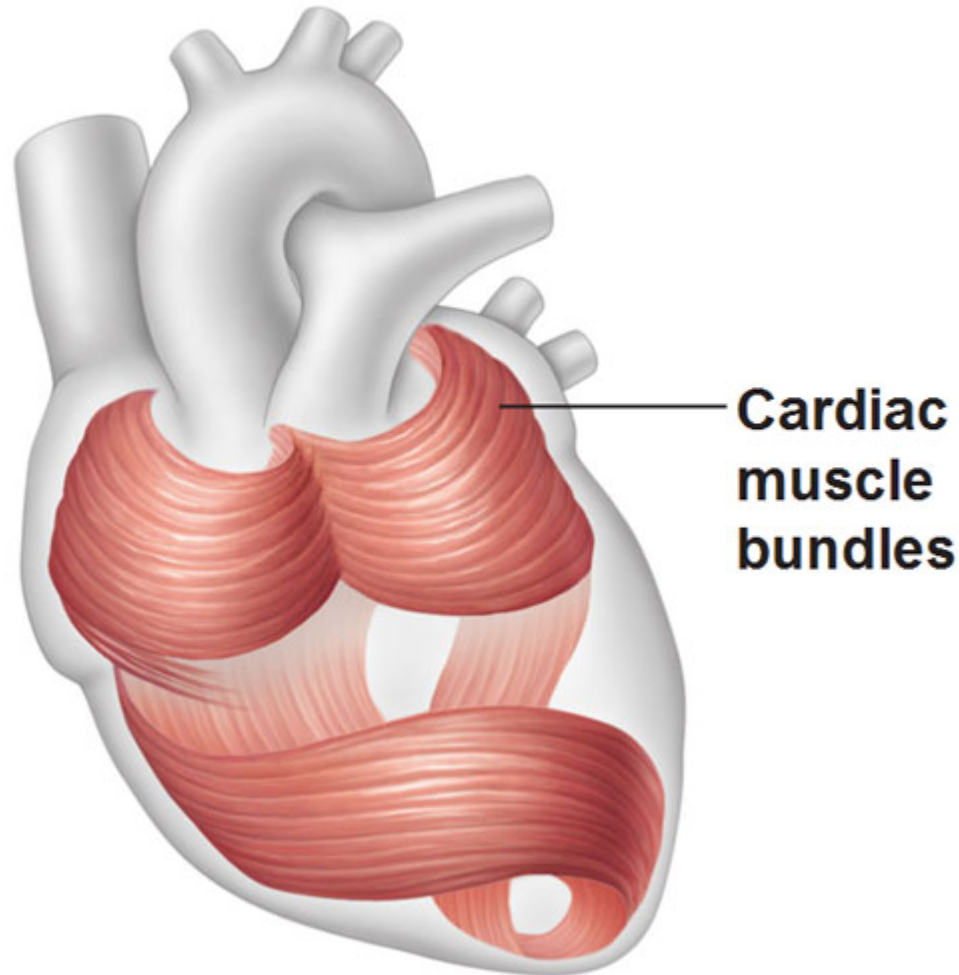
Cardiac wall



Myocardial architecture - layers

Circular and Spiral Arrangements of Cardiac Muscle Bundles

Cardiac muscle tissue and its connective tissues are arranged in networks that insure proper directions of squeezing blood



Atria:

- Outer circular
- Inner longitudinal

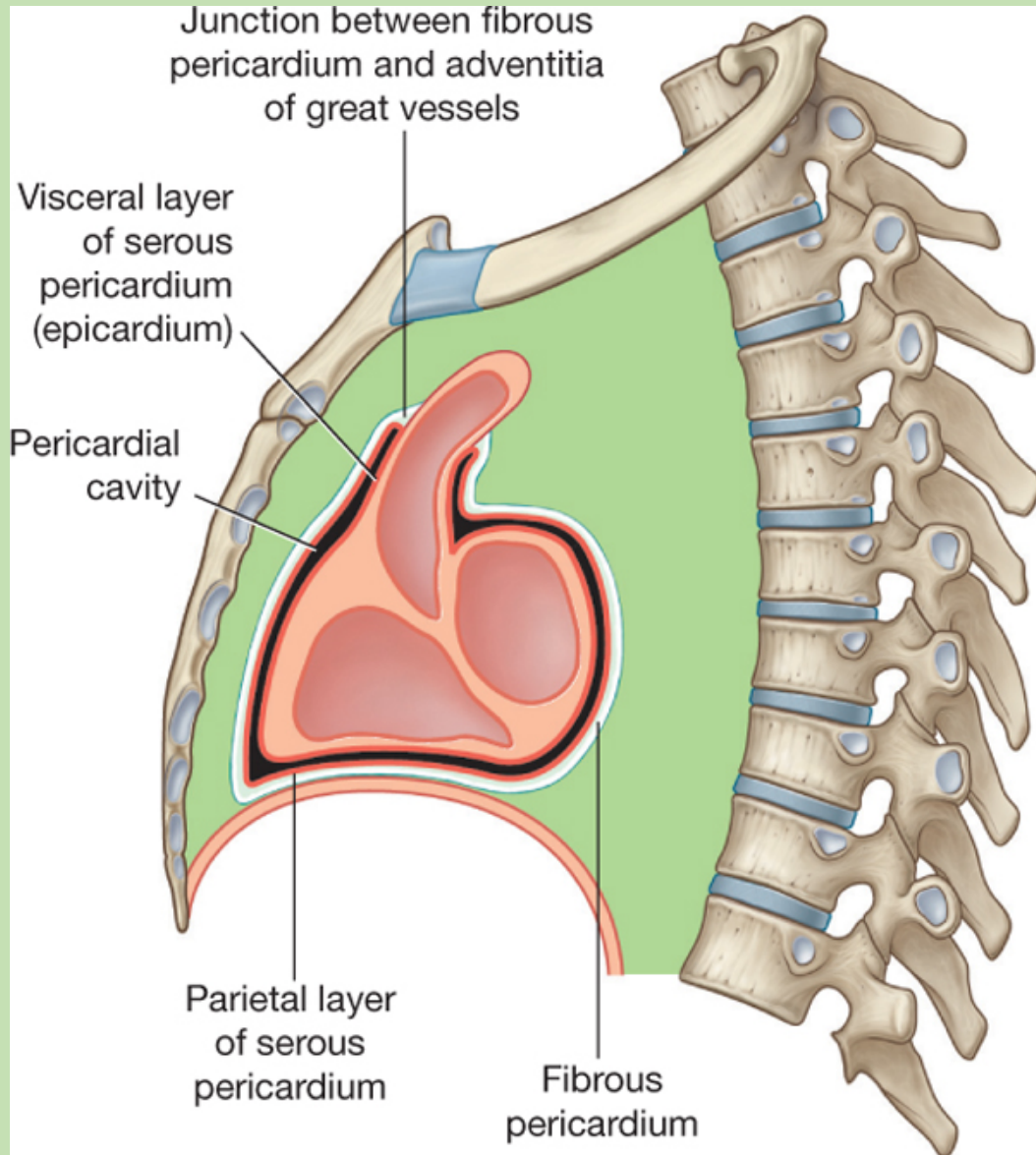
Ventricles:

- Outer oblique
- Middle circular
- Inner longitudinal

Myocardial architecture - layers

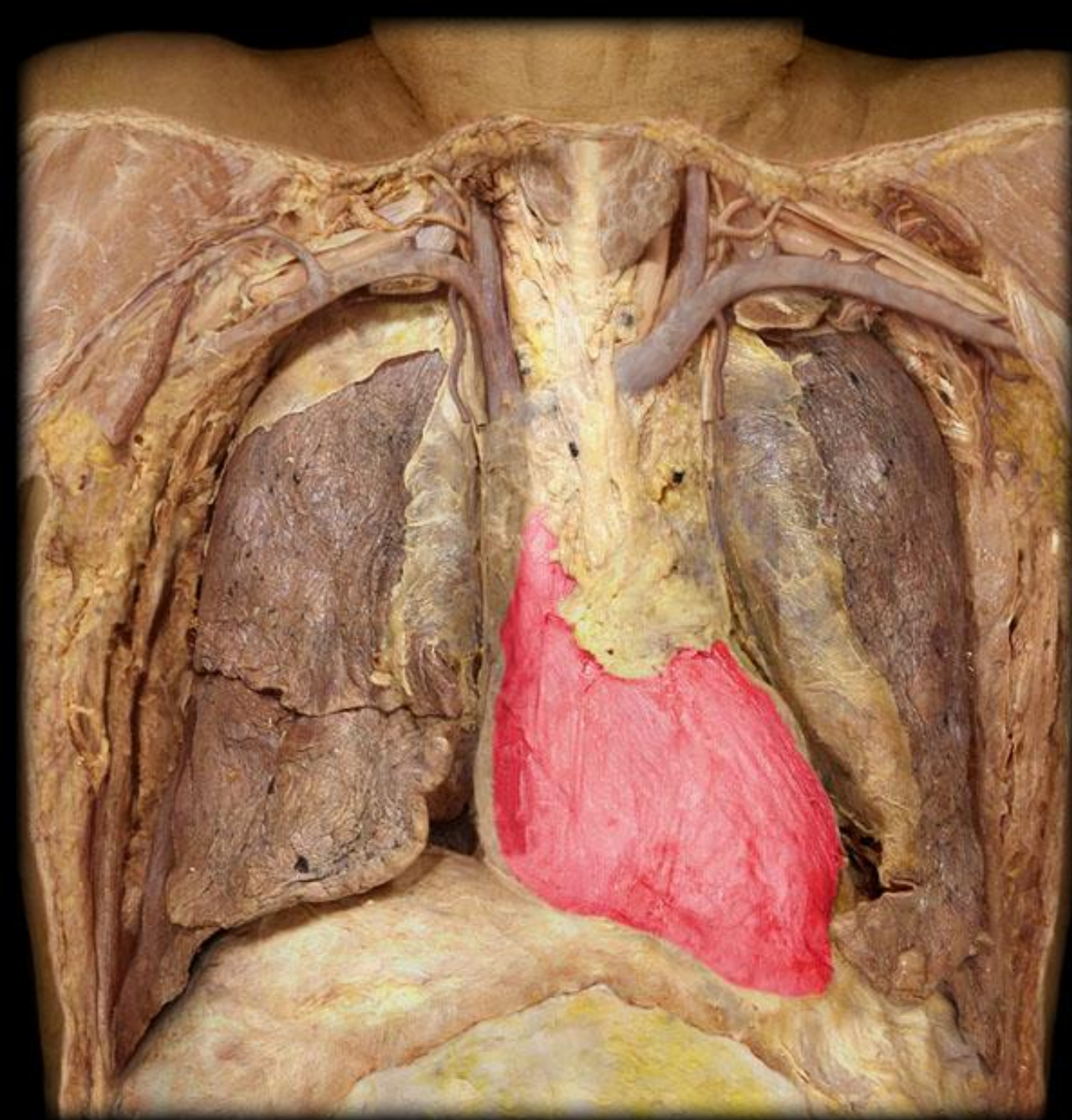


Pericardium

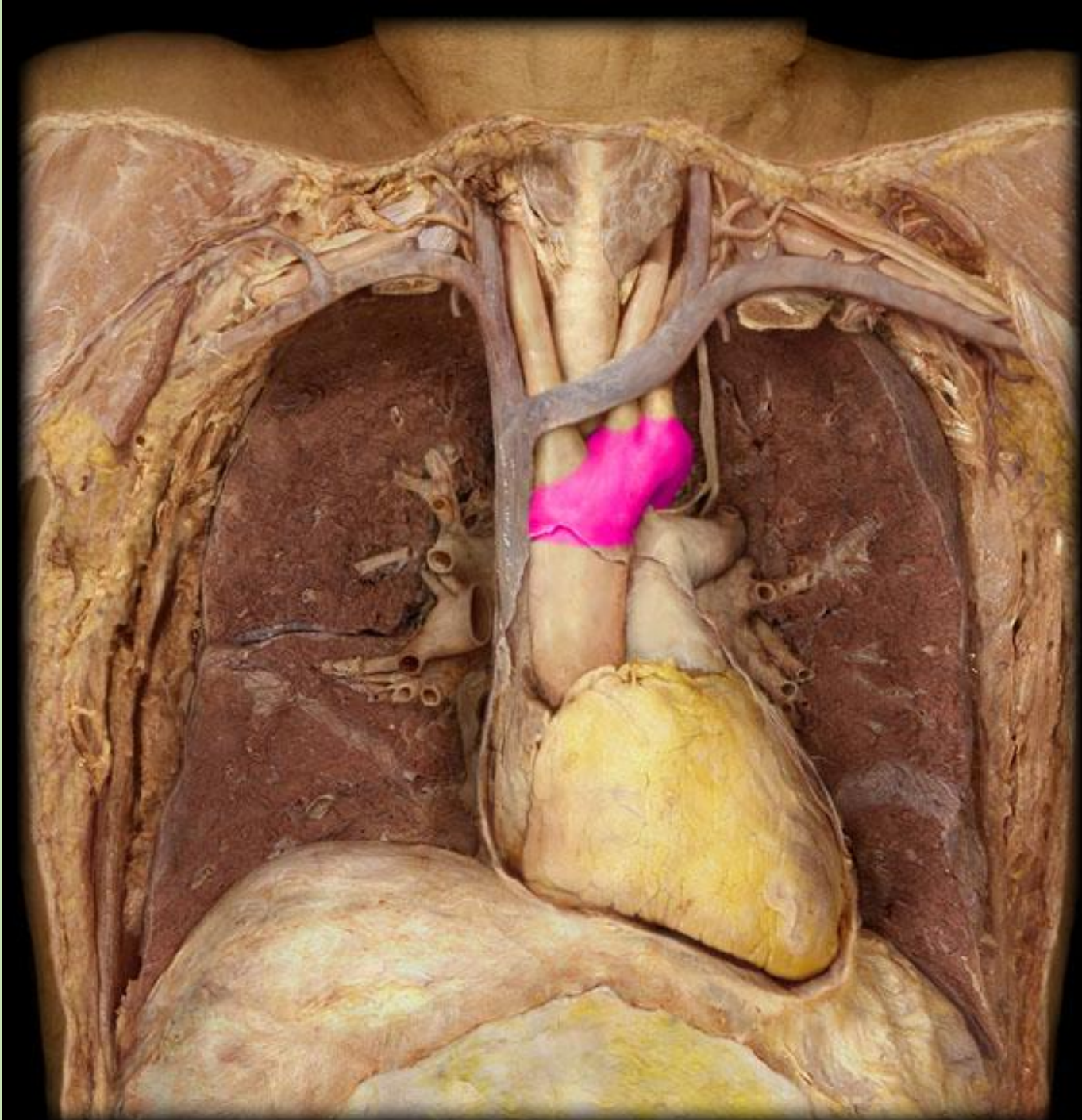


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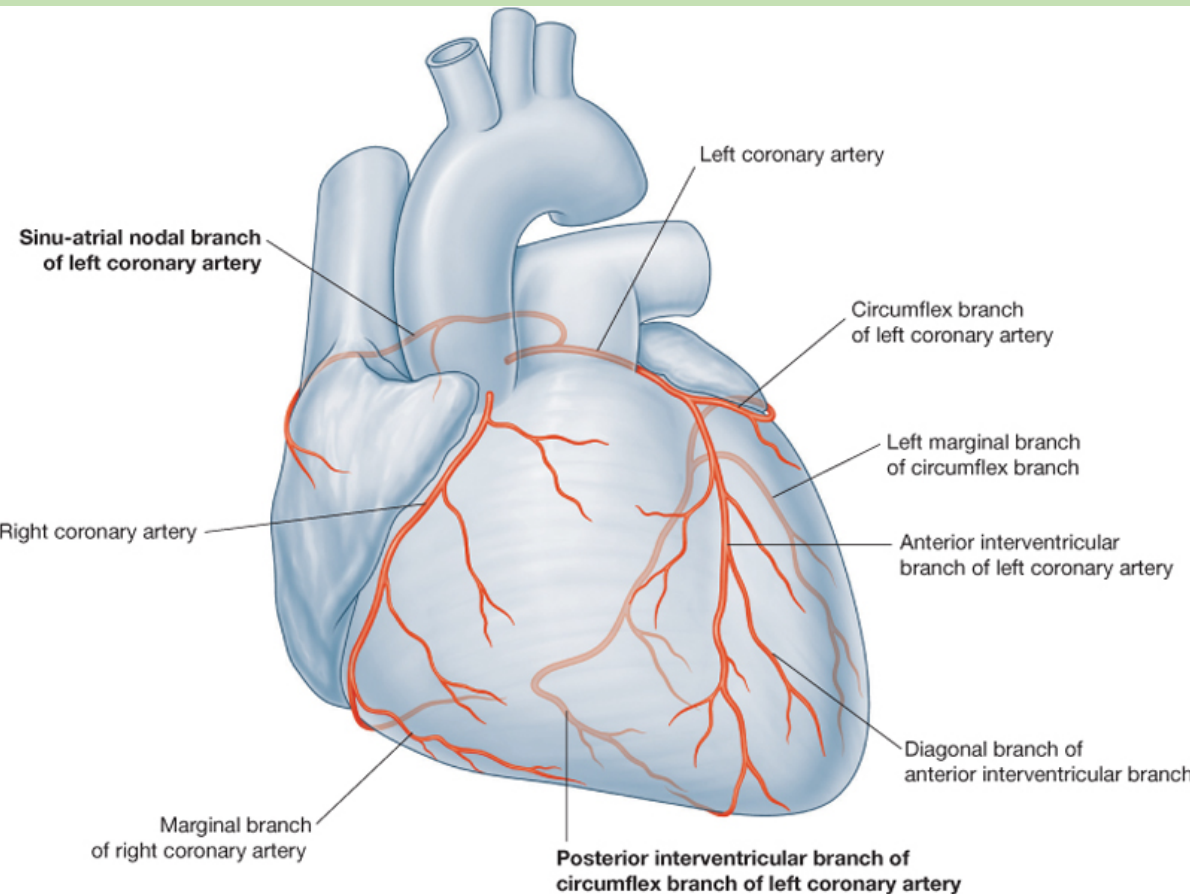


parietal pericardium

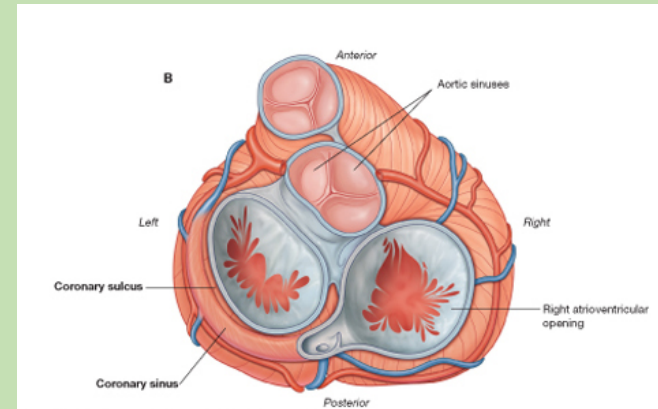


visceral pericardium

Left coronary artery



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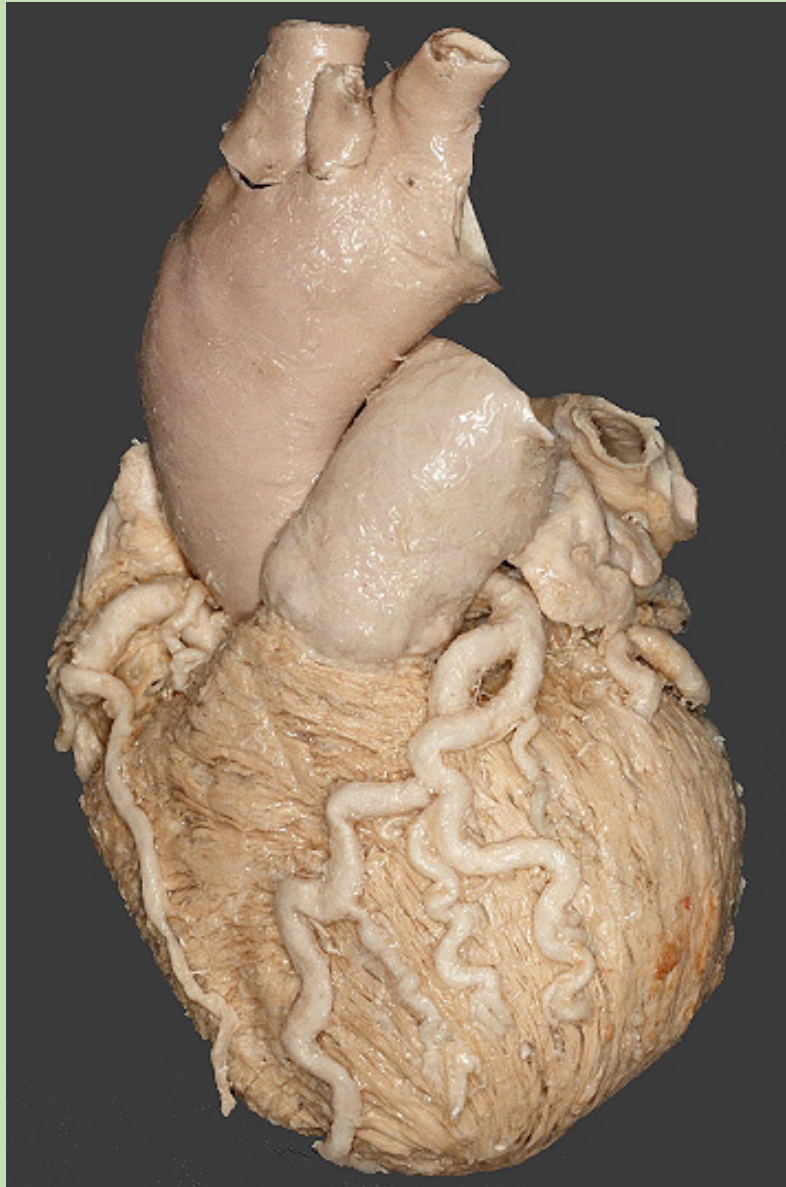


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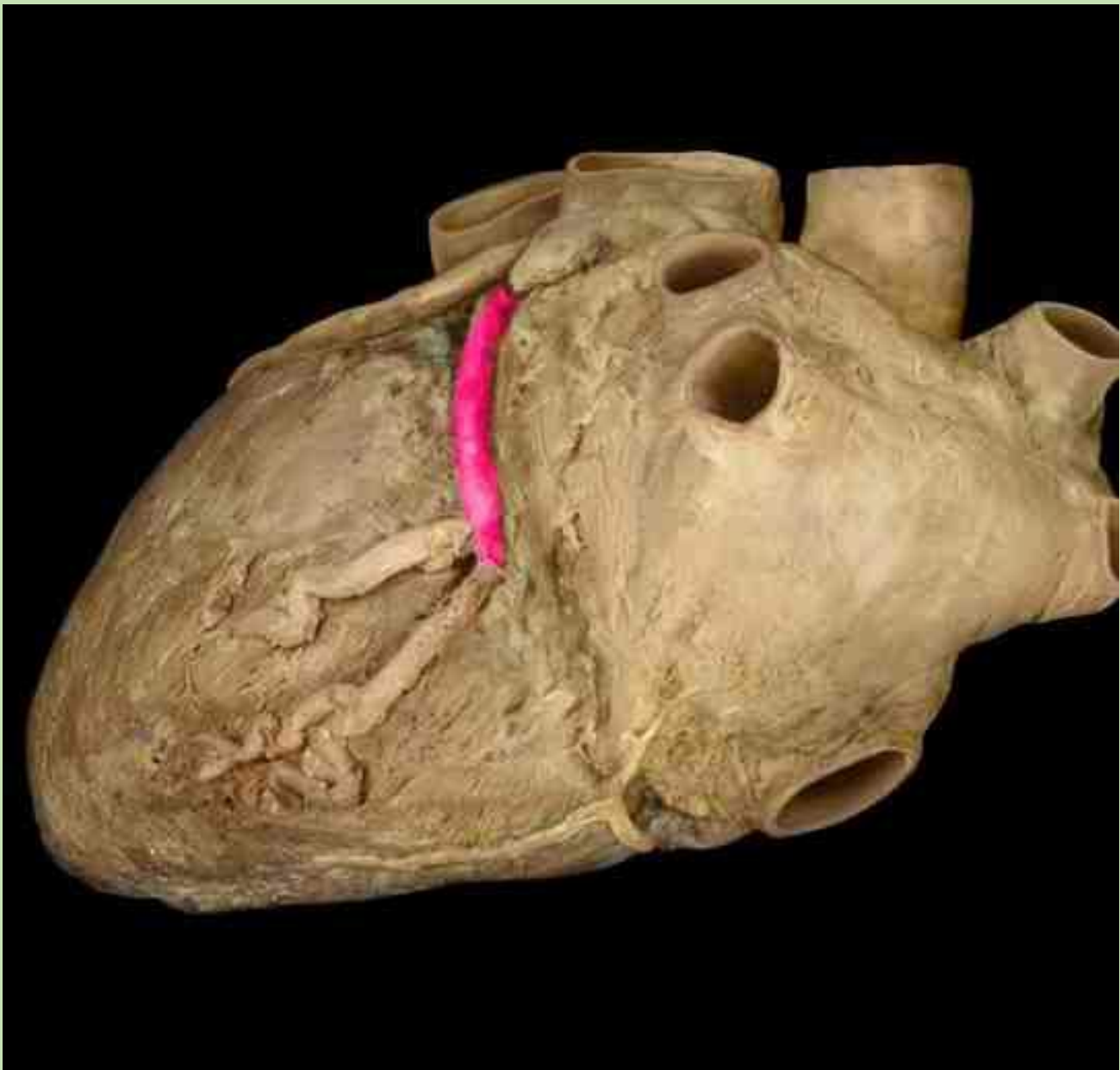
It springs from the left aortic sinus.

Main branches:

- **Anterior interventricular artery**
- **Circumflex branch - left marginal artery**

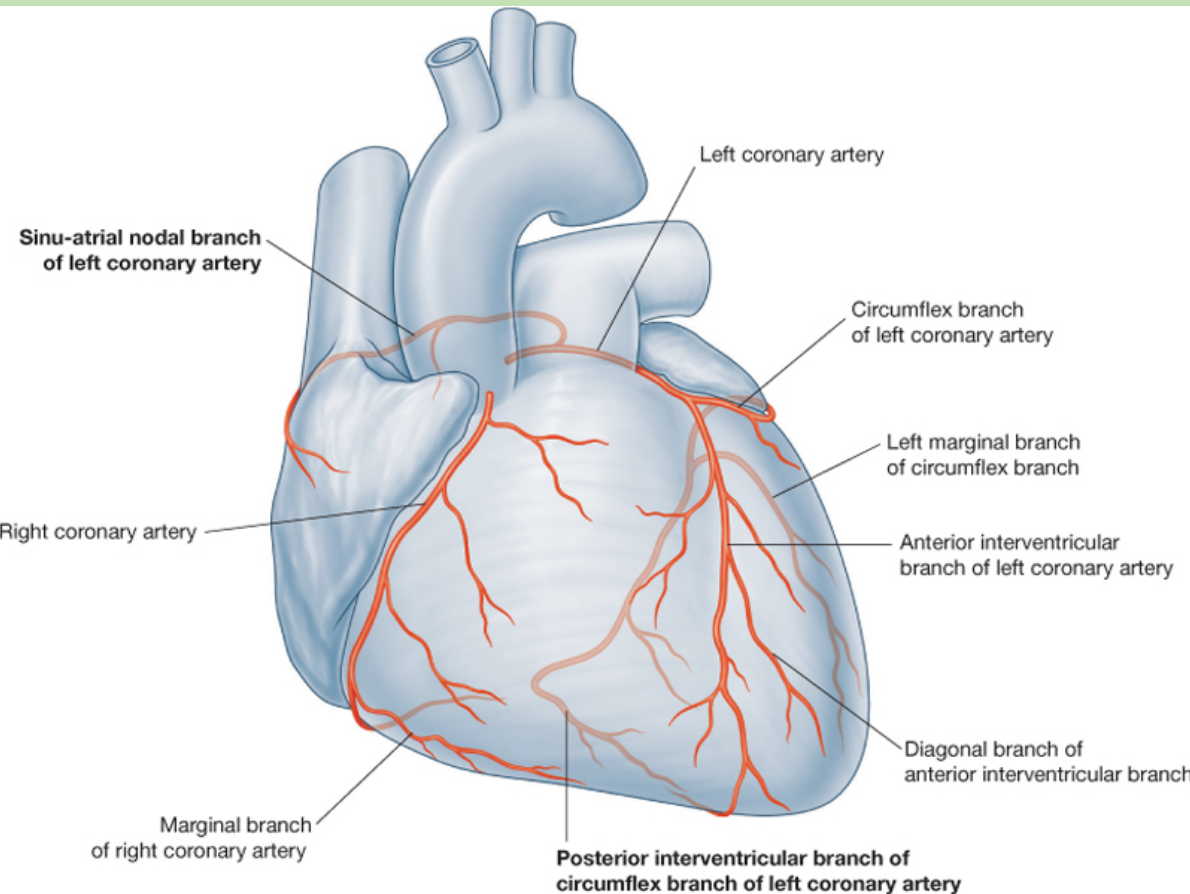


anterior interventricular artery

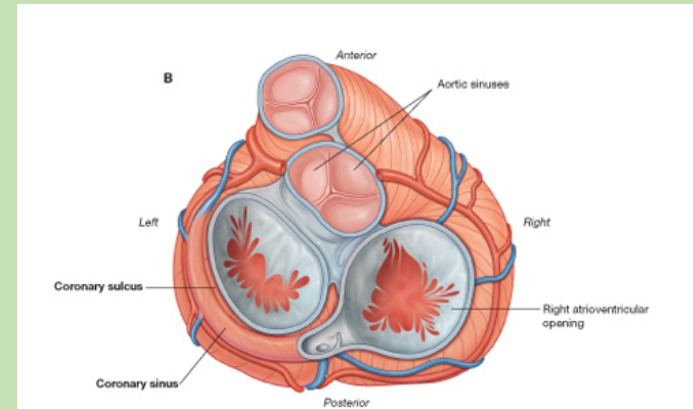


circumflex branch

Right coronary artery



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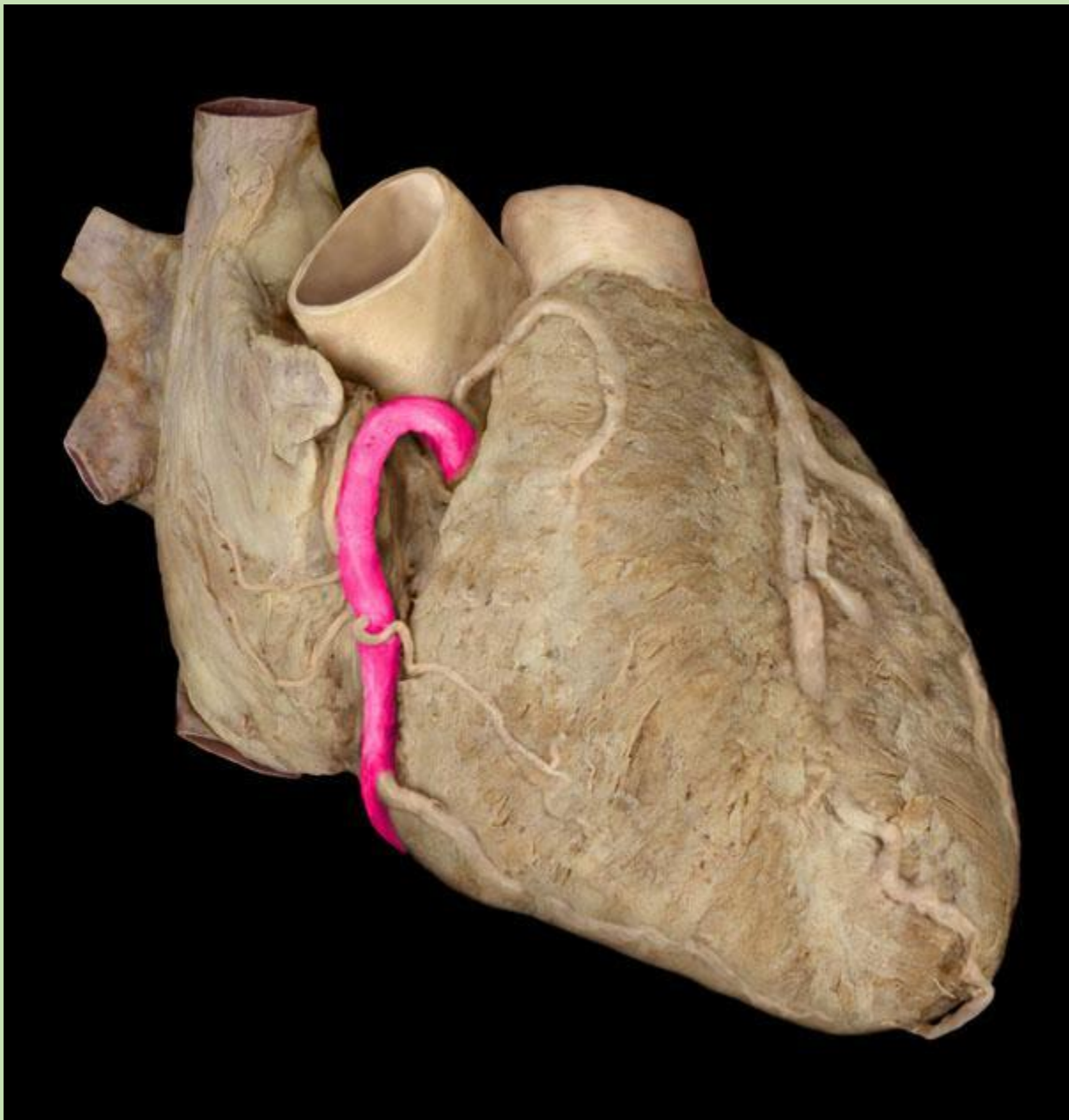


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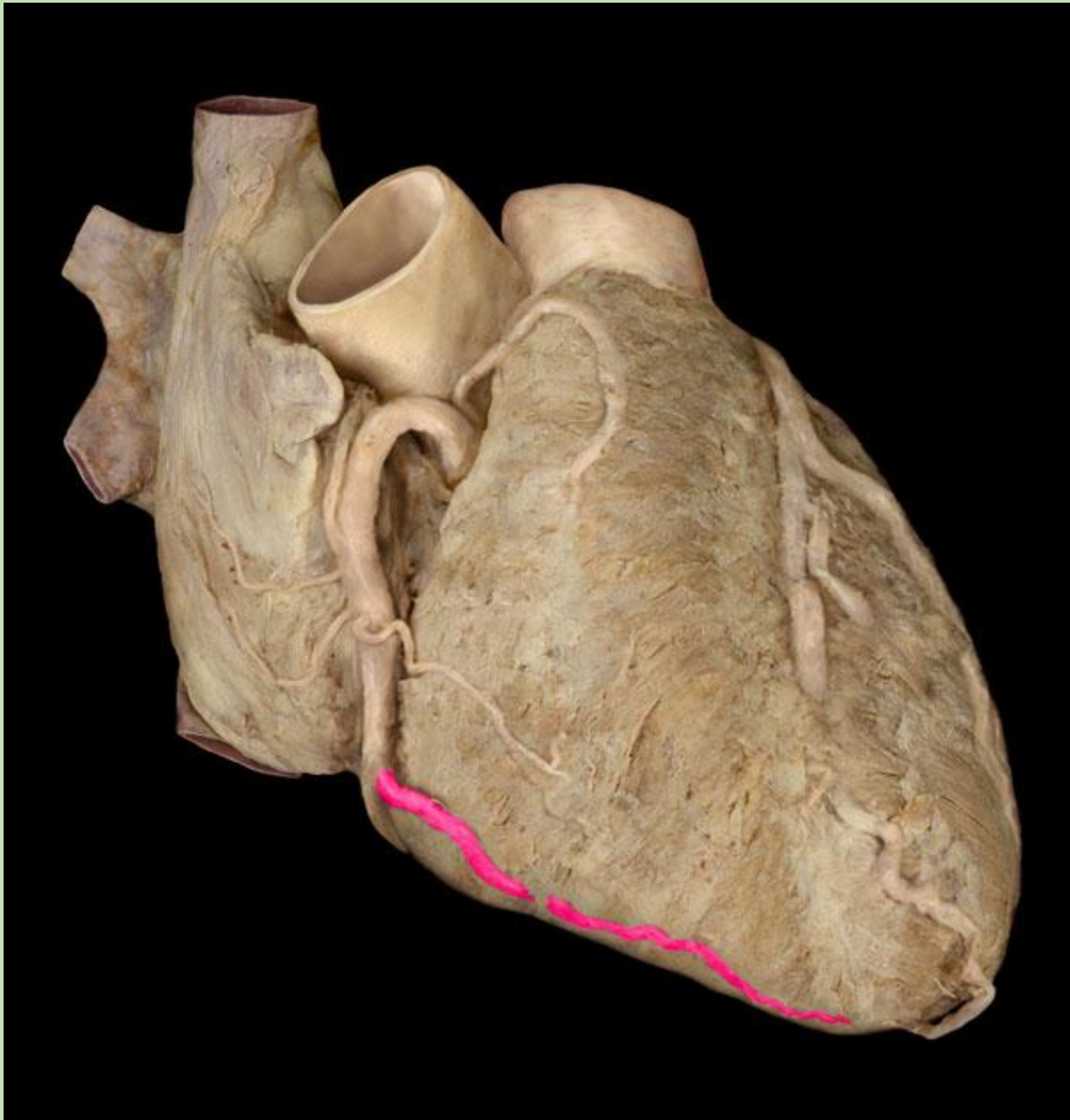
It springs from the right aortic sinus.

Main branches:

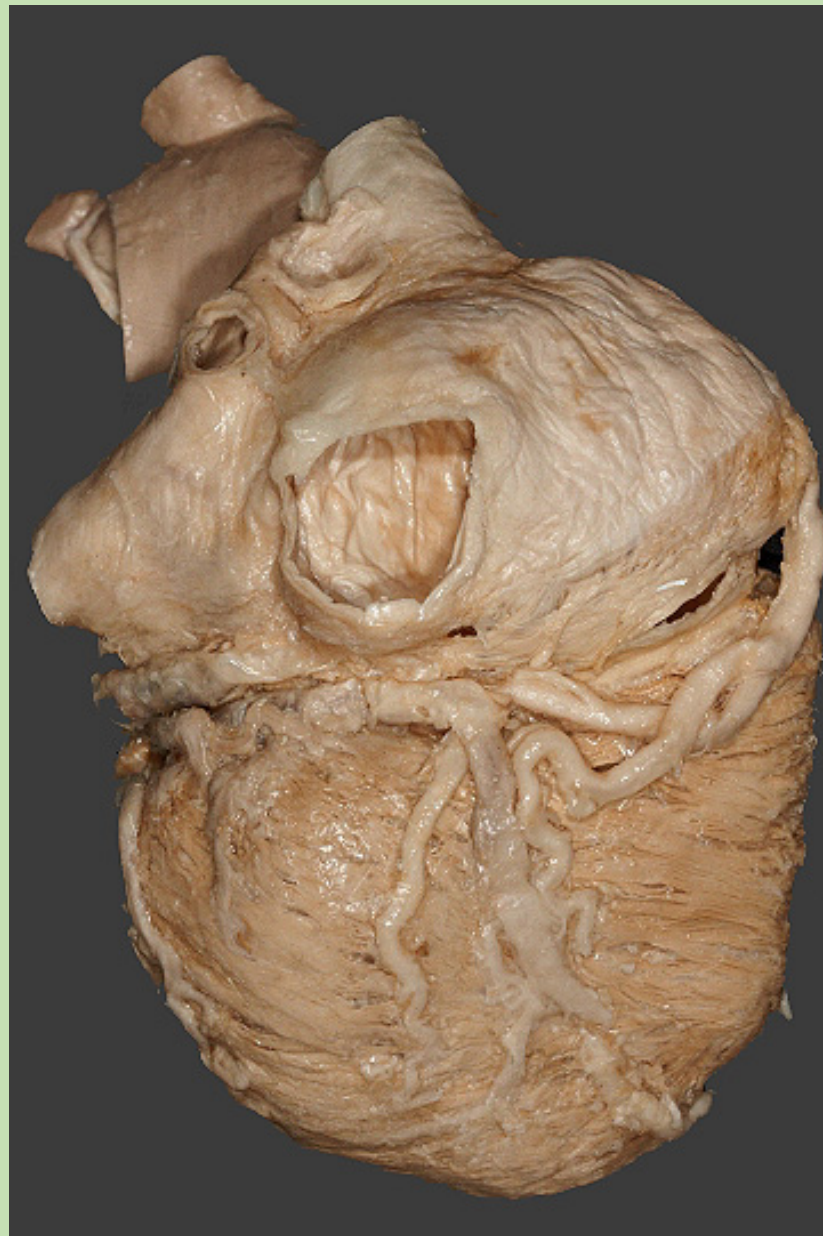
- **Nodal artery**
- **Right marginal artery**
- **Posterior interventricular artery**



right coronary artery

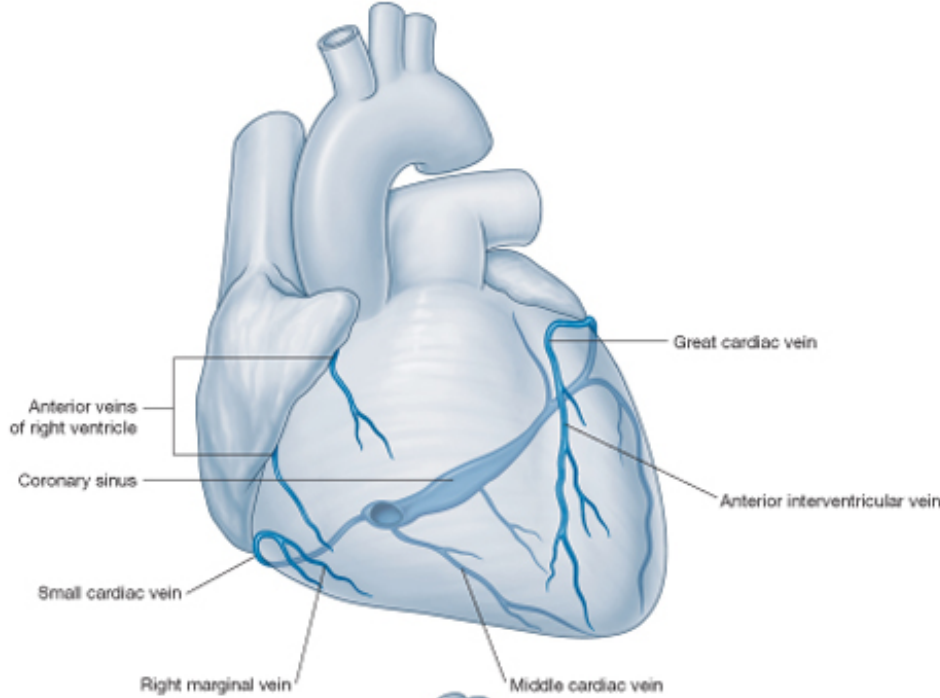


right marginal artery



posterior interventricular artery

Cardiac veins

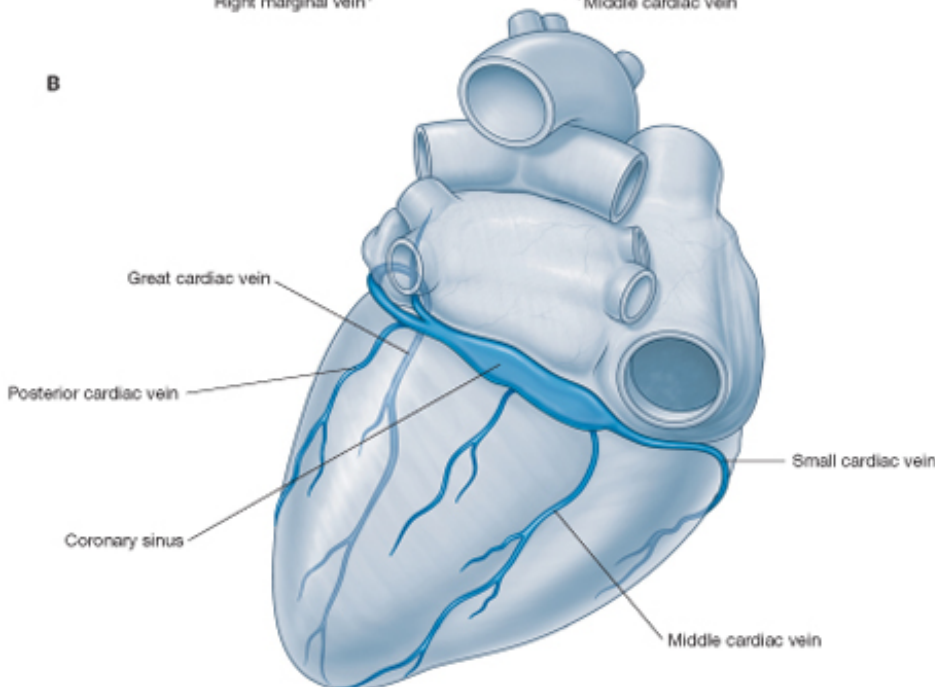


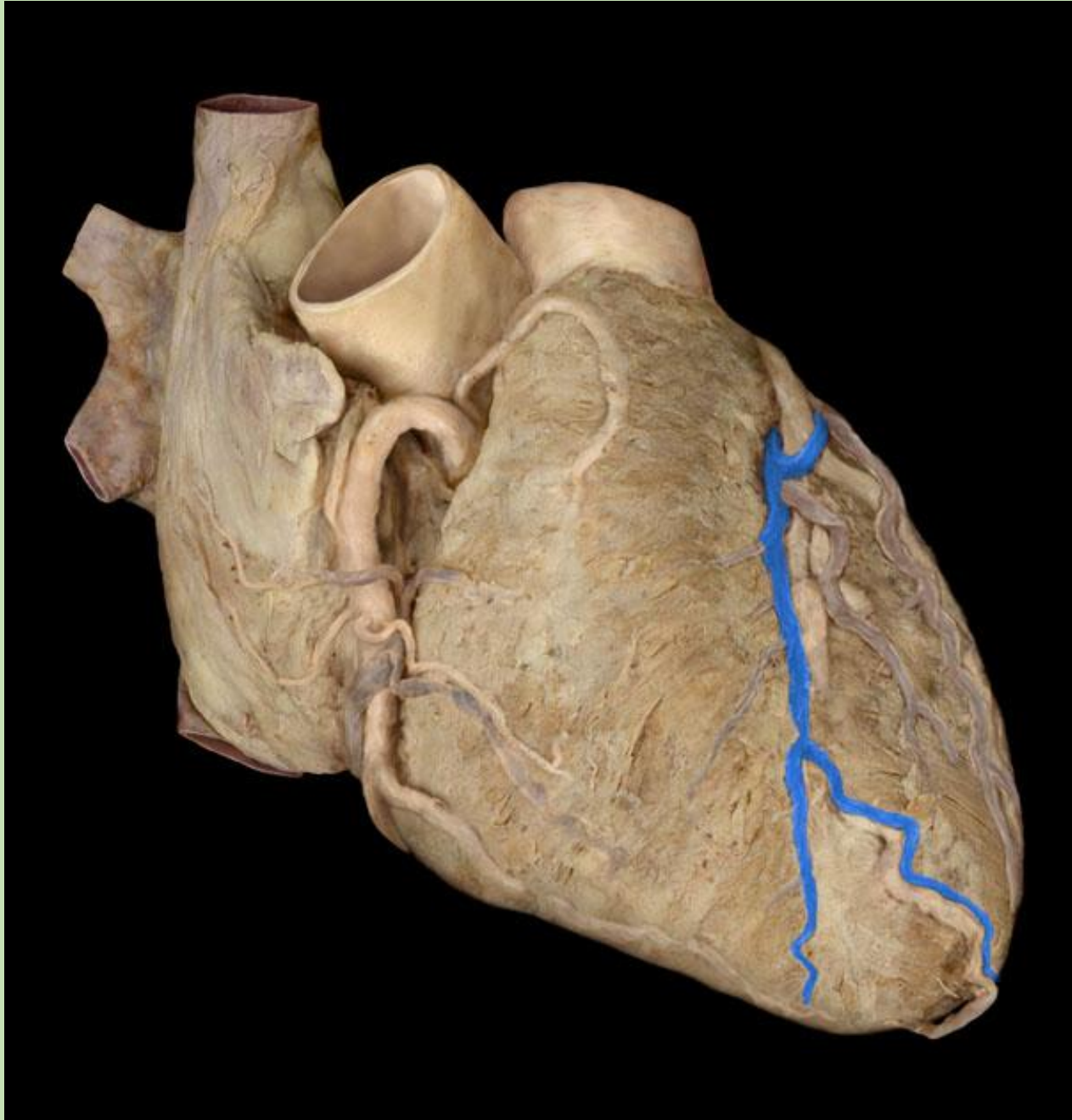
- **Great cardiac vein**
- **Middle cardiac vein**
- **Small cardiac vein**



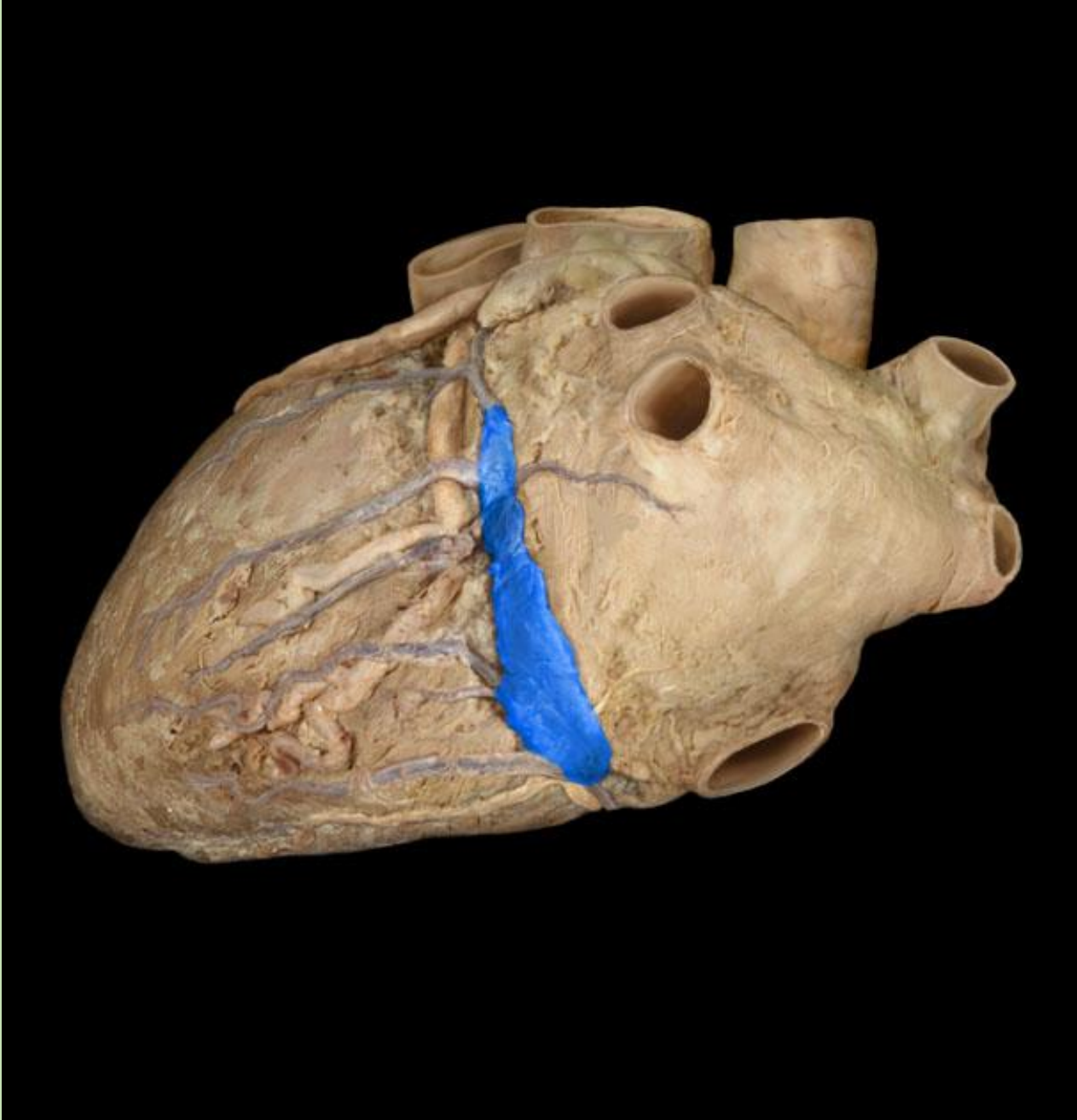
Coronary sinus

- **Minimal cardiac veins**



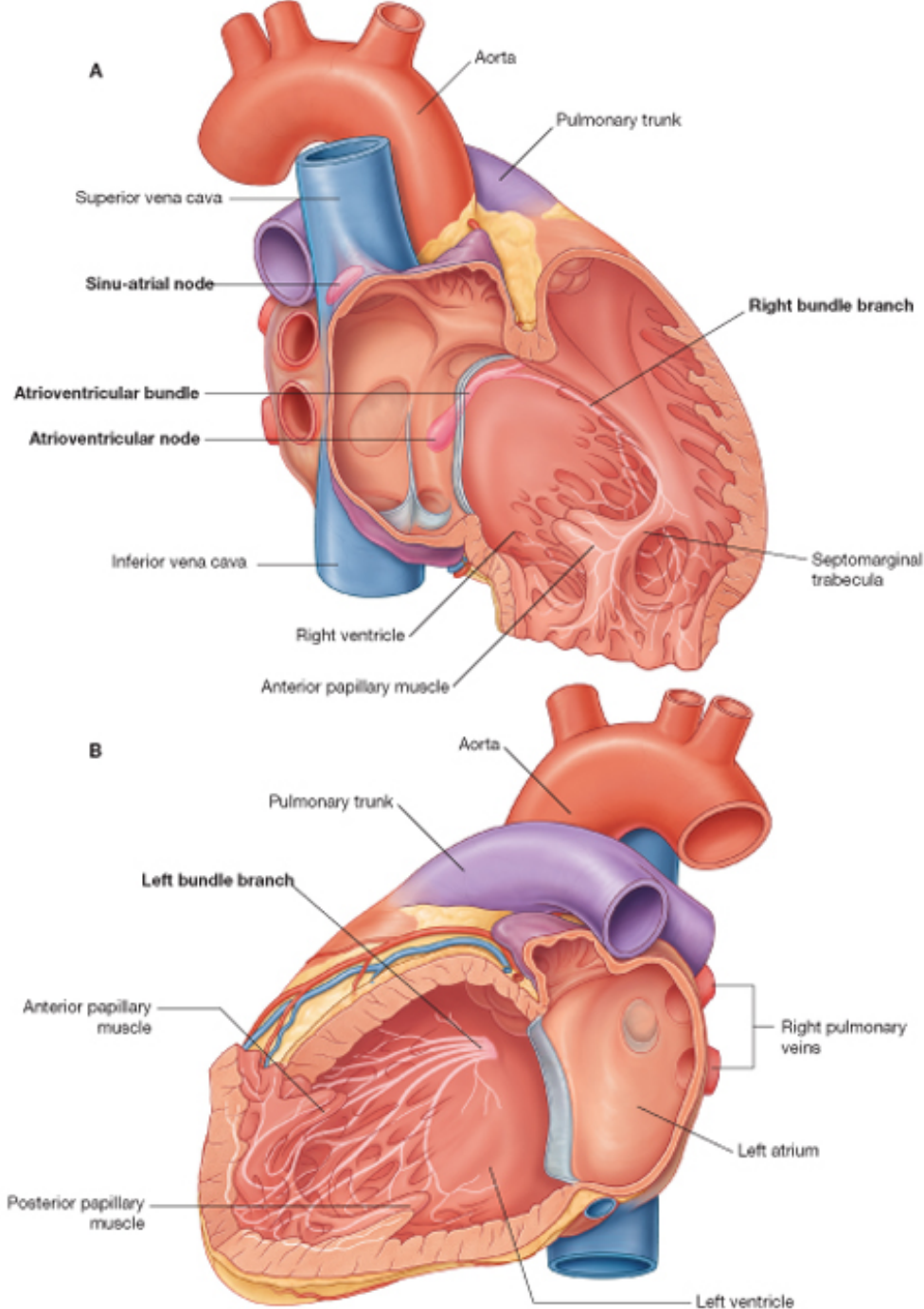


great cardiac vein



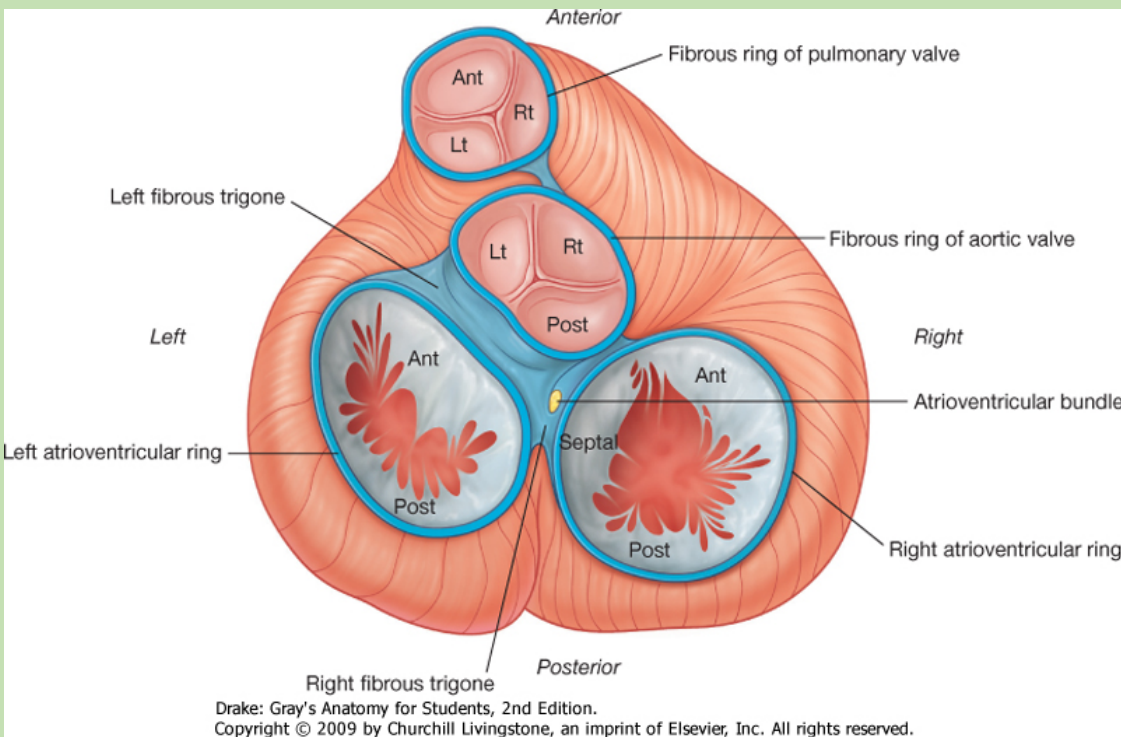
coronary sinus

Impulse formation and conduction system



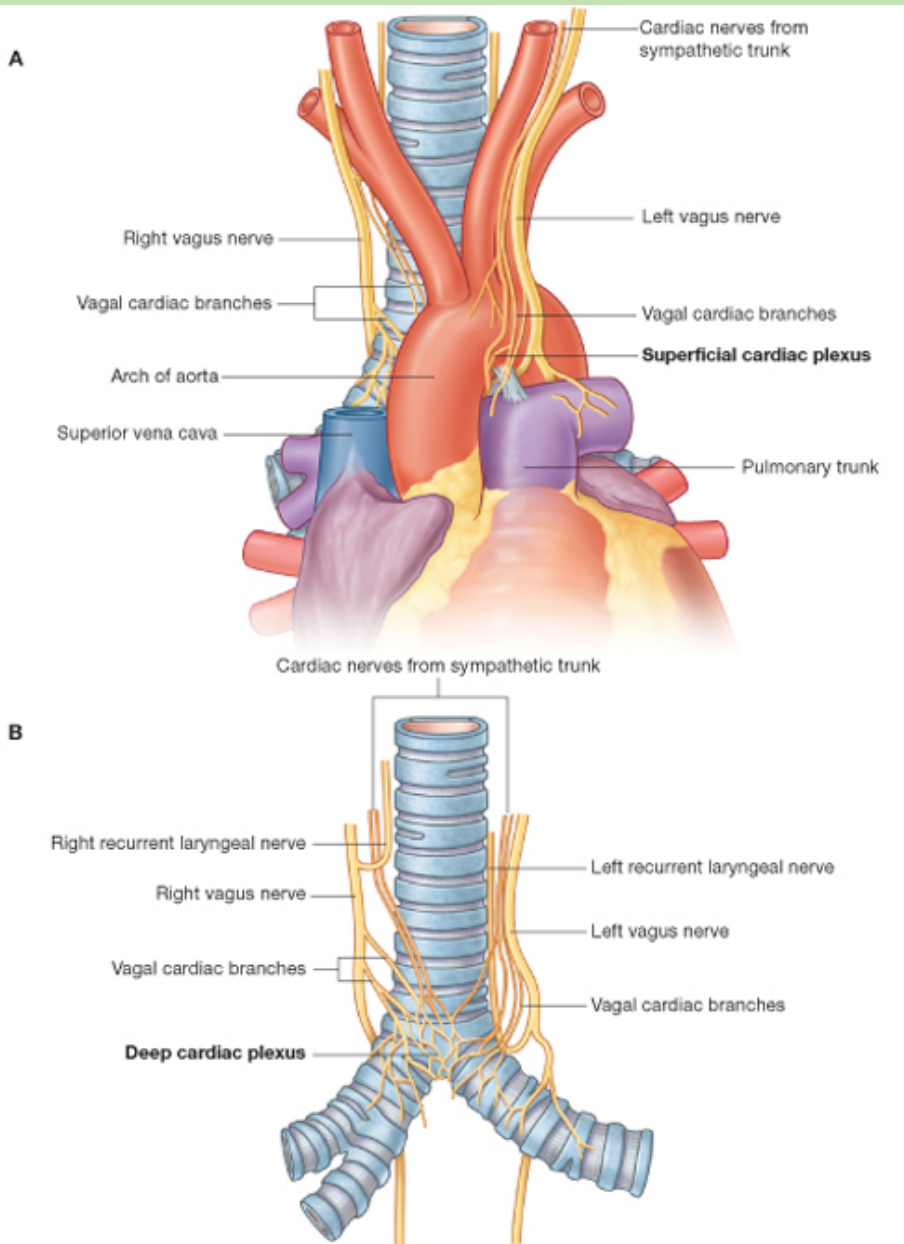
- **Sinuatrinal (SA) node:** 60-80 impulses/min (primary pacemaker)
- **Atrioventricular (AV) node:** 40 impulses/min (delays the impulses)
- **A t r i o v e n t r i c u l a r bundle=**bundle of His
- **R i g h t a n d l e f t b u n d l e b r a n c h e s =**Tawara's bundles
- **Purkinje's fibers**

Fibrous skeleton of the heart – anuli fibrosi



- **Complete separation** of the myocardium from ventricles and atria.
- **Electrical insulation** between atria and ventricles. (right fibrous trigone – bundle of His)
- **Mechanical framework** for the muscle fibers and all cardiac valves.

Autonomic innervation of the heart



- **Parasympathetic:** Vagus nerve fibers from the dorsal vagal nucleus give off the **superior and inferior cervical cardiac branches** in the neck and the **thoracic cardiac branches** in the chest. (They decrease the heart rate.)
- **Sympathetic:** The three cervical sympathetic ganglia give off the **superior, middle, and inferior cervical cardiac nerves**, and the thoracic ganglia give off the **thoracic cardiac branches**. (They increase the heart rate.)

Thank you for your attention.

References:

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Thieme: Atlas of Anatomy, Neck and Internal Organs

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