

Normal Cardiac Anatomy

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Thoracic and Cardiovascular Surgery

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References

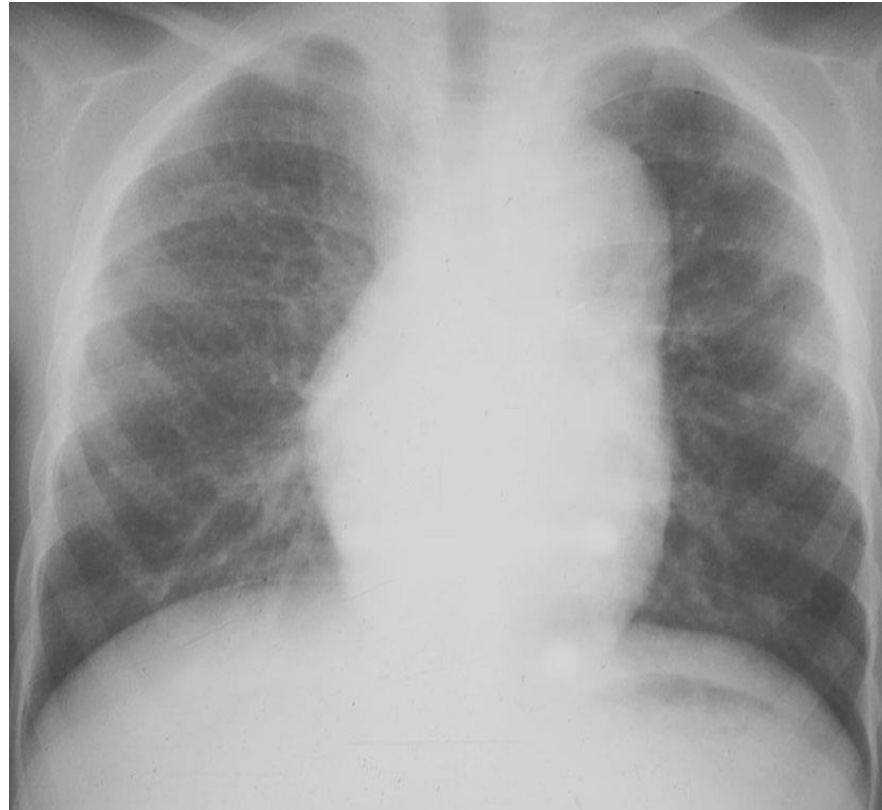
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Heart anatomy : Position



Levocardia



Mesocardia



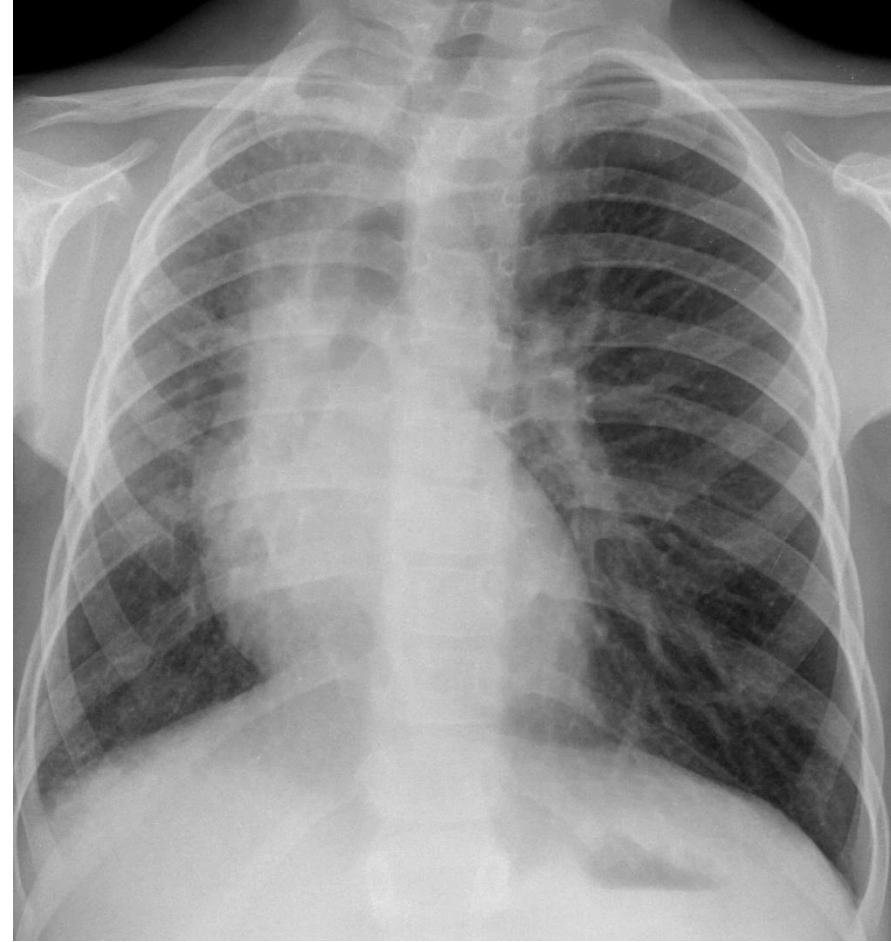
Dextrocardia



Heart anatomy : Position



Dextrocardia



L cardia, Displacement



Heart segments : Terminology

Atrium

RA, LA

← **Atrioventricular junction**
(TV, MV/ atrioventricular valve)

Ventricle

RV, LV

← **Ventriculoarterial junction**
(AV, PV/semilunar valve)

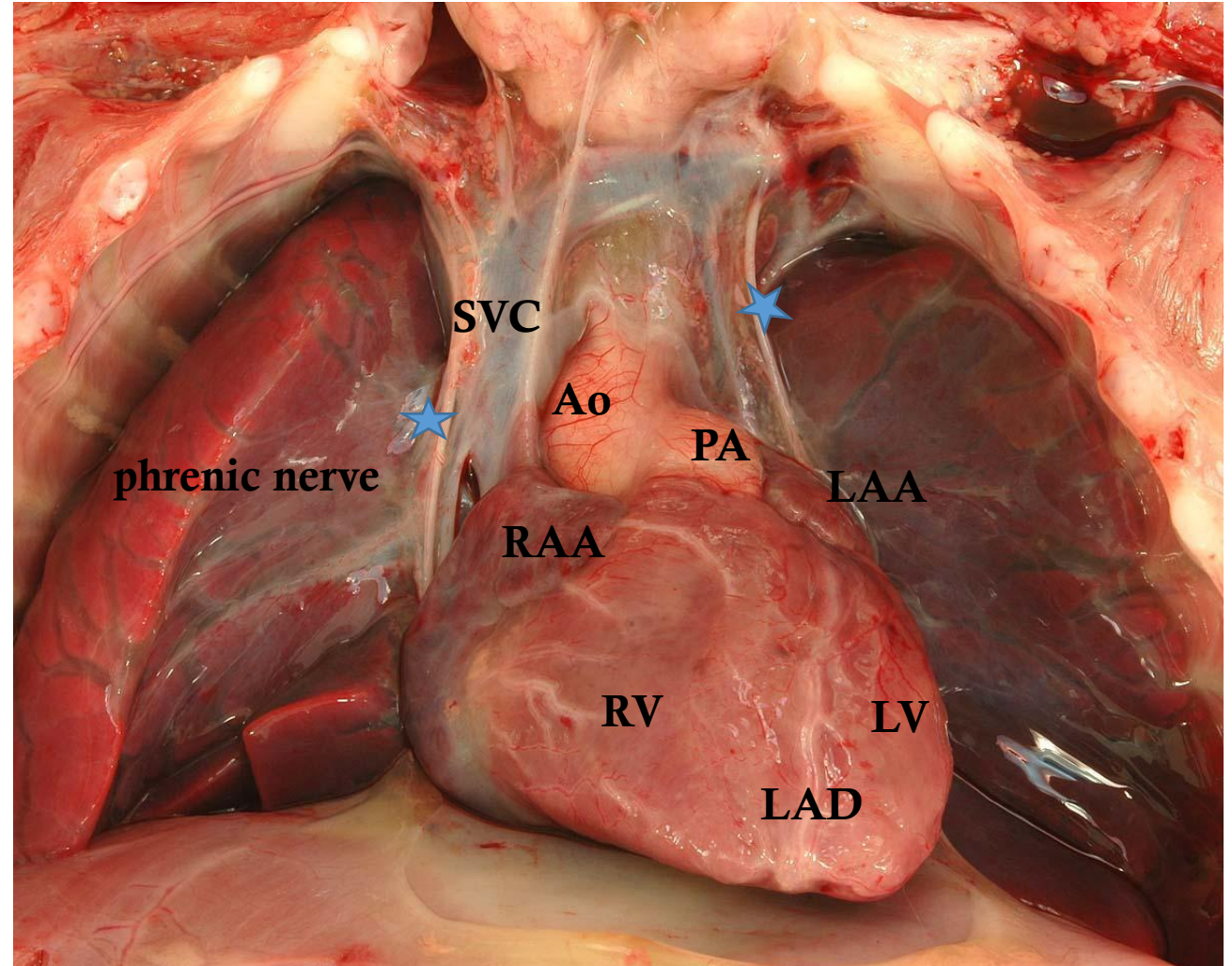
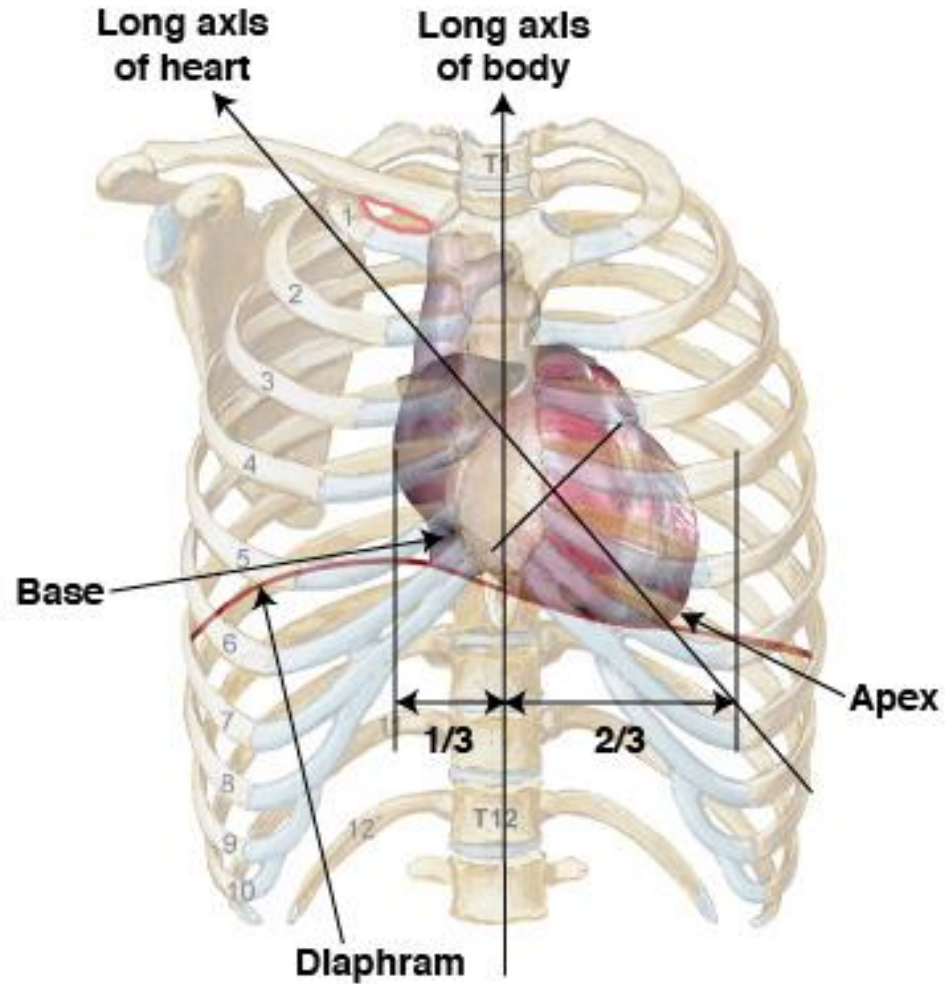
**Great
Arteries**

Ao, PA

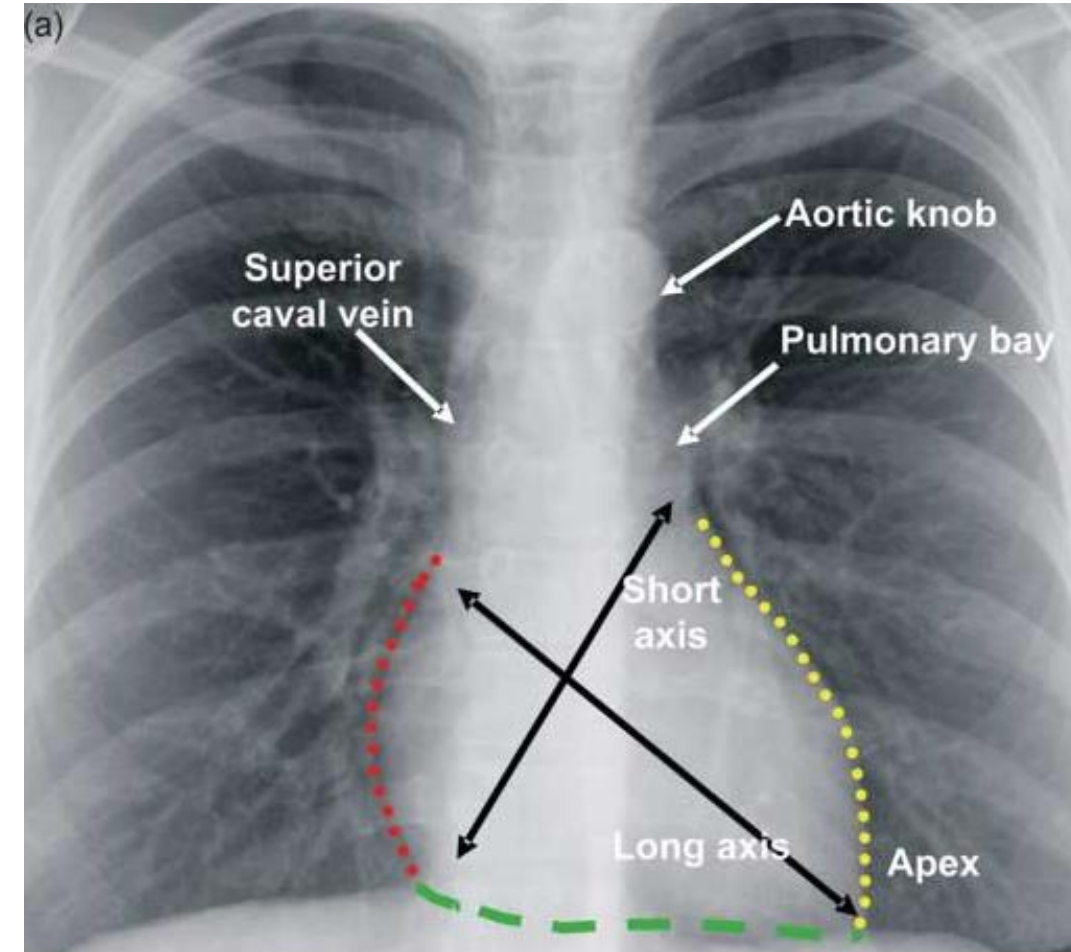
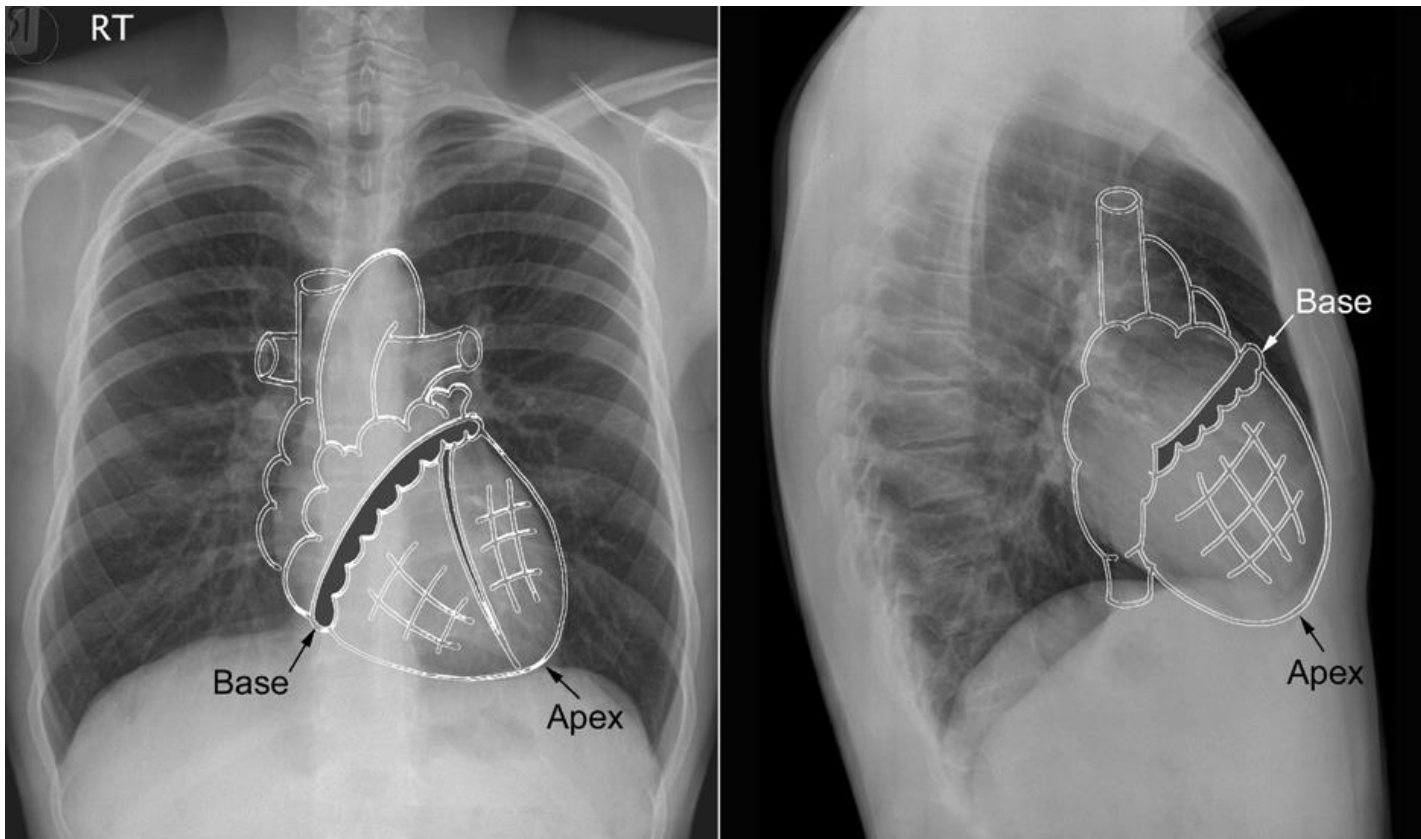
Left or right side vs **Morphology**



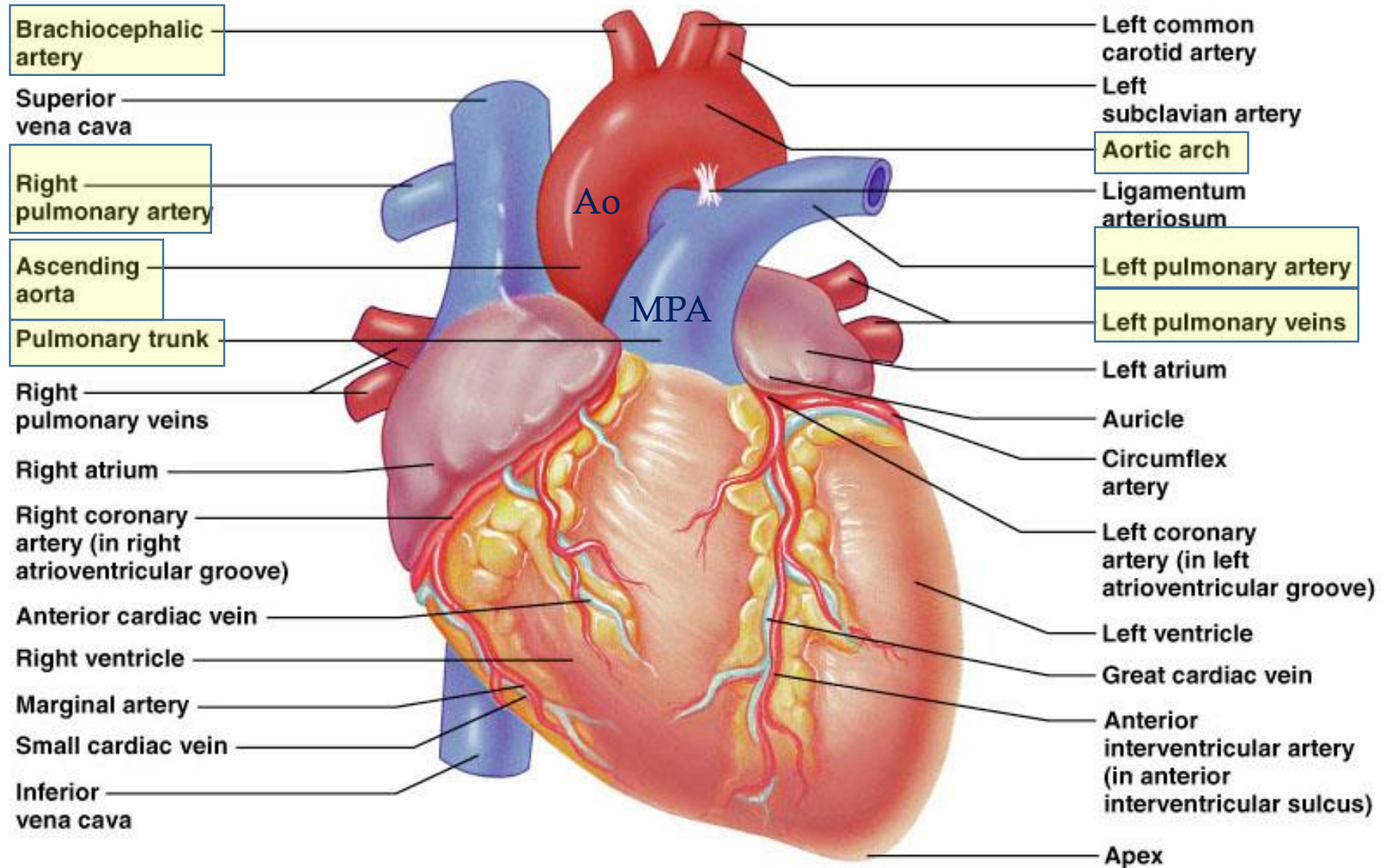
Heart anatomy : External view



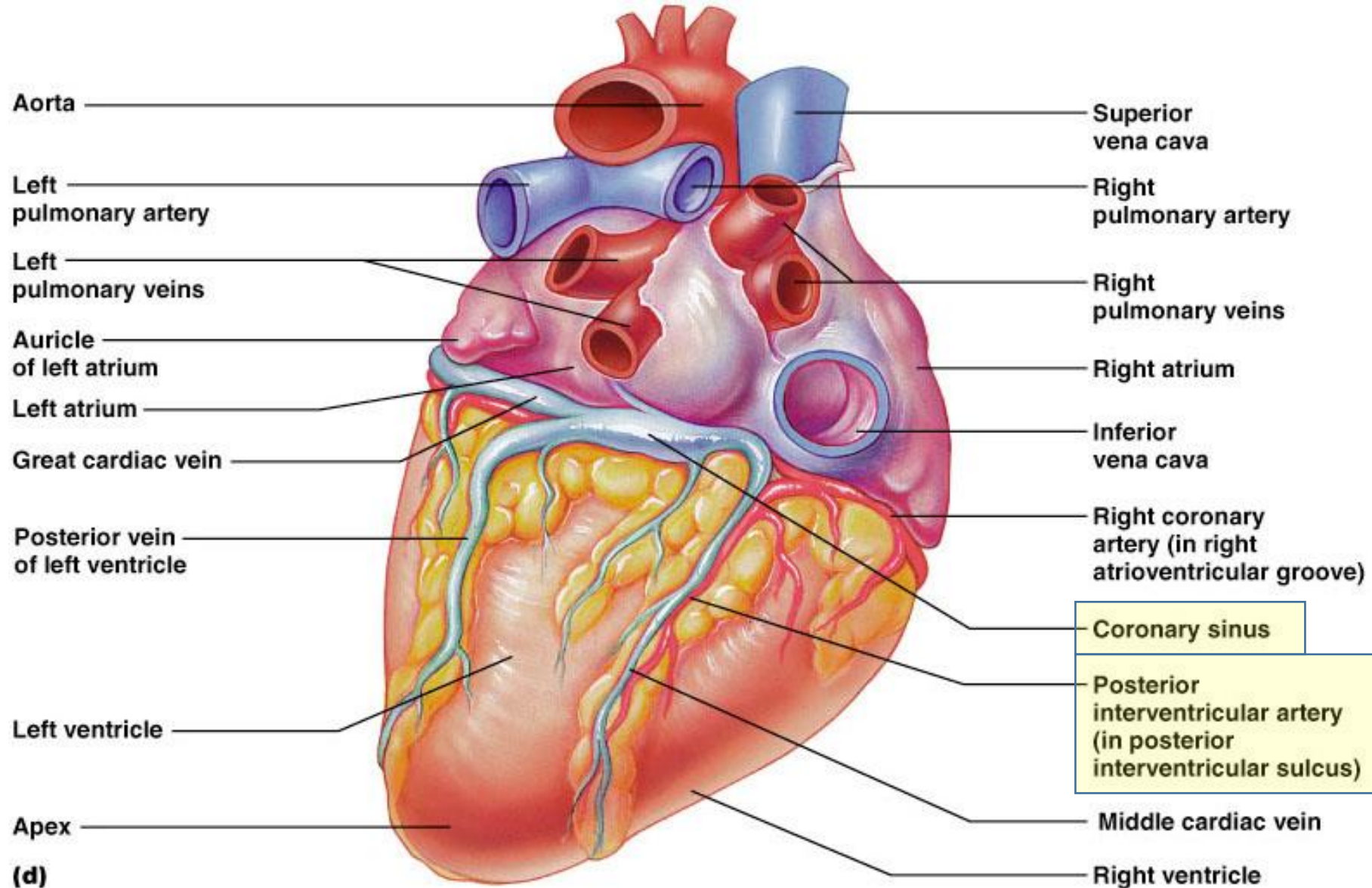
Heart anatomy : Terminology



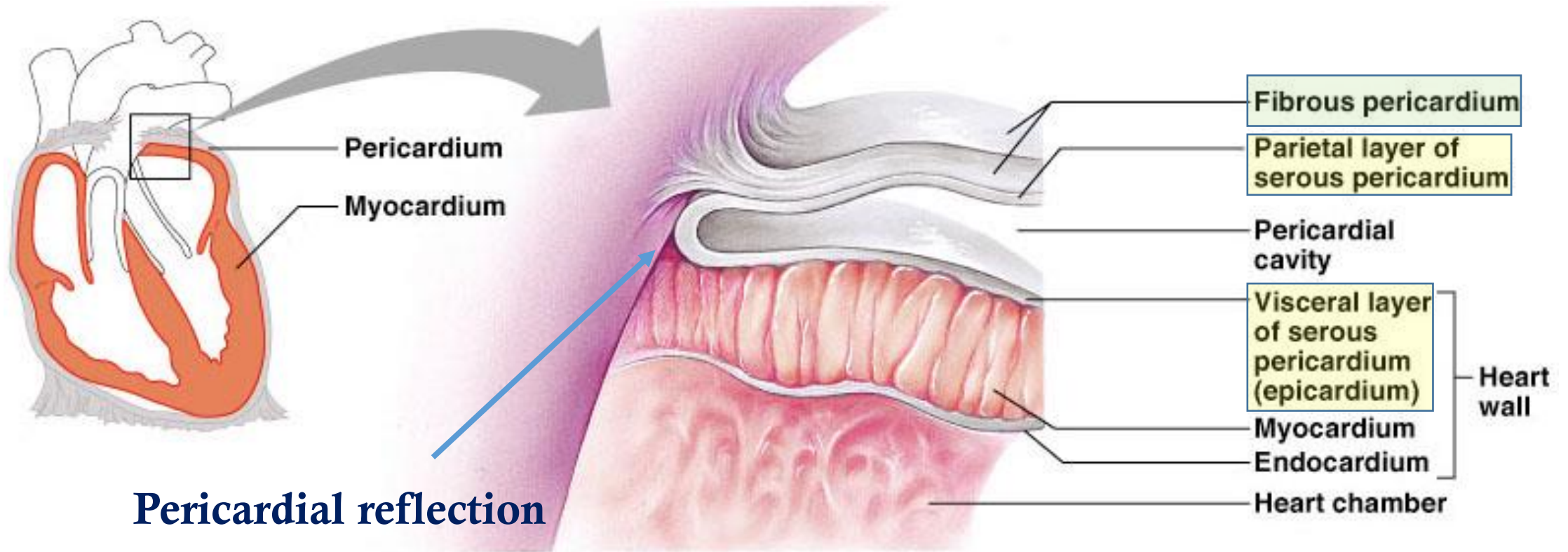
Heart anatomy : Anterior view



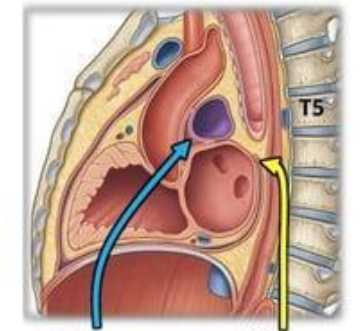
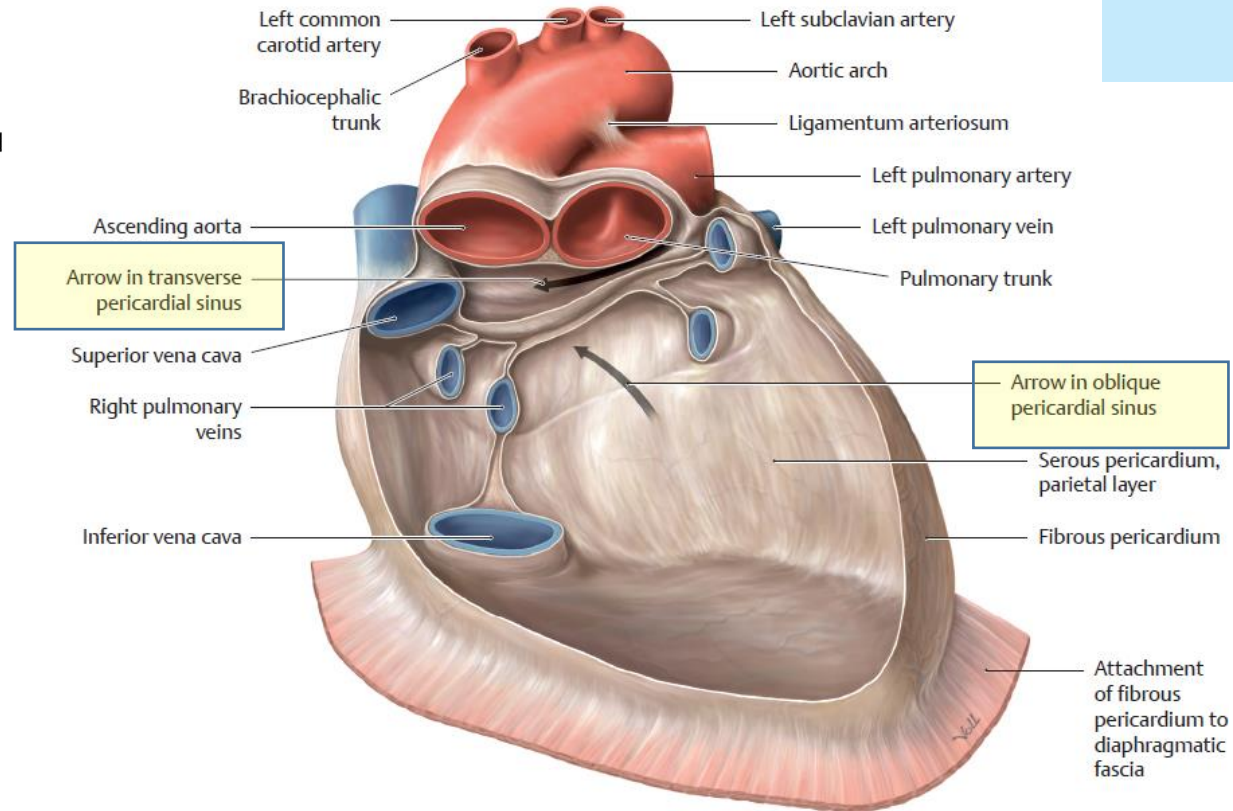
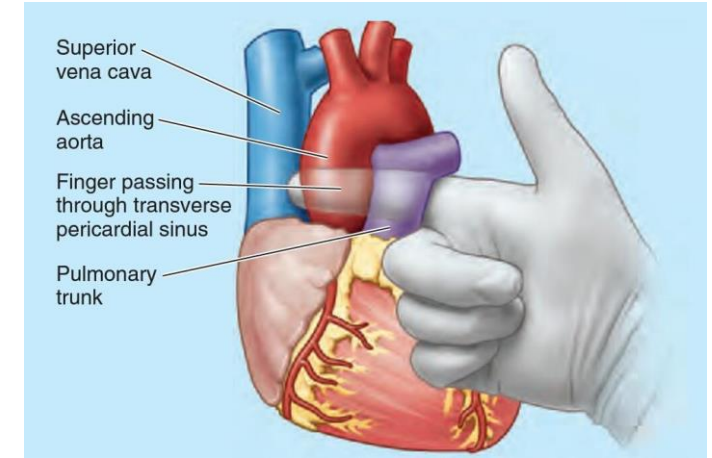
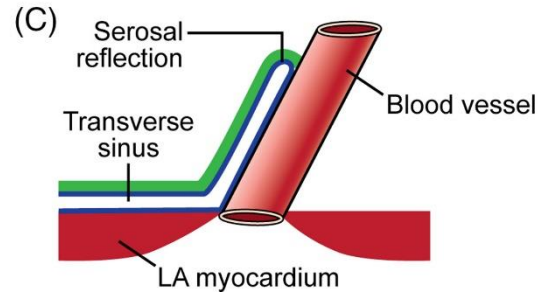
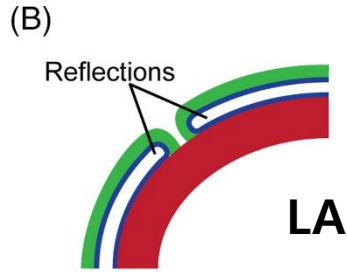
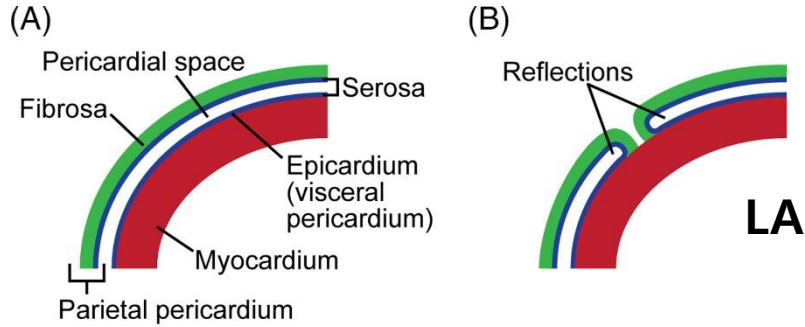
Heart anatomy : Posterior view



Heart anatomy : Pericardium



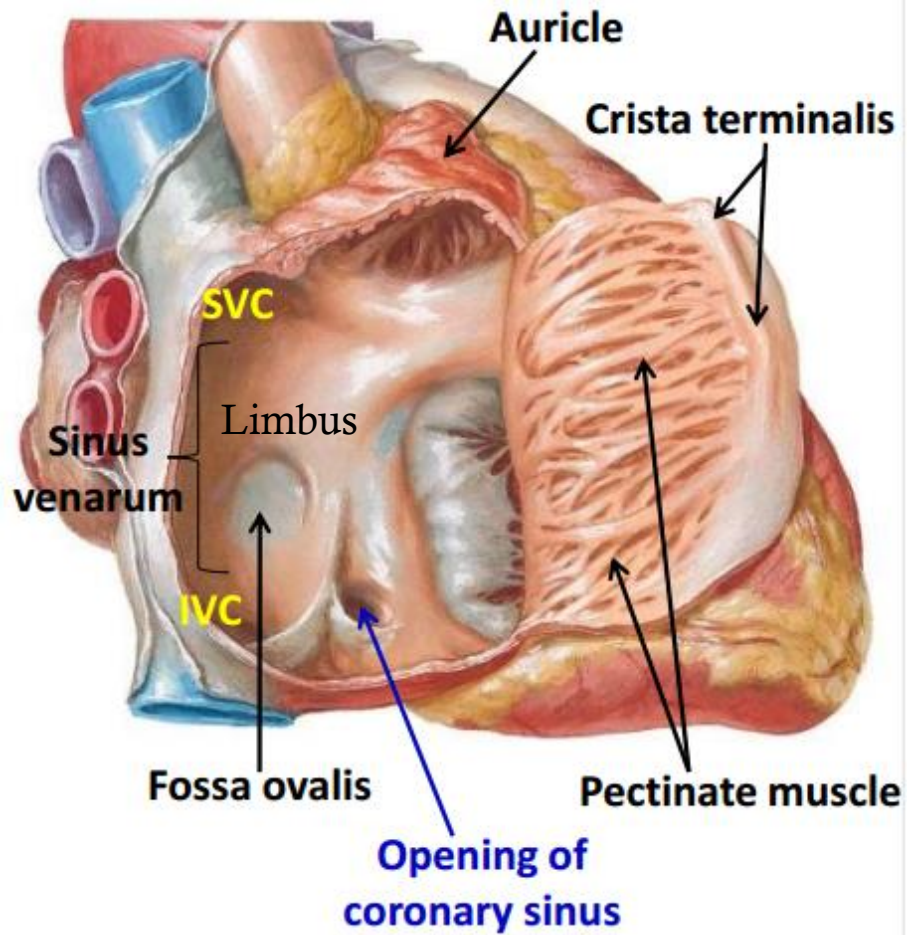
Pericardial Sinus (cavity)



Transverse pericardial sinus, Oblique pericardial sinus



Right Atrium: Internal view



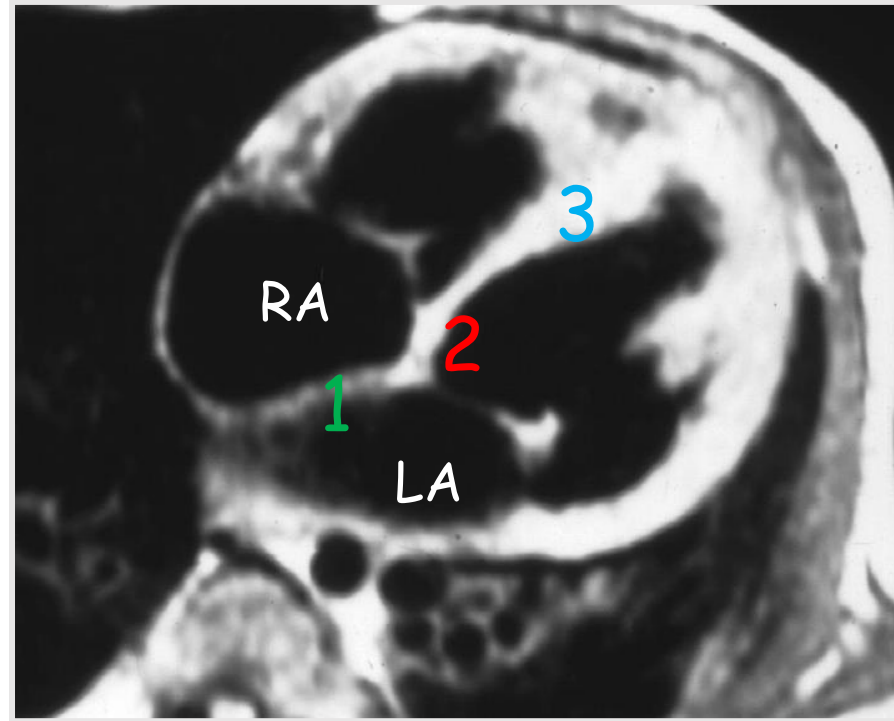
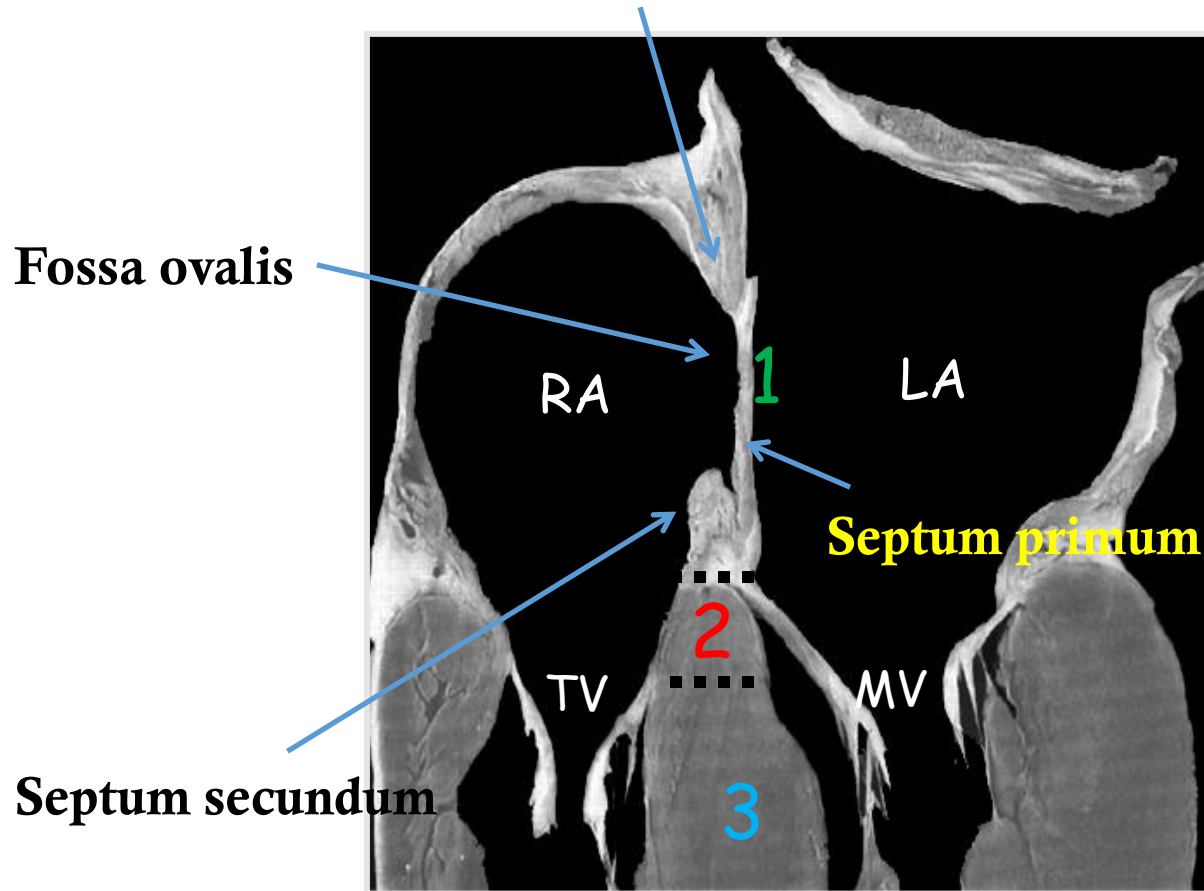
- Appendage : triangular, wide orifice
- Interatrial septum :
 - Fossa ovalis, Limbus of fossa ovalis
- Atrioventricular septum
- Sinus venarum
- Pectinate muscles extending to AV junction
- Crista terminalis & Sulcus terminalis
- Eustachian valve (IVC)
- Thebesian valve (coronary sinus)



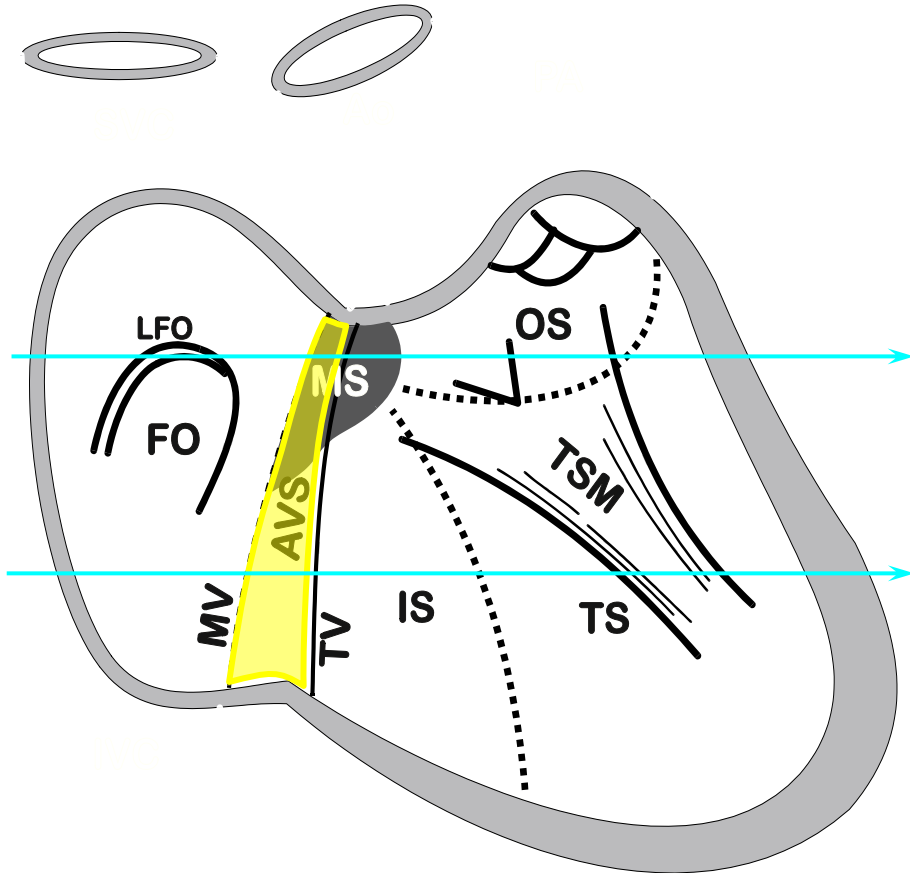
Atrial Septum

- 1. IAS
- 2. AVS
- 3. IVS

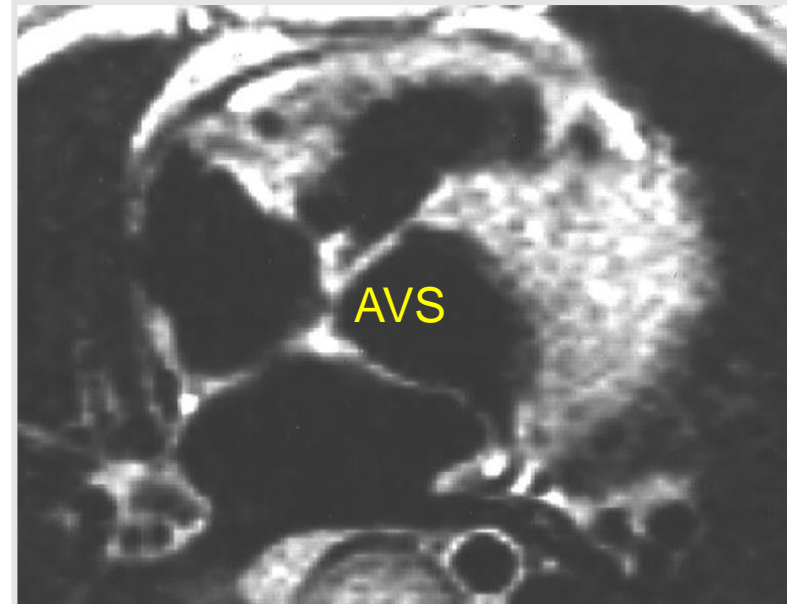
Septum secundum (Limbus)



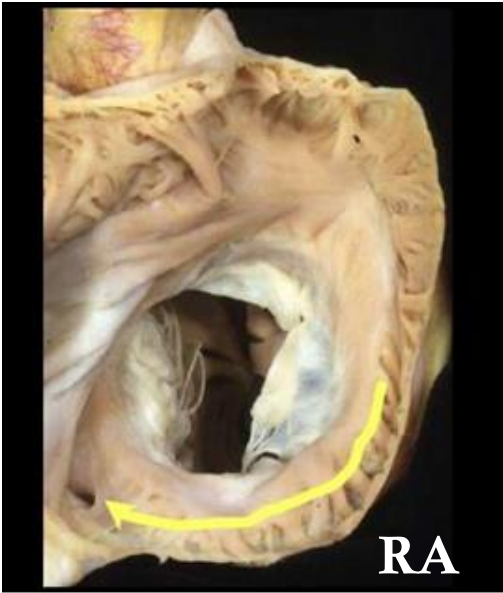
Atrioventricular Septum



AVS = membranous + muscular
Membranous septum = AV + IV



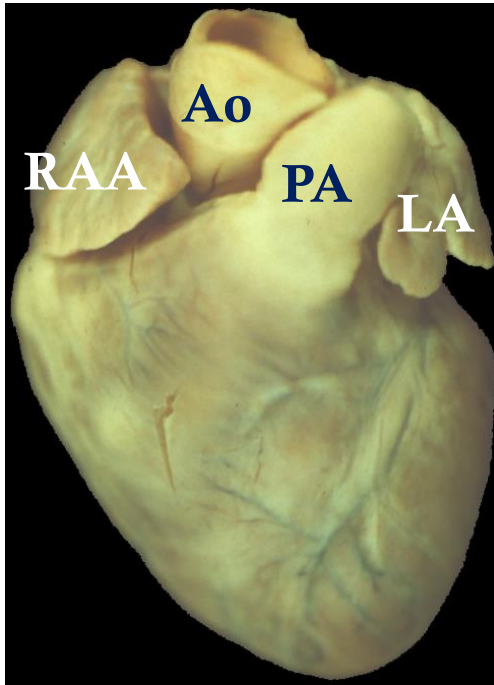
Left Atrium: Internal view



- Appendage : narrow base, hooked appearance
- Smooth atrial septum
 - : Pectinate muscles not extending to AV junction
- No crista terminalis and sulcus terminalis
- No fossa ovalis



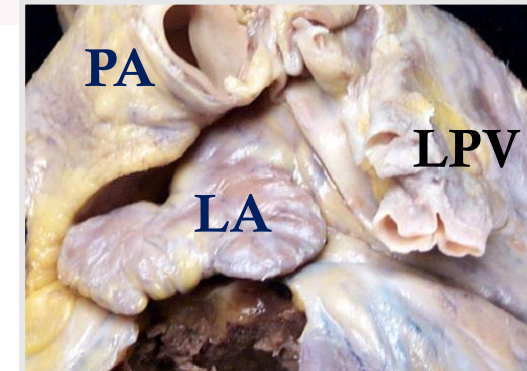
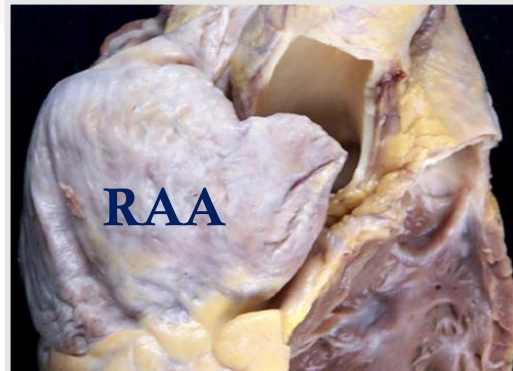
Right atrium vs. Left atrium



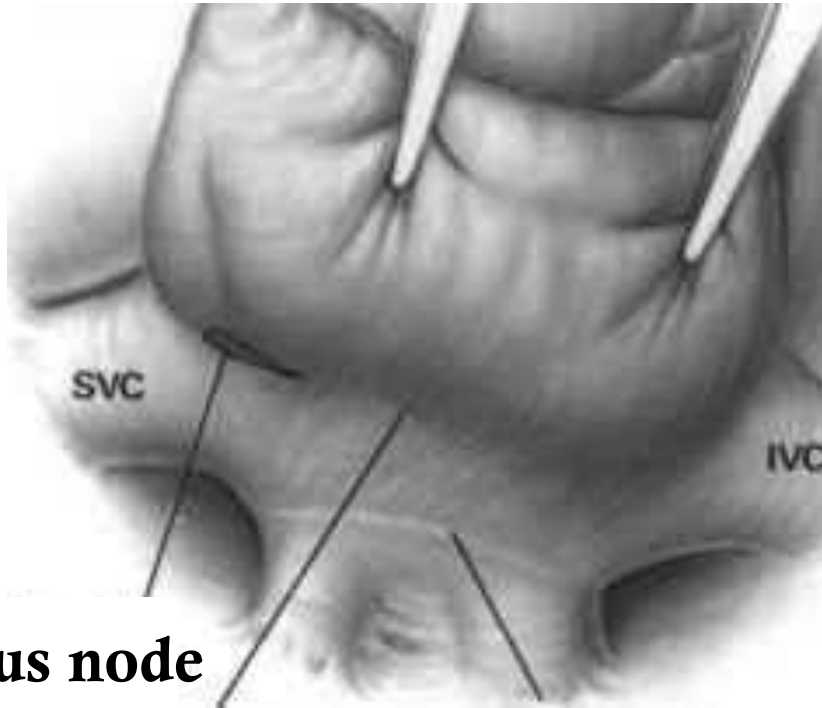
MORPHOLOGICAL CHARACTERISTICS OF CARDIAC CHAMBERS

ATRIAL MORPHOLOGY

<u>Right atrium</u>	<u>Left atrium</u>
Large, pyramidal atrial appendage	Small, ~finger-like appendage
Wide orifice of atrial appendage	Narrow orifice of atrial appendage
Crista and sulcus terminalis	No crista and sulcus terminalis
Sinus venarum receiving SVC and IVC	Smooth posterior wall receiving pulmonary veins
Limbus surrounding fossa ovalis	Free flap of fossa ovalis

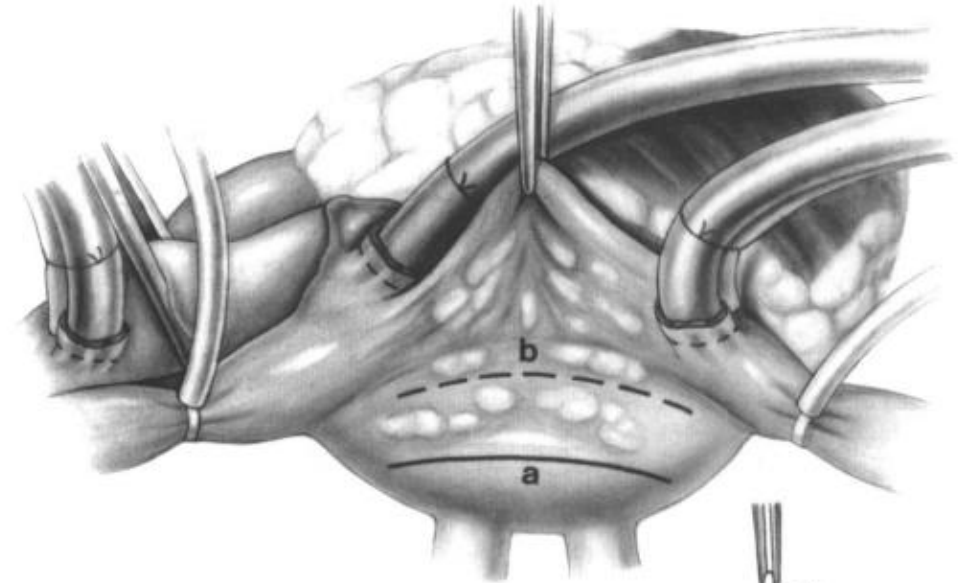


Waterston's Groove (Sondergaard's groove)

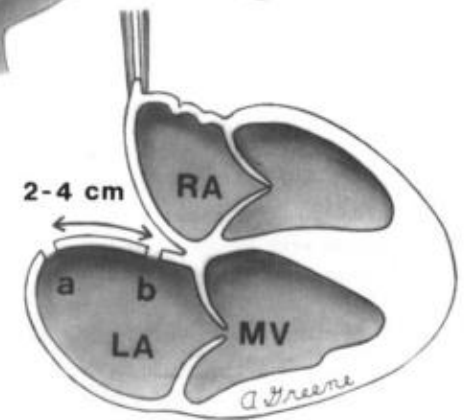


Sinus node

Sulcus terminalis



Waterston's groove

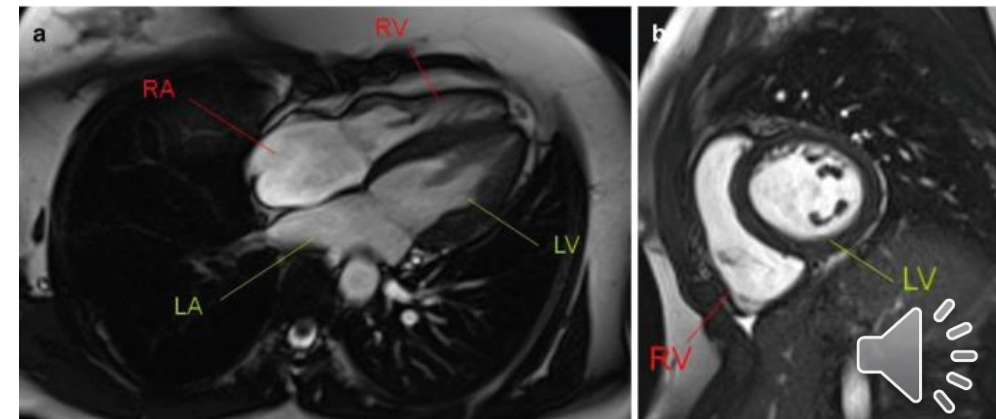
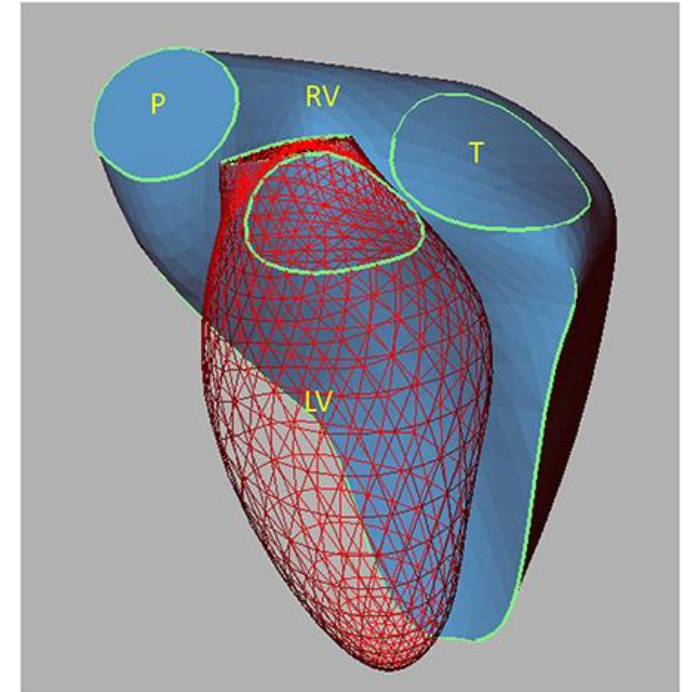


Interatrial fold



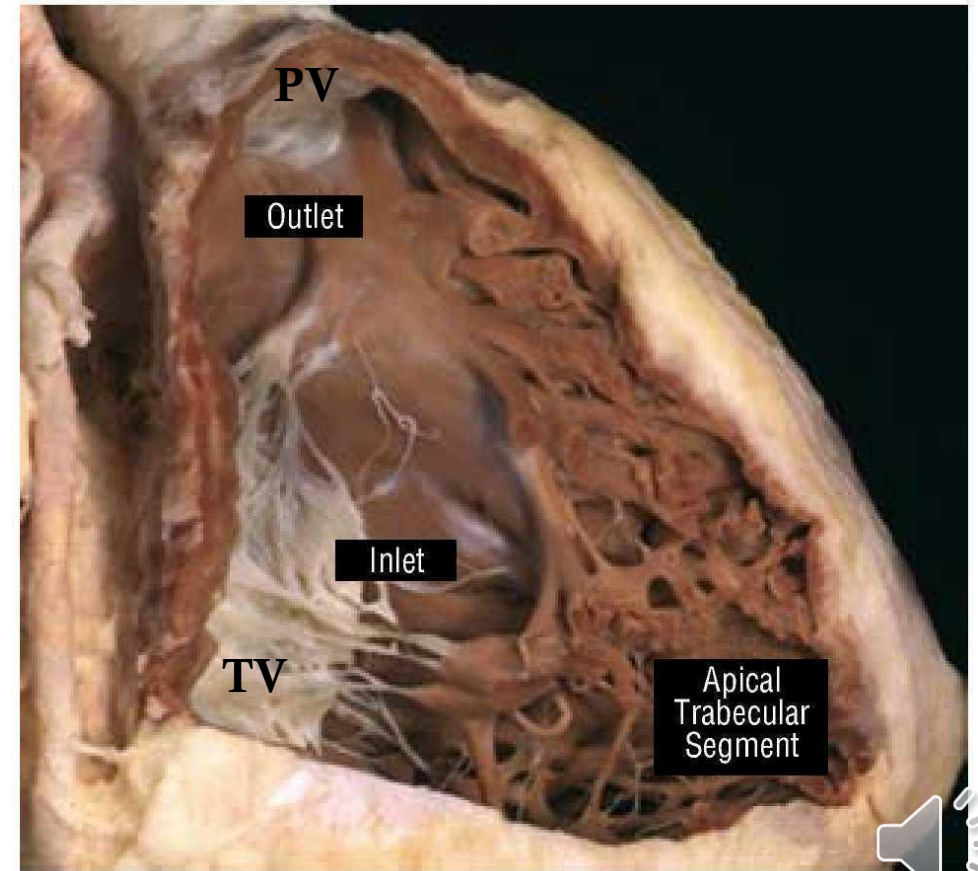
Right Ventricle : Internal view

- Configuration: triangular & crescentic
- Tricuspid valve : more apical septal insertion
- Conus : Pulmonary tricuspid discontinuity
- Coarse septal trabeculation
- Trabecula septomarginalis (TSM) :
most stout trabeculation on the septal surface
- Moderator band : septum to parietal wall

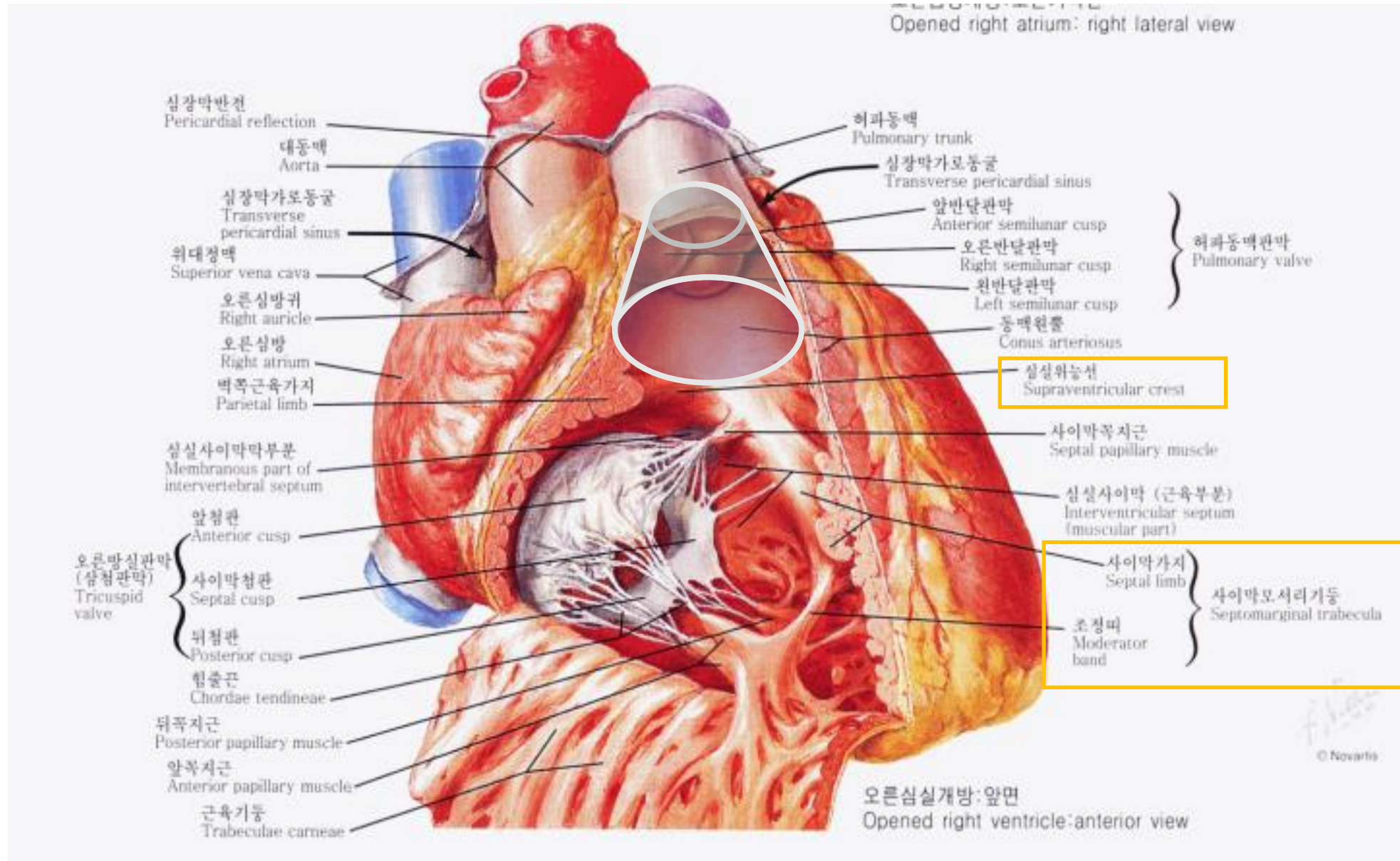


Right Ventricle : Internal view

- Configuration: triangular & crescentic
- Tricuspid valve : more apical septal insertion
- Septal cordal attachment
- Conus : Pulmonary tricuspid discontinuity
- Coarse septal trabeculation
- Trabecula septomarginalis (TSM)
: Moderator band + septal limb

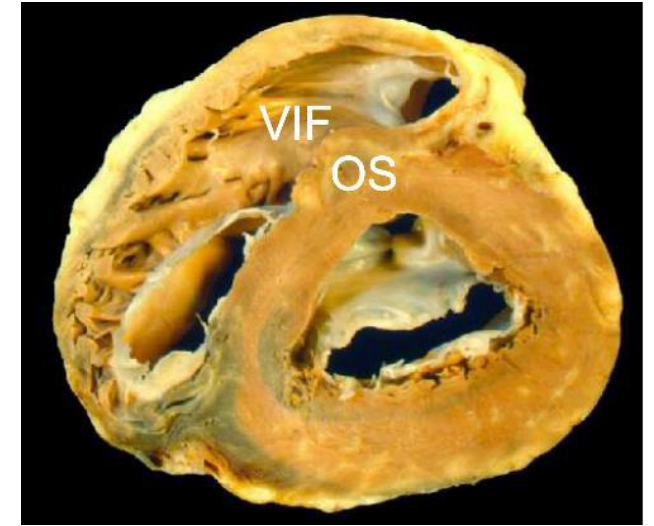
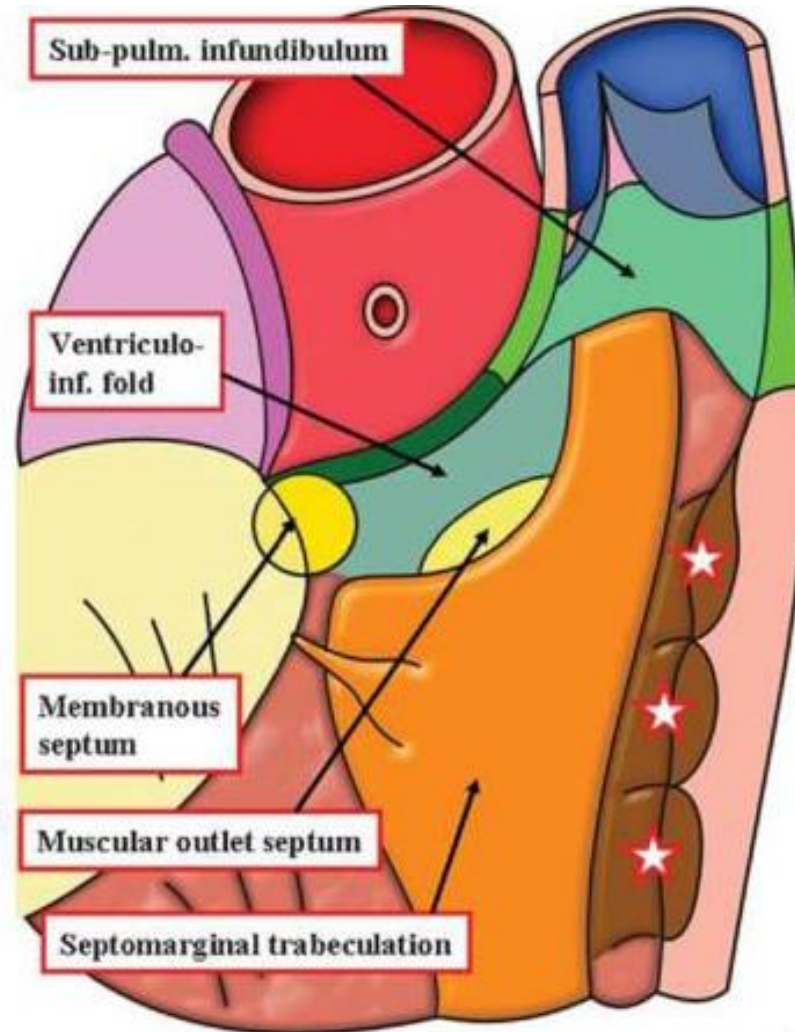
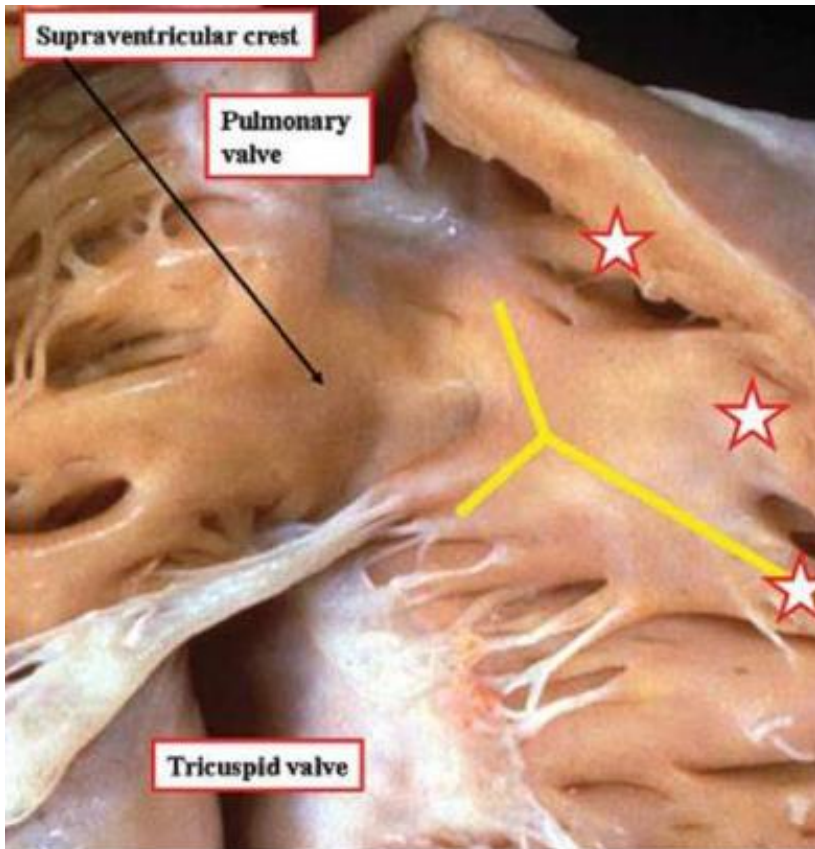


Right Ventricle : Internal view



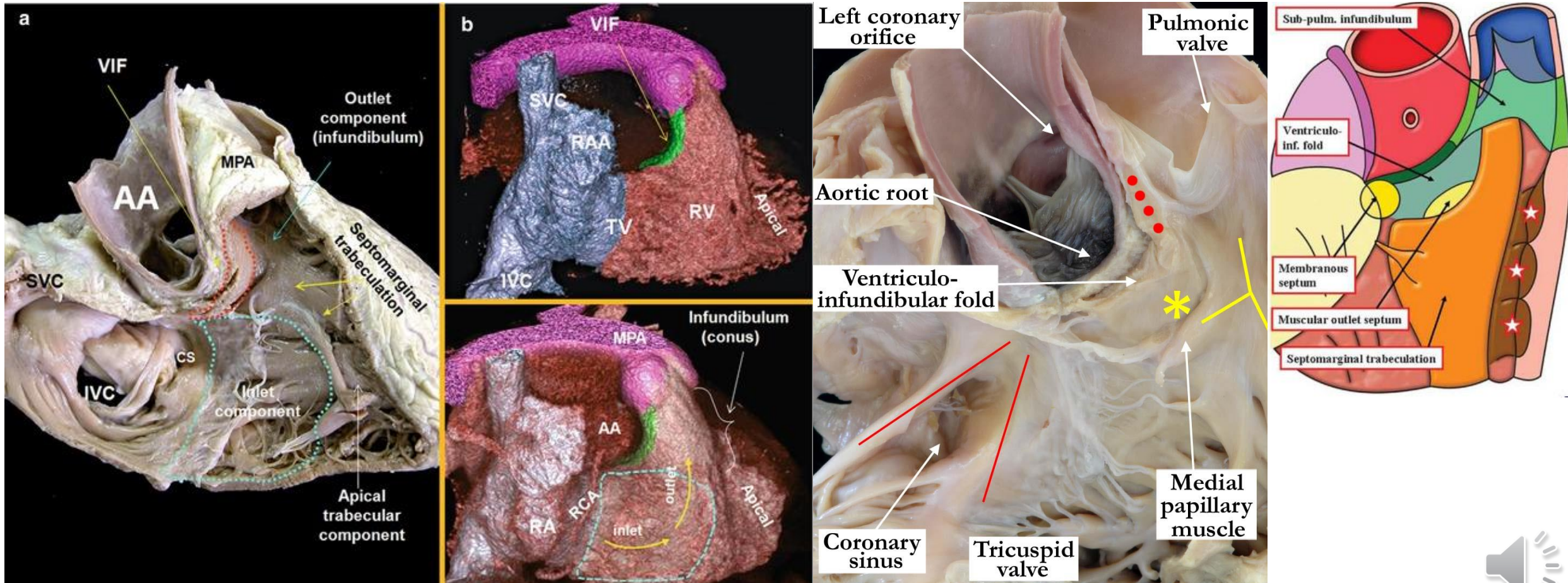
Crista supraventricularis (Supraventricular crest)

: Muscular crest which separates the pulmonary and tricuspid valves
(VIF + outlet septum)



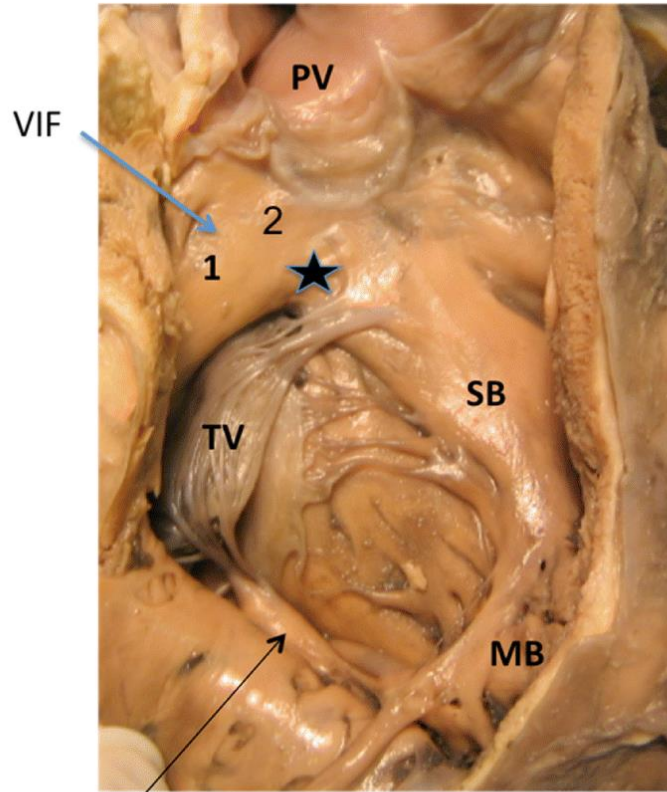
Ventriculoinfundibular fold (VIF)

: Any muscular structure separating an arterial valve from an atrioventricular valve



Trabecular Septomarginalis (TSM)

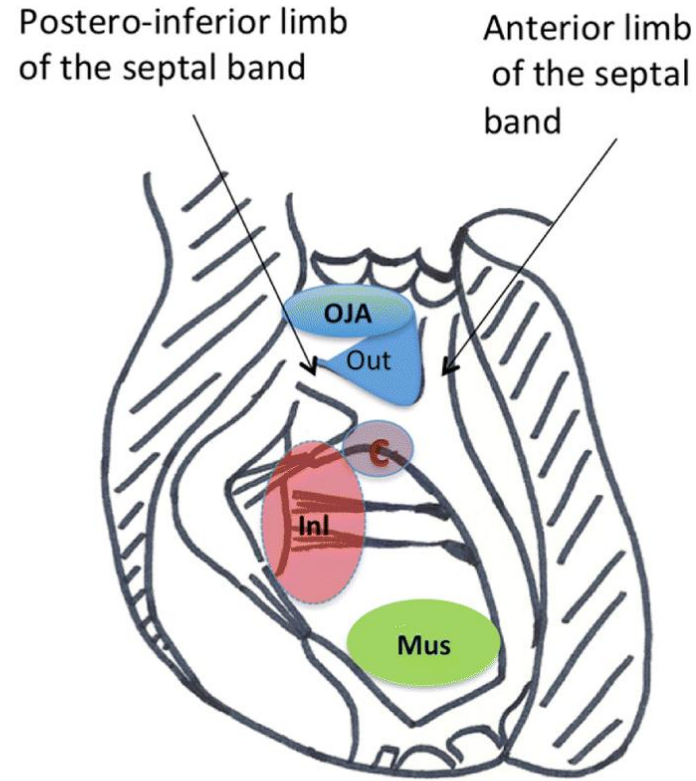
:Extensive septal trabeculation of the morphologically RV.
It has a body (B) and anterior (AL) and posterior (PL) limbs.



Anterior papillary muscle of the tricuspid valve

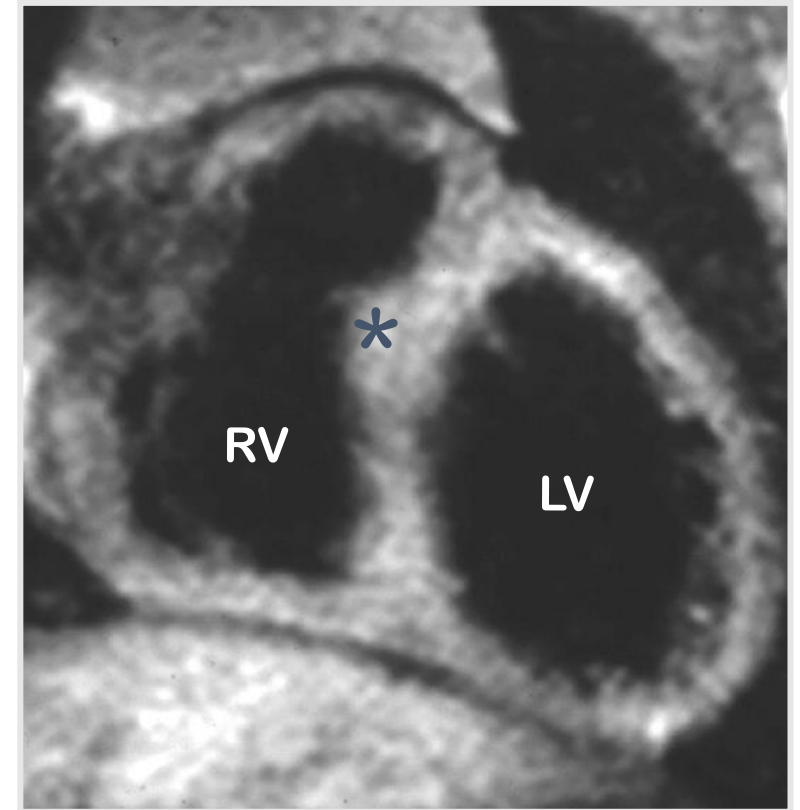
a

* SB : TSM



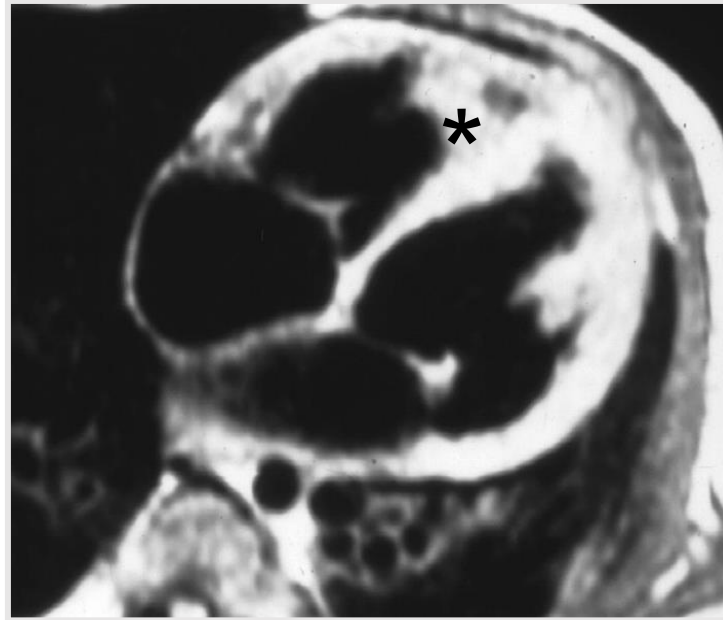
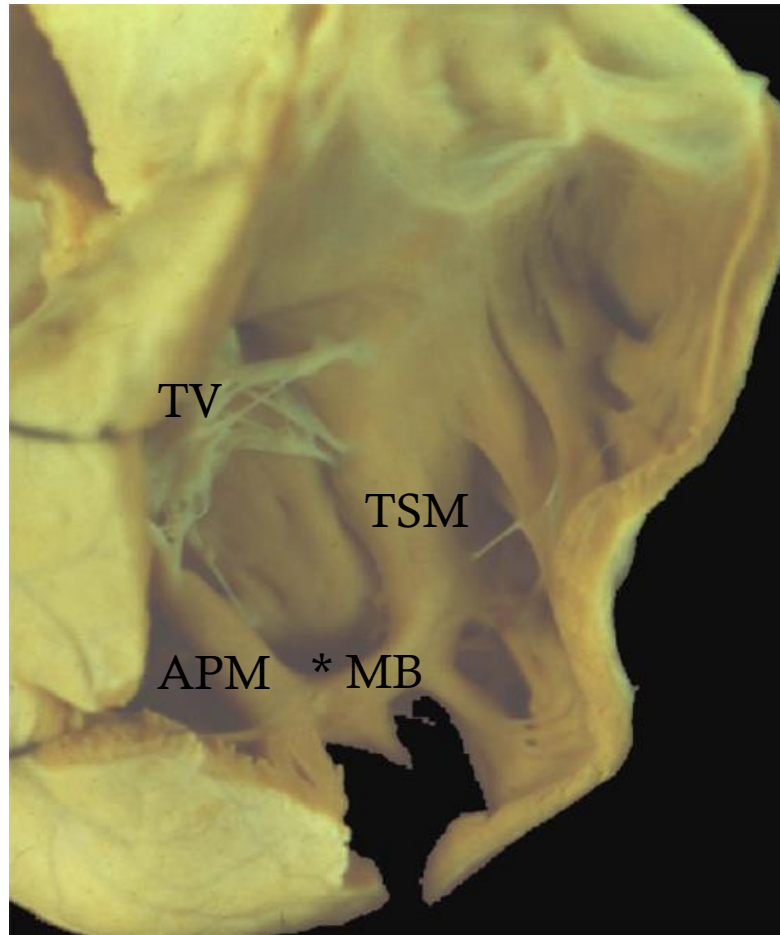
b

* OJA
: outlet juxta arterial



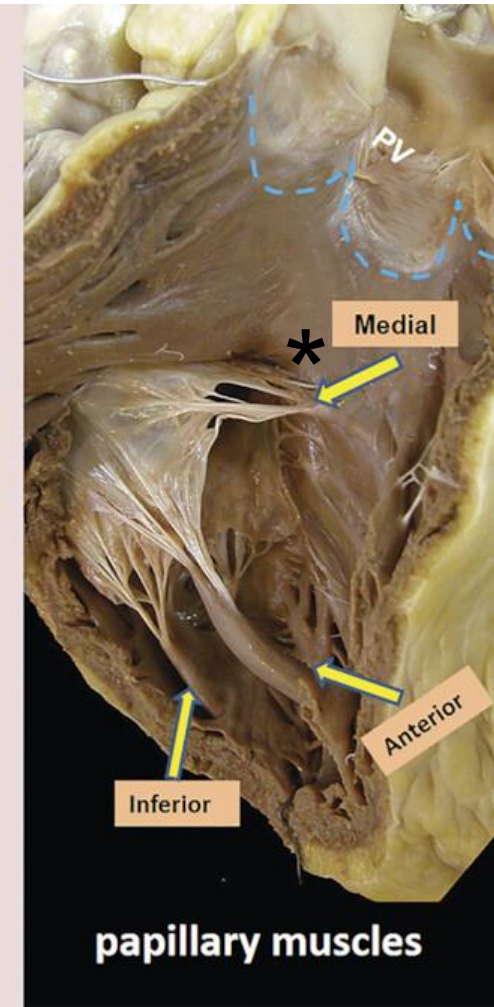
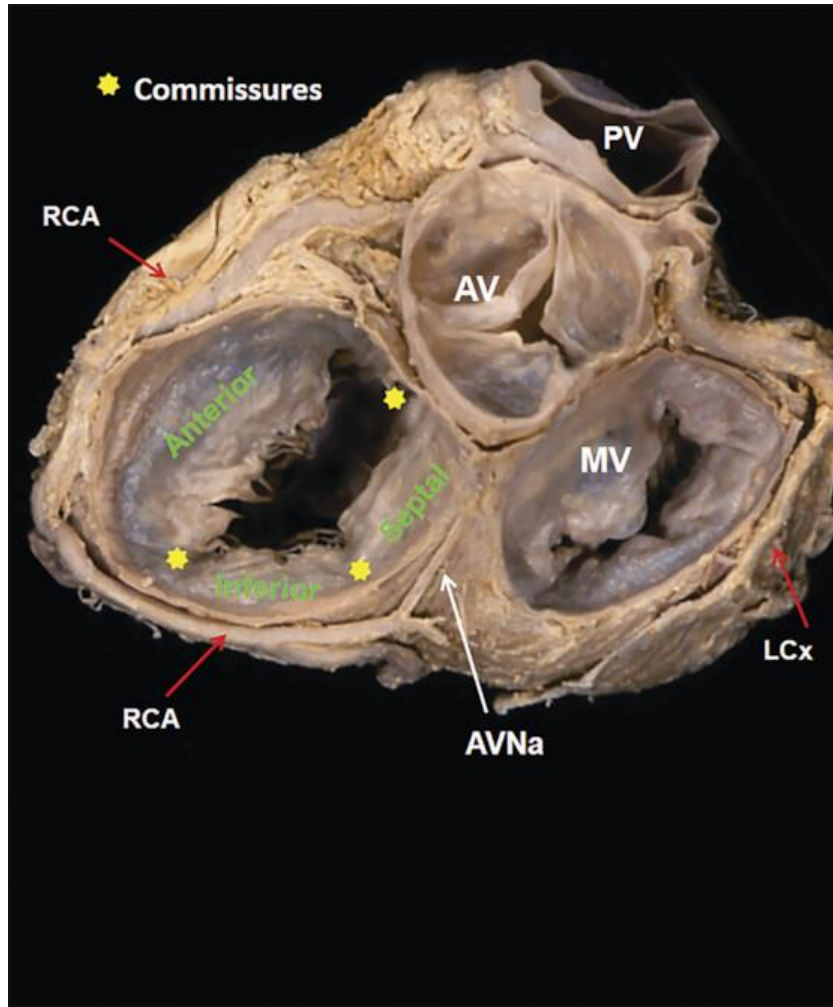
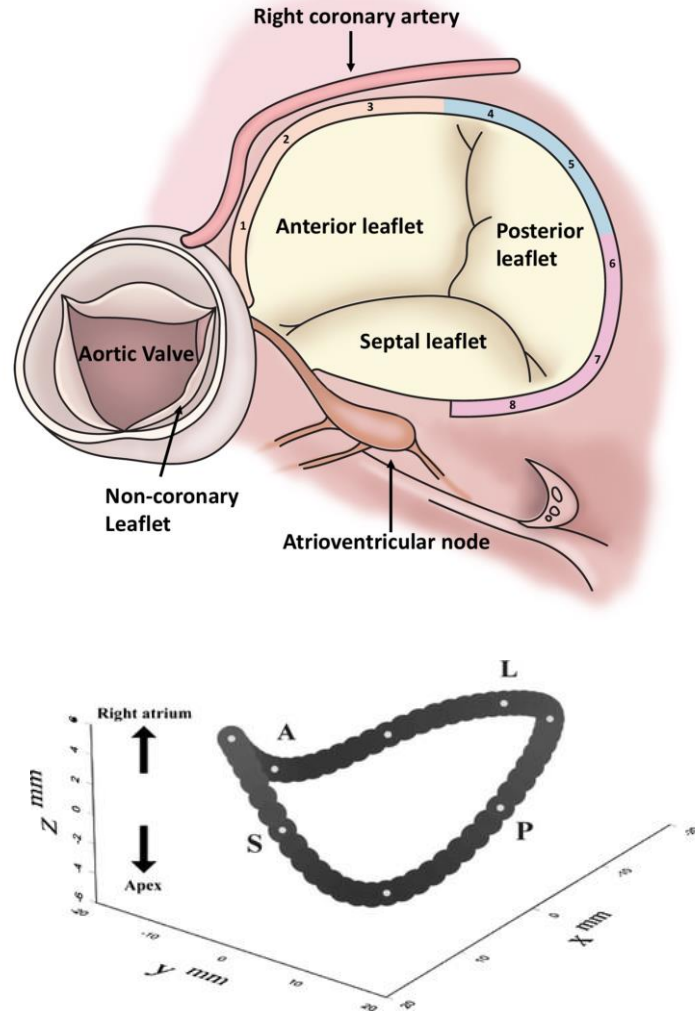
Moderate Band (MB)

: one of the TSM which arises from the body of TSM and crosses to the ventricular free wall



Tricuspid valve (TV)

:Three leaflets – septal, anterosuperior, inferior (posterior)

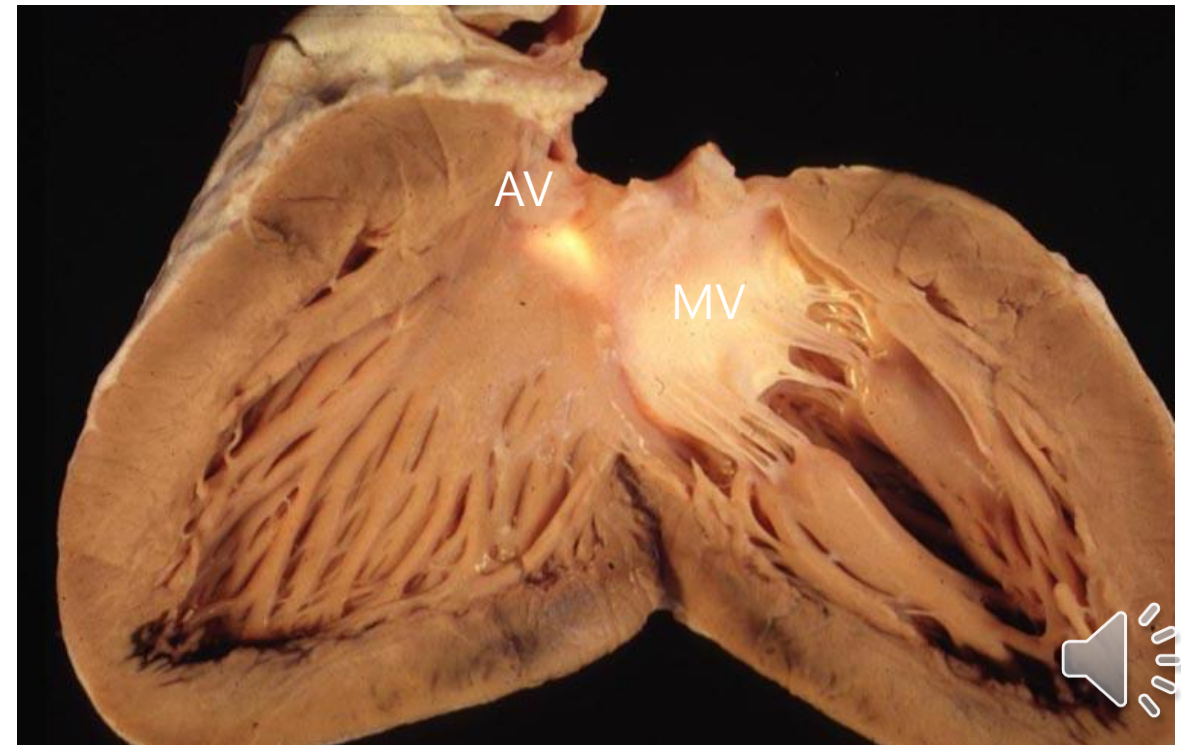
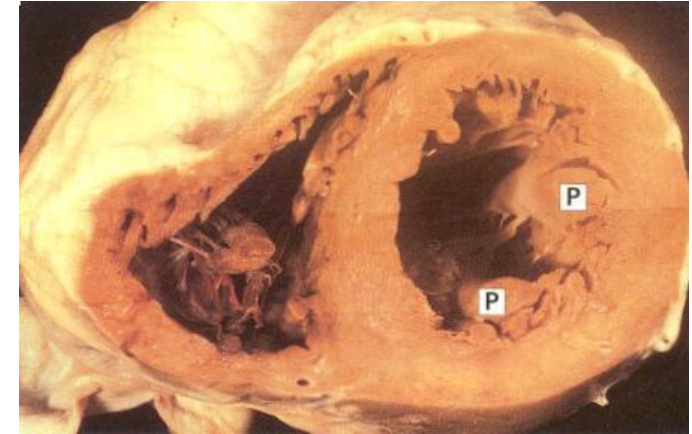


* Papillary ms of conus (Lancisi)



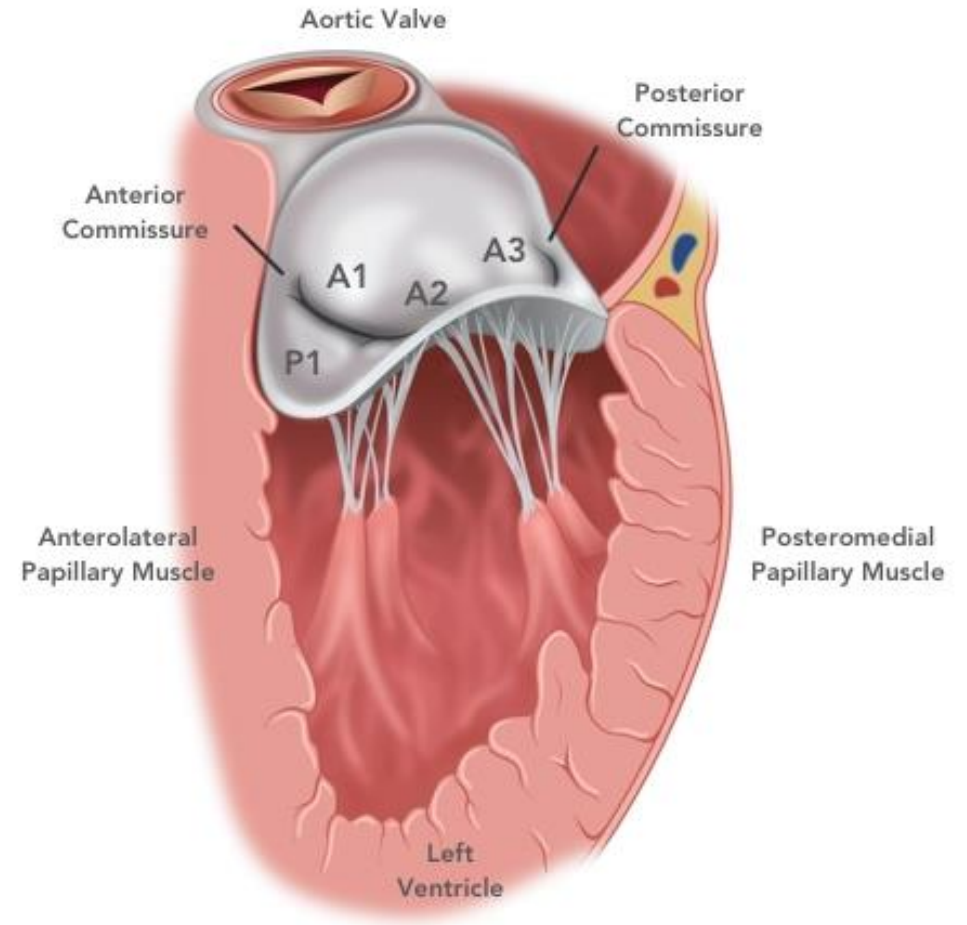
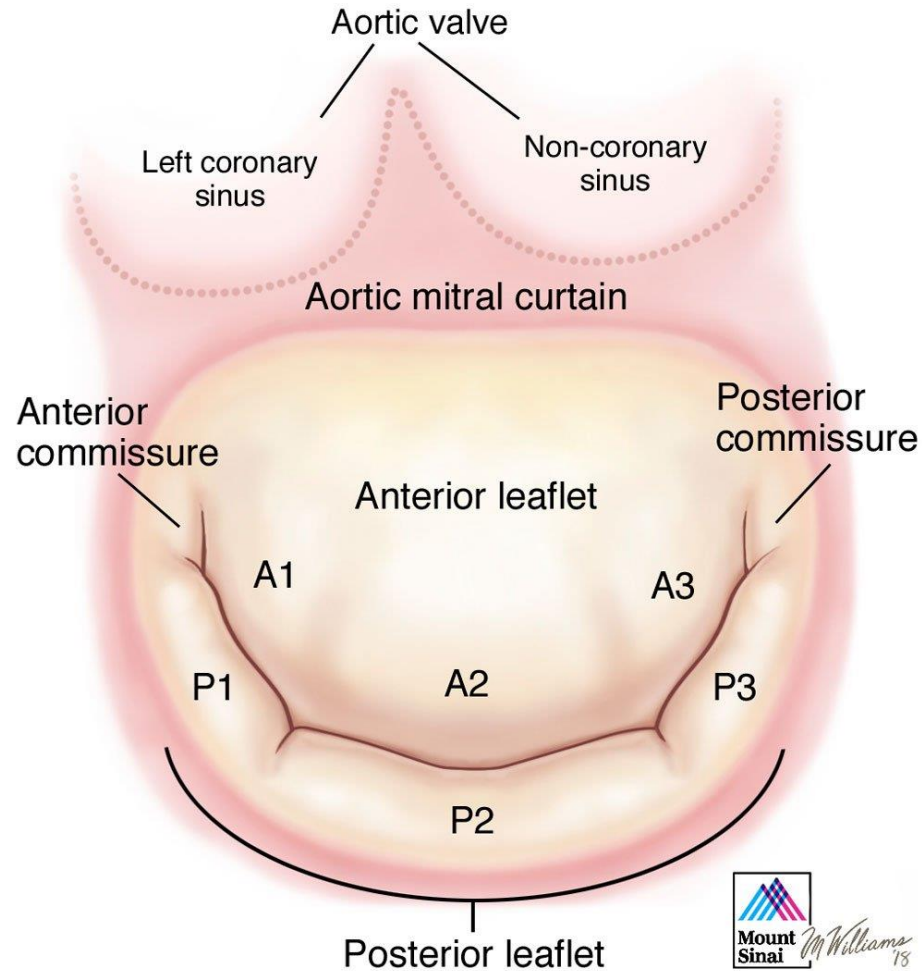
Left Ventricle : Internal view

- Configuration : bullet-shape, round shape
- more cranial septal insertion than TV
- no septal cordal attachment
- smooth septal surface
- no conus (infundibulum)
: aorto-mitral fibrous continuity



Mitral valve (TV)

:Two leaflets – anterior (aortic), posterior (mural)



Right Ventricle vs. Left Ventricle

VENTRICULAR MORPHOLOGY *(See the photos and drawings in previous page)*

Right ventricle	Left ventricle
Tricuspid valve with more apical septal attachment	Mitral (bicuspid) valve with more cranial septal attachment
Heavier trabeculations	Finer and more regular trabeculations
Septoparietal trabeculations for example, moderator band	No septoparietal trabeculation
Discontinuity between atrioventricular and semilunar valves with a well-developed muscular infundibulum	Fibrous continuity between atrioventricular and semilunar valves with less prominent infundilumum



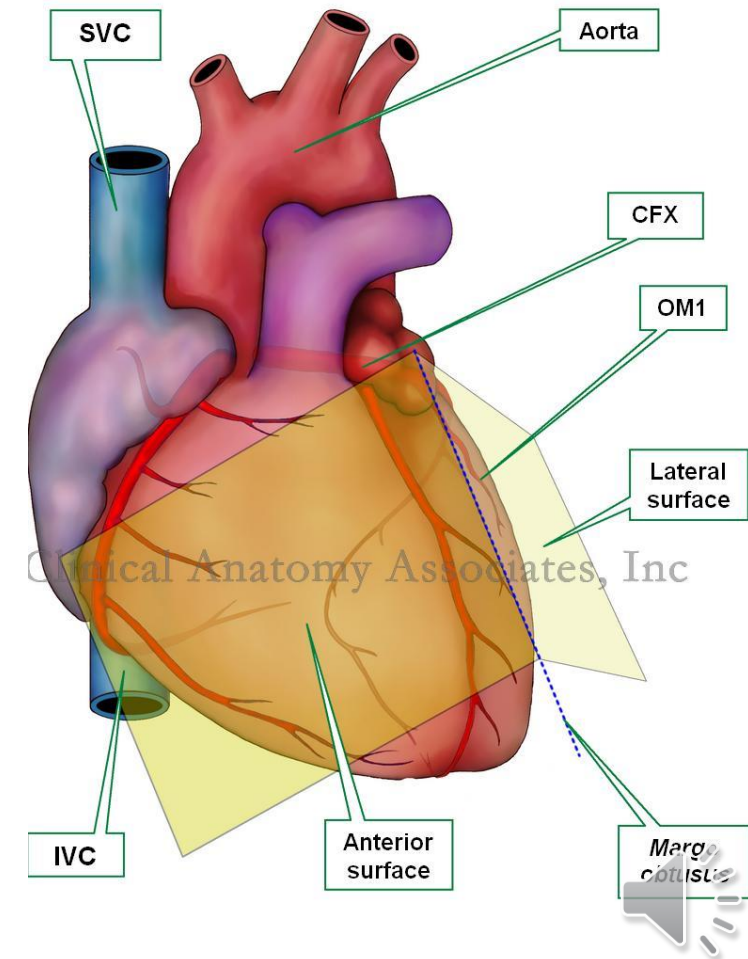
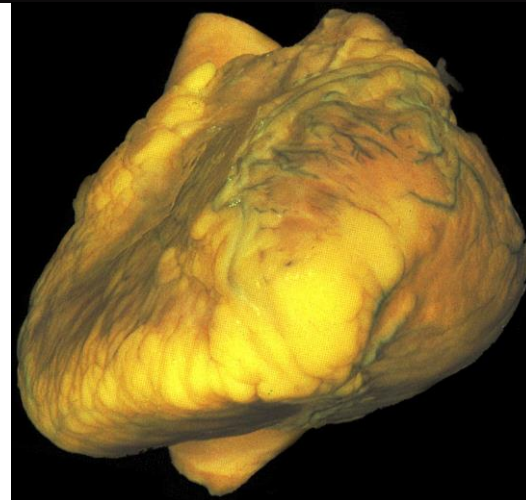
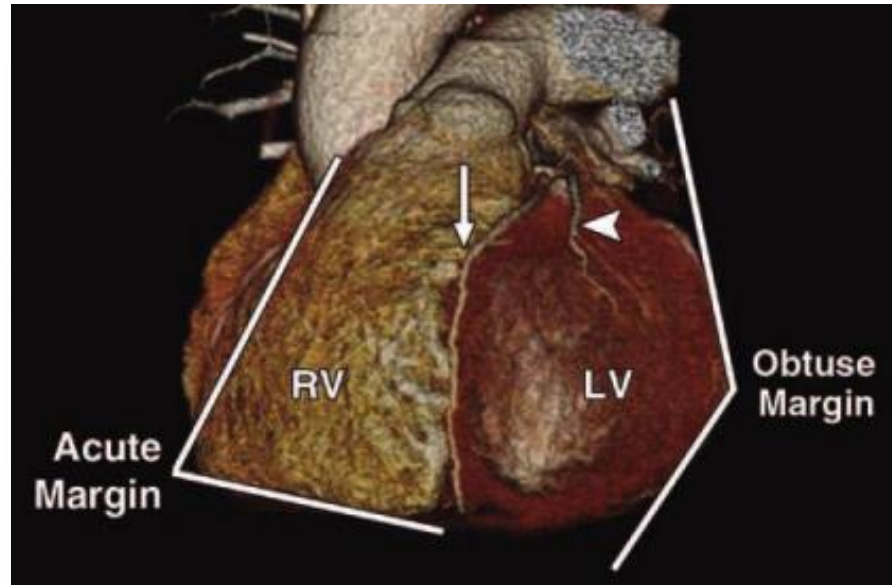
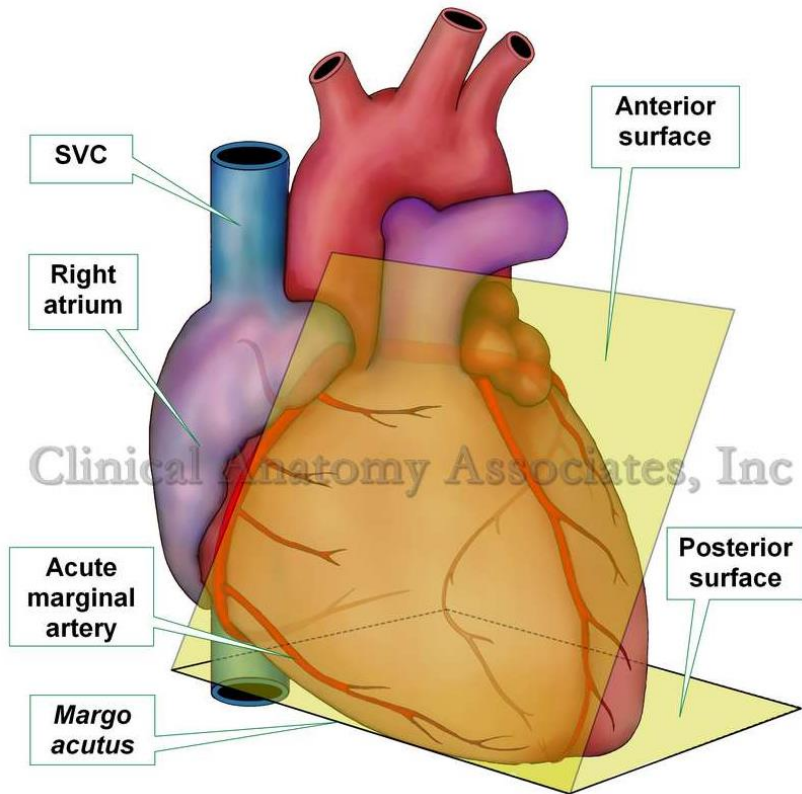
Atrial and Ventricle Identification

- Shape of atrial appendage
- Pectinate muscles extension
- Crista terminalis
- Septal morphology
- Not by venous connections
- Infundibulum vs. Fibrous continuity between AV valve and semilunar valve
- Septal attachment of AV valve
- TSM (Moderate band)
- Not by great artery connections

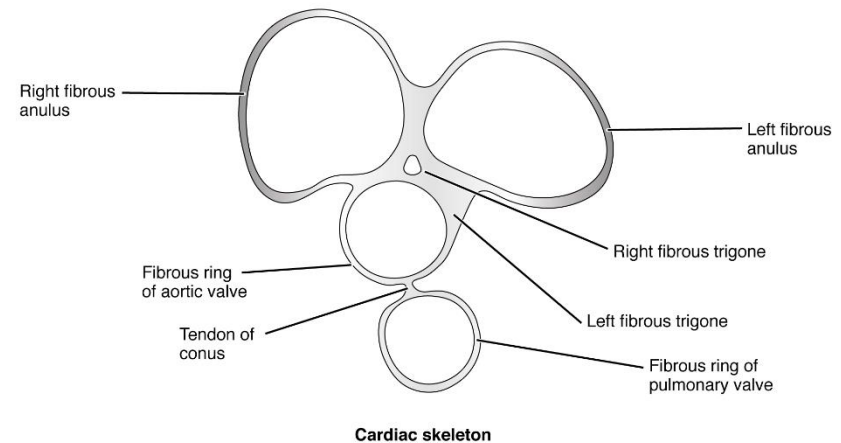
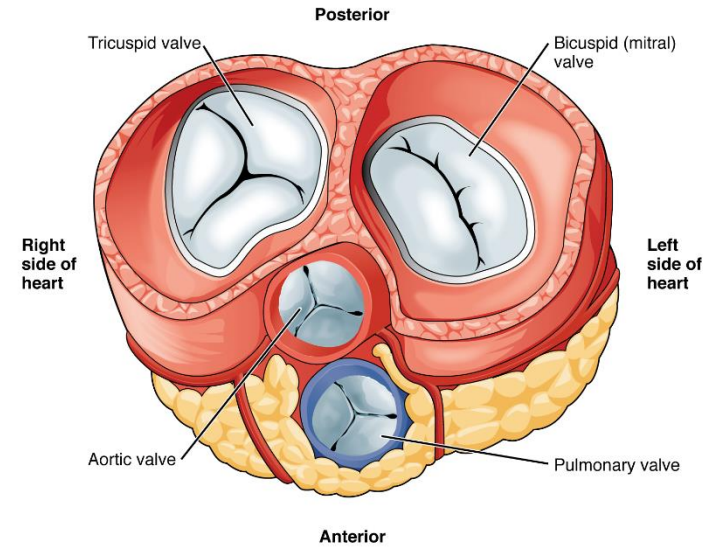
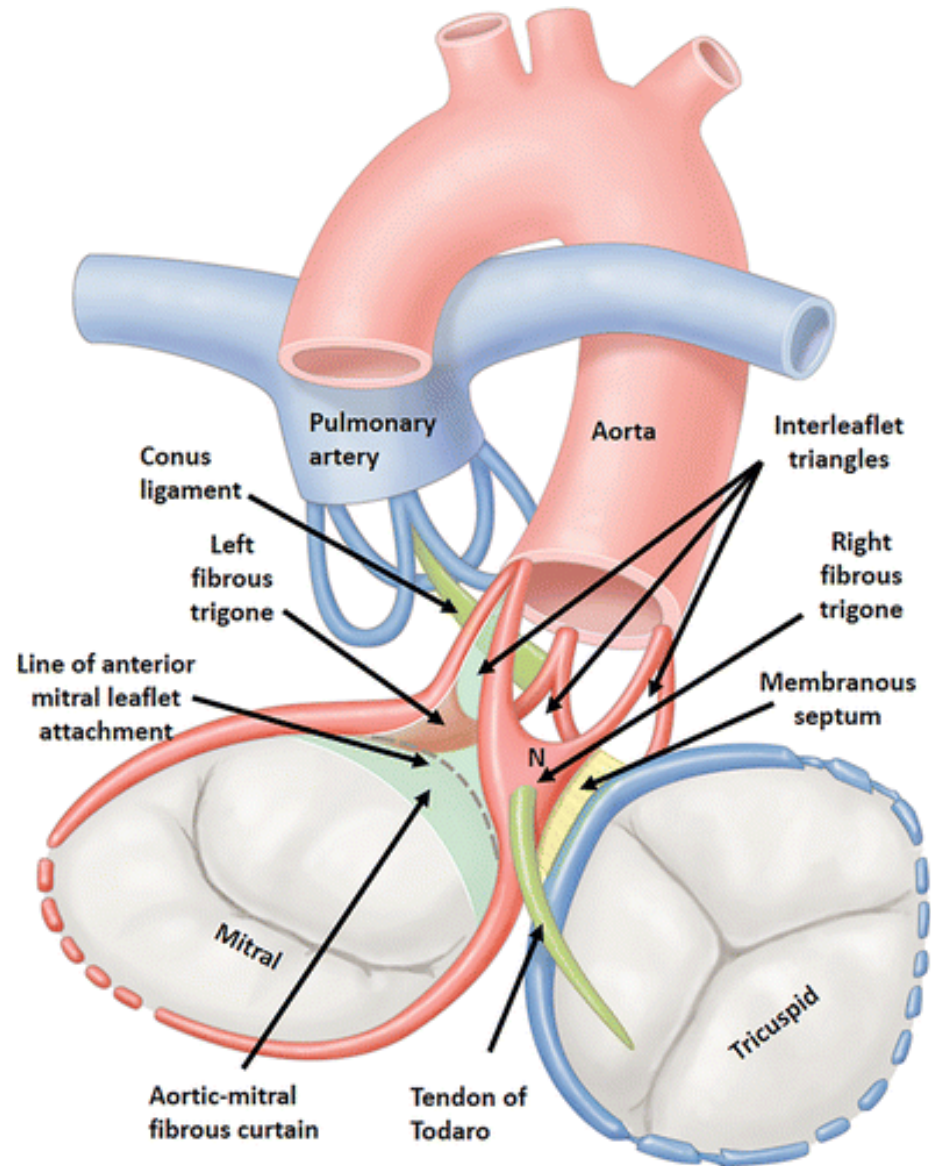


Heart anatomy : Terminology

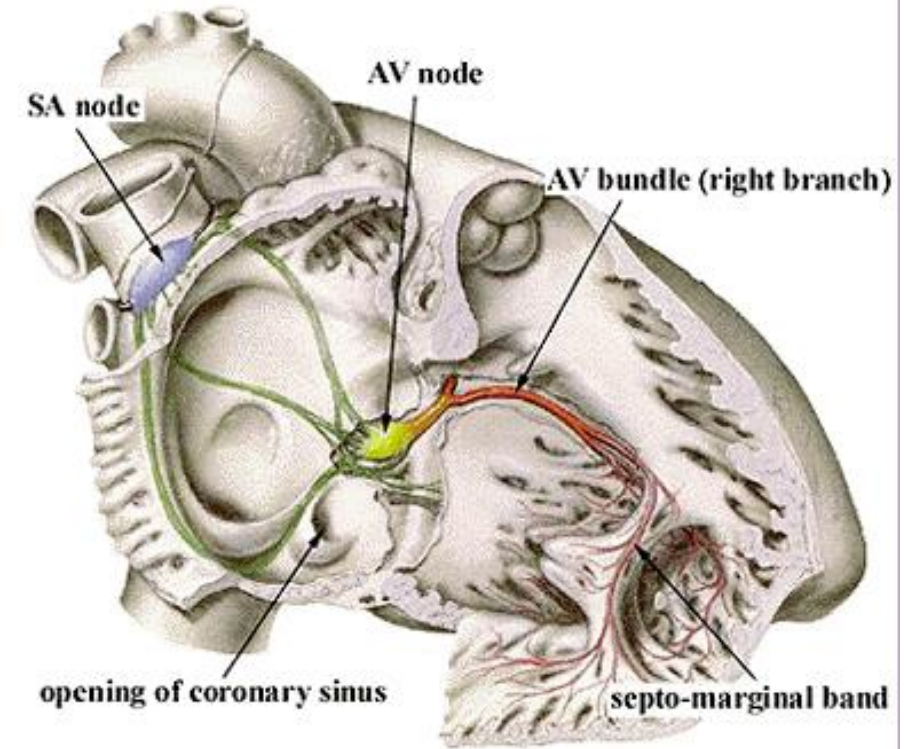
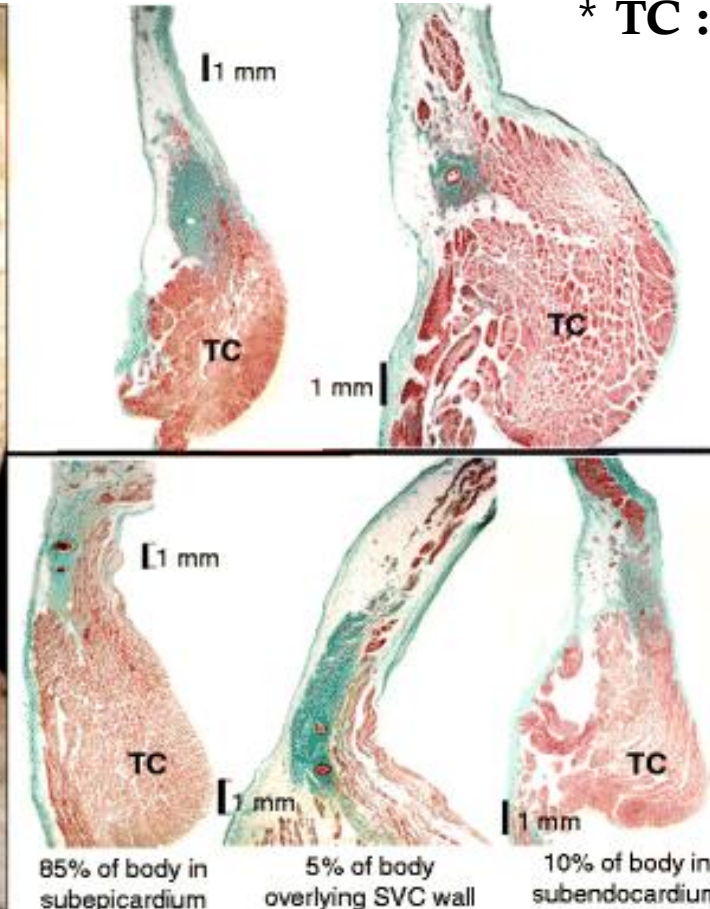
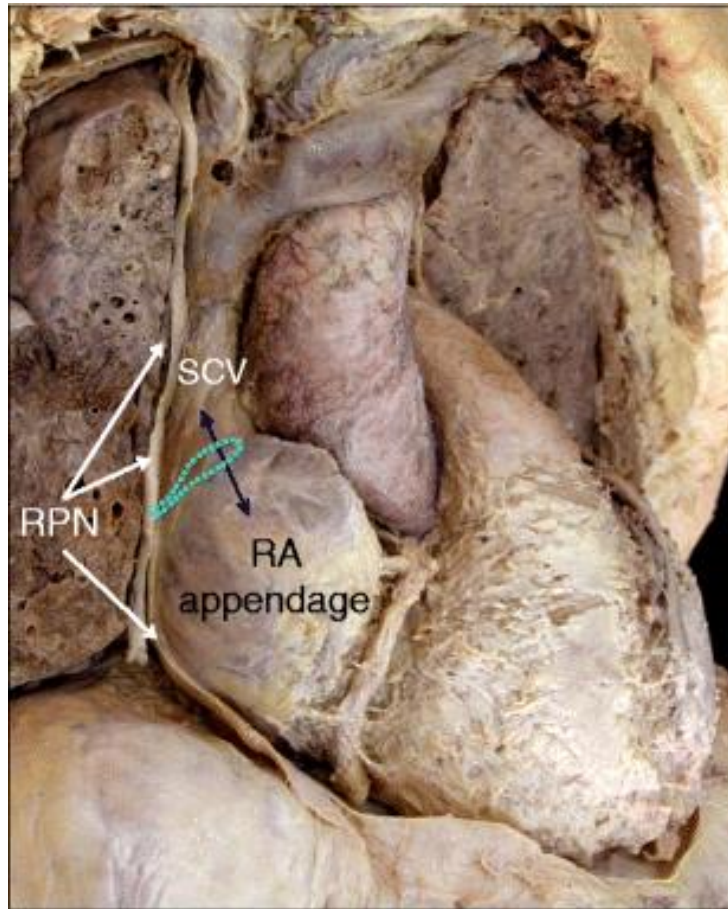
Margins - acute margin & obtuse margin



Heart Valves : Fibrous Skeleton



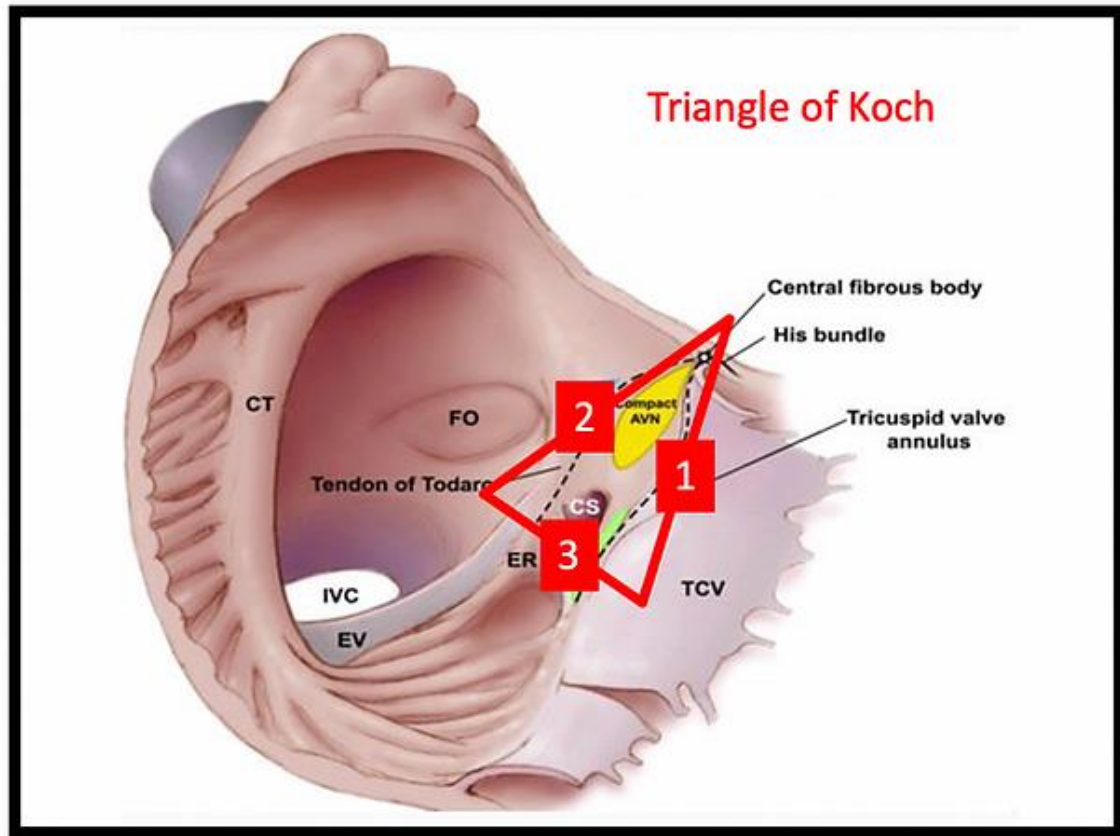
Heart anatomy :Conduction : SA node



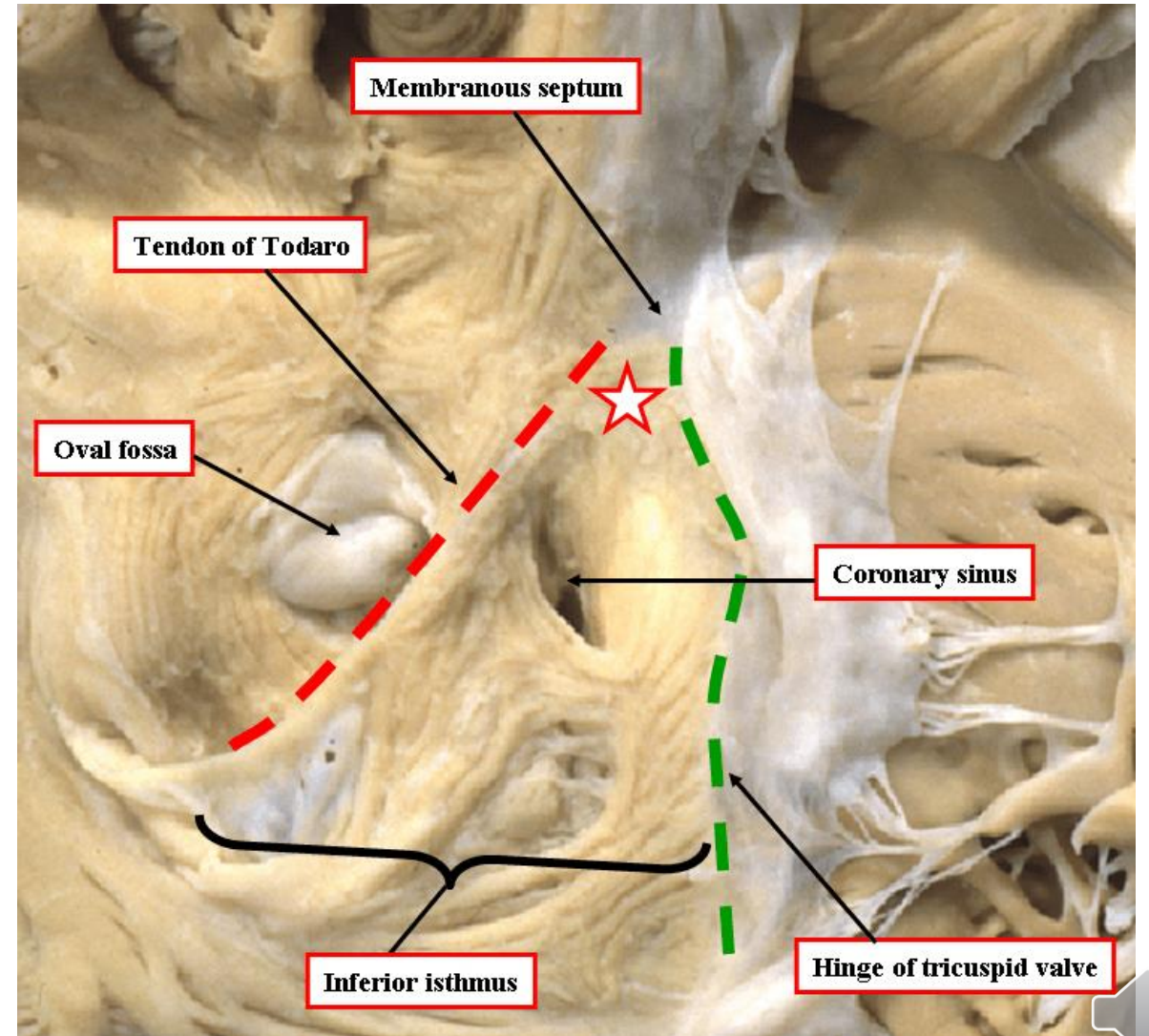
With this stain (Masson's trichrome), the node is recognisable by its fibrous matrix (*green*) and its artery.



Heart anatomy :Conduction : AV node



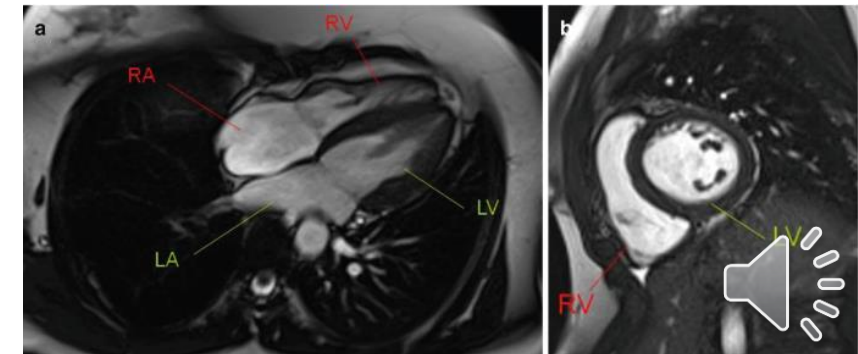
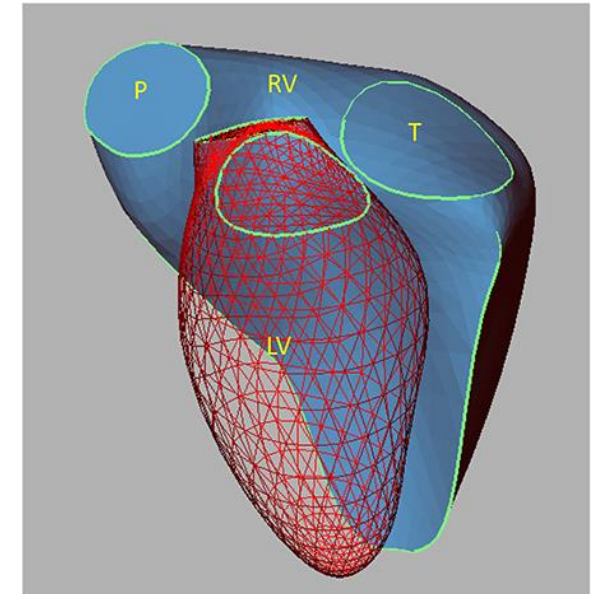
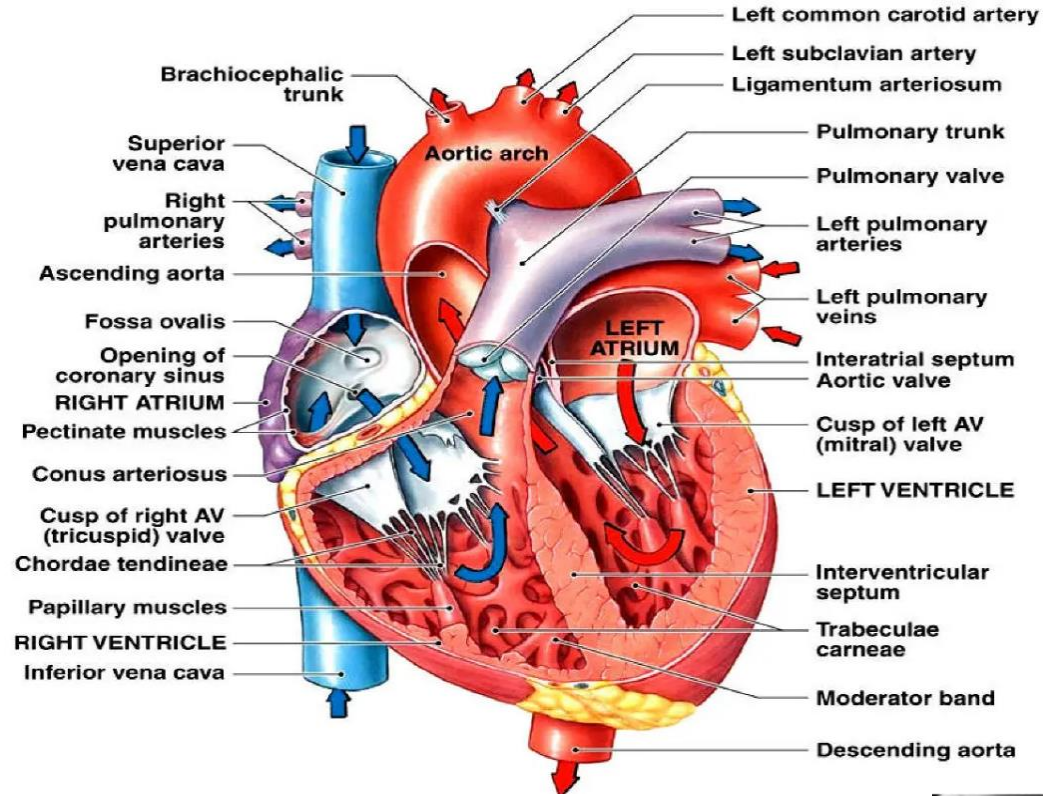
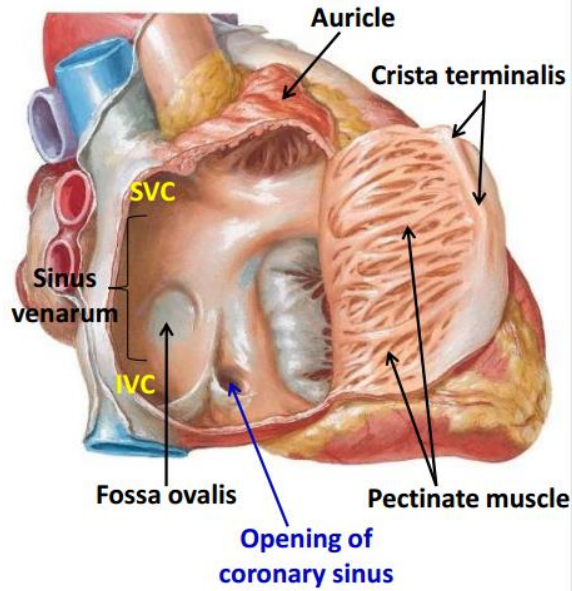
Anatomical structures define the **triangle of Koch**



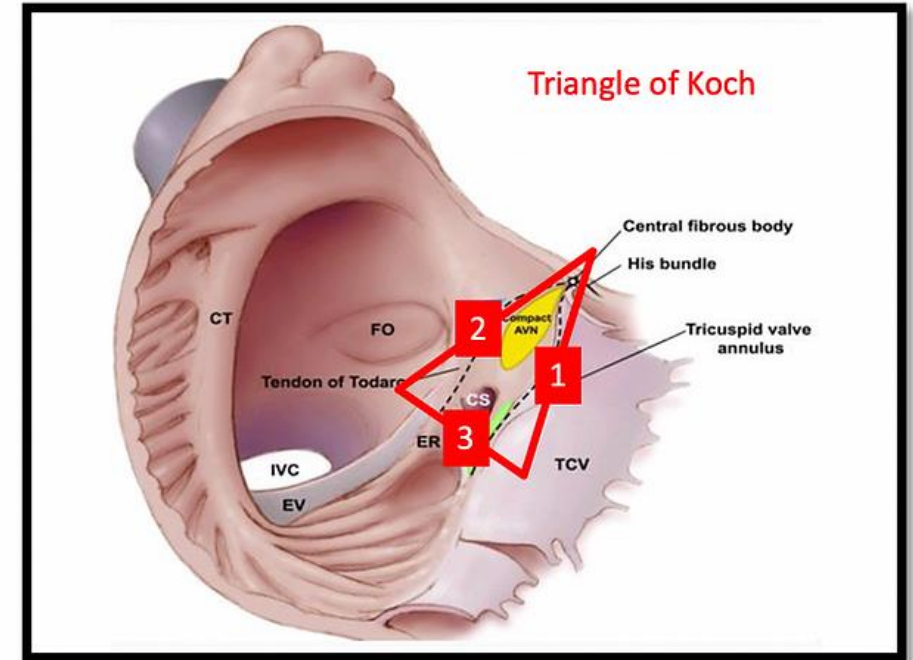
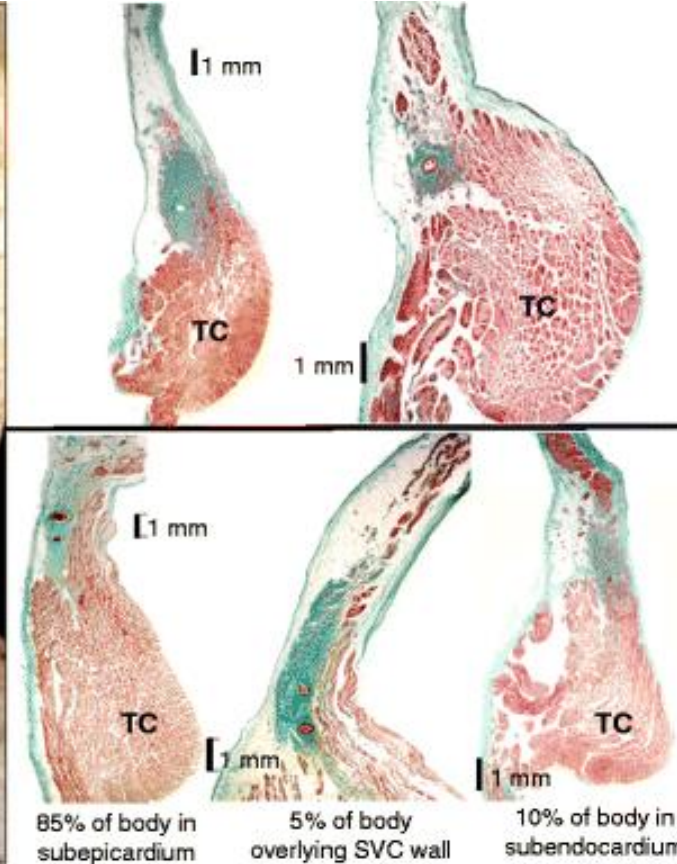
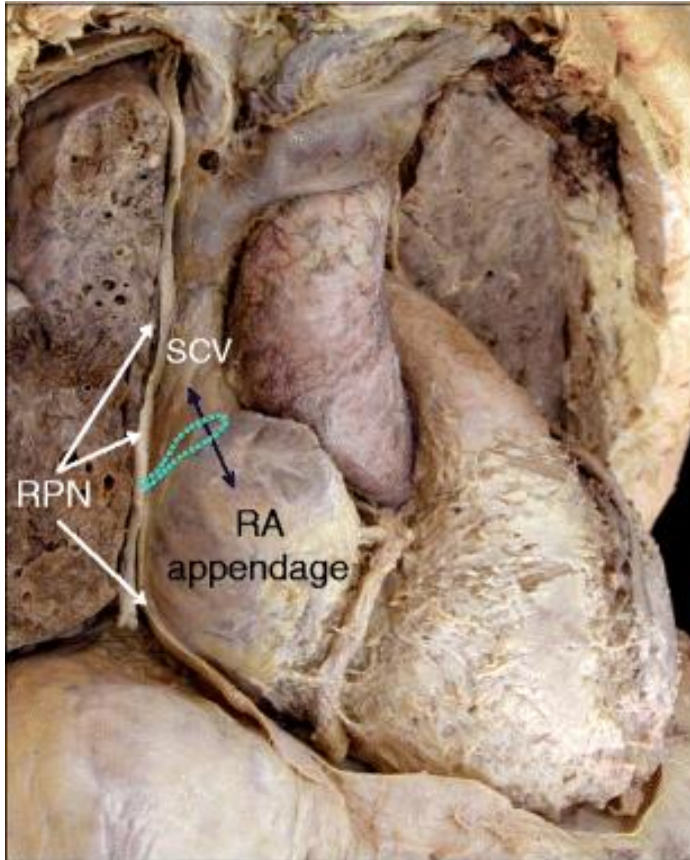
Cavotricuspid isthmus



Take Home message!

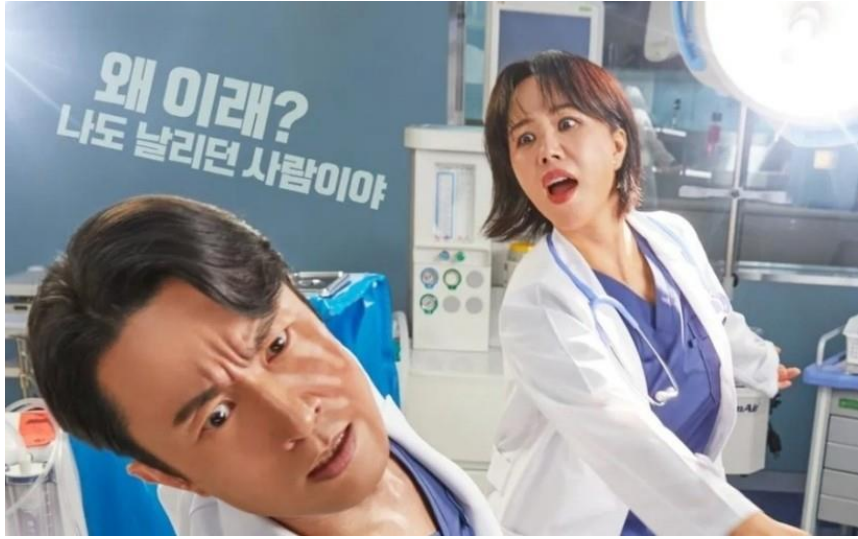


Take Home message!



Anatomical structures define the triangle of Koch





자신의 삶이 행복하고 환자들에게 존경받는 흉부외과 의사가 되시기를 기도

