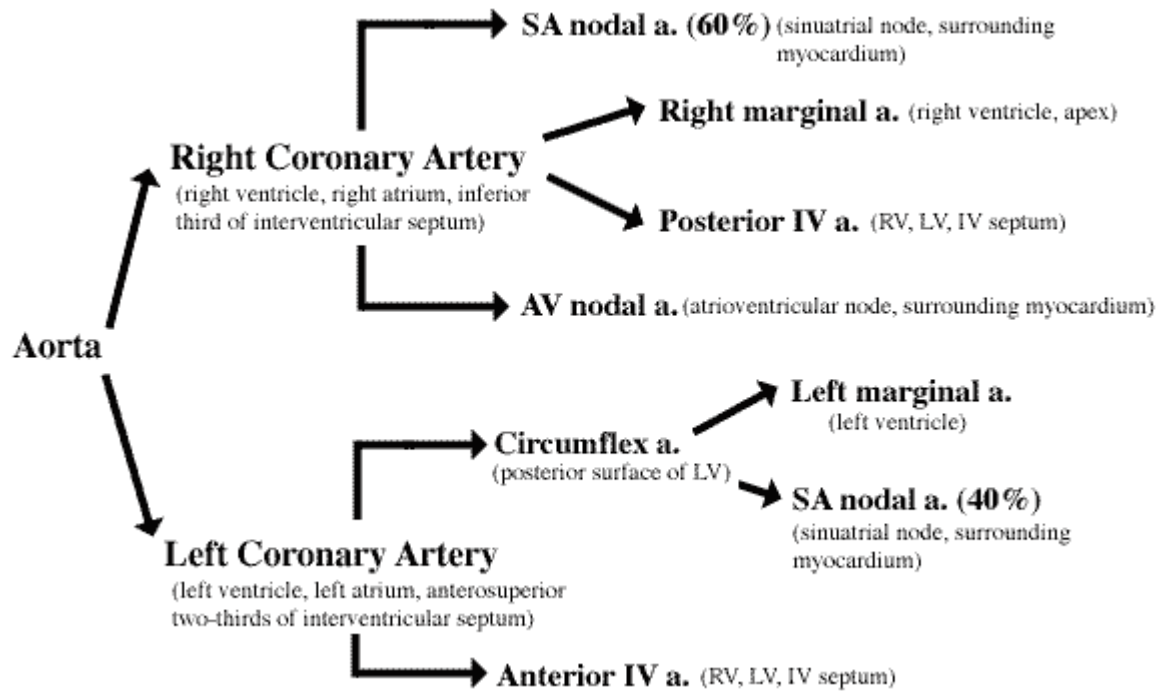


## HEART DETAILS



### Right Atrium:

- **sinus venarum:** thin-walled posterior part, where vena cava empty (Latin, sinus = fold, hollow)
- **pectinate muscle:** muscular anterior part (Latin, pecten = comb)
- **right AV (tricuspid) valve - superior surface:** opens into right ventricle
- **sulcus terminalis:** external demarcation of separation of sinus venarum and pectinate muscle
- **crista terminalis:** internal demarcation of separation of sinus venarum and pectinate muscle
- **opening of coronary sinus:** this venous trunk drains most of the heart and dumps right into the right atrium
- **fossa ovalis:** remnant of foramen ovale, an opening in the interatrial septum in fetus

### • Right Ventricle:

- **conus arteriosus:** smooth portion leading to pulmonary valve and trunk
- **trabeculae carnae:** ridged muscular wall
- **right AV (tricuspid) valve - inferior surface:** opens from right atrium
- **chordae tendinae:** attach to cusps of AV valve, preventing both separation and prolapse (valves being pushed back into atrium) (Note: the chordae tendinae and papillary muscles *do not* "pull" the valves open.)
- **papillary muscles:** contraction during systole (ventricular contraction) helps prevent valve prolapse and regurgitation of blood
- **pulmonary valve:** leads to pulmonary trunk. Semilunar cusps prevent regurgitation of blood from pulmonary trunk during diastole (ventricular relaxation).

- **Left Atrium:**

- **smooth-walled portion:** no specific name, as in right atrium, but serves similar purpose - site of emptying of the four pulmonary veins
- **pectinate muscle:** muscular anterior part, near auricle
- **interatrial septum:** opening (closed at the other end by the fossa ovalis) to the right atrium
- **left AV (mitral) valve - superior surface:** opens to left ventricle

- **Left Ventricle:**

- **trabeculae carnae:** ridged muscular wall
- **left AV (mitral, bicuspid) valve - inferior surface:** opens from left atrium
- **chordae tendinae:** attach to cusps of AV valve, preventing both separation and prolapse (valves being pushed back into atrium) (Note: the chordae tendinae and papillary muscles *do not* "pull" the valves open.)

- **papillary muscles**: contraction during systole (ventricular contraction) helps prevent valve prolapse and regurgitation of blood
  - **aortic valve**: leads to aortic arch. Semilunar cusps prevent regurgitation of blood from pulmonary trunk during diastole (ventricular relaxation).
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Compare and contrast the anatomical characteristics of the right and left sides of the heart.

The right and left sides of the heart are very similar in terms of structural components.

- Both contain an
  - **AV valve,**
  - **a semilunar**
  - **outflow valve,**
  - **smooth and muscular parts,** etc.
- The primary difference between the right and left sides of the heart is **size**.
- The muscle of the left ventricle is **2-3 times thicker than that of the right**, although the size of the cavity itself is about the same as the right.
- Both **ventricles pump the same amount of blood**, but the left ventricle must be much more powerful in order to perfuse the entire body, as opposed to the right ventricle that only has to perfuse the lungs.
- The systemic resistance to flow, which must be overcome by the left ventricle, is much higher than the pulmonary resistance to flow.

Identify the arterial supply and venous drainage of the heart. Describe the electrical conduction system.

Examine the **right atrioventricular (tricuspid) valve**. Define the cusps.

There are three cusps. The two larger ones are the **anterior** and the **septal cusps**. The smaller one is the **posterior cusp**.

Define chamber walls: interventricular (or interatrial), anterior and posterior.

- **Right atrium:** thin-walled sinus venarum posteriorly, more muscular anteriorly (including a muscular auricle), with interatrial septum between it and the left atrium
- **Left atrium:** thin-walled portion posteriorly, muscular auricle more anteriorly, with interatrial septum between it and the right atrium
- **Right ventricle:** lateral and anterior walls are muscular, while the posterior portion is mostly composed of interventricular septum
- **Left ventricle:** interventricular septum is more anterior, rest of wall is muscular

In the right atrium, define [papillary muscles](#), [chordae tendinae](#), and [tricuspid valve](#) cusps.

- The right ventricle usually has only two [papillary muscles](#) (anterior and posterior); occasionally there is one or more small septal papillary muscles.
- They are muscular projections from the ventricular wall which have tendinous cords ([chordae tendinae](#)) extending to the tricuspid valve cusps.
- The anterior muscle is the largest and has tendinous cords attaching to the anterior and posterior cusps.
- The smaller posterior muscle, which may consist of several parts, has cords attaching to the posterior and septal cusps.
- The septal muscle, when there is one, has cords attaching to the anterior and septal cusps.
- If there is no septal muscle, chordae tendinae arise directly from ventricle's septal wall.

. Do you find a **septomarginal trabecula**?

- The **septomarginal trabecula (moderator band)**, when present, is a muscular ridge of myocardium extending from the right ventricle's septal wall to the base of the **anterior papillary muscle**.

. Name the semilunar cusps of the [pulmonary valve](#).

The pulmonary valve's three semilunar cusps are named according to their orientations: **right**, **left** and **anterior**.

Does the [left atrioventricular \(mitral, bicuspid\) valve](#) have any commissural cusps? Note relation of anterior cusp to aortic wall.

- Commissural cusps are small accessory cusps occurring between the named cusps (**anterior** and **posterior**). The anterior cusp of the mitral valve abuts and curves around the base of the aorta.

. What is the relationship of the heart's fibrous skeleton to its conduction system? Why is this important?

- The fibrous skeleton provides attachment for heart's myocardium and valves.
- Additionally, it serves as an electrical insulator between the atria and ventricles penetrated only by the conduction system.
- This ensures that there is a pause between the contraction of the atria (leading to ventricular filling) and the contraction of the ventricles (ventricular ejection or emptying).

Nerves of the Thoracic Cavity					
Nerve	Source	Branches	Motor	Sensory	Notes
<b>cardiac plexus</b>	cardiac brs. of the vagus n. and cervical sympathetic trunk; thoracic visceral nn.	no named branches	moderates heart muscle (parasympathetic: decreases rate and force of contraction; sympathetic: increases rate and force of contraction); vascular smooth muscle of the heart & lungs (sympathetic); smooth muscle & mucous glands of bronchial tree (parasympathetic)	pain from the heart and lungs	cardiac plexus is continuous with the coronary and pulmonary plexuses; thoracic visceral nn. carry pain from the heart to the upper thoracic spinal cord segments resulting in pain referred to the left upper limb in the T1 and T2 dermatomes
<b>cardiac,</b>	cervical	no named	heart (sympathetic:	heart,	cervical

<b>sympathetic</b>	sympathetic trunk	branches	increases rate and force of contraction, parasympathetic: decreases rate and force of contraction); bronchial tree & lungs via pulmonary plexus	bronchial tree and lungs	sympathetic trunk usually gives 3 cervical cardiac brs. 1 (superior, middle and inferior) to the cardiac plexus
<b>cardiac, vagal</b>	vagus n. (X)	no named branches	heart (parasympathetic: decreases rate and force of contraction; sympathetic: increases rate and force of contraction); bronchial tree and lungs via pulmonary plexus	heart, bronchial tree and lungs	vagus n. has 2 cervical cardiac brs. (superior and inferior) and 1 or more thoracic cardiac brs.
<b>pulmonary plexus</b>	continuous with the cardiac plexus; thoracic visceral nn.; pulmonary brs. of vagus	no named branches	parasympathetic: smooth muscle & glands of the bronchial tree; sympathetic: vascular smooth muscle of the lungs	none	pulmonary plexus is located along the pulmonary vessels and primary bronchi in the root of the lung
<b>vagus n.</b>	medulla: dorsal motor nucleus (GVE preganglionic parasympathetic); inferior ganglion (GVA); nucleus ambiguus (SVE); superior ganglion (GSA); inferior ganglion(SVA)	auricular br., pharyngeal br., superior laryngeal, superior and inferior cervical cardiac brs., recurrent laryngeal n., thoracic	SVE: intrinsic muscles of the larynx, pharynx (except stylopharyngeus), and palate (except tensor veli palatini); GVE: smooth muscle of the respiratory tree & gut (proximal to the left colic flexure), heart; secretomotor:	GSA: skin of the external auditory meatus; GVA: viscera of head, neck, thorax & abdomen proximal to the left	also known as: CN X, 10th cranial nerve; the vagus n. passes through the jugular foramen to exit the posterior cranial fossa; vagus means

cardiac brs., brs. to the pulmonary plexus, brs. to the esophageal plexus, anterior and posterior vagal trunks	mucous glands of the larynx, respiratory tree, pharynx and gut; secretomotor to digestive glands	colic flexure; SVA: taste from the epiglottis	"wanderer" in reference to its extensive distribution to the body cavities
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Great Vessels				
Artery	Source	Branches	Supply	Notes
<b>aorta, ascending</b>	left ventricle of the heart	left and right coronary aa.	heart, entire body	ascending aorta is the shortest part of the aorta; it continues as the aortic arch
<b>arch, aortic</b>	the continuation of the ascending aorta	brachiocephalic trunk, left common carotid a., left subclavian a.	the entire body except the heart	aortic arch continues as the descending thoracic aorta; the fibrous ligamentum arteriosum connects to the inferior surface of the aortic arch and it marks the location of the fetal ductus arteriosus aortic arch continues as the descending thoracic aorta
<b>brachiocephalic trunk</b>	aortic arch	right common carotid a., right subclavian a.	right side of the head and neck; right upper limb and right side of the chest wall	there is only one brachiocephalic trunk
<b>carotid, common</b>	brachiocephalic trunk (right), aortic arch (left)	external carotid a., internal carotid a.	most of the head and upper neck	common carotid a. bifurcates at the level of the superior border of the thyroid cartilage; the internal carotid a. and the

				external carotid a. are its terminal brs.; the carotid sinus and carotid body are located at the bifurcation
<b>subclavian</b>	brachiocephalic a. (right), aortic arch (left)	1st part: vertebral a., thyrocervical trunk, internal thoracic a.; 2nd part: costocervical trunk; 3rd part: dorsal scapular a. (70%)	neck, brain, spinal cord, thyroid gland, larynx, shoulder, chest muscles, upper limb	subclavian a. is continuous with the axillary a., the name change occurs at the lateral border of the first rib; anterior scalene muscle passes anterior to the subclavian a., dividing it into 3 parts

Internal Features of the Heart		
Organ/Part of Organ	Location/Description	Notes
<b>atrioventricular bundle</b>	part of the conduction system of the heart	atrioventricular bundle is a strand of specialized myocardium that passes through the right fibrous trigone into the muscular part of the interventricular septum; it divides into right and left branches to supply the ventricles; also known as: bundle of His
<b>atrioventricular node</b>	part of the conduction system of the heart	atrioventricular node is located in the wall of the right atrium above the opening of the coronary sinus and the septal cusp of the tricuspid valve
<b>atrioventricular valve, left</b>	heart valve located between the left atrium and the left ventricle	left atrioventricular valve has two valve cusps; also known as: mitral or bicuspid valve
<b>atrioventricular valve, right</b>	atrioventricular node between the right atrium and the right ventricle	right atrioventricular valve has three valve cusps; also known as: tricuspid valve
<b>chordae tendineae</b>	thin connective tissue cords that attach the atrioventricular valve cusps to the papillary mm.	chordae tendineae are found only in the ventricles, not in the atria
<b>crista terminalis</b>	ridge of cardiac muscle separating the smooth sinus venarum posteriorly from the roughened wall of the primitive	the sinuatrial node lies within the superior end of the crista terminalis



	atrium anteriorly	
<b>fossa ovalis</b>	shallow depression in the left wall of the right atrium	fossa ovalis is the remnant of the foramen ovale which provided an open communication between the right atrium and left atrium in the fetus
<b>ligamentum arteriosum</b>	fibrous cord of connective tissue that connects the left pulmonary a. near its origin with the undersurface of the aortic arch	ligamentum arteriosum is a remnant of the ductus arteriosus; the left recurrent laryngeal n. passes beneath it
<b>limbus fossa ovalis</b>	the ridge around the fossa ovalis in the left wall of the right atrium	limbus fossa ovalis is the margin of the septum secundum
<b>mitral valve</b>	heart valve located between the left atrium and the left ventricle	mitral valve has two valve cusps; it is named for the similarity of its shape to that of a bishop's miter; also known as: left atrioventricular valve or bicuspid valve
<b>moderator band</b>	ridge of cardiac muscle spanning from the interventricular septum to the anterior papillary m. in the right ventricle	septomarginal trabecula contains part of the right branch of the atrioventricular bundle; also known as: septomarginal trabecula
<b>papillary muscle</b>	a small, nipple-like projection of cardiac muscle located within the ventricles	papillary muscles attach to the cusps of the atrioventricular valves via chordae tendineae and act to keep the valve cusps from prolapsing under systolic blood pressure; there are three in the right ventricle: anterior, posterior, septal; there are two in the left ventricle: anterior, posterior
<b>pectinate muscles</b>	prominent ridges of myocardium located on the inner surface of the right atrium	pectinate muscles are very pronounced in the right atrium and in both auricles
<b>pulmonary conus</b>	smooth area of the right ventricle below the opening into the pulmonary trunk	pulmonary conus is the pulmonary part of the conus cordis which divides during development to form the outflow portions of the right and left ventricles
<b>semilunar valves</b>	valve with three pocket-shaped cusps located in the base of the pulmonary trunk and ascending aorta	semilunar valve has a thin endothelial free margin on each cusp called a lunula; a dense nodule is located at the midpoint of the free margin of each valve cusp; the pulmonary semilunar valve has anterior, left and right cusps; the aortic semilunar valve has right, left and posterior cusps
<b>septomarginal trabecula</b>	ridge of cardiac muscle spanning from the interventricular septum to the anterior papillary m. in the	septomarginal trabecula contains part of the right branch of the atrioventricular bundle; also known as: moderator band

	right ventricle	
<b>sinuatrial node</b>	part of the conduction system of the heart	sinuatrial node is located within the crista terminalis near the superior vena cava; it is the "pacemaker" of the heart
<b>trabeculae carnae</b>	ridges of cardiac muscle located on the inner wall of both ventricles	the word trabecula is derived from the Latin word <i>trabs</i> , which means a beam
<b>tricuspid valve</b>	a three cusped valve located at the ostium between the right atrium and the right ventricle	tricuspid valve possesses anterior, posterior and septal cusps; also known as: right atrioventricular valve