



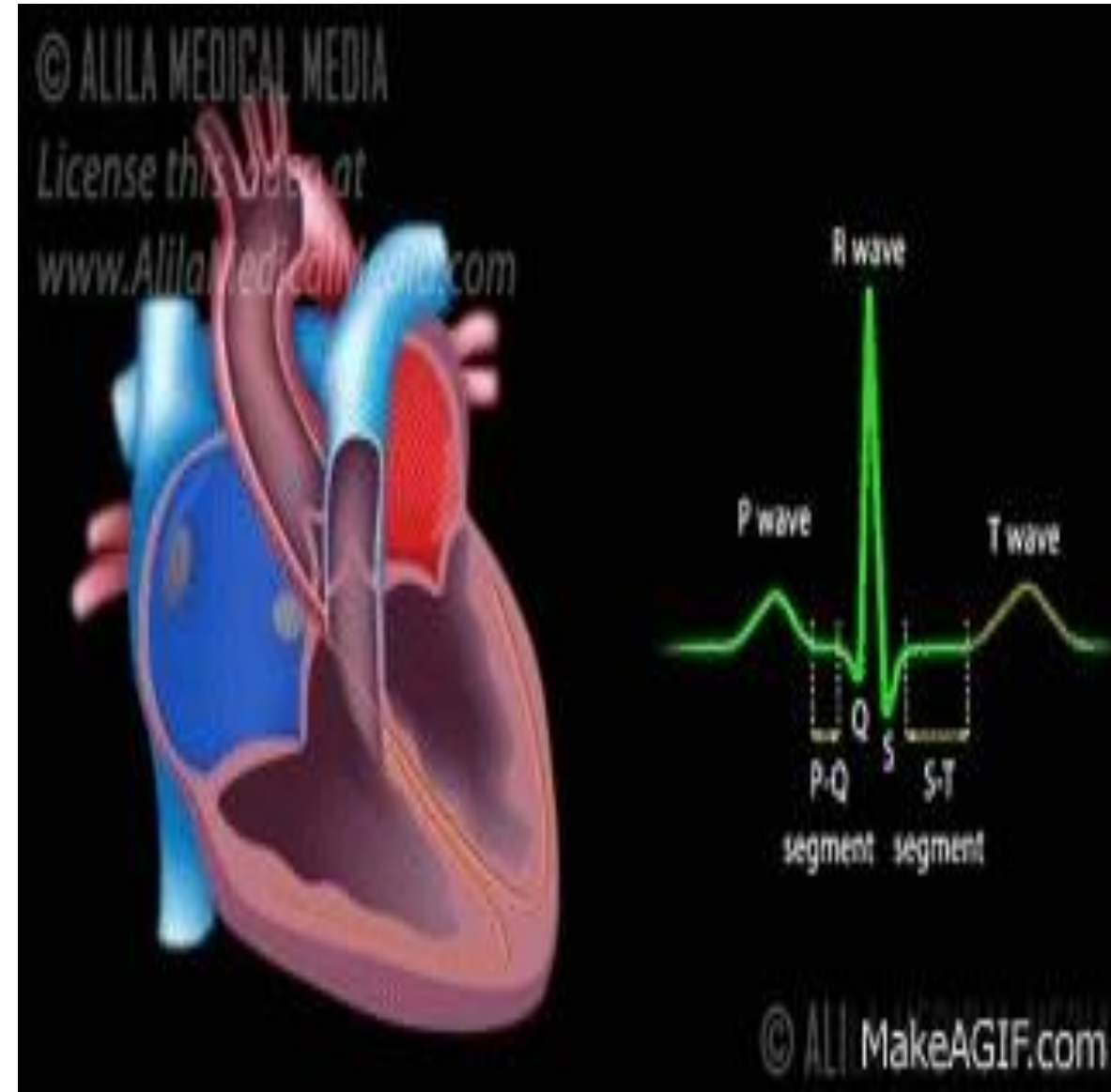
Human Anatomy - 1st year 2020-2021



Conducting System Of The Heart

Lecture (7)

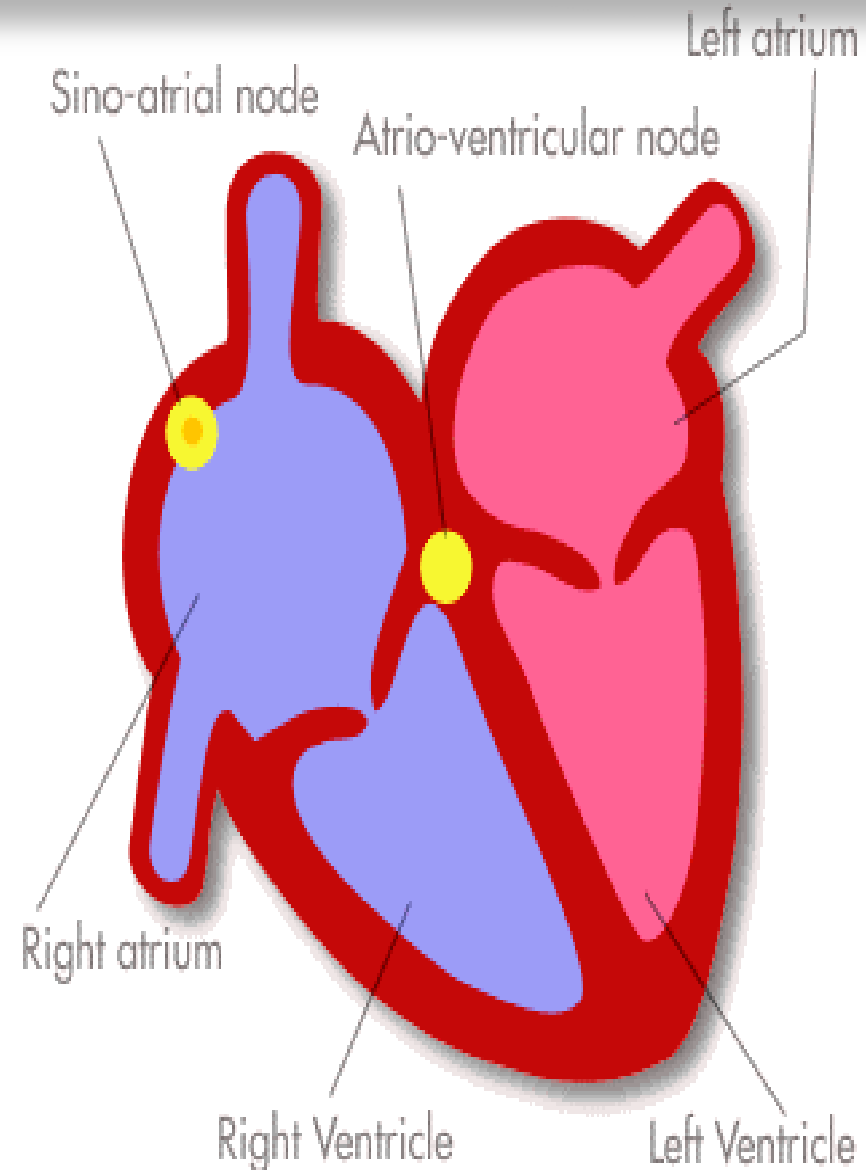
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Conducting System Of Heart :

To describe :

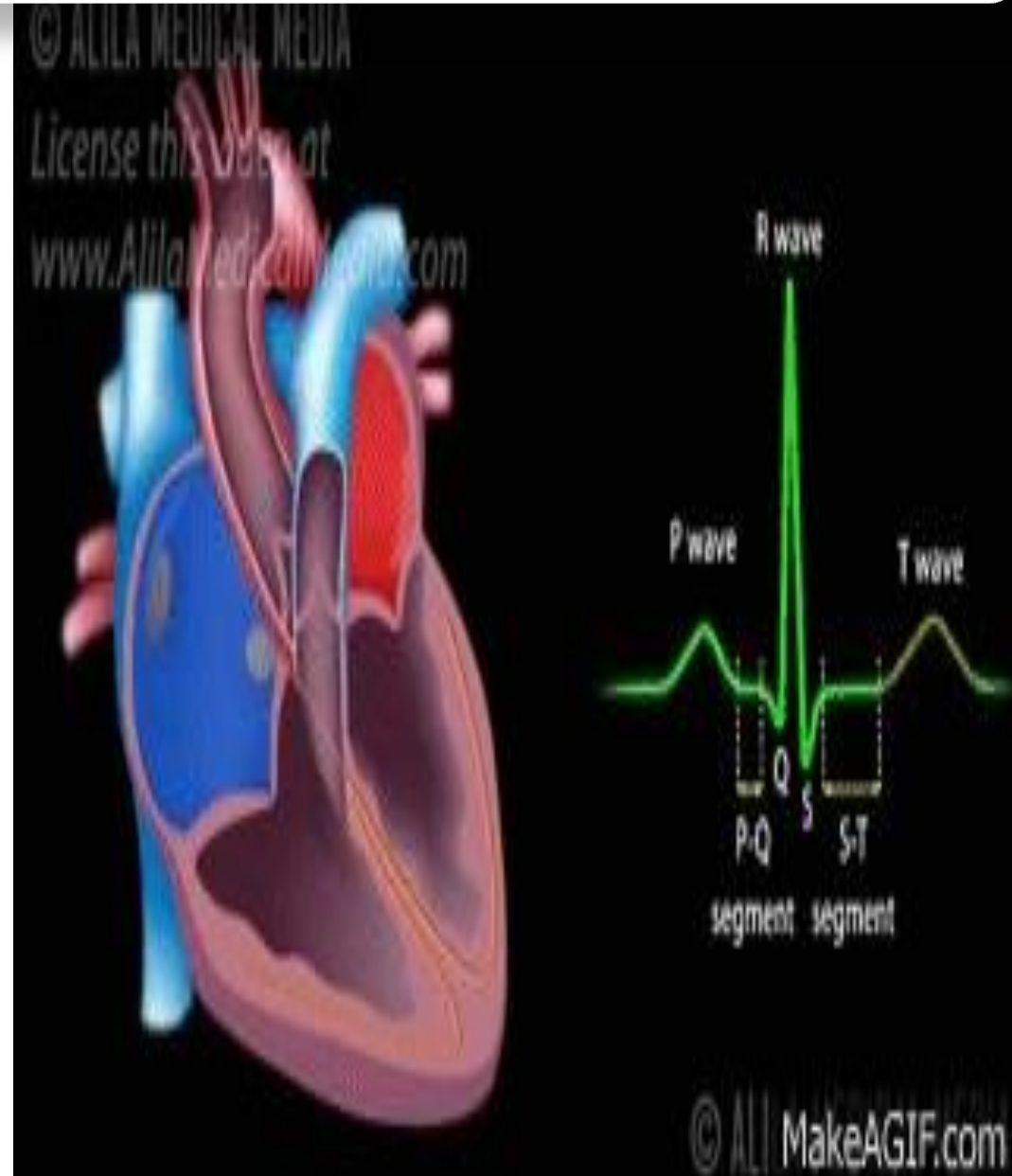
- 1. Conductive system of the heart.**
- 2. Blood supply of conductive system**



Conducting System Of Heart :

✍ The conducting system of the heart consists of Specialized cardiac cells and conducting fibers that are specialized for initiating impulses and conducting them rapidly through the heart.

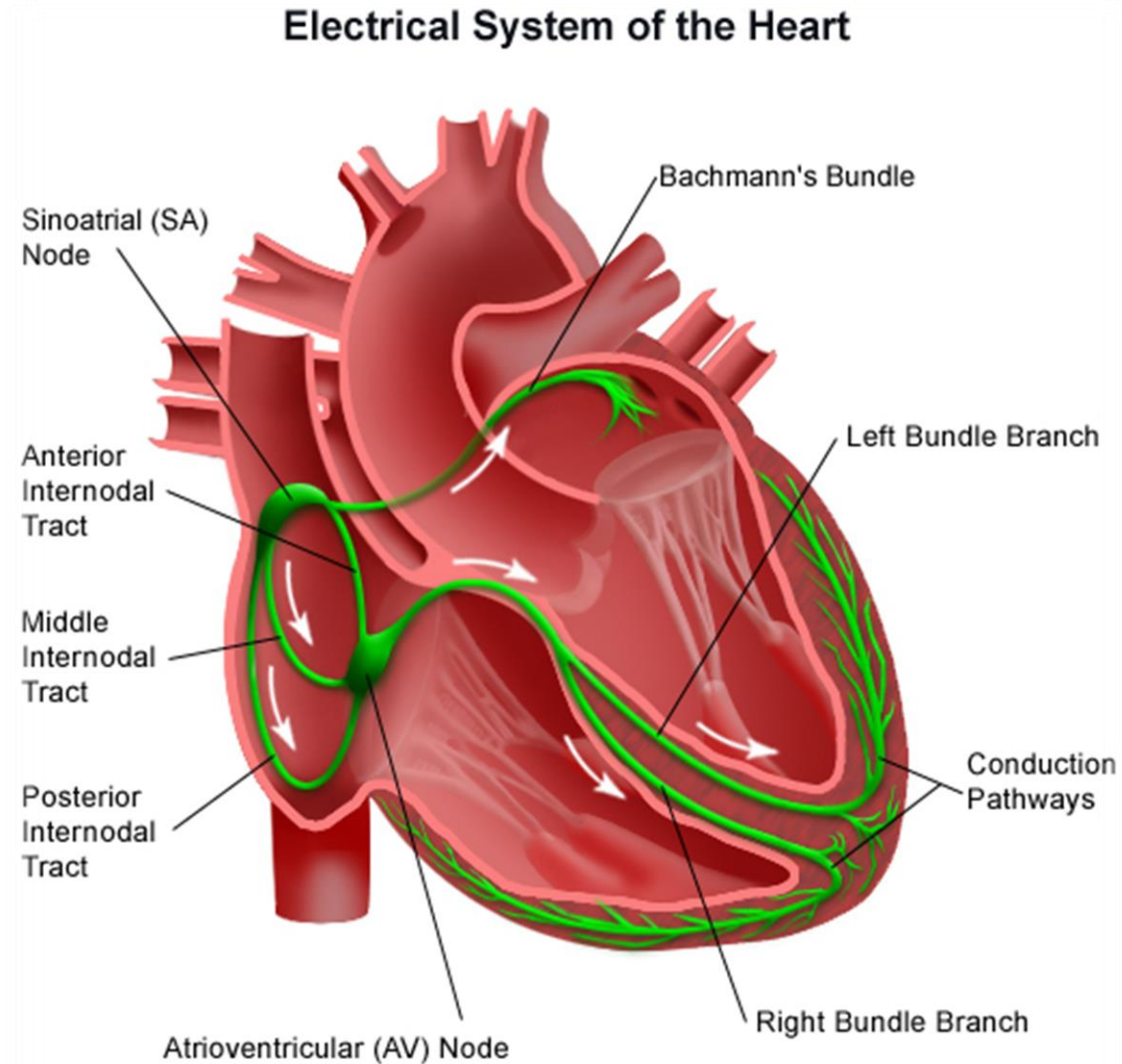
✍ They initiate the normal cardiac cycle and coordinate the contractions of cardiac chambers. The result is sequential atrioventricular contraction which provides for the most effective flow of blood.



Sinoatrial Node

💧 The sinoatrial (SA) node is a — collection of specialized cells (pacemaker cells) located in the upper wall of the right atrium in the upper part of sulcus terminalis, at the junction where the superior vena cava enters.

💧 These pacemaker cells can — spontaneously generate electrical impulses (70-80). These impulses spread across both atria, resulting in atrial contraction (atrial systole) — with blood moving from the atria into the ventricles.



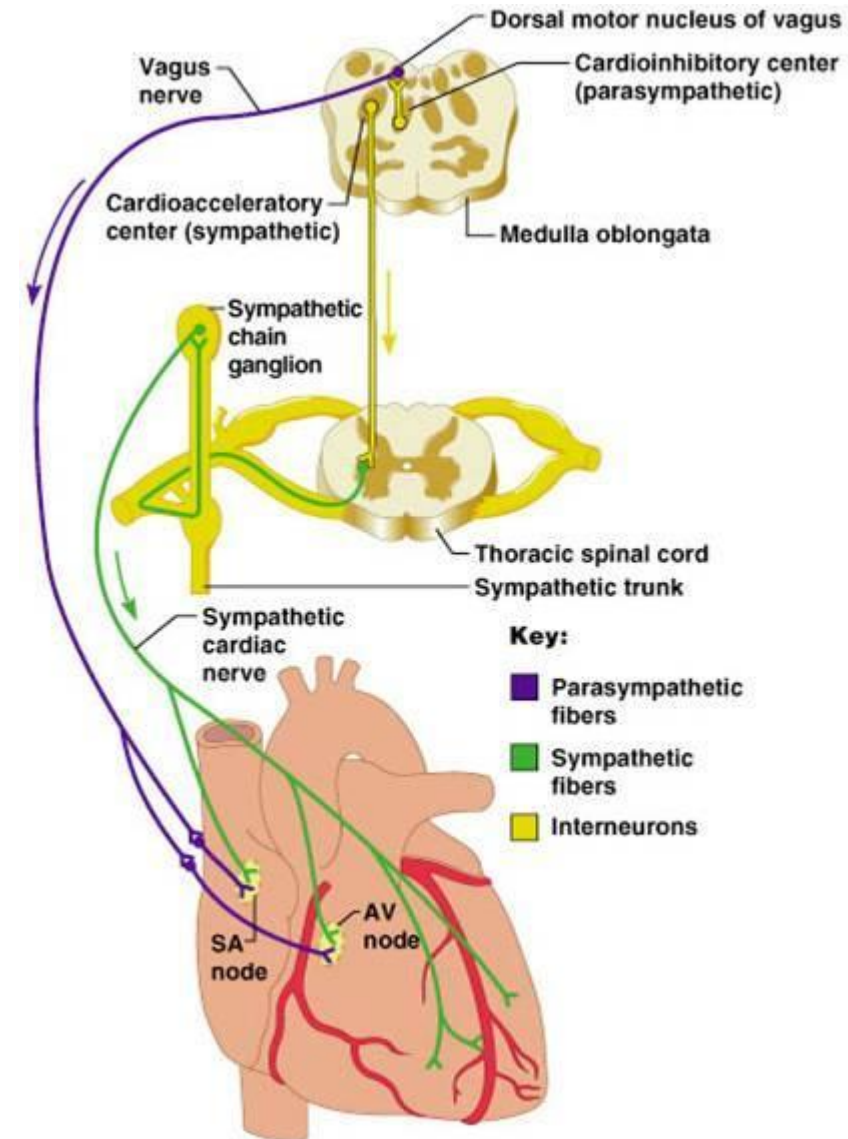
Sinoatrial Node

Sympathetic stimulation:

Increases the frequency of discharge of impulses from the S-A node → increases the heart rate (tachycardia).

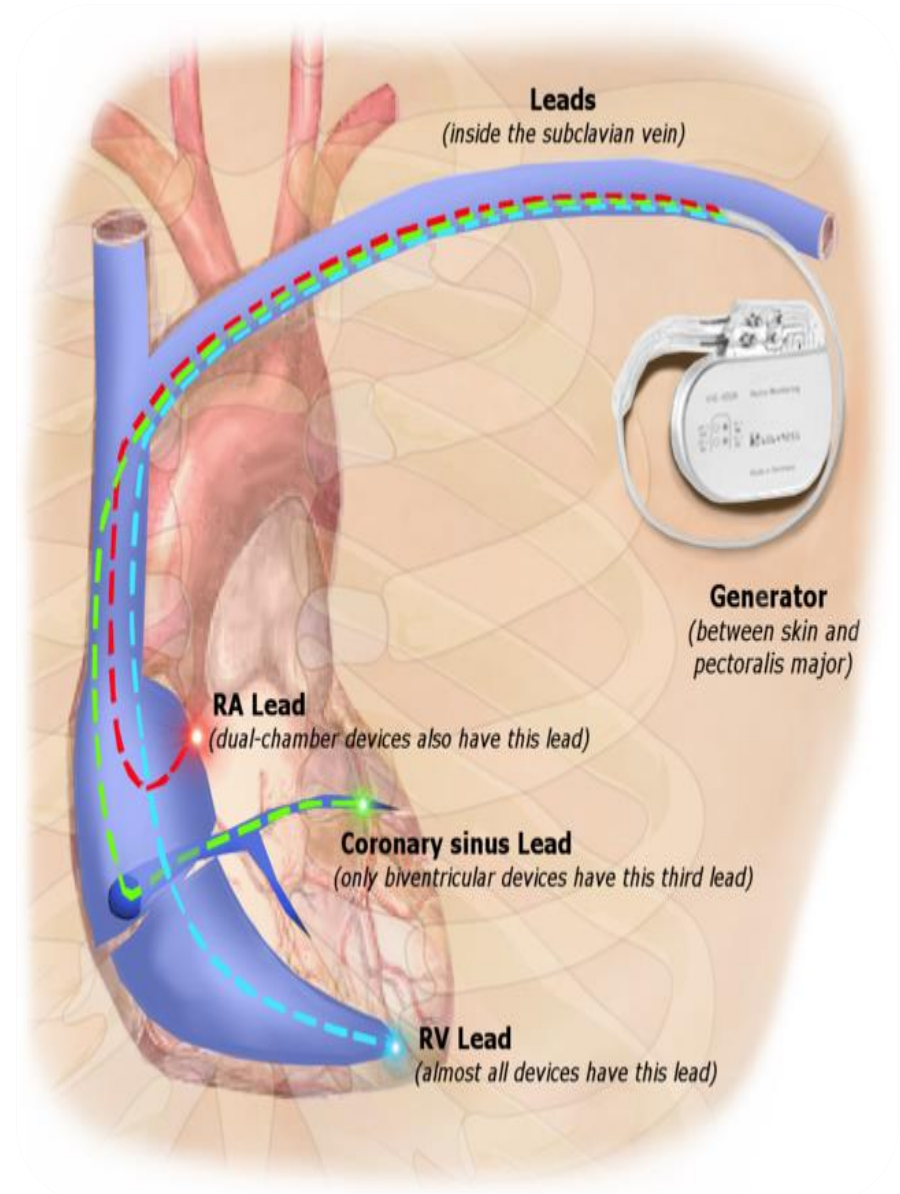
Parasympathetic stimulation:

Decreases the frequency of discharge of impulses from the S-A node → decreases the heart rate (Brady cardia).



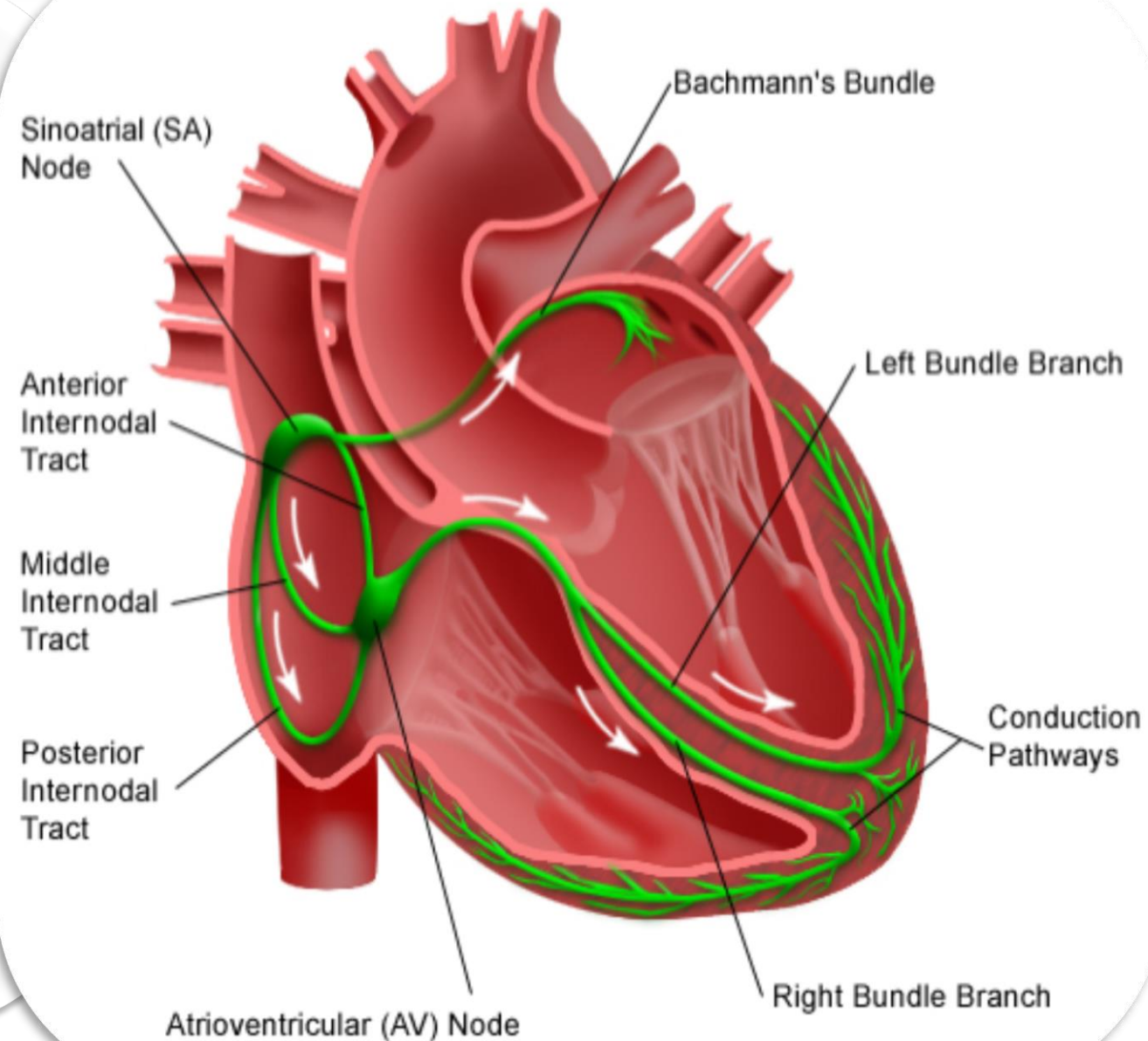
Artificial pacemaker

Is a small electrical device commonly fitted to correct heart rate and rhythm. It is inserted into the chest under the left clavicle, with wires connected to the heart via the venous system.



Atrioventricular Node (AV node)

- After the electrical impulses spread across the atria, they converge at the AV node .
- AV node located in the Koch triangle near the coronary sinus on the interatrial septum.
- The AV node acts to delay impulses to ensure the atria have enough time to fully eject blood into the ventricles before ventricular systole
- The wave of excitation then passes from AV node into the atrioventricular bundle.

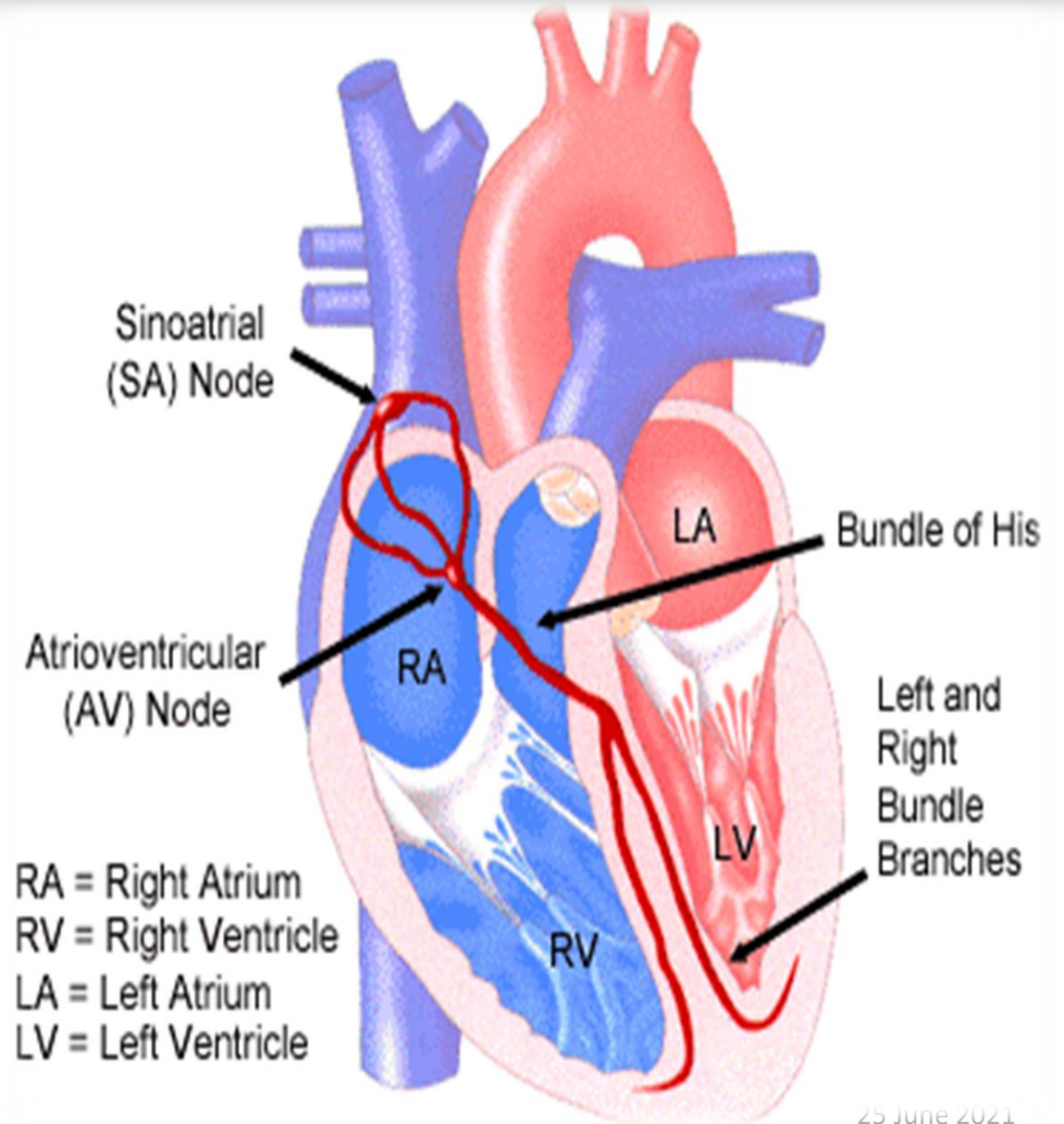


Bundle of His

✍ The atrioventricular –
bundle of His

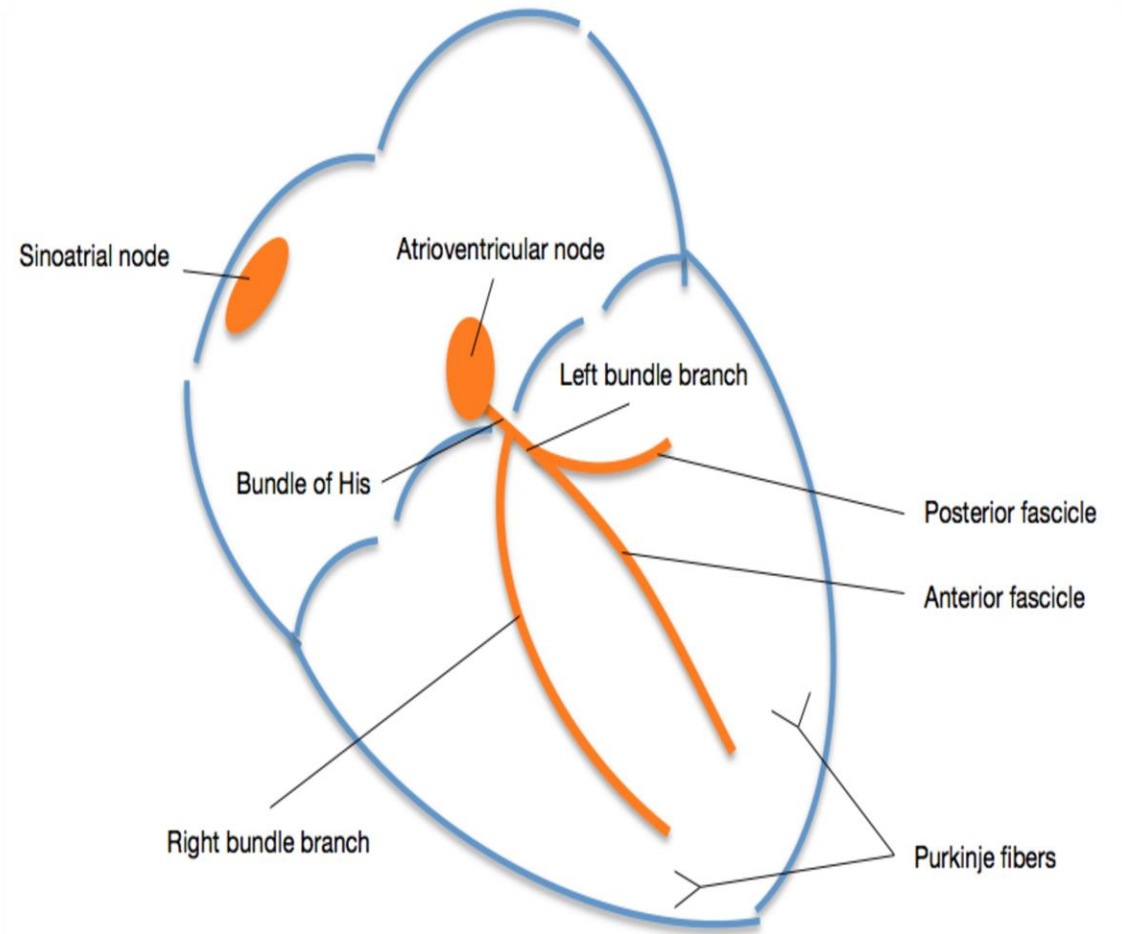
is a continuation of AV node, –
and serves to transmit the
electrical impulse from the AV
node to the Purkinje fibers of
the ventricles.

✍ It descends down the –
membranous part of the
interventricular septum, then
divides into two main
bundles:

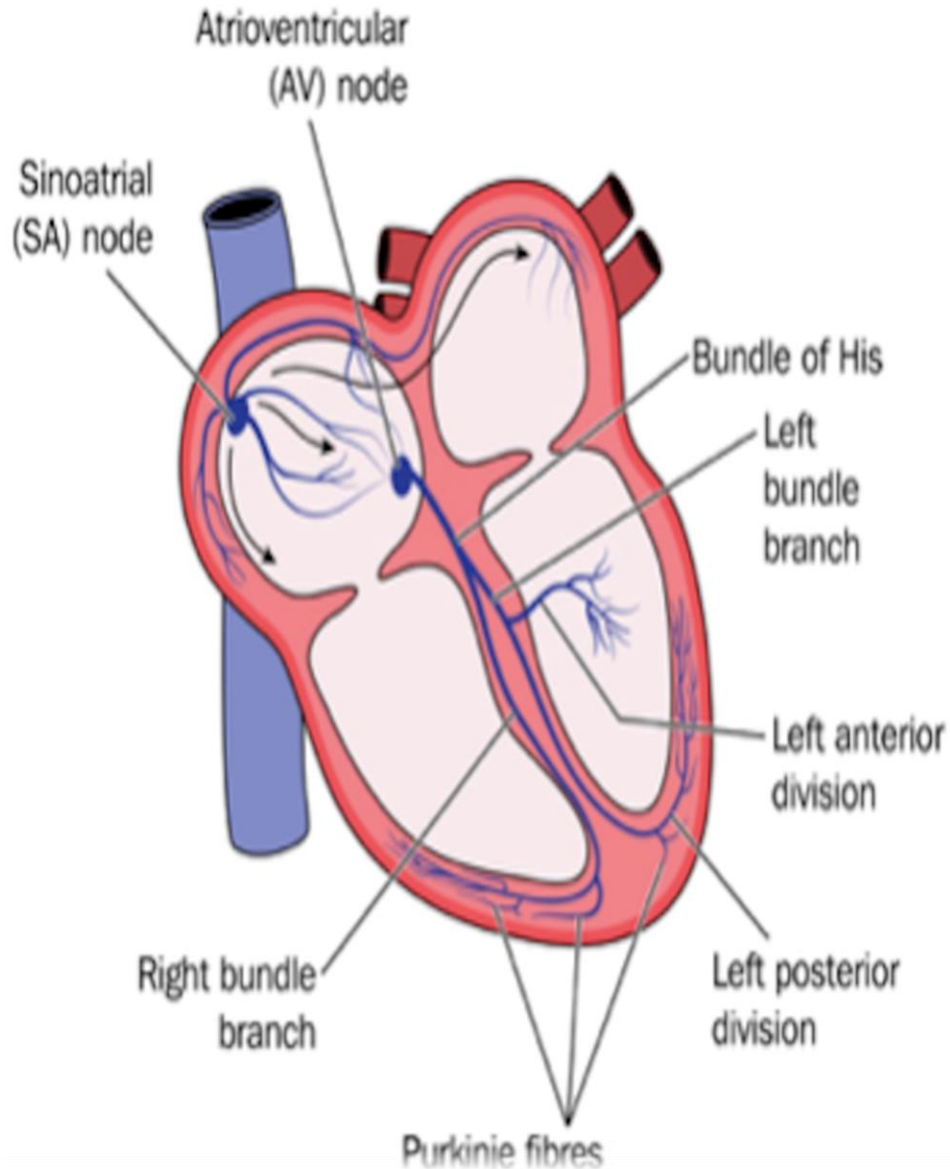


Left bundle branches

- **Pierces the interventricular septum**
- **Passes down side beneath the endocardium**
- **Divides into two branches Anterior & Posterior**
- **Eventually become continuous with the fibers of the purkinje plexus of the left ventricle.**

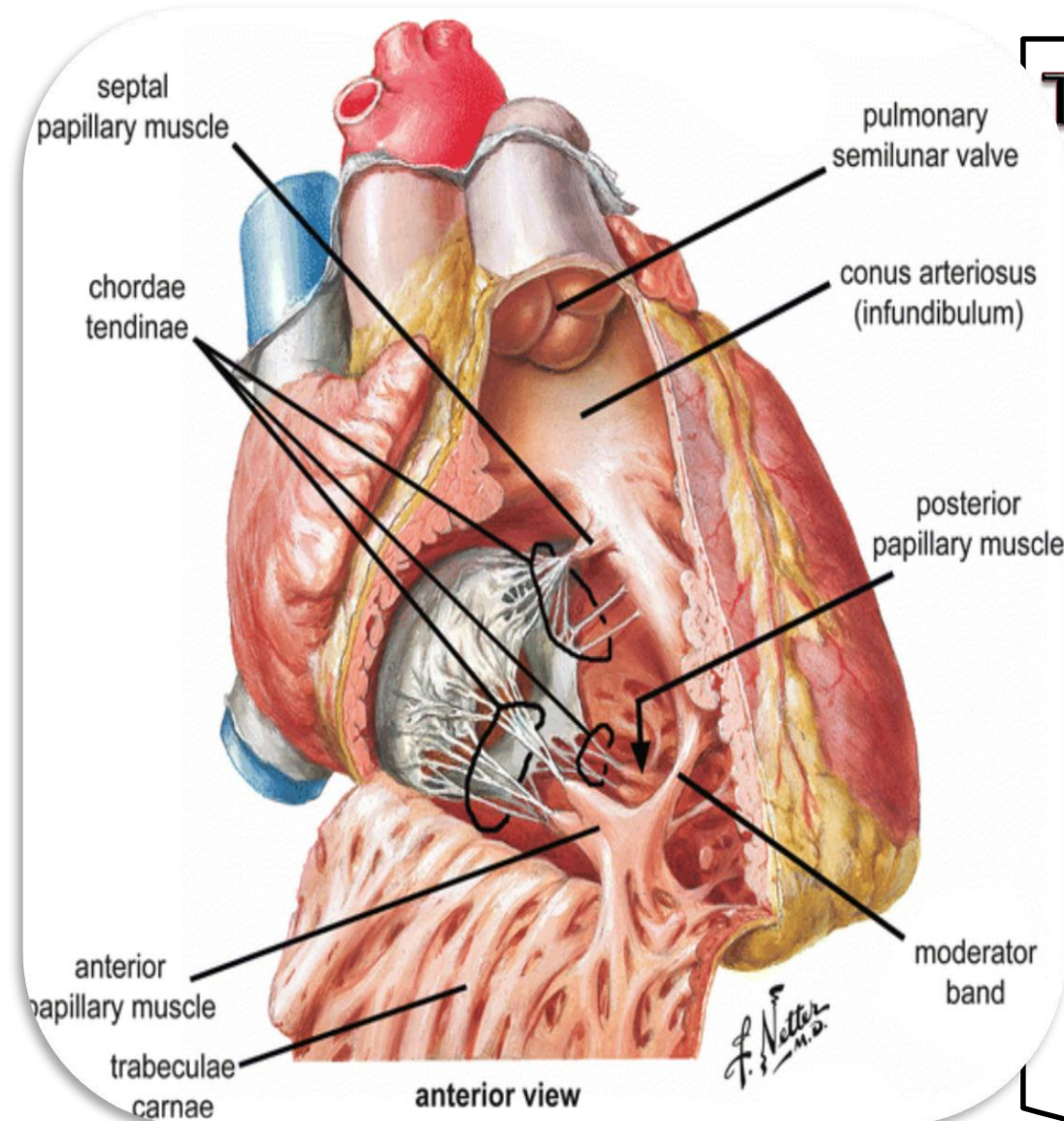


Right bundle branches



- Passes on the right side of ventricular septum
- Reach the moderator band
- Crosses through moderator band to reach anterior wall of right ventricle
- Becomes continuous with fibers of Purkinje

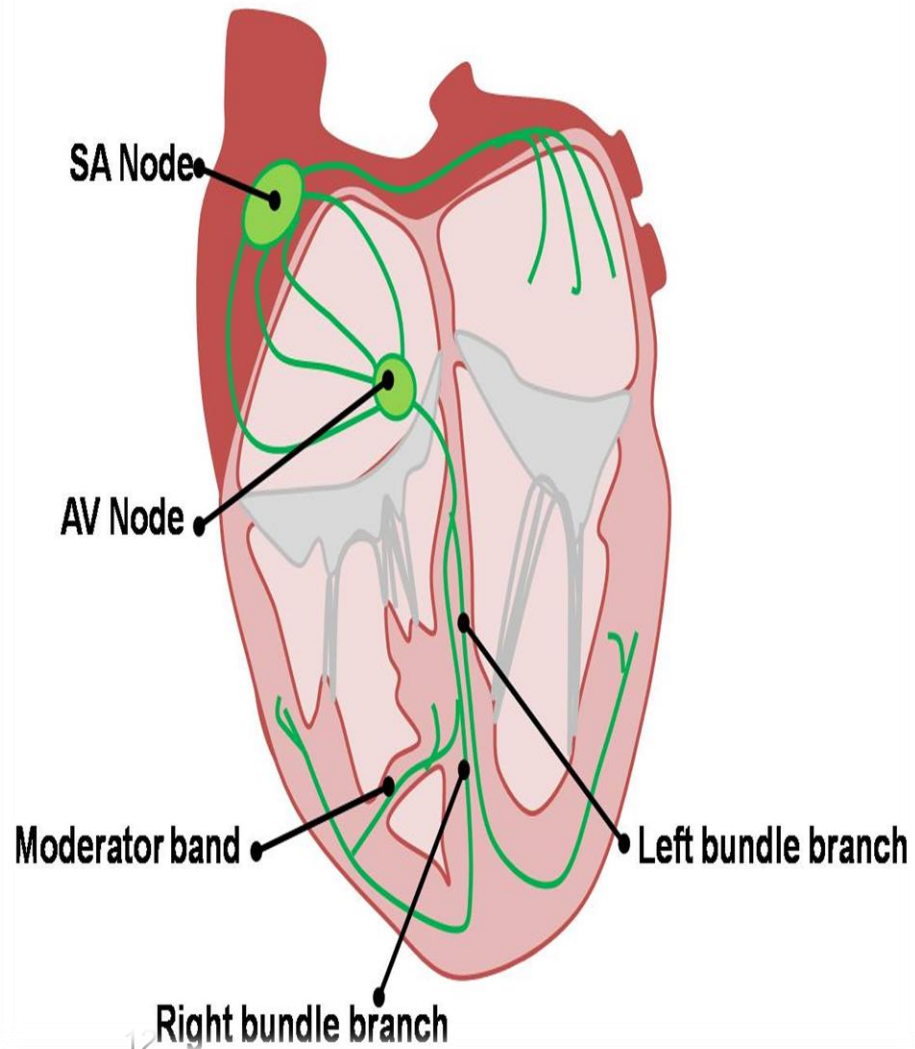
Moderator band



The moderator band is a muscular strand that traverses the right ventricle from the base of the anterior papillary muscle to the interventricular septum. It delivers impulses to the anterior papillary muscle faster and facilitate the conduction time thereby allowing coordinated contraction of the anterior papillary muscle.

Moderator band

Cardiac Conduction System

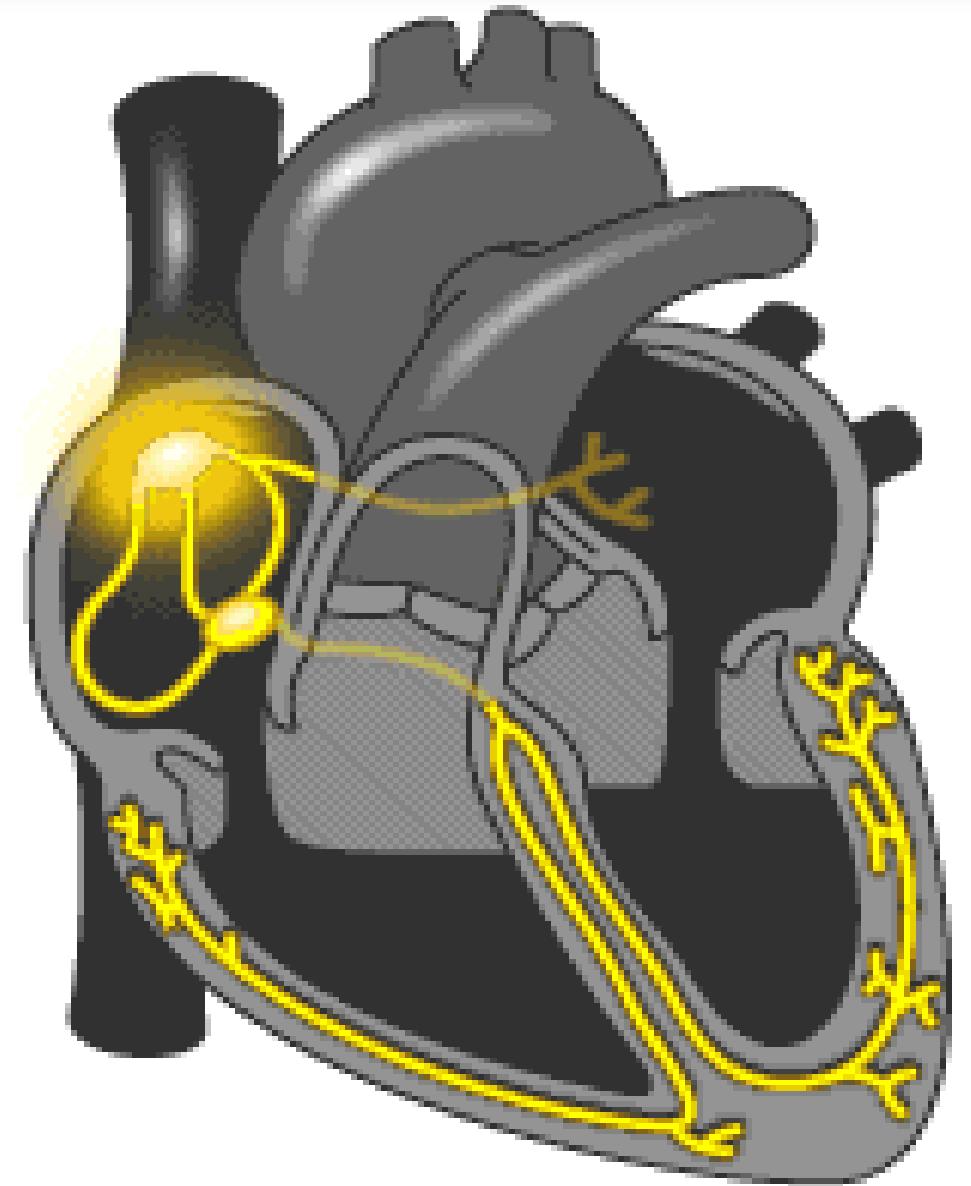


It serves two main functions:

- ✍ conveys the right branch of the atrioventricular bundle of the conduction system.
- ✍ prevents the right ventricle from "over-expanding"

Purkinje fibers;

The Purkinje fibers (sub-endocardial plexus of conduction cells) are a network of specialized cells. These cells are located in the subendocardial surface of the ventricular walls, and are able to rapidly transmit cardiac impulse from the atrioventricular bundle to the myocardium of the ventricles.

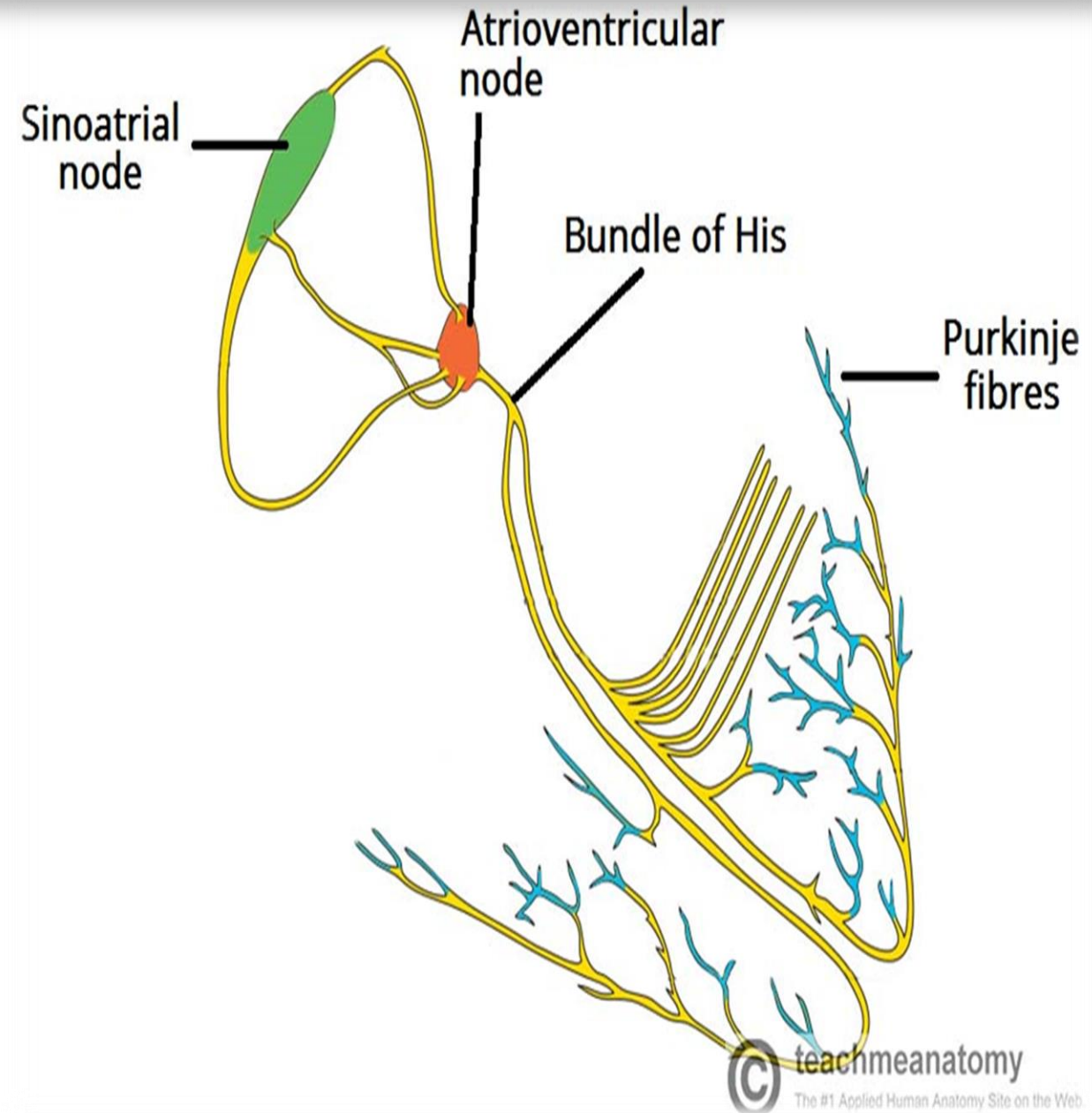


The sequence of electrical events during one full contraction of the heart muscle:

◆ An excitation signal is created by **(SA) node** .Then spreads across the atria causing them to contract.

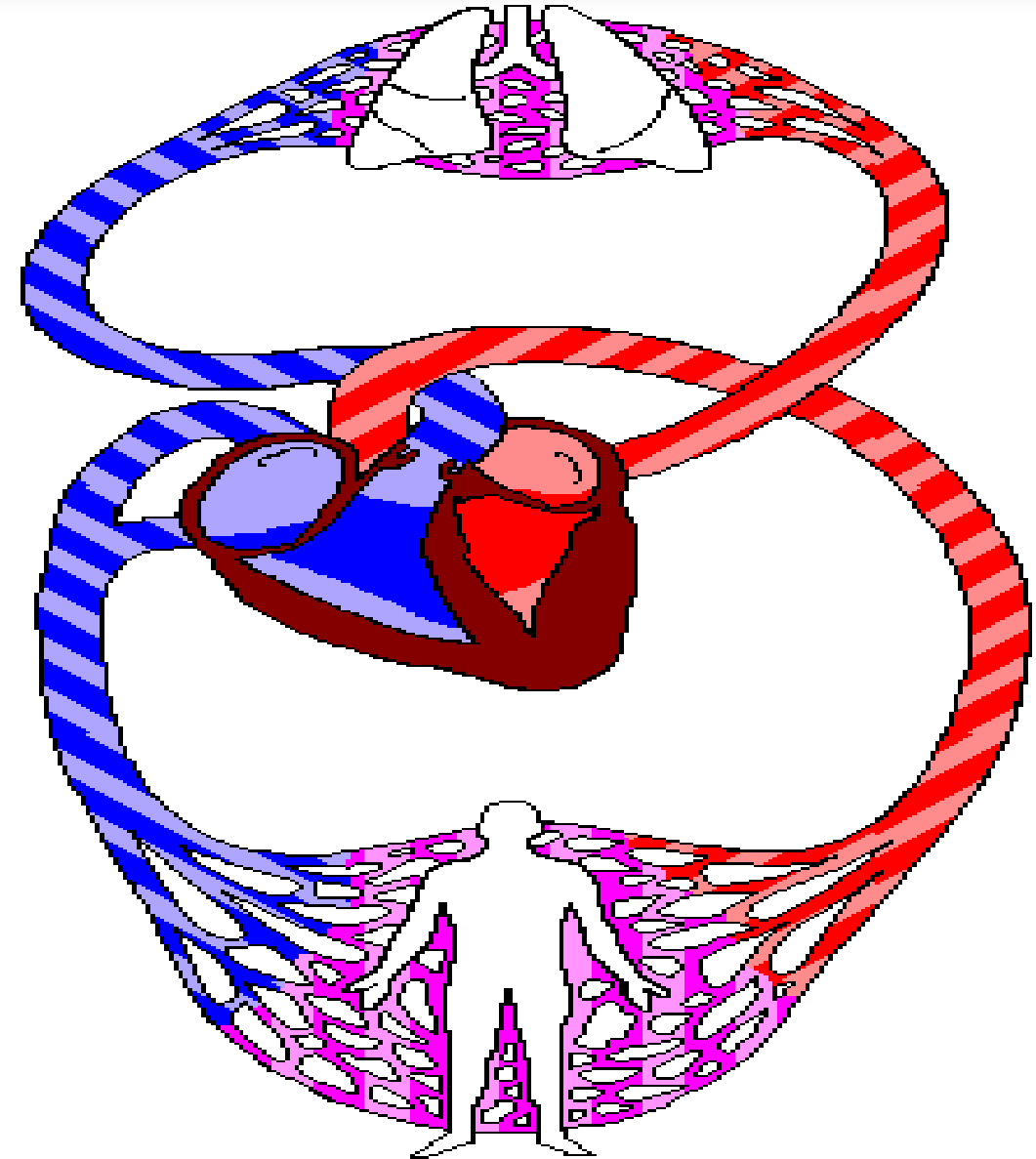
◆ Reaching the **(AV) node** and then to the **bundle of His**, down the inter ventricular septum.t.

◆ The bundle of His, bundle branches and Purkinje fibers transmit impulses quickly and cause both ventricles to contract at the same time.



The sequence of electrical events during one full contraction of the heart muscle:

- As the ventricles contract, blood is forced out through the semilunar valves into the pulmonary trunk and the aorta.
- After the ventricles complete their contraction phase, they relax and the SA node initiates another impulse to start another cardiac cycle.



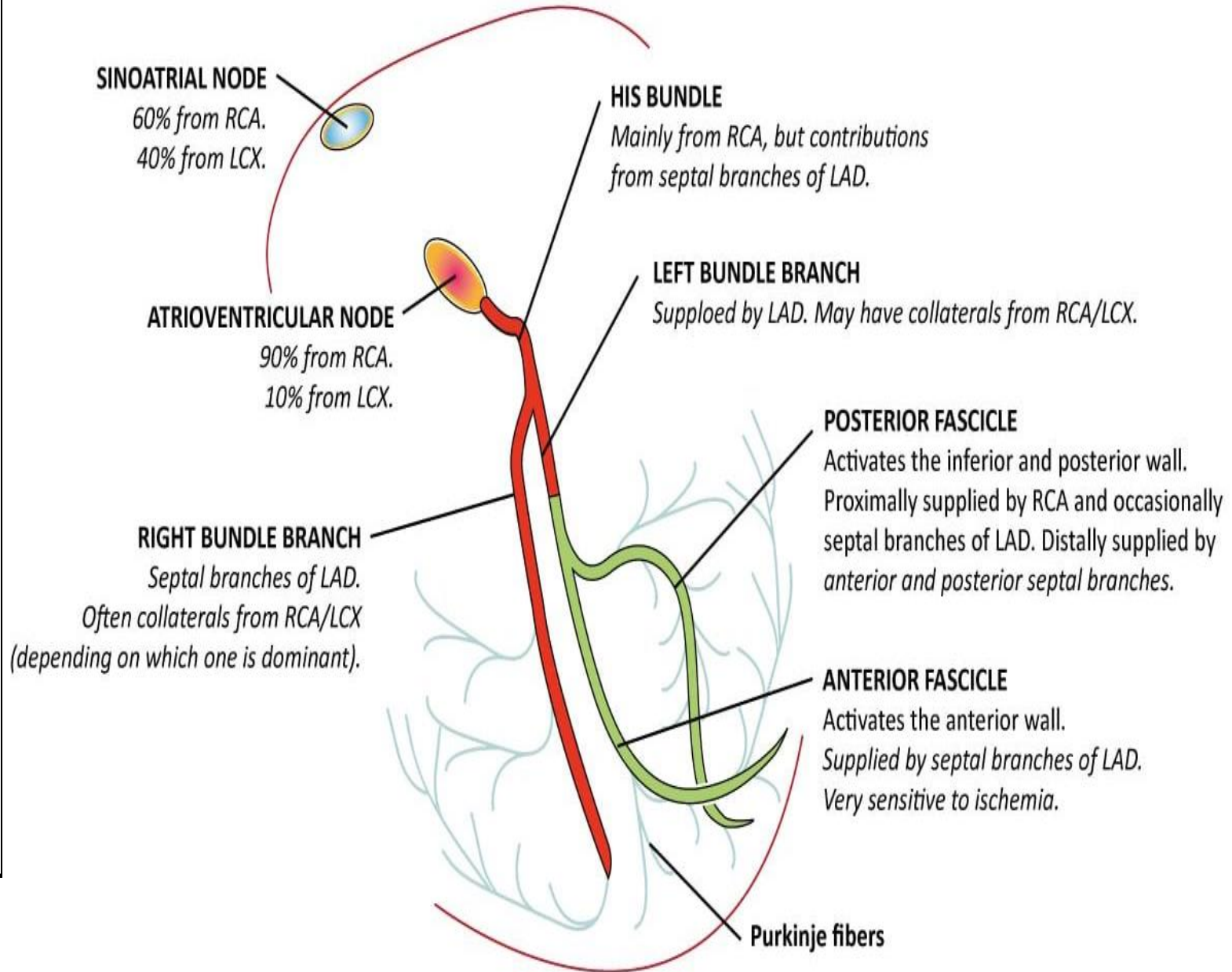
Blood supply of conducting system

▶ 1. SA node :

from the right coronary artery in 60% of cases, And 40% from circumflex branch of the left coronary artery

▶ 2. AV node

From right coronary artery in 90% And 10% from left coronary artery



Blood supply of conducting system

► 3. His Bundle

The proximal His bundle may have dual supply, from both right and left coronary arteries but mainly from right coronary artery .

► 4. The **RBB** of the atrioventricular bundle is supplied by the left coronary artery; the

► 5. The **LBB** is supplied by the right and left coronary arteries.

► 6. **Purkinje fiber** from anterior descending artery branch of left coronary artery.

