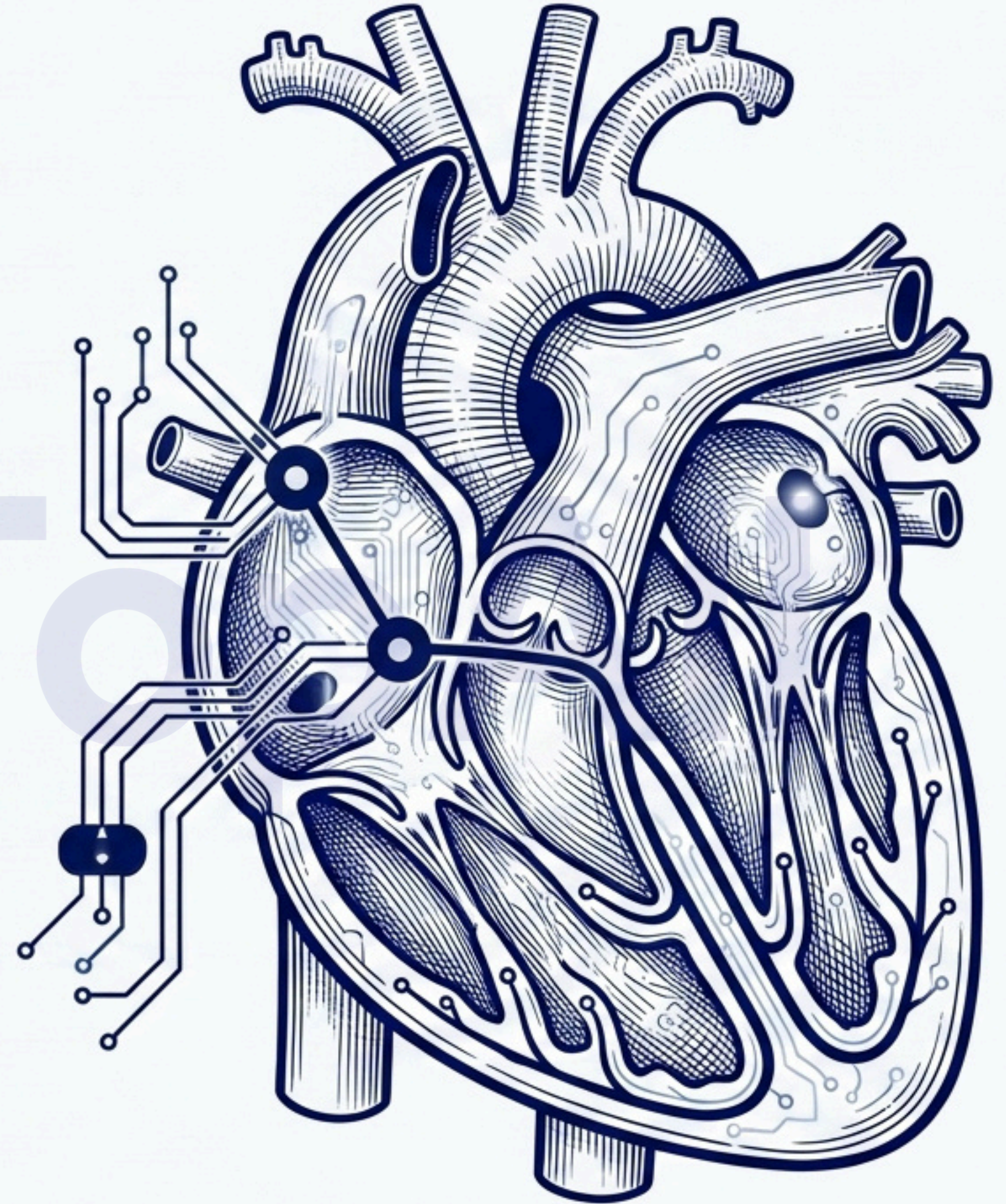


SYSTEM: Myogenic
DEFAULT_RATE: 72 beats min⁻¹

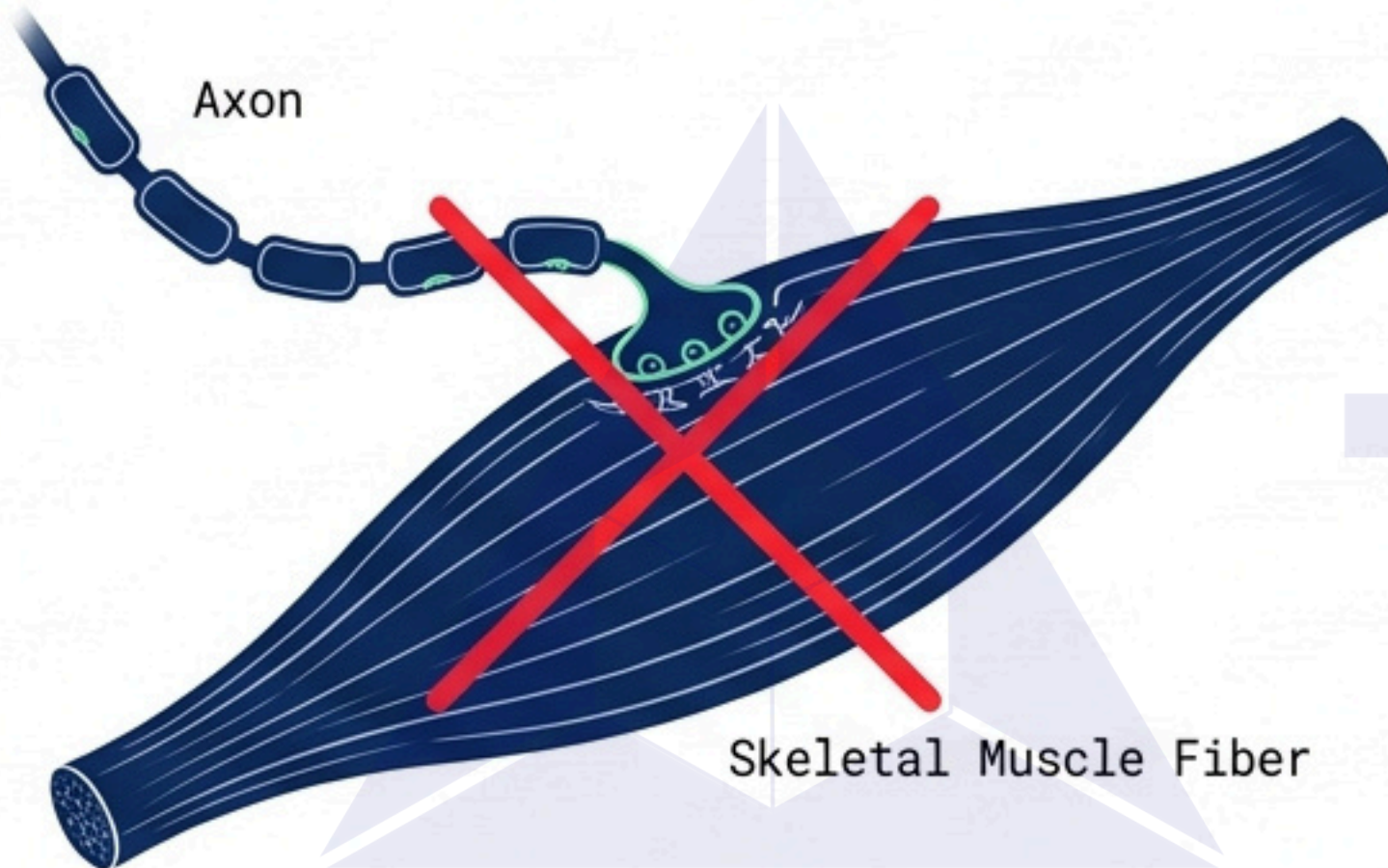
How the Heart Beats on Its Own

Mapping the intrinsic electrical system of human cardiac musculature.



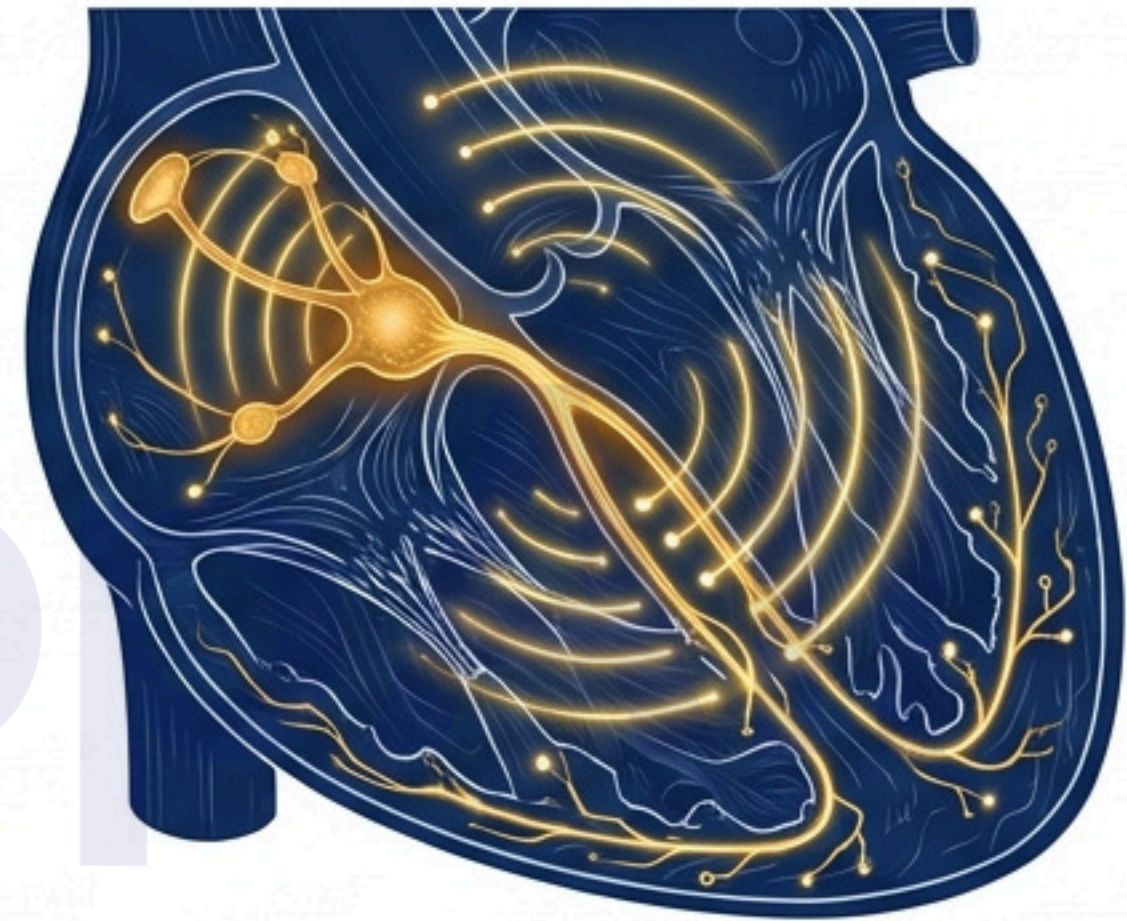
Nodal Tissue: The Autoexcitable Engine

Neurogenic (External)



Skeletal muscles require an external nerve stimulus to contract.

Myogenic (Internal)

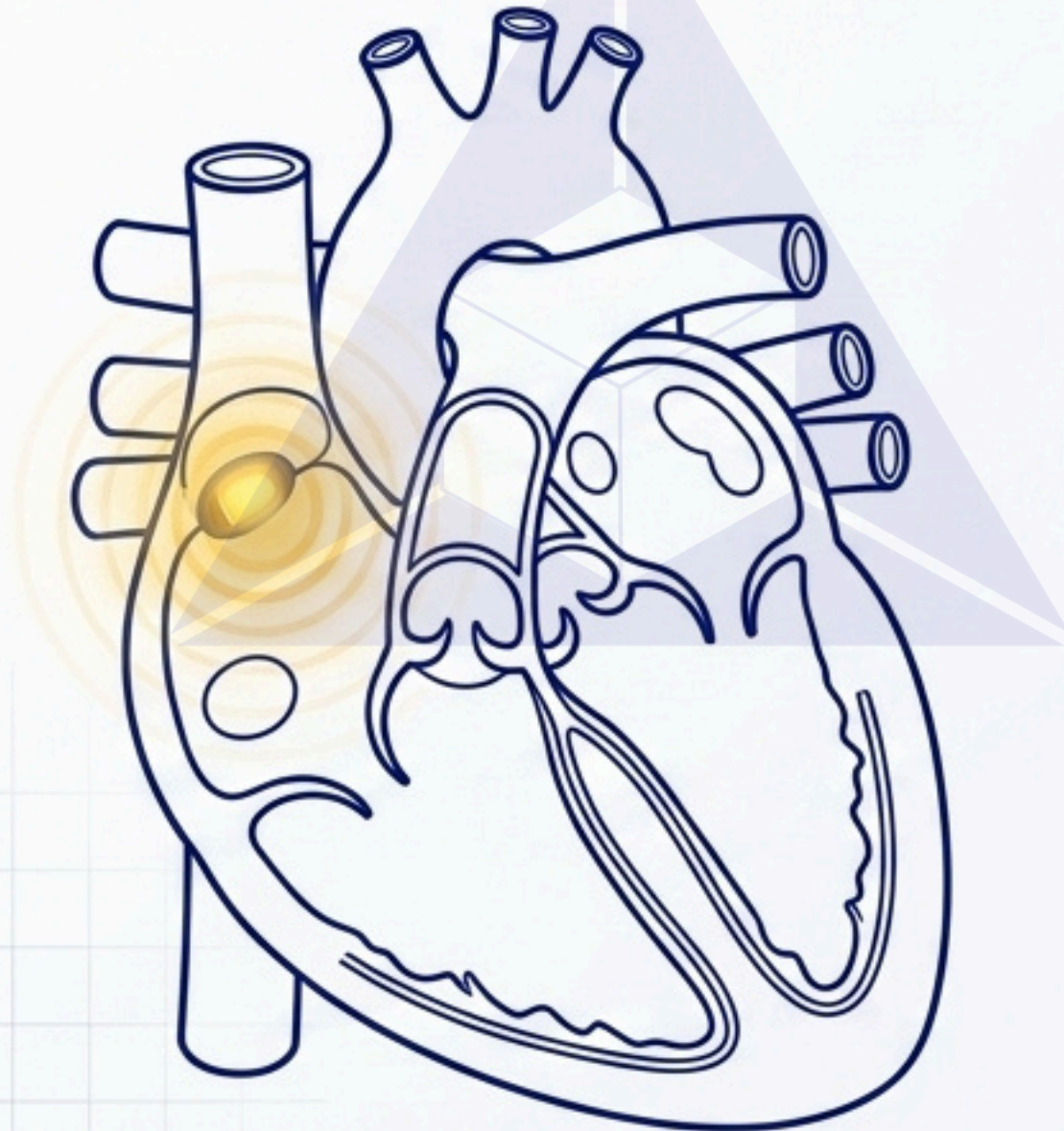


Normal activities of the heart are regulated intrinsically by specialized cardiac musculature called nodal tissue.

Autoexcitable Concept: Nodal musculature has the unique ability to generate action potentials without any external stimuli. The heart provides its own spark.

The Sino-Atrial Node (SAN)

The Relay Map (Step 1)



Anatomical Placement

- Located in the right upper corner of the right atrium.
- A distinct patch of specialized nodal tissue.

Physiological Function

- Generates the initial action potential.
- Stimulates both atria to undergo simultaneous contraction (the atrial systole), increasing blood flow into the ventricles by about 30%.



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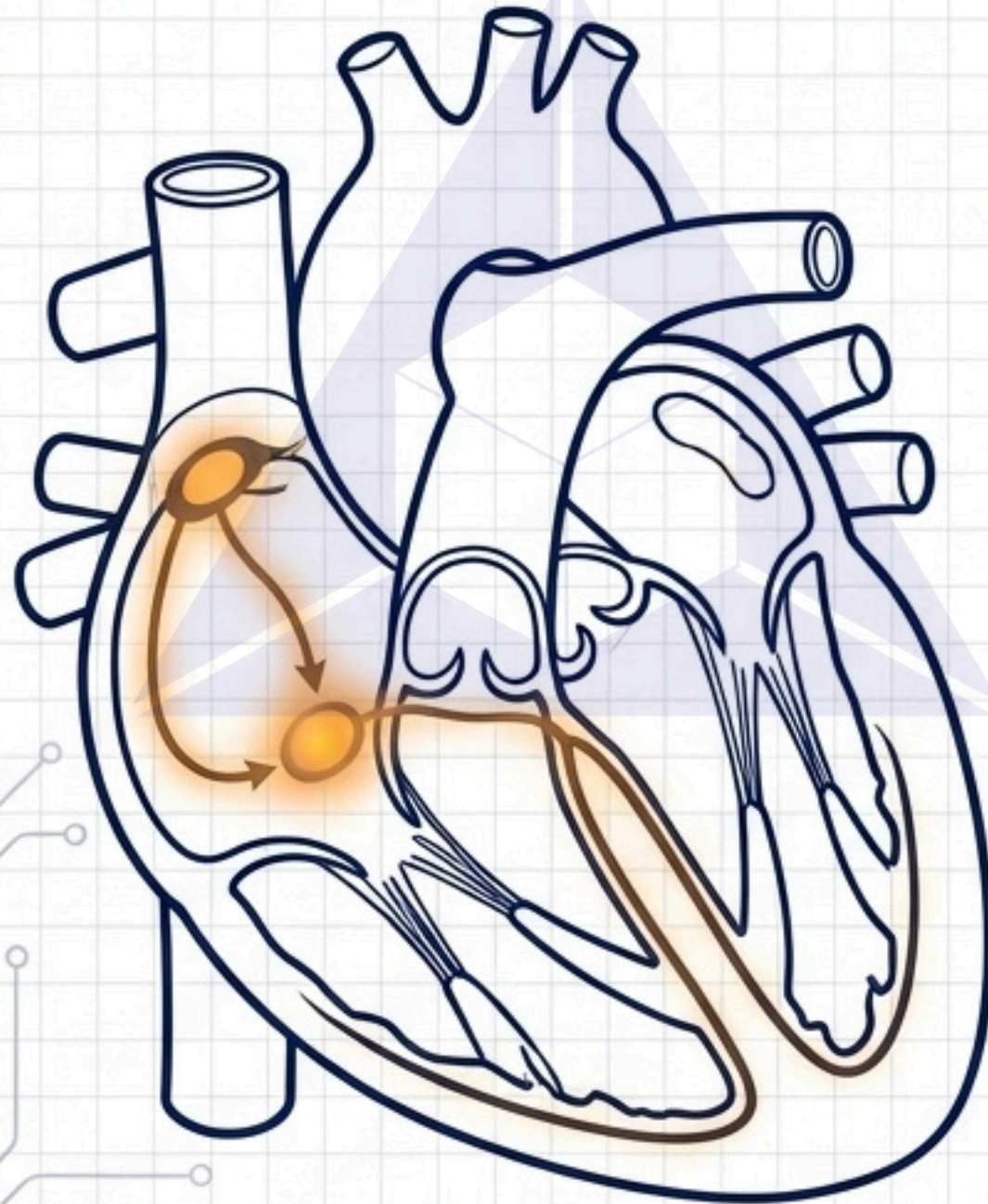
Key Highlights

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- » Track Your Performance Smarter



The Atrio-Ventricular Node (AVN)

The Relay Map (Step 2)



Anatomical Placement

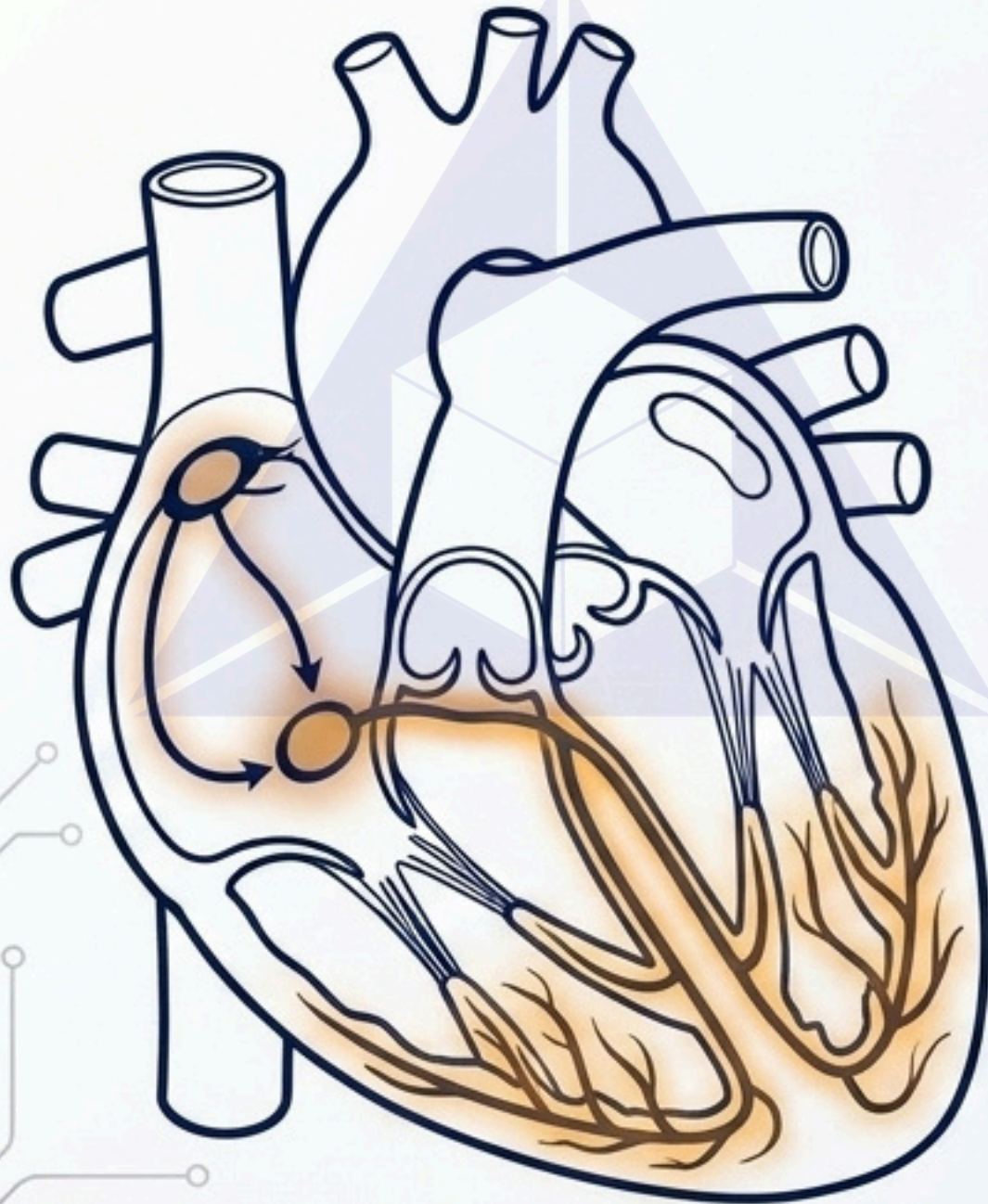
- Positioned in the lower left corner of the right atrium.
- Sits intimately close to the thick fibrous atrio-ventricular septum.

Physiological Function

- Acts as the essential relay station catching the electrical signal from the atria.
- Prepares to conduct the action potential across the non-conductive boundary into the ventricular side.

AV Bundle, Bundle of His & Purkinje Fibres

The Relay Map (Step 3)



AV Bundle

Continues directly from the AVN, passing through the atrio-ventricular septa to emerge on top of the inter-ventricular septum.

Bundle of His

The bundle immediately divides into a right and left branch running down the septum.

Purkinje Fibres

These branches give rise to minute fibres extending throughout the entire ventricular musculature, causing massive ventricular contraction (systole).

Why the SAN Rules: The Pacemaker Override

Pacemaker Hierarchy Matrix

	Component	Action Potential Generation	Primary Role
1	Sino-Atrial Node (SAN)	70–75 min ⁻¹	Master Initiator (Pacemaker)
2	Subordinate Nodal Tissue	Slower Generation	Relay / Distributor

While all nodal tissue is autoexcitable, the SAN generates the maximum number of action potentials. The fastest node overrides the others, setting the pace for the entire organ's rhythmic contractile activity.

The Pulse Timeline



The Biological Circuit Complete

The human heart is a self-regulated, myogenic machine. A single beat is the result of a perfectly timed electrical cascade.



This precise, repeating electrical sequence constitutes the cardiac cycle, pumping blood tirelessly without a single external command.



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