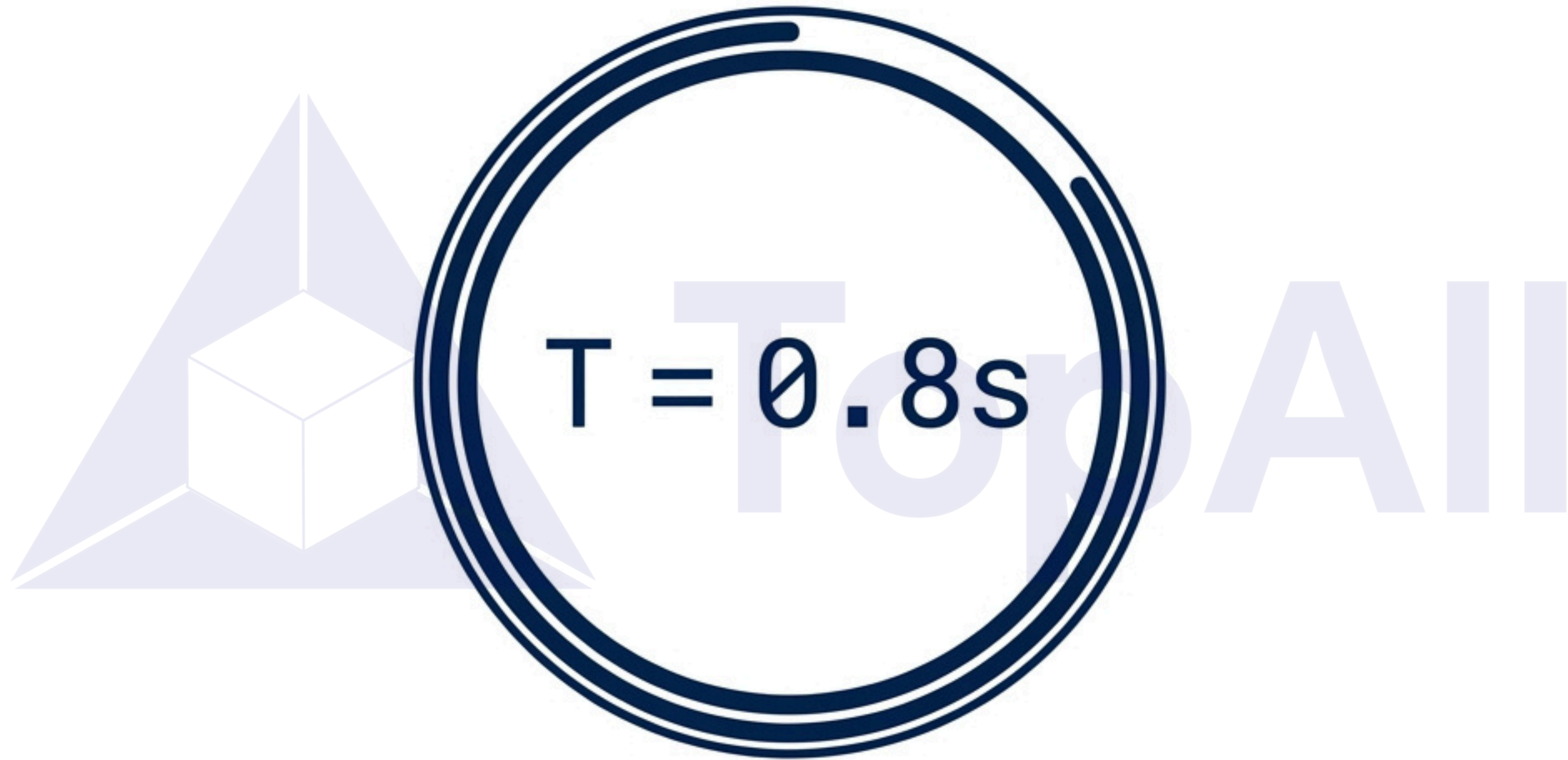


The 0.8-Second Heartbeat Sequence



Mechanics, timings, and mathematics
of the human cardiac cycle.

Phase 01: Joint Diastole

Chamber Status

ATRIA: [RELAXED]
VENTRICLES: [RELAXED]

Context: All four chambers
are in a resting, dilated state.

Valve Status

TRICUSPID/BICUSPID:
[OPEN]

SEMILUNAR: [CLOSED]

Flow Metrics

Blood flows passively from
the pulmonary veins and
vena cava, moving
completely through the left
and right atria directly into
the ventricles.

ELECTRICAL: Baseline. Awaiting Sino-Atrial Node (SAN) trigger.

Phase 02: Atrial Systole

Chamber Status

ATRIA:
[CONTRACTING]

VENTRICLES:
[RELAXED]

Valve Status

TRICUSPID/BICUSPID:
[OPEN]

SEMILUNAR:
[CLOSED]

Flow Metrics

VENTRICULAR VOLUME:
[+30% INCREASE]

The contraction forces a top-up volume into the already filling ventricles.

Sensory Node

ELECTRICAL: Action Potential Generated.

The Sino-Atrial Node (SAN) fires, stimulating simultaneous atrial contraction.



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$$E=mc^2$$



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Phase 03: Ventricular Systole

Chamber Status

ATRIA: [RELAXED]

VENTRICLES: [CONTRACTING]

Valve Status

TRICUSPID/BICUSPID: [CLOSED]

SEMILUNAR: [OPEN]

Flow Metrics

Blood is forcefully ejected into the circulatory pathways via the pulmonary artery (right) and aorta (left).

Sensory Node

ELECTRICAL: Signal passes to AVN -> AV Bundle -> Purkinje fibres.

ACOUSTIC: FIRST HEART SOUND [LUB] (Sudden closure of tricuspid/bicuspid valves).

Phase 04: Ventricular Diastole



Diagnostic Dashboard

Chamber Status

ATRIA: [RELAXED]

VENTRICLES: [RELAXING]

Valve Status

SEMILUNAR: [CLOSED]

TRICUSPID/BICUSPID:
[PUSHED OPEN]

Flow Metrics

Venous blood pooling in the atria forcefully pushes AV valves open, resuming free flow into ventricles. System returns to Joint Diastole.

Sensory Node

Acoustic Data Only

ACOUSTIC: SECOND HEART SOUND [DUB] (Sudden closure of semilunar valves).

System Pace: The 0.8s Derivation

OBSERVED PACE: 72 Beats / Min

60 seconds (1 minute)

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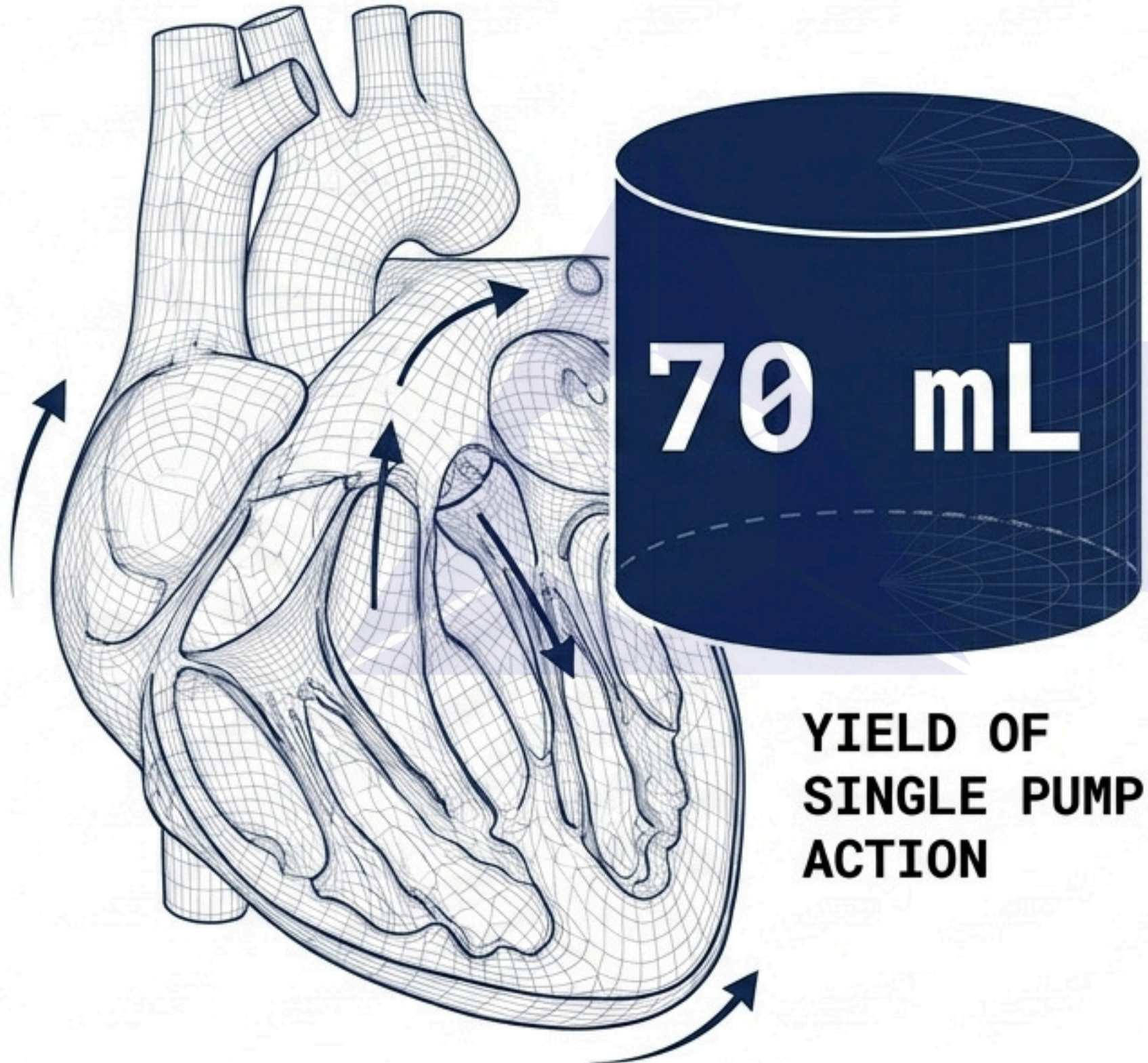
72 cycles (beats)

=

0.8 seconds per cardiac cycle

The Sino-Atrial Node (SAN) pacemaker generates 70–75 action potentials per minute, sustaining this rhythmic contractile activity.

Stroke Volume: Output Per Cycle



VARIABLE:

Stroke Volume

VALUE:

~70 mL

DEFINITION:

The exact volume of blood pumped out by ***EACH*** ventricle during a single 0.8-second cardiac cycle.

Cardiac Output: The 5-Liter Synthesis



RATE

72

Beats / Min

×

VOLUME

70

mL / Beat

=

OUTPUT

5040

mL / Min

CARDIAC OUTPUT $\approx$ 5 LITERS / MIN

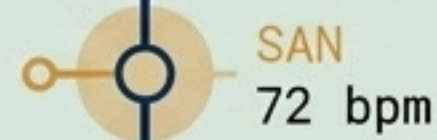
ADAPTABILITY

The body can actively alter both heart rate and stroke volume. An athlete's maximum cardiac output vastly exceeds the resting 5L average.

Synthesis

1. The Spark (Electrical)

The auto-excitable SAN dictates a natural rhythm of 72 cycles per minute.

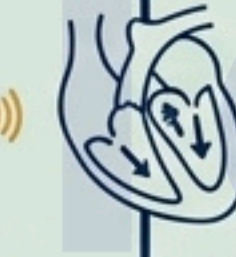


2. The Sequence (Mechanical)

A highly choreographed 0.8-second systole/diastole loop utilizing pressure differentials to snap valves open and closed (creating the diagnostic LUB-DUB acoustic signature).

0.8s loop --  SYSTOLE/DIASTOLE 

 LUB-DUB 



3. The Sustenance (Volumetric)

This sequence flawlessly ejects 70mL per ventricle, per beat, guaranteeing a continuous ~5L/min supply of life-sustaining fluid to the human body.





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