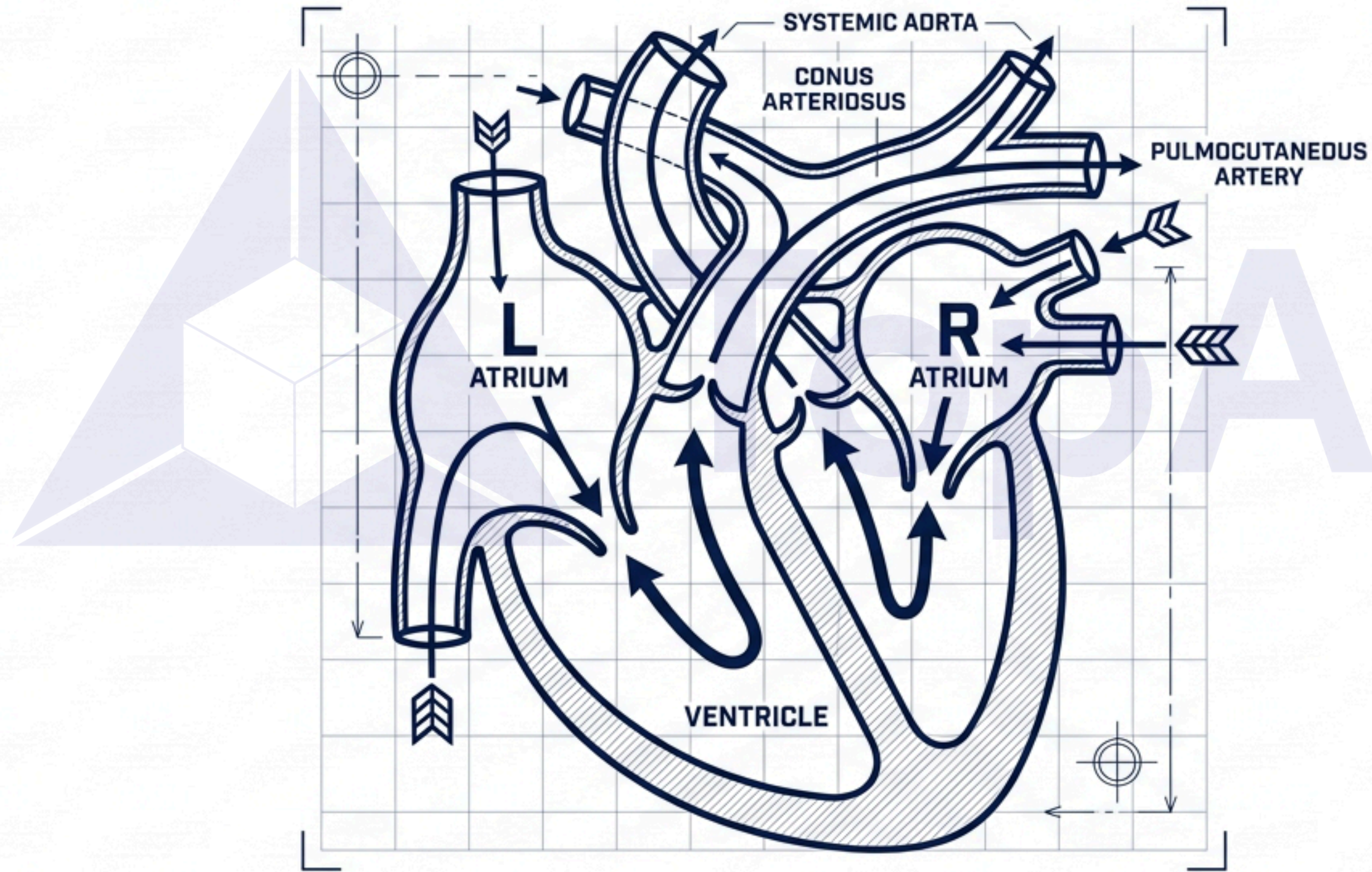
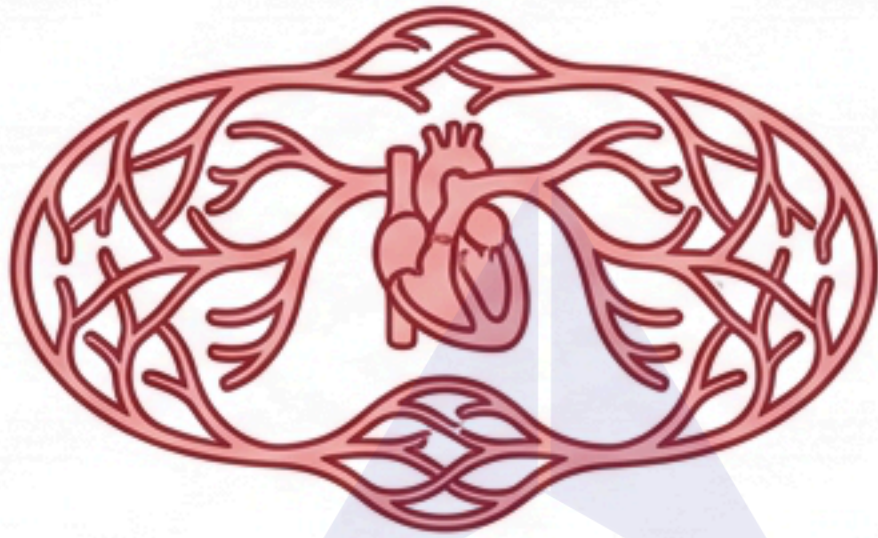


Three-Chambered Heart in Action

A Macro-to-Micro Schematic of Frog Circulation and Lymphatic Systems

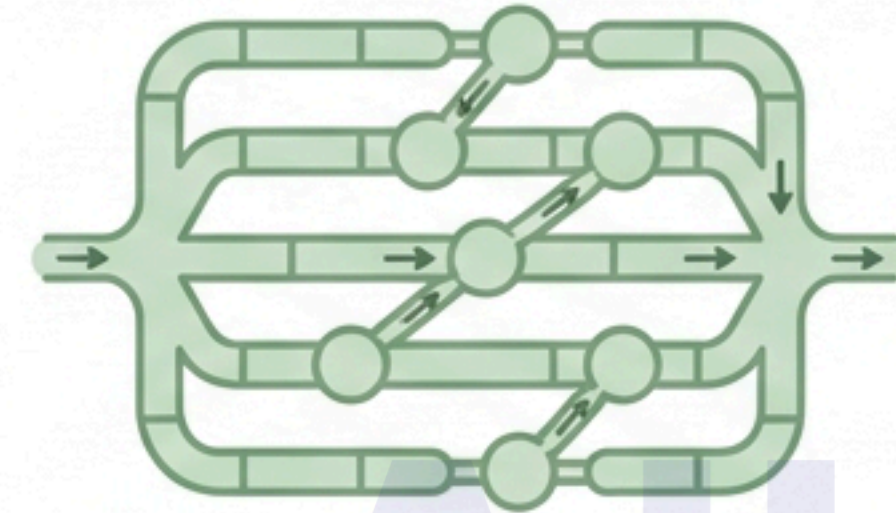


The Dual Fluid Network



Blood Vascular System

- Closed-type system utilizing a single circulation model.
- Driven by a muscular heart pumping blood through distinct vessels.



Lymphatic System

- A parallel network operating alongside the blood system.
- Consists of lymph fluid, specialized lymph channels, and lymph nodes.

Both systems are well-developed and function together to distribute nutrients, water, and gases while managing fluid balance.

The Three-Chambered Engine



A three-chambered architecture means oxygenated and deoxygenated blood mix within the single ventricle before being pumped to the body.



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$$E=mc^2$$



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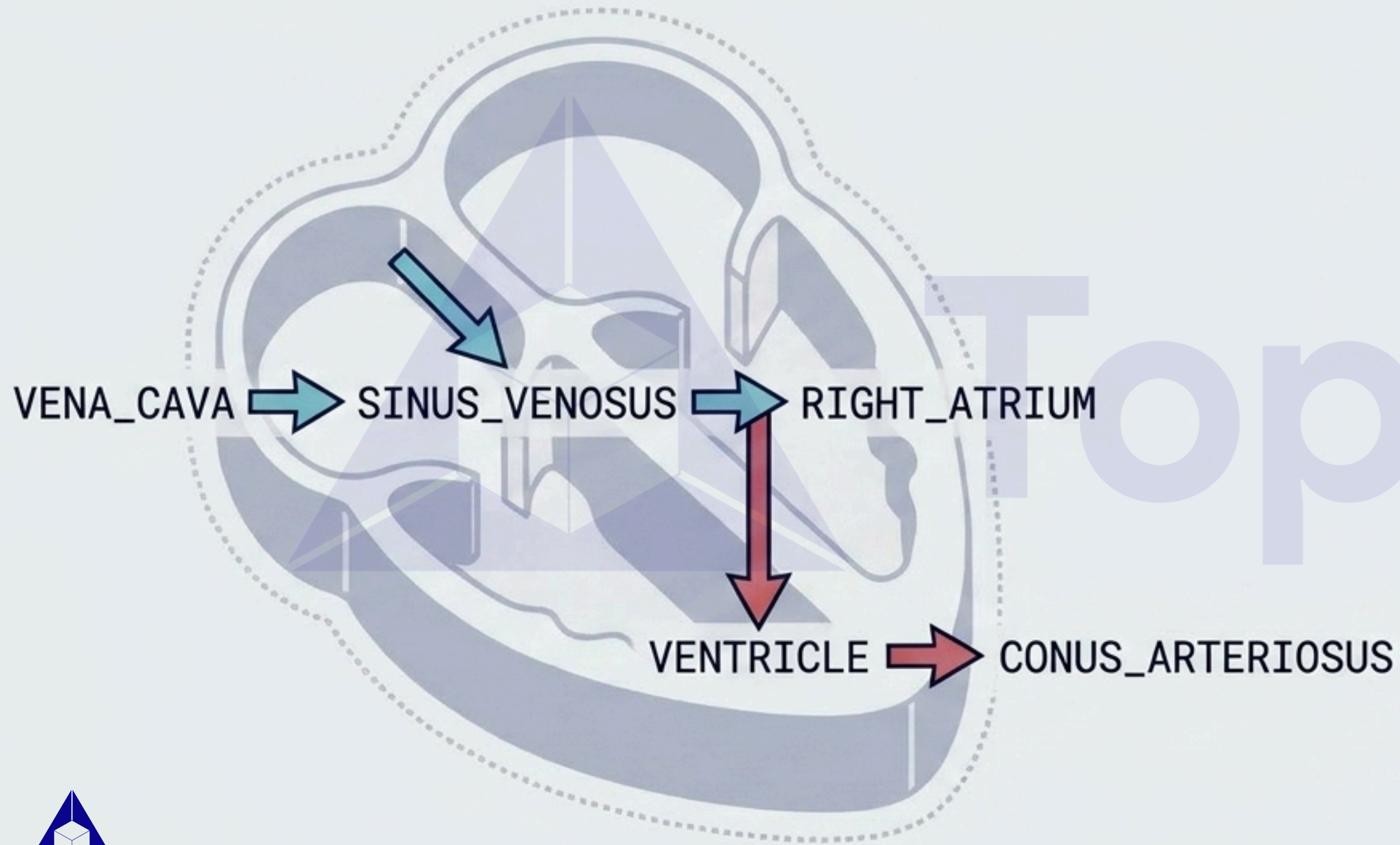
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Auxiliary Pumping Structures



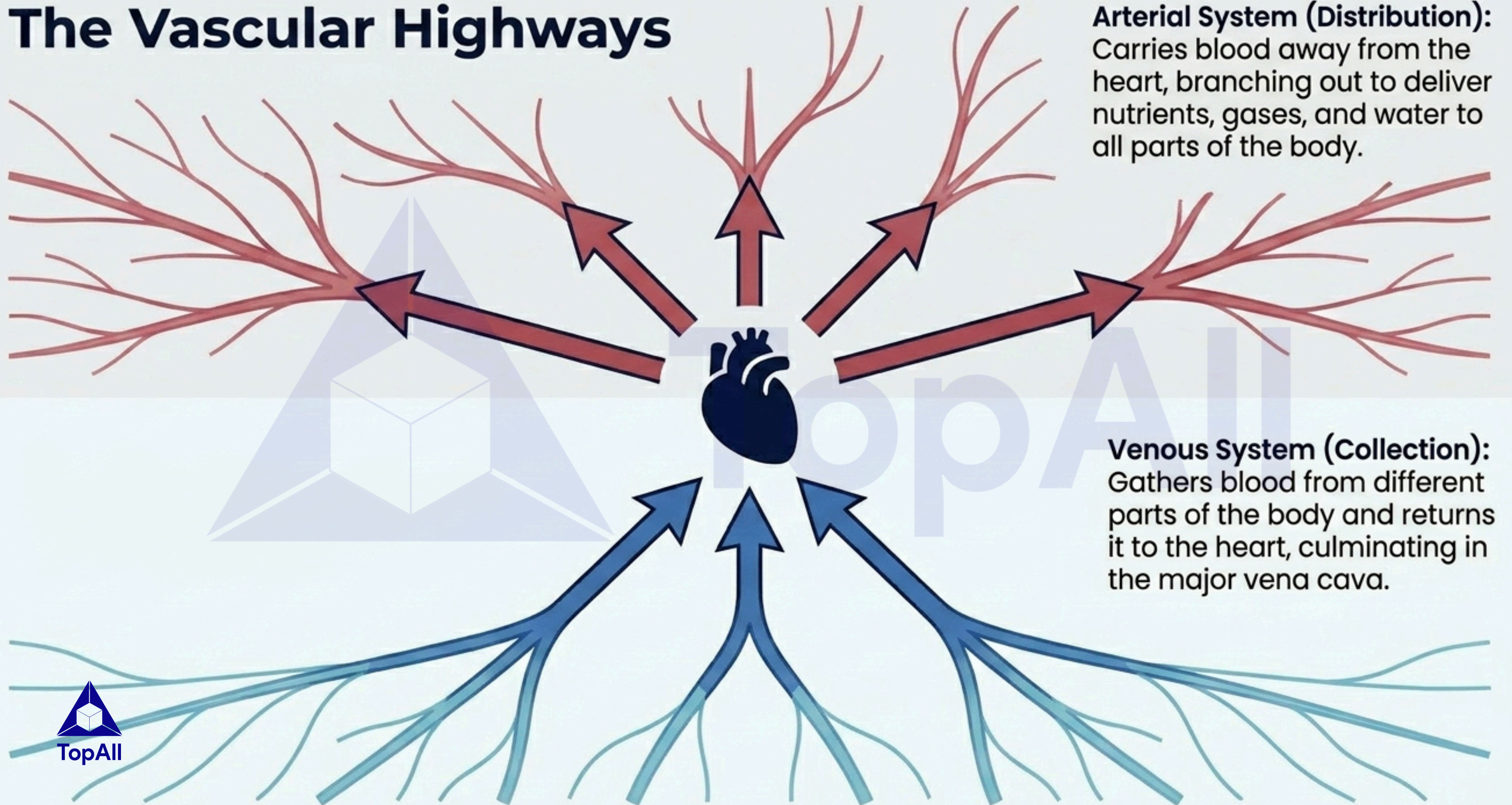
Input: Sinus Venosus

A distinct triangular structure that pools blood from the vena cava before feeding it into the right atrium.

Output: Conus Arteriosus

A specialized sac on the ventral side that receives the powerful outflow from the single ventricle and directs it to the body.

The Vascular Highways



Specialized Venous Routes



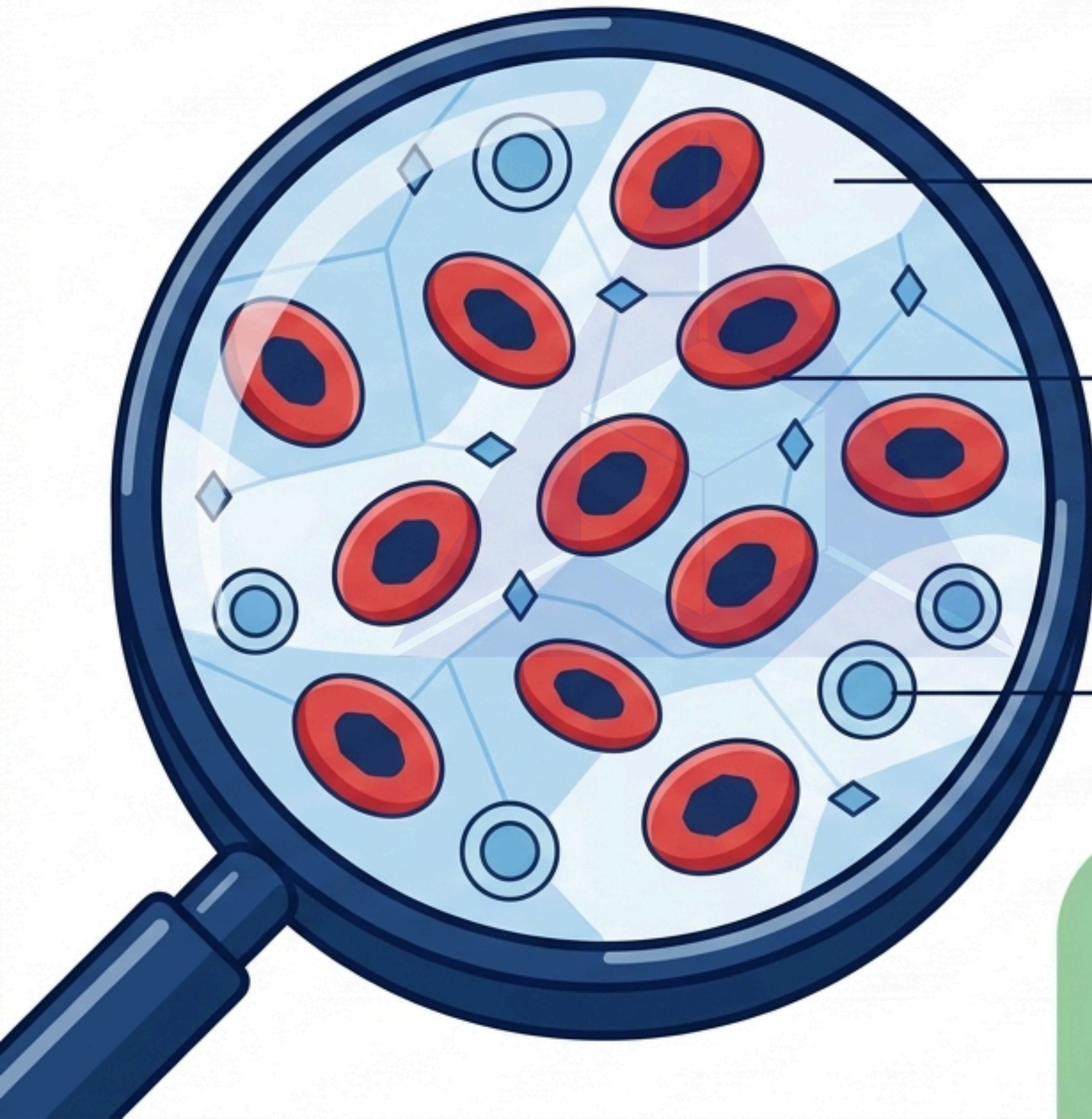
Hepatic Portal System: A specialized venous connection directly routing blood from the digestive tract to the liver.



Renal Portal System: A secondary specialized route connecting the lower parts of the body directly to the kidneys for processing.

Unlike standard veins that return blood directly to the heart, portal systems act as capillary-to-capillary transit routes between major organs.

Cellular Carriers of the Vascular System



Plasma: The fluid medium of the blood.

Erythrocytes (RBCs): The oxygen carriers. Distinctly nucleated and containing the red pigment haemoglobin.

Leucocytes & Platelets: Present alongside RBCs for immune defense and clotting.

Unlike mammalian red blood cells, frog erythrocytes retain their nucleus while still utilizing haemoglobin to transport vital oxygen and gases.

The Lymphatic Parallel



Feature	Blood	Lymph
Primary Pathway	Closed Blood Vessels (Arteries/Veins)	Lymph Channels & Nodes
Erythrocytes (RBCs)	Present (Nucleated)	Absent
Protein Content	High	Lacks Certain Proteins
Pump Mechanism	Muscular Heart	Passive/Skeletal Movement

While blood serves as the **primary high-pressure distribution network** for gases and nutrients, the **lymphatic** system provides a vital, **parallel drainage and immune network**, **distinguished** primarily by the **absence** of red blood cells and select proteins.



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