Blood vascular System of *Calotes*

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Blood-Vascular System
[I] Heart

- Heart of *Calotes lies* mid-ventrally in the anterior part of thoracic cavity or is placed in the anterior part of the pleuroperitonial cavityat at the level midway between the forelimb.

- The heart is enclosed in a thin transparent membrane, the pericardium, which is lined with endocardium, thus, it is two-layered. The space between the heart and pericardium is filled with pericardial fluid.

- The heart is triangular in shape and three-chambered-two auricles and a ventricle.

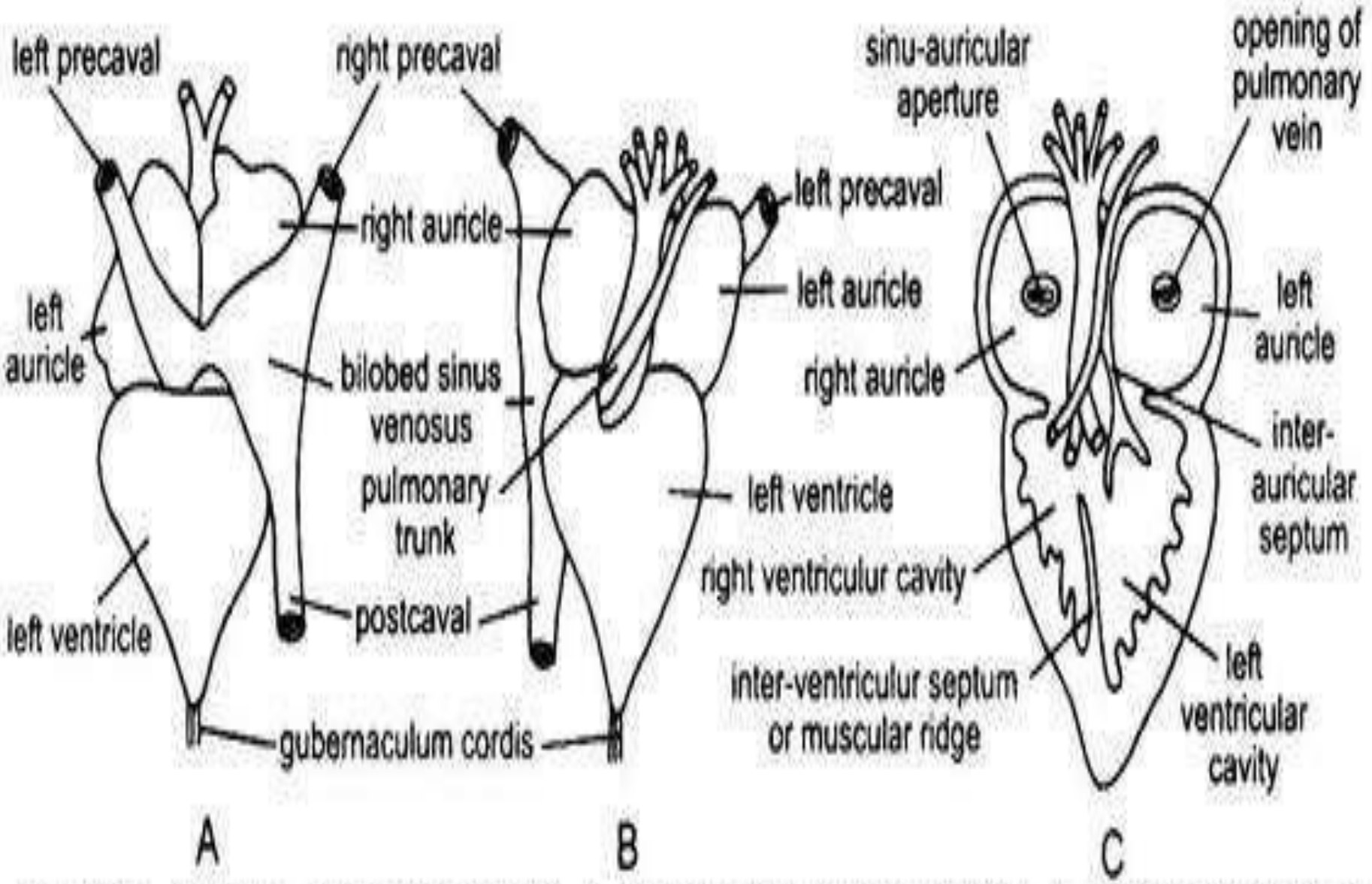


Fig. 22.4. *Calotes*. Structure of heart. A–Dorsal view; B–Ventral view; C–Internal structure in diagrammatic ventral view.

External features

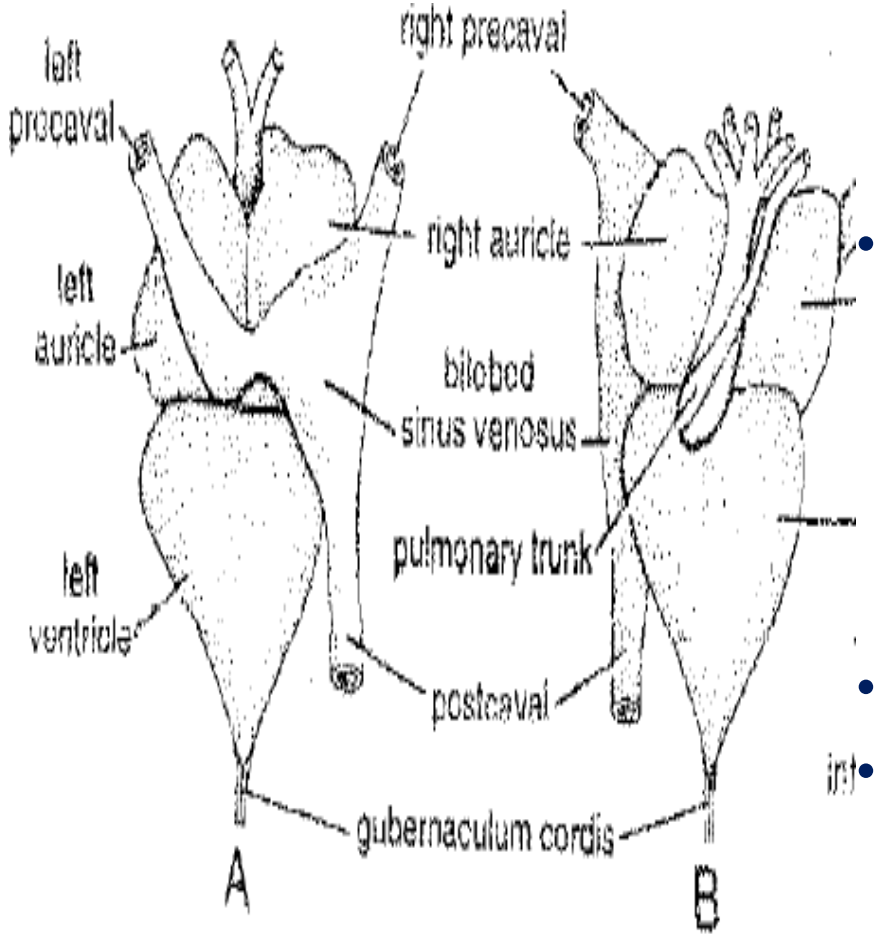


Fig. 4. *Calotes*. Structure of heart. A—Dorsal view. B—Ventral view.

- Heart is a triangular, red-coloured and 3-chambered muscular organ. This, slight anterior location of the heart indicates a little lower grade of organization.
- The right auricle is larger than the left auricle. *The* anterior two *auricles are clearly marked off from* the posterior single *ventricle by a transverse auriculo-ventricular groove.*
- *A truncus arteriosus is* lacking.
- The thin-walled *sinus venosus*, *reduced* and unequally bilobed by a constriction, lies transversely and dorsally upon the auricles. It is formed by the fusion of the three venae cavae.

External features

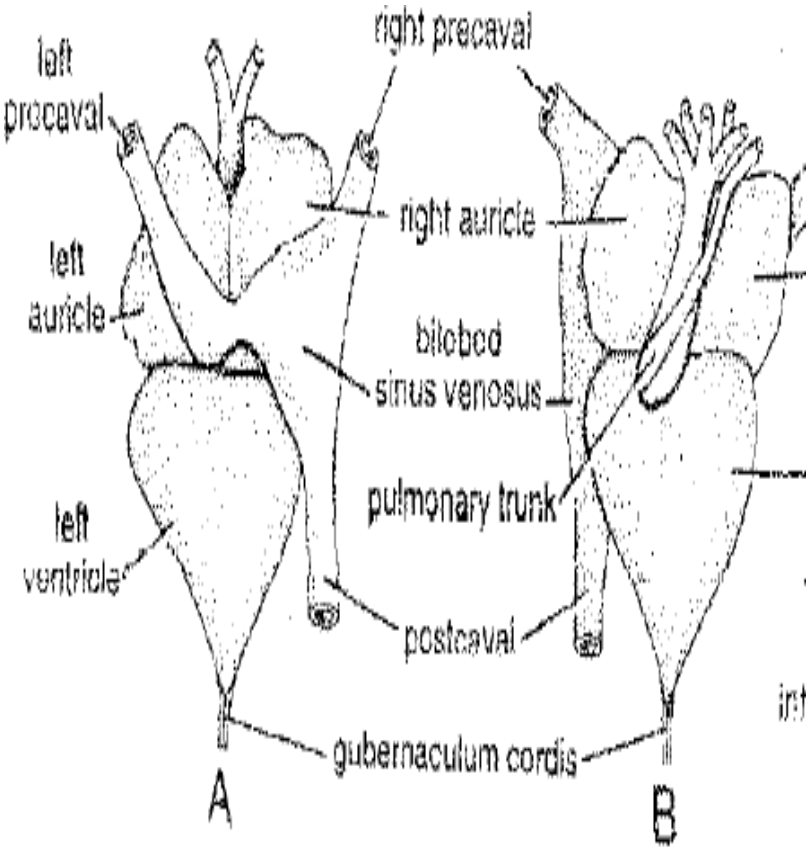
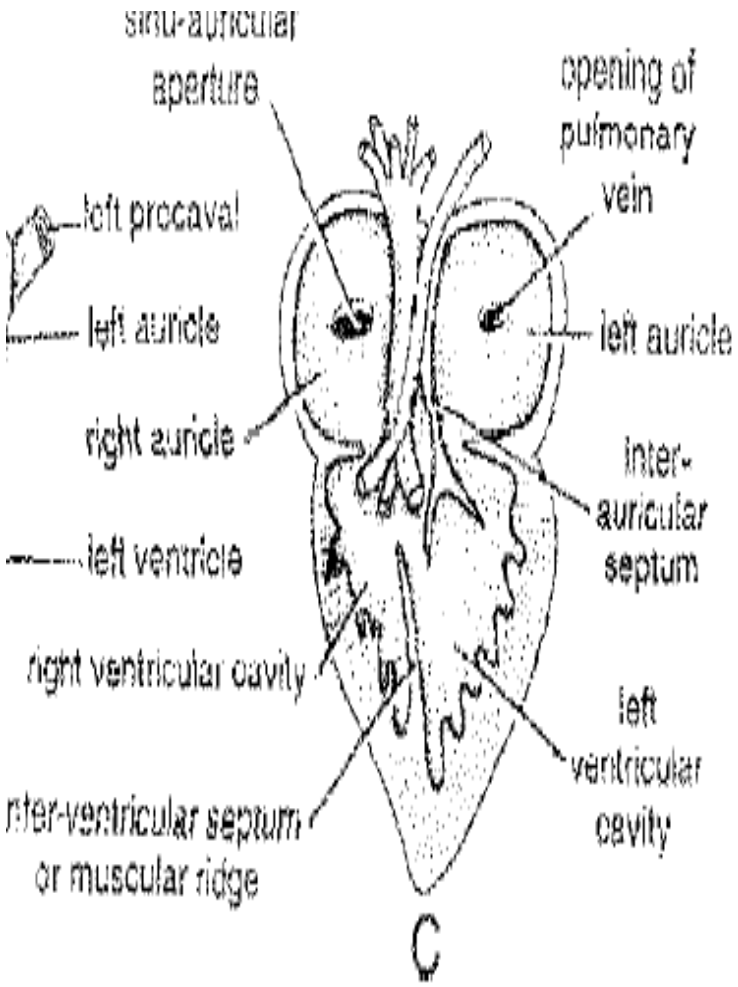


Fig. 4. *Calotes*. Structure of heart. A—Dorsal view. B—Ventral view.

- These three venae cavae empty independently into the sinus venosus.
- There are no valves.
- The smaller left lobe of sinus venosus is formed by the left precaval, while the larger right lobe is formed by the union of right precaval and the postcaval.
- The apex of the ventricle is attached with the liver by a thin, white cord of tissue, the gubernaculum cordis.

Heart: Internal structure.



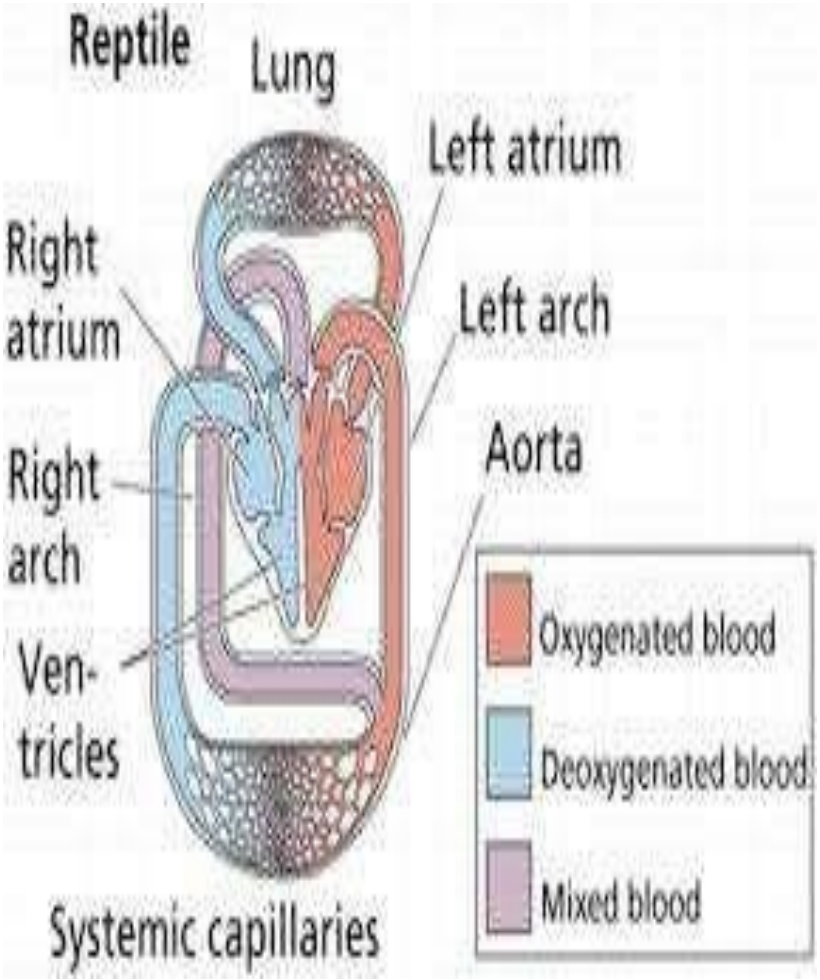
w. C—Internal structure in diagrammatic ventral view.

- Internally the two auricles are separated by a thin, muscular and vertical interauricular septum.
- Right auricle is larger and darker. Its thicker wall is raised internally into small ridges, the musculi pectinati.
- Sinus venosus opens into its dorsal wall by a large semicircular sinu auricular aperture, guarded by two flap-like sinu auricular valves. These valves develop from the upper and lower margins of the aperture and their frilled free ends project into the lumen of right auricle.
- Left auricle is smaller, thin-walled and its roof receives a small circular and valveless common pulmonary aperture of pulmonary veins

Heart: Internal structure.

- Ventricle has thick, spongy muscular walls internally projecting into interlacing ridges, called columnar carneae.
- The two auricles open into ventricle' through right and left uuriculo-ventricular apertures guarded by auriculo-ventricular valves. The flaps of these valves are attached to columnae carneae by thread-like muscles, the chordae tendineae.
- An incomplete interventricular septum or muscular ridge divides the lumen of ventricle incompletely into a right chamber, cavum pulmonale, and a left chamber, cavum dorsale. This partition has become complete in crocodiles except for an aperture, called foramen of Panizza. The foramen of Panizza is a communicating aperture between the left and right systemic arches just at the point of crossing after their emergence from the ventricle.
- Three arches, right and left systemic and pulmonary, arise from ventricle.
- Each arch has paired semilunar valves at its base to check return of blood. The walls of the heart are provided with three layers viz., tunica intima, tunica media and tunica adventitia, out of these tunica media is made of cardiac muscles and is innervated with cardiac branch of 10th cranial nerve.

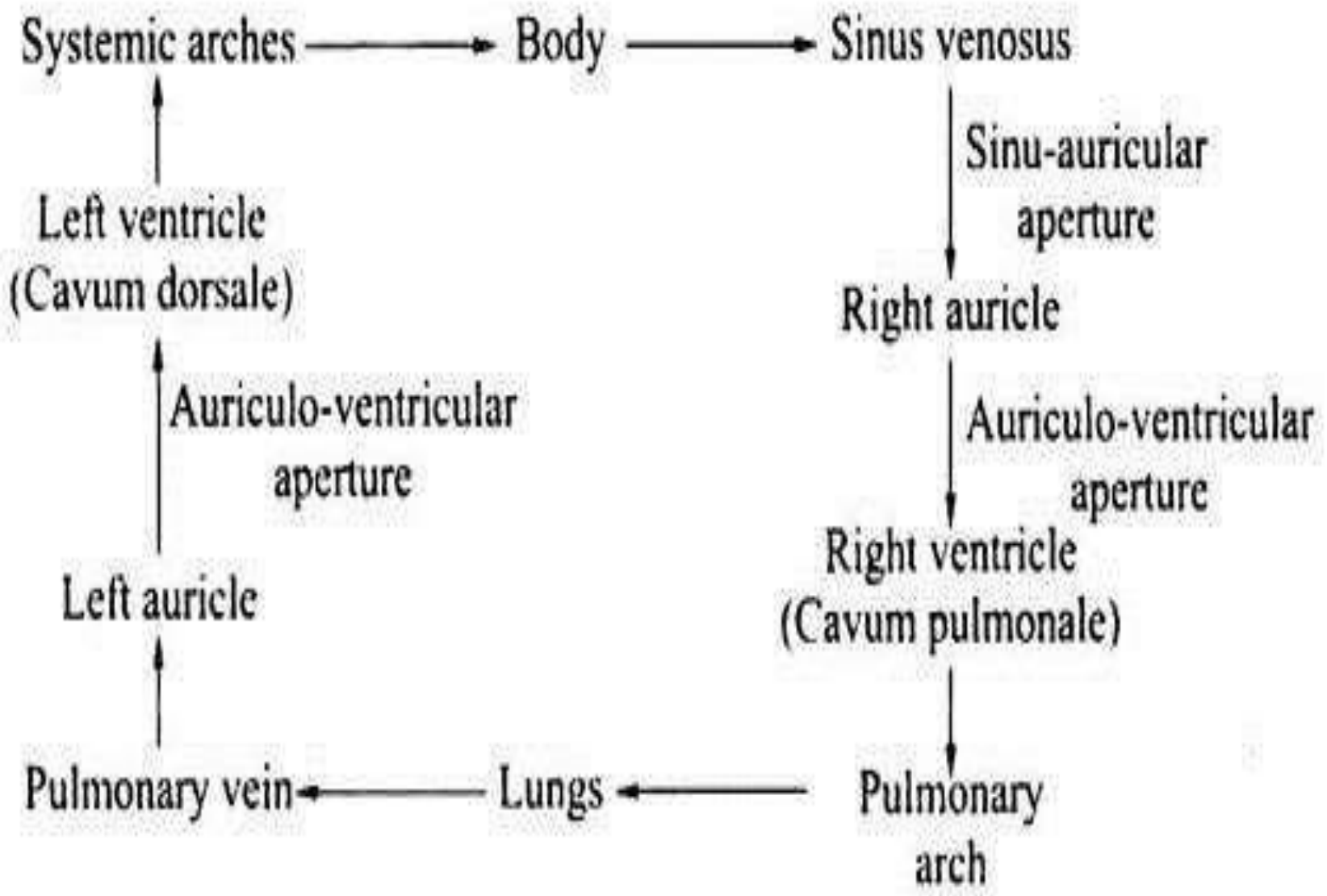
Working of Heart



- In the garden lizard *(Calotes)*, the circulation of blood is double.
- The deoxygenated blood of the sinus venosus enters the right auricle through sinu-auricular aperture.
- The oxygenated blood from the lungs enters the left auricle by the pulmonary vein.
- The left auricle pours its blood into the left part of cavum dorsale of the ventricle through the auriculo-ventricular aperture.
- The right auricle also pours its blood into the right portion of cavum pulmonale or ventrale of the ventricle through the auriculo-ventricular aperture.

- The oxygenated blood from the cavum dorsale goes principally through both carotid arches and the right systemic arch.
- Some of the right systemic blood may be added via the ductus caroticus to that of the internal carotid.
- While the deoxygenated blood from the cavum pulmonale passes into the pulmonary arteries for reoxygenation in the lungs.
- The blood in the right part of the cavum dorsale goes into the left systemic arch and probably passes through the ductus caroticus on that side into the carotid.

Blood Flow


Systemic arches
Body
Sinus venosus
Sinu-auricular aperture
Left ventricle (Cavum dorsale)
Right auricle
Auriculo-ventricular aperture
Auriculo-ventricular aperture
Left auricle
Right ventricle (Cavum pulmonale)
Pulmonary vein
Lungs
Pulmonary arch

Blood

- Blood of Calotes is red in colour and is made up of plasma and blood cells.
- The red blood corpuscles are biconvex, elliptical in outline and each bears an elliptical nucleus.
- The white blood corpuscles are irregular in outline, non-pigmented and each bears a spherical nucleus.