

# *Pila globosa*

## Circulatory system

# Blood Vascular System of *Pila globosa*

- Due to double mode of respiration the blood vascular system of *Pila globosa* has become very much complicated. It is of open type.
- **It consists of:**
  - (i) Pericardium
  - (ii) Heart
  - (iii) Arteries
  - (iv) Sinuses
  - (v) Veins, through which the blood flows.

### **(i) Pericardium:**

- The pericardium is a thin-walled ovoid sac lying dorsally on the left side of the body whorl behind the mantle cavity.
- It extends anteriorly up to the stomach and digestive gland.
- It is a fairly deep cavity which communicates with that of the posterior renal chamber through a renopericardial aperture.
- The pericardium corresponds to the coelom of annelids and vertebrates.
- It encloses the two chambers of the heart, the main aortic arches and the aortic ampulla.

### **(ii) Heart:**

- The heart of *Pila globosa* has a single auricle and one ventricle found enclosed in the pericardium. Physiologically, the heart is said to be myogenic

## (a) Auricle:

- The auricle lies in the dorsal part of the pericardium, while the ventricle is situated just below it in the same vertical axis.
- The auricle is a thin-walled, highly contractile sac and more or less triangular in shape.

## Ventricle:

- The ventricle is ovoidal in shape and has thick spongy wall formed of a large number of muscular strands forming a meshwork which greatly reduces the cavity of the ventricle.

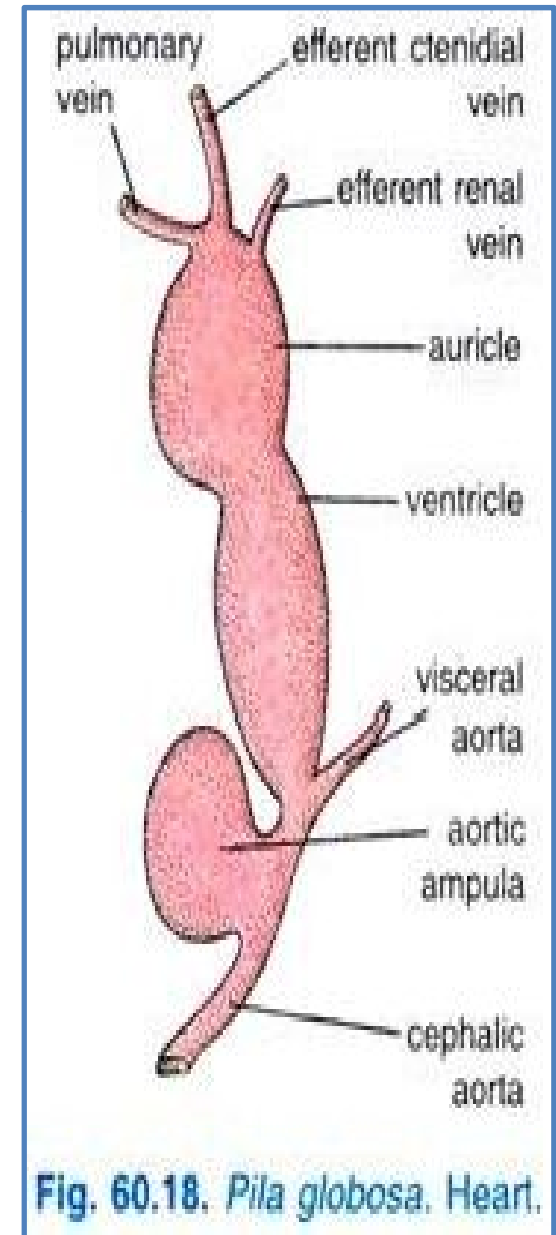


Fig. 60.18. *Pila globosa*. Heart.

## Arteries:

- From the ventricle arises an aorta or aortic-trunk which divides into two branches, a cephalic aorta and a visceral aorta.
- The cephalic aorta has a bulbous outgrowth called aortic ampulla, a characteristic of the members of the family Pilidae, which aids in **circulation of blood and controls blood pressure.**
- first supplying to the **skin**, the cutaneous artery, second supplying to the oesophagus, the oesophageal artery and third being stout and thick supplies to the left side of the mantle, the left pallial artery.

## **Visceral Aorta:**

- The visceral aorta runs into the visceral mass and supplies to its different organs by giving off many branches.

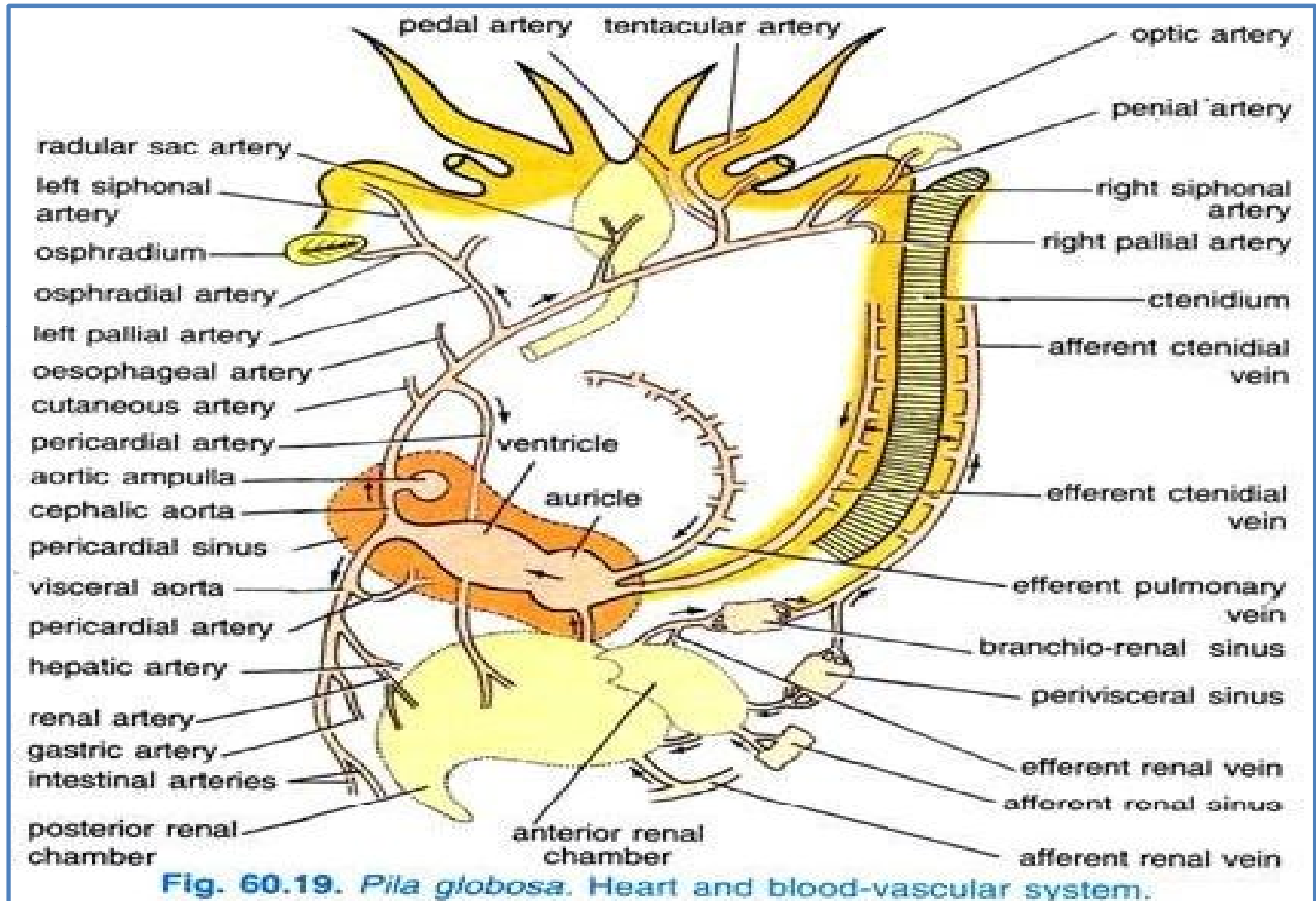
## **There are four chief sinuses in the body:**

- (a) Anterior peri-visceral sinus.
- (b) Anterior peri- intestinal sinus.
- (c) Branchio-renal sinus and
- (d) Pulmonary sinus.

## **Veins:**

- The veins carry venous blood from different parts of the body to the auricle directly or through the gill, mantle and kidney.

# *Pila globosa*- circulatory system



## **Blood:**

- The blood of gastropods contains a respiratory pigment called **haemocyanin** which is a compound of **copper and protein**, haemocyanin is dissolved in the plasma and gives a **faintly blue colour to the blood**.
- But in a few gastropods, such as Planorbis, haemoglobin is found in place of haemocyanin.
- In the blood plasma are **stellate amoebocytes** which are phagocytic, they **remove waste substances and some of them carry on intracellular digestion**.



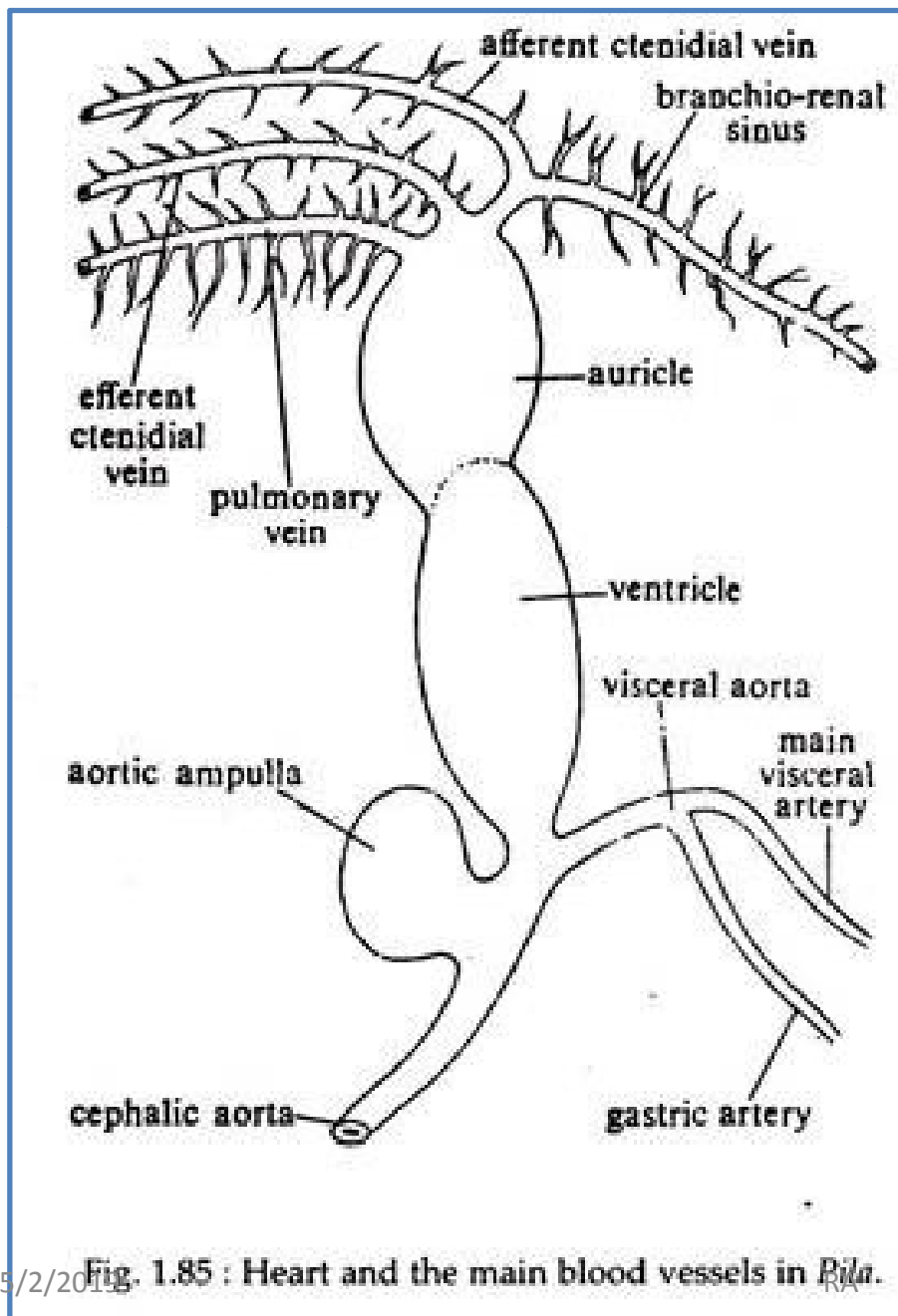


Fig. 1.85 : Heart and the main blood vessels in *Pila*.

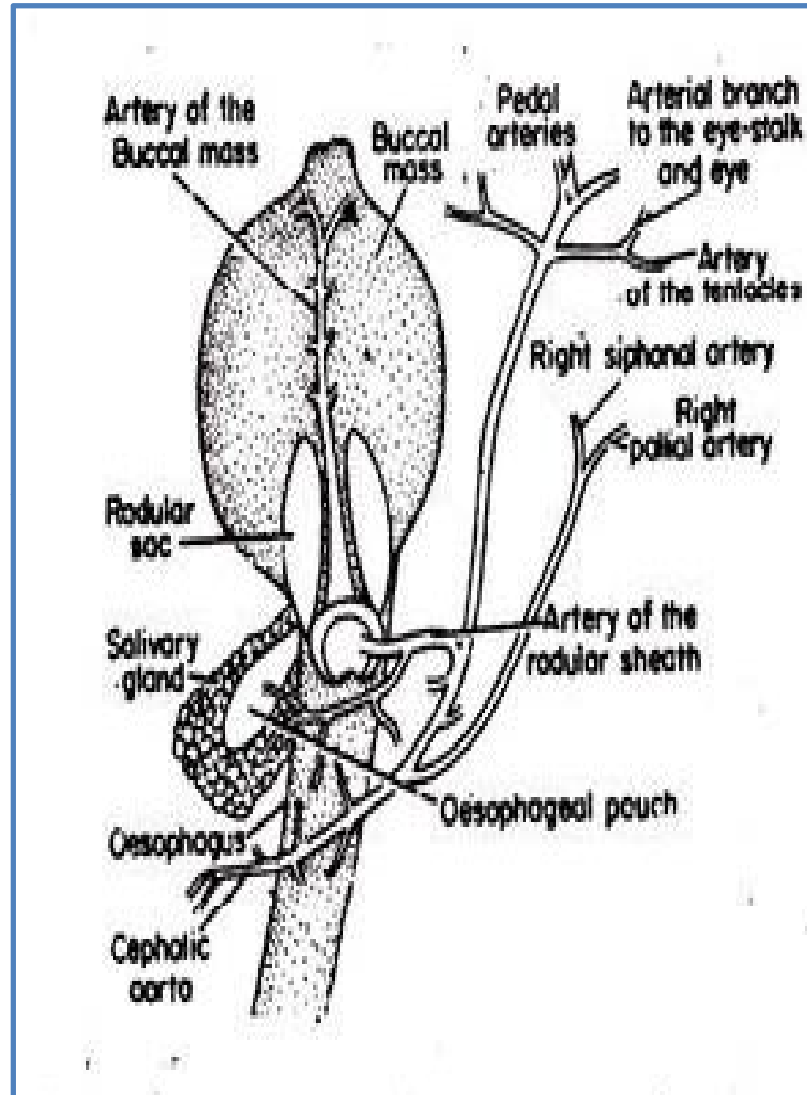


Fig. 1.86 : Showing blood supply to the buccal mass and adjoining structures in *Pila*.

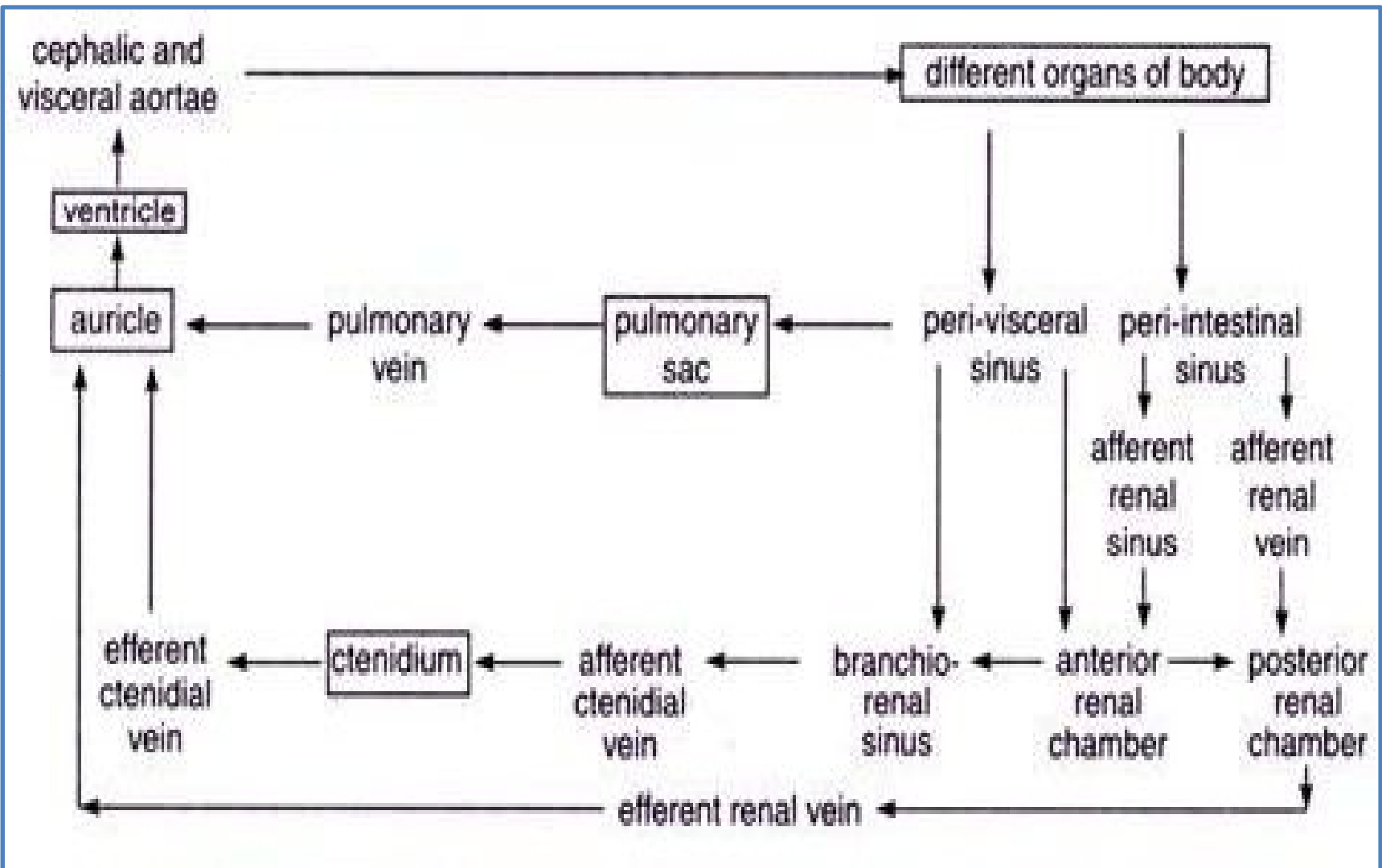


Fig. 60.20. *Pila globosa*. Diagrammatic representation of the course of circulation.

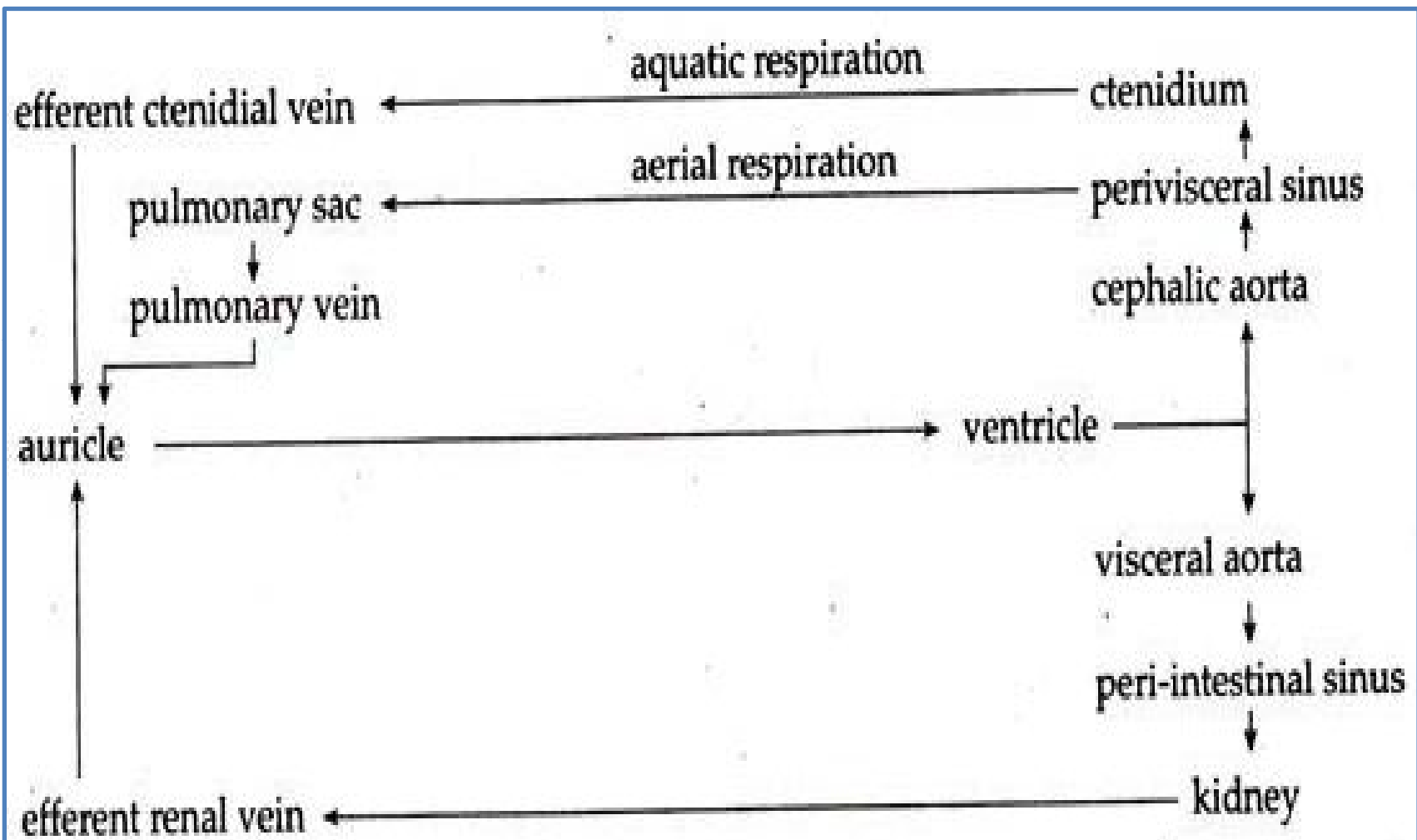


Fig. 1.87 : Flow chart of circulation in *Pila*.

## **Course of Circulation:**

- **All parts of the body are supplied with blood from the ventricle through the cephalic and visceral aortae.**
- **The cephalic aorta carries blood to the head and its associated structures, a part of the mantle, the buccal mass, the oesophagus, the copulatory organ and the columellar muscle.**
- **The visceral aorta supplies the whole of the visceral mass.**

- **The blood is collected from the various parts of the body into two main sinuses the peri-visceral and peri-intestinal.**
- **From these sinuses, the blood passes either into the ctenidium, pulmonary sac or into the renal organ.**
- **During aquatic respiration the blood from the peri-visceral sinus goes to the ctenidium and is purified; an efferent ctenidial vein then takes this blood into the auricle.**

- During **aerial respiration** the **blood from the peri-visceral sinus** goes to the lung and is **purified**;
- a pulmonary vein takes this blood into the auricle.
- The blood from **the peri-intestinal sinus** takes two courses, it either goes **from this sinus to the anterior renal chamber** and from there **to the ctenidium and is purified**, then through the efferent ctenidial vein it goes to the auricle.

- Or the blood from the peri-intestinal sinus goes to the anterior renal chamber, then to the posterior renal chamber, in any case the blood from the posterior renal chamber goes through an efferent renal vein into the auricle.
- Thus, the **auricle receives pure blood from the ctenidium or the lung and impure blood from the posterior renal chamber, this mixed blood enters the ventricle and is distributed to the arteries.**
- The renal chambers, however, remove waste substances from the blood.