

Venous system in Protochordates and Cyclostomes

Venous system of Protochordates

Branchiostoma :

Subintestinal Vein:

From the lymph spaces of the intestine blood is collected into a median longitudinal a subintestinal vein. For a greater part of its length the subintestinal is not a single vein but a plexus of small vessels, it runs below the intestine, and blood flows forwards in it; The blood from the tail is collected by a caudal vein which in the intestinal region joins the plexuses of the subintestinal vein.

Hepatic Portal System:

The subintestinal vein in the anterior part of the midgut form a short but wide hepatic portal vein which runs along the ventral border of the midgut diverticulum and ramifies in its wall, thus, forming a system which is not strictly comparable with, but which foreshadows the hepatic portal system of vertebrates. Small blood vessels from the midgut diverticulum unite to form a short hepatic vein running along the dorsal border of the midgut diverticulum. The hepatic vein enters a sac-like sinus venosus from which arises the ventral aorta.

Parietal Veins:

A pair of parietal veins lying on either side of the gut receives blood from the dorsal body wall. They run dorsal to the intestine for a short distance and then run ventrally to open into the sinus venosus.

Cardinal Veins:

Running in the body wall at the level of gonads on each side are an anterior cardinal and a posterior cardinal veins which receive blood through small segmental veins coming from the body wall, myotomes and gonads. The anterior and posterior cardinal veins of each side unite just behind pharynx to form a ductus Cuvieri or common cardinal vein. The two ductus Cuvieri pass inwards through the atrium to join the sinus venosus.

A renal portal and a true hepatic portal system are absent because of the absence of kidneys and a true liver, yet the circulatory system is of the pattern found in vertebrates.

The course of circulation in Branchiostoma is as follows:

(a) The blood circulates from the posterior to the anterior end through the ventral vessel, sub-intestinal vein and the posterior cardinal veins, whereas

(b) The paired and unpaired dorsal aortae and the anterior cardinal veins drive blood from the anterior to the posterior direction.

Venous System of cyclostomes:

The venous system of lampreys consists of true veins and a complicated network of venous sinuses. The blood from the tail region is carried by a large caudal vein. This vein divides anteriorly into two posterior cardinal veins just at the point of the entrance into the abdominal cavity.

The cardinals collect the blood from kidneys, gonads and myotomes and ultimately open to the heart by a single ductus Cuvieri on the right hand side.

The left ductus Cuvieri is absent in adults, although both are evident in the larval stage. The blood from the anterior region of the body is conveyed to the heart by a pair of anterior cardinal veins. Besides these anterior cardinals, a large median inferior jugular vein drains blood from the musculature of the buccal funnel and gill-pouches.

There is no renal portal vein, but a hepatic portal vein draining blood from the gut enters into the liver through a contractile portal heart.

A very simple portal system is present which connects the hypothalamus with the pituitary. From the liver, the blood is carried to the heart by hepatic veins. Besides the veins, there are special networks of venous sinuses specially in the head region. The branchial sinuses constitute the most important of the sinuses and consist of three longitudinal channels.

These are:

- a. Ventral branchial sinus or ventral jugular sinus,
- b. Inferior branchial sinus situated below the gill-pouches, and
- c. Superior branchial sinus lying over the gill-pouches.

All these branchial sinuses are interconnected through the gill-bars