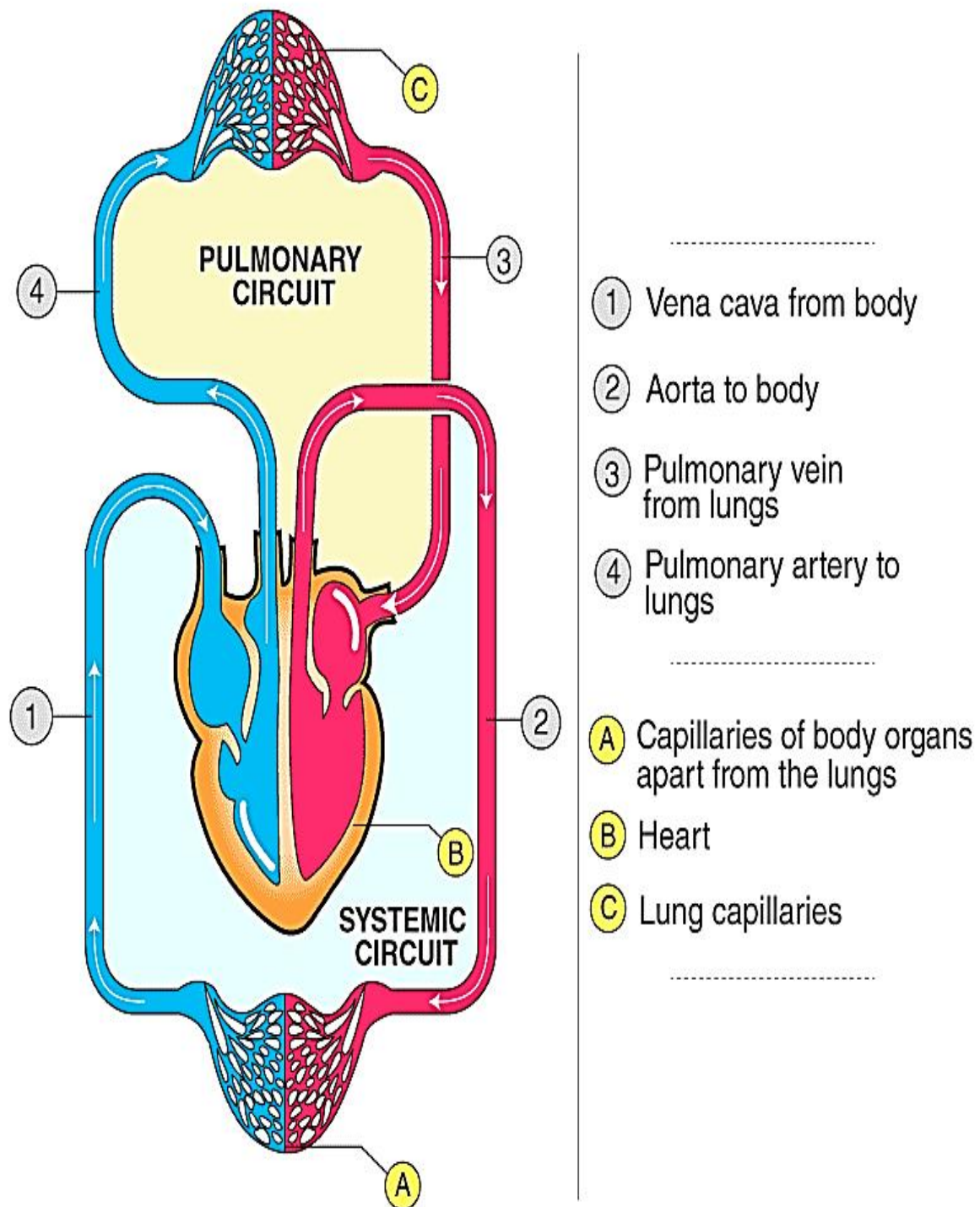
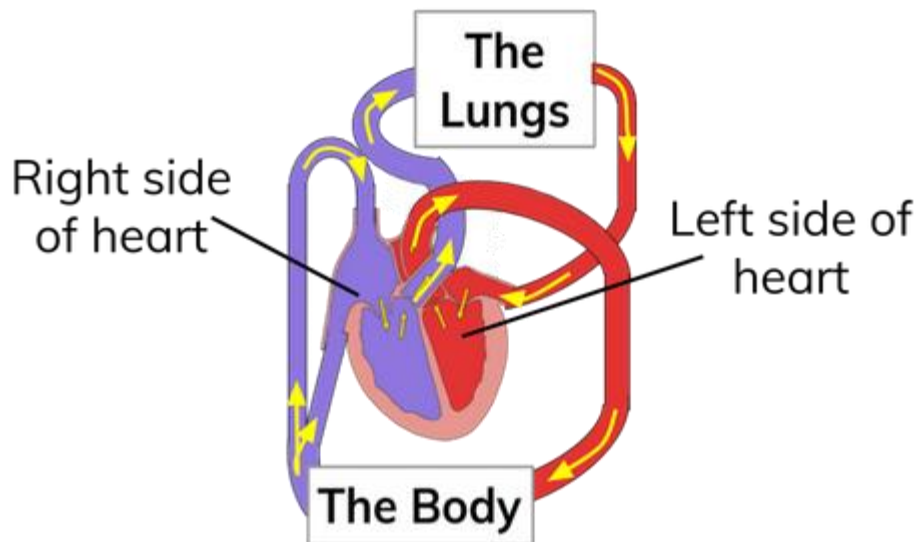


Double Circulation

The circulatory system is responsible for the transportation of nutrients and gases like oxygen, for the body and metabolic waste products away from the body. The heart and the lungs play an important role in circulating and purification of blood throughout the body. But is the heart the only organ that helps in purification? Let's have a brief study on double circulation and the relevant organs involved.





Types of Circulatory Systems

In animals, there are two types of circulatory systems: open circulatory system and closed circulatory system. The majority of mammals, including humans, use a double circulatory system. The closed circulatory system is further classified into two, based on the number of times blood circulation takes place through the heart:

- **Single Circulation**

In a single circulatory system, the blood will pass through the heart to gills, then after purification, blood will be distributed to different parts of the body. Only one cardiac cycle is completed, hence the name single circulation. For example: single circulation is mainly seen in birds, fish, reptiles, etc.

- **Double Circulation**

The heart is the key organ for blood circulation and the double circulation is an efficient way of circulation as it provides an effective way of circulation. The main difference is that the blood follows two routes – one for oxygenated blood and the other for deoxygenated blood. Hence, the name “double circulation.” The majority of mammals, including humans utilize a double circulatory system.

The human heart is divided into four chambers:

1. Left Atria
2. Right Atria
3. Left Ventricles
4. Right Ventricles

Further, the heart is connected to the lungs through the pulmonary artery and vein. In double circulation, there are two pathways in which the blood flows. They are:

- ***Systemic circulation***

Systemic circulation carries oxygenated blood from the left ventricles to the tissue capillaries.

- The oxygen-rich blood is transferred to the aorta for circulating into various parts of the body.
- Later, the veins and venules collect the deoxygenated blood – which is rich in carbon dioxide from various parts of the body.
- The deoxygenated blood is pumped back into the superior vena cava and then to the right atrium.
- Once, after receiving the deoxygenated blood, the right atrium carries blood to the right ventricle for pulmonary circulation.

- ***Pulmonary circulation***

In the pulmonary circulation, the blood circulation starts from the right atrium to the left atrium. In this pathway:

- The pulmonary artery collects the blood from the right ventricle and carries to lungs for oxygenation.
- Once, after the purification process, the oxygenated blood is pumped back to the left atrium through the pulmonary vein which is carried to the left ventricles.
- The left ventricles pump the oxygenated blood to the aorta for systemic circulation.

Double circulation supports a strict separation of both oxygenated and deoxygenated blood. Therefore, this circulation ensures that the body always has a dedicated supply of oxygen and also, it improves body efficiency. This is also one of the reasons why mammals can maintain their body temperatures. Apart from the double circulation, a third portal system also exists to improve circulation efficiency.