جامعة المستقبل
AL MUSTAQBAL UNIVERSITY
كلية العلوم
قسم الفيزياء الطبية

Anatomy

The Cardiovascular System

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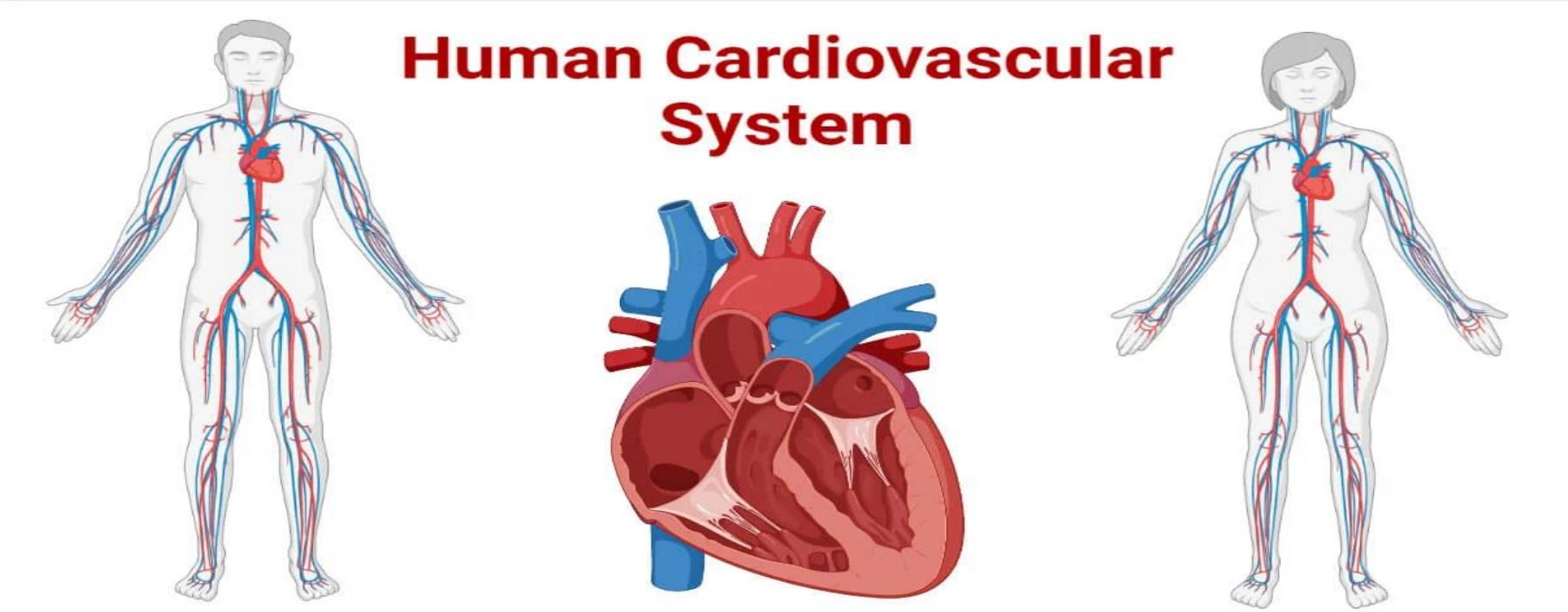
The principal components of the cardiovascular system are:

1- blood **2-blood vessels** **3-the heart.**

The primary function of the **cardiovascular system** is to provide an adequate supply of oxygen and nutrients to all cells of the body and carry away the waste products of their metabolism.

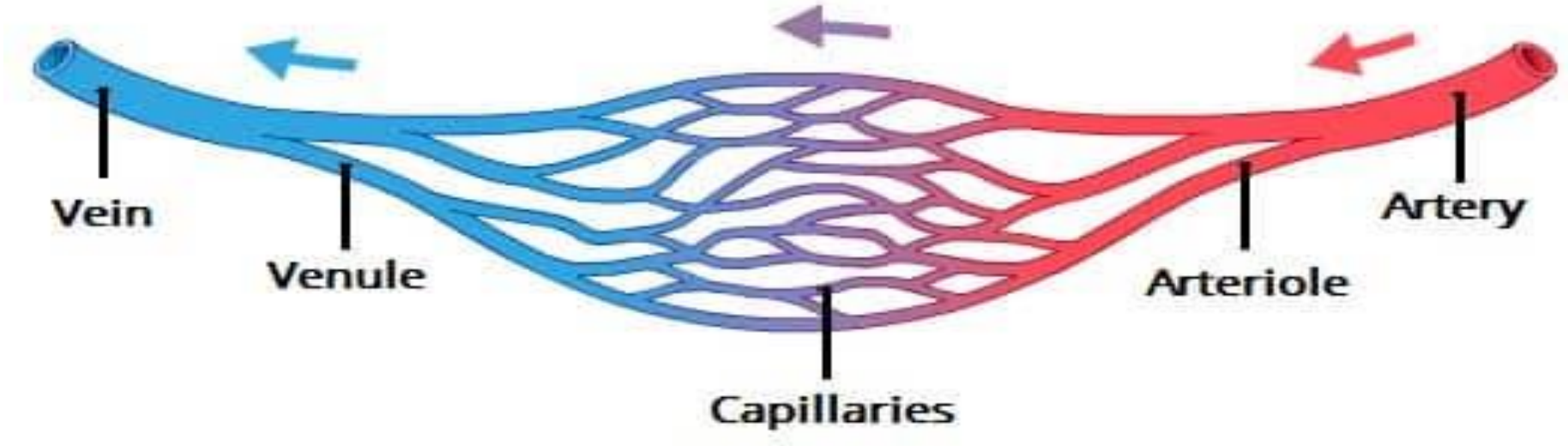
Blood carries materials to and from the tissues, blood vessels are conduits that bring blood close to cells, and the heart is used to create the pressure that is needed to propel blood around the system.



Blood Vessels

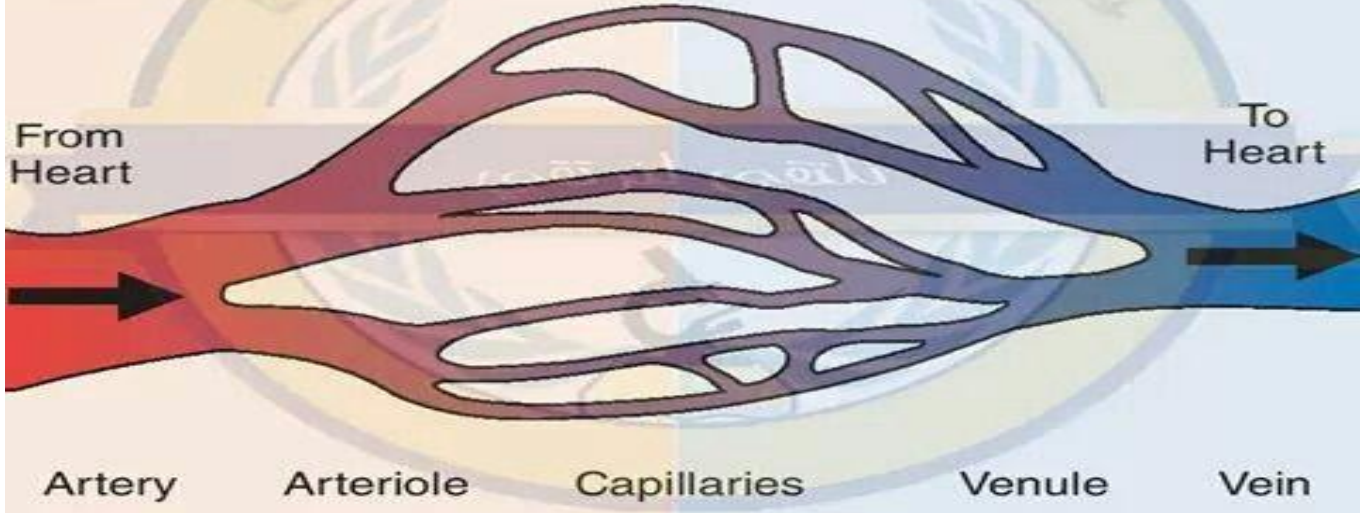
The average man has approximately six litres of blood in his body. This blood is carried by several different types of blood vessels, each of which are specialised to play their role in circulating blood around the body.

There are three major types of vessels; arteries, veins and capillaries. Arteries (with the exception of the pulmonary artery) deliver **oxygenated** blood to the tissues. At the tissues, the oxygen and nutrient exchange is carried out by the capillaries. The capillaries also return **deoxygenated** blood to the veins, which bring it back to the heart (with the exception of the pulmonary veins).



ARTERIES VERSUS VEINS

Arteries	Veins
1. Carry blood from the heart, carry oxygenated blood (except pulmonary artery)	1. Carry blood to the heart, carry deoxygenated blood (except pulmonary vein)
2. Normally bright red in color	2. Normally dark red in color
3. Elastic walls that expand with surge of blood	3. Thin walls/less elastic
4. No valves	4. Valves
5. Can feel a pulse	5. No pulse

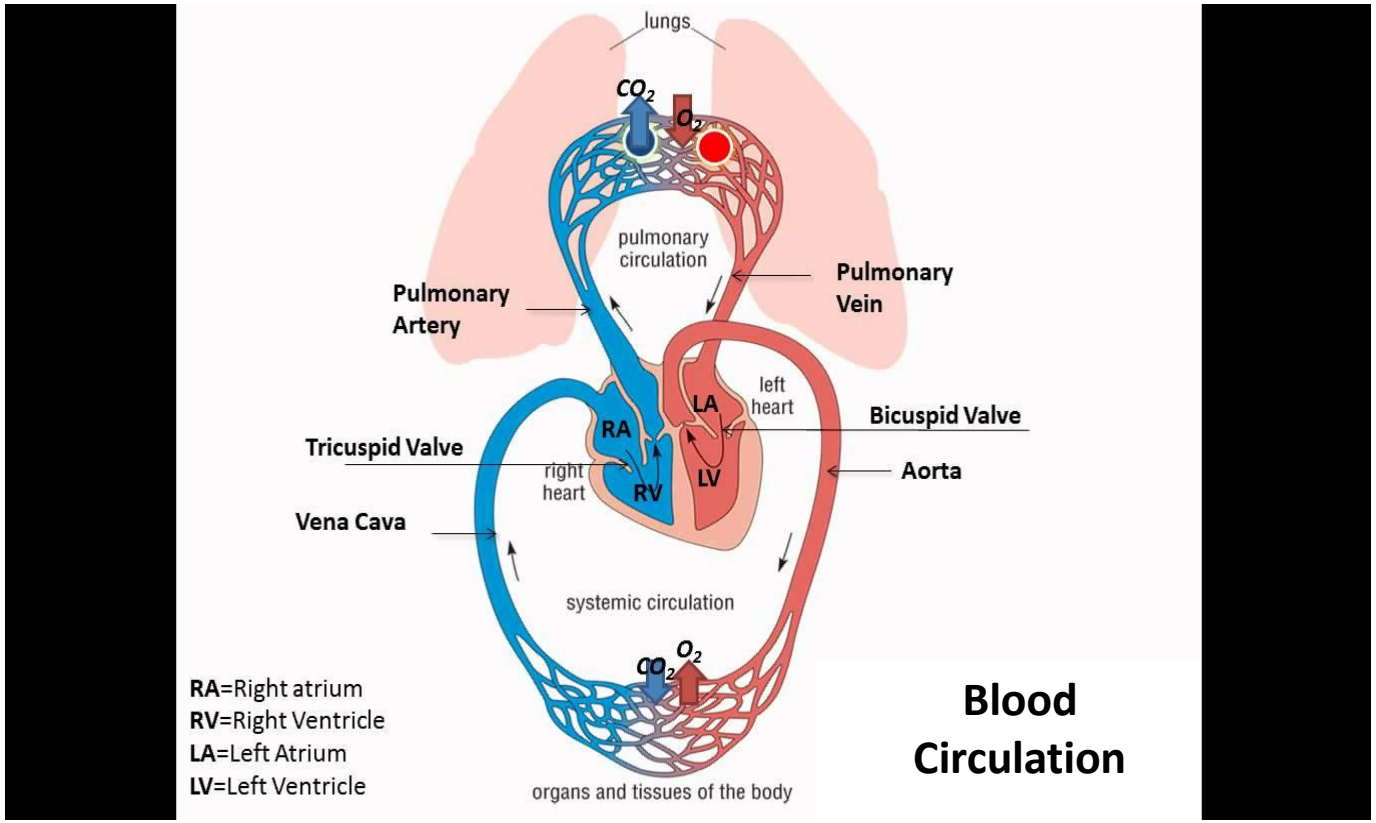


Veins contain **valves** that primarily prevent the back-flow of blood. They also act together with muscle contraction, squeezing the veins to propel blood towards the heart.

Blood Circulation

Blood circulates around the body via two distinct pathways; the **pulmonary circulation** and the **systemic circulation**.

Together they create a closed pathways that keep the **deoxygenated** and **oxygenated** blood separated.

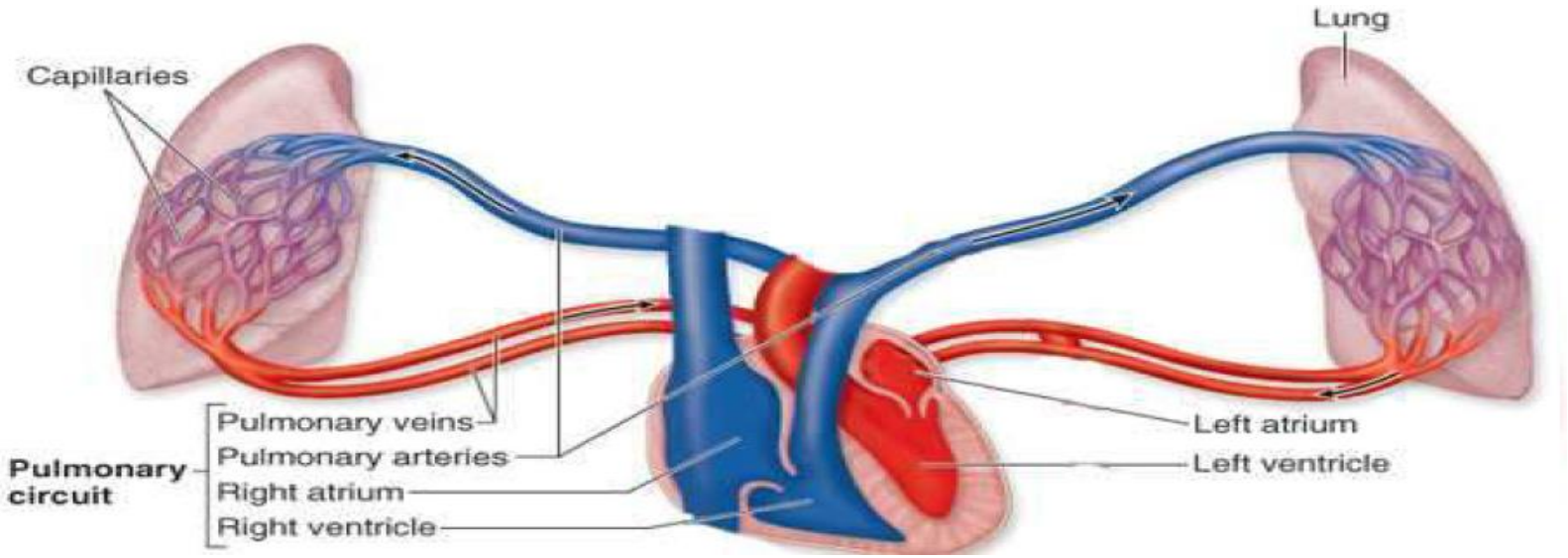


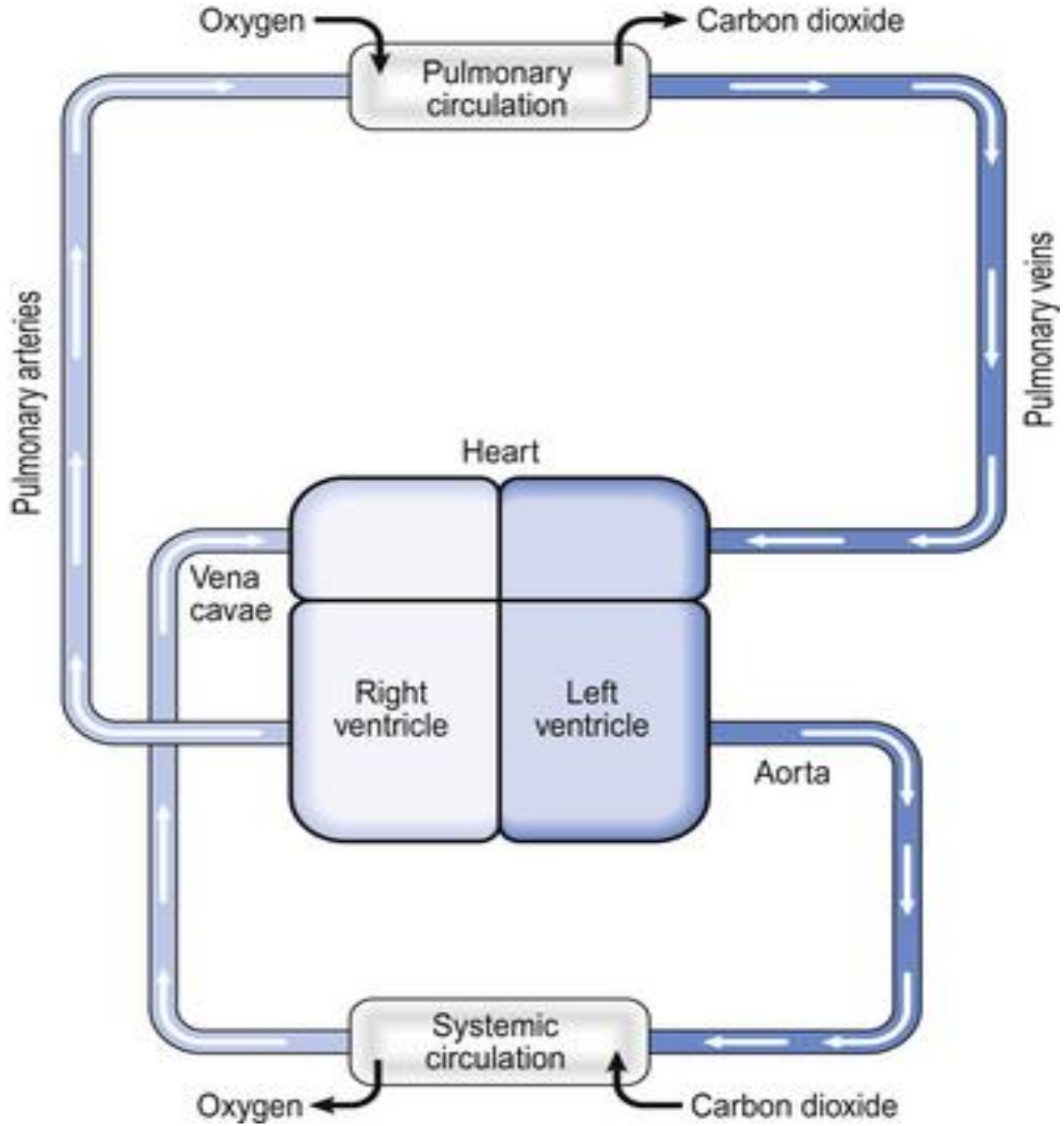
Pulmonary Circulation

Pulmonary circulation begins at the right ventricle, where the deoxygenated blood from the body tissues is pumped into the pulmonary arteries and to the lungs.

In the lungs, the blood exchanges carbon dioxide (waste product of cellular respiration) to oxygen.

The oxygenated blood them travels back to the heart and the left atrium, via the pulmonary vein.



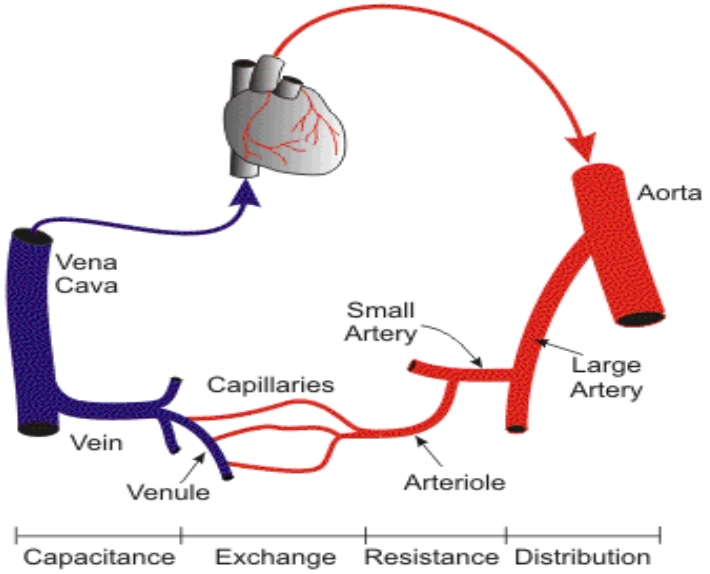

Oxygen
Carbon dioxide
Pulmonary circulation
Pulmonary arteries
Pulmonary veins
Heart
Vena cavae
Right ventricle
Left ventricle
Aorta
Systemic circulation
Oxygen
Carbon dioxide

Systemic Circulation

The systemic circulation begins at the left ventricle that pumps oxygenated blood into the aorta.

Aorta branches out into smaller arteries, which carry the oxygenated blood to the rest of the body (with the exception of lungs).

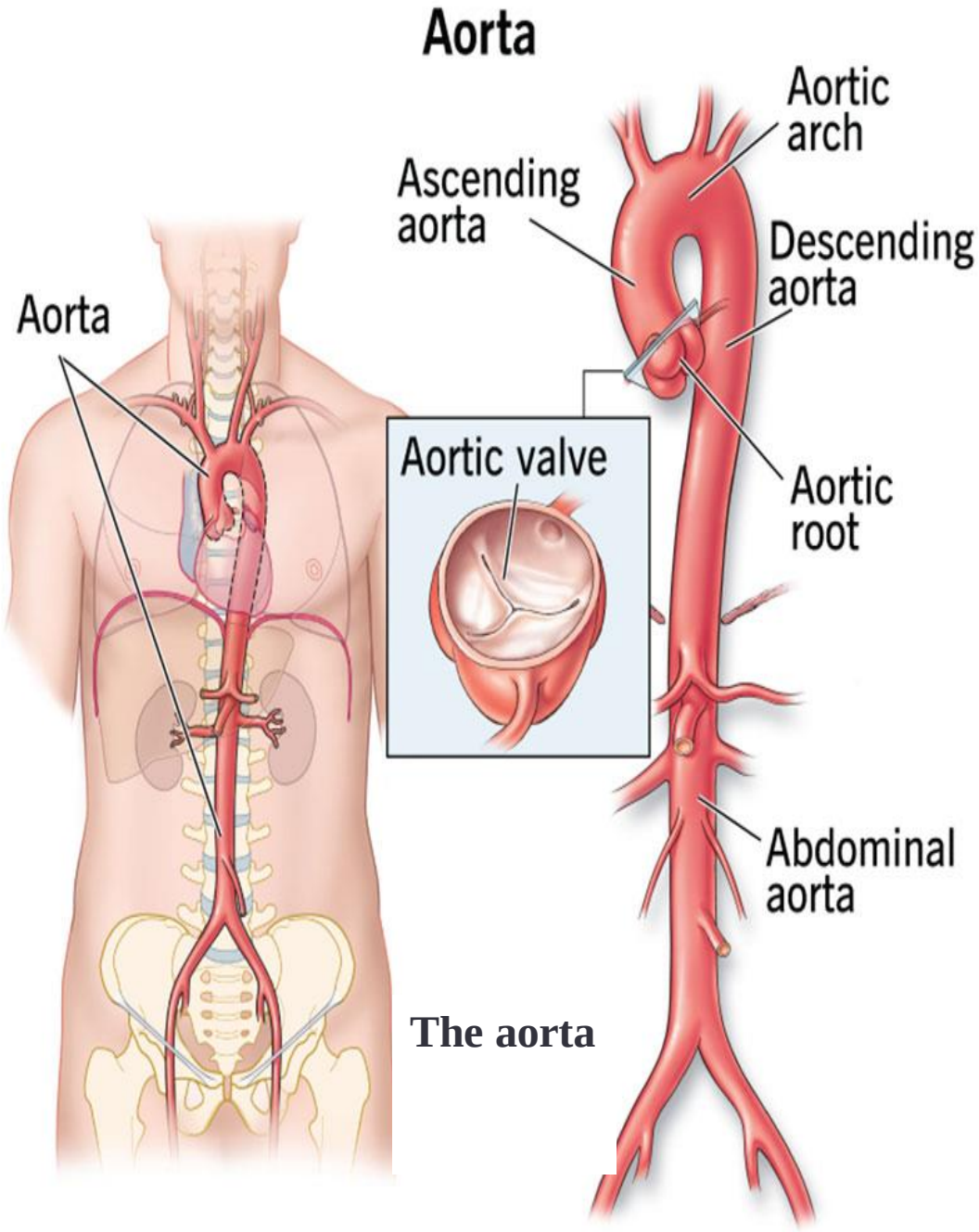
Oxygen is delivered to the body tissues and exchanged to carbon dioxide. The now deoxygenated blood is carried back to the heart and the right atrium via veins.



The Great Vessels

The aorta is the largest artery in the body, initially being an inch wide in diameter. It receives the cardiac output from the left ventricle and supplies the body with oxygenated blood via the systemic circulation.

The aorta can be divided into four sections: the **ascending aorta**, the **aortic arch**, the **thoracic (descending) aorta** and the **abdominal aorta.** It terminates at the level of L4 by bifurcating into the left and right common iliac arteries. The aorta classified as a large elastic artery.



The aorta

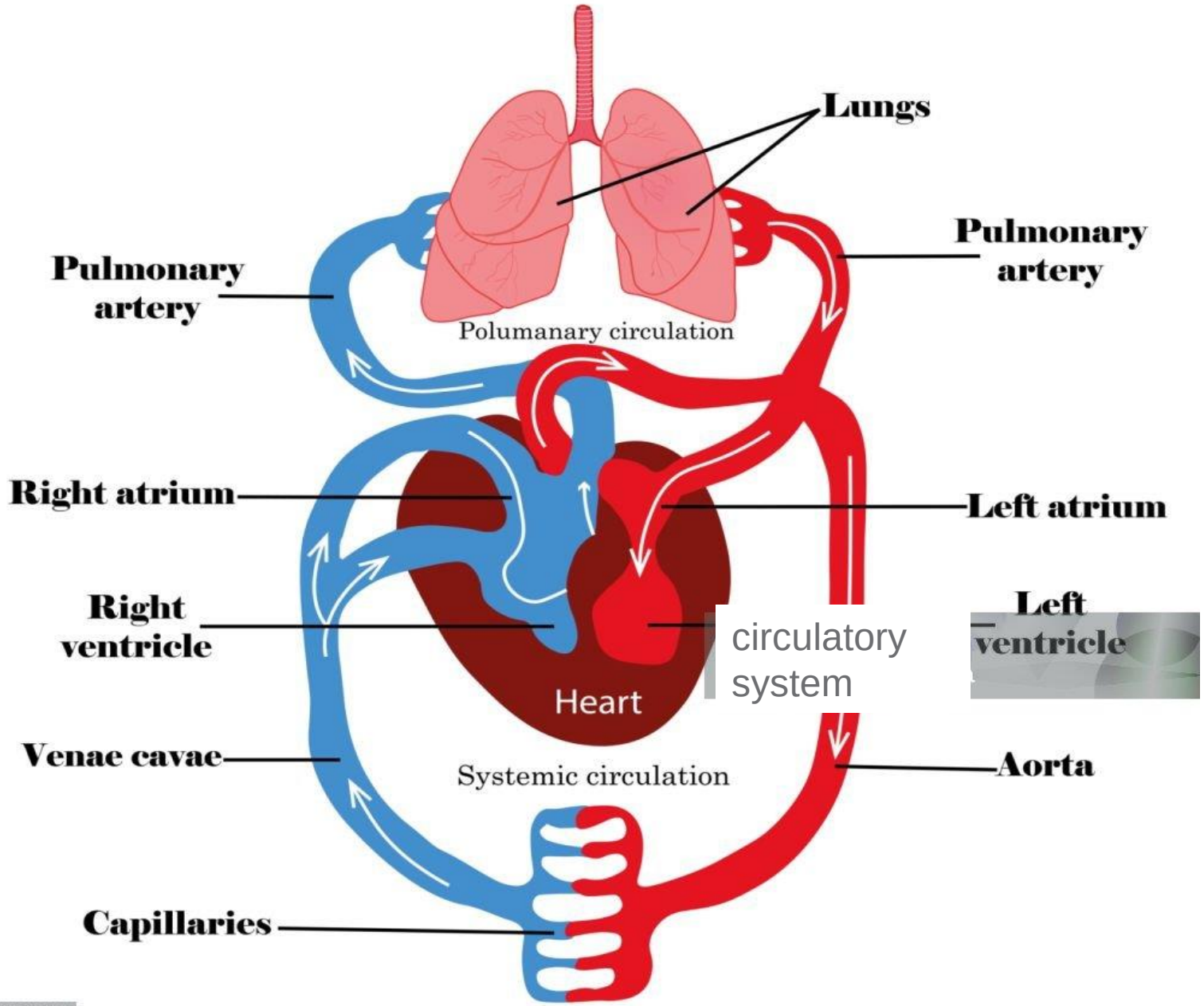
Pulmonary Arteries
The pulmonary arteries receive **deoxygenated** blood from the right ventricle and deliver it to the lungs for gas exchange to take place. The arteries begin as the **pulmonary trunk**, a thick and short vessel, and then splits into the **right and left pulmonary arteries**.

Pulmonary Veins
The pulmonary veins receive oxygenated blood from the lungs, delivering it to the left side of the heart to be pumped back around the body. There are **four pulmonary veins**, with one superior and one inferior for each of the lungs.

Superior Vena Cava
The superior vena cava receives deoxygenated blood from the upper body (superior to the diaphragm, excluding the lungs and heart), delivering it to the right atrium.

Inferior Vena Cava
The inferior vena cava receives deoxygenated blood from the lower body (all structures inferior to the diaphragm), delivering it back to right atrium.

BLOOD CIRCULATION



circulatory system

THANK YOU!