

The pulmonary and systemic circuits



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The Pulmonary and Systemic Circuits The Pulmonary Circuits The heart is responsible for pumping the blood to every cell in the body. It is also responsible for pumping blood to the lungs, where the blood gives up carbon dioxide and takes on oxygen. The heart is able to pump blood to both regions efficiently because there are really two separate circulatory circuits with the heart as the common link. Some authors even refer to the heart as two separate hearts--a right heart in the pulmonary circuit and left heart in the systemic circuit.

In the pulmonary circuit, blood leaves the heart through the pulmonary arteries, goes to the lungs, and returns to the heart through the pulmonary veins. The Systemic Circuits In the systemic circuit, blood leaves the heart through the aorta, goes to all the organs of the body through the systemic arteries, and then returns to the heart through the systemic veins. Thus there are two circuits. Arteries always carry blood away from the heart and veins always carry blood toward the heart.

Most of the time, arteries carry oxygenated blood and veins carry deoxygenated blood. There are exceptions. The pulmonary arteries leaving the right ventricle for the lungs carry deoxygenated blood and the pulmonary veins carry oxygenated blood. If you are confused as to which way the blood flows through the heart, try this saying " When it leaves the right, it comes right back, but when it leaves the left, it's left. " The blood does not have to travel as far when going from the heart to the lungs as it does from the heart to the toes.

It makes sense that the heart would be larger on one side than on the other. When you look at a heart, you see that the right side of the heart is distinctly

smaller than the left side, and the left ventricle is the largest of the four chambers. Blood Supply to the Heart While you might think the heart would have no problem getting enough oxygen-rich blood, the heart is no different from any other organ. It must have its own source of oxygenated blood. The heart is supplied by its own set of blood vessels. These are the coronary arteries.

There are two main ones with two major branches each. They arise from the aorta right after it leaves the heart. The coronary arteries eventually branch into capillary beds that course throughout the heart walls and supply the heart muscle with oxygenated blood. The coronary veins return blood from the heart muscle, but instead of emptying into another larger vein, they empty directly into the right atrium.

1. Blood enters R. Atrium through Vena Cava
2. Blood flows through right AV valve into R. ventricle
3. Contraction of R. ventricle forces pulmonary valve open
4. Blood flows through pulmonary valve into pulmonary trunk
5. Blood is distributed by right and left pulmonary arteries to lung
6. Blood returns from lung via pulmonary vein to left atrium
7. Blood in L. atrium flows through L. AV valve into L. Ventricle
8. Contraction of L. ventricle. forces aortic valve open
9. Blood flows through aortic valve into ascending aorta
10. blood in aorta is distributed to every organ in the body, O₂ unload and CO₂ loads
11. Blood returns to heart through Vena Cavae.