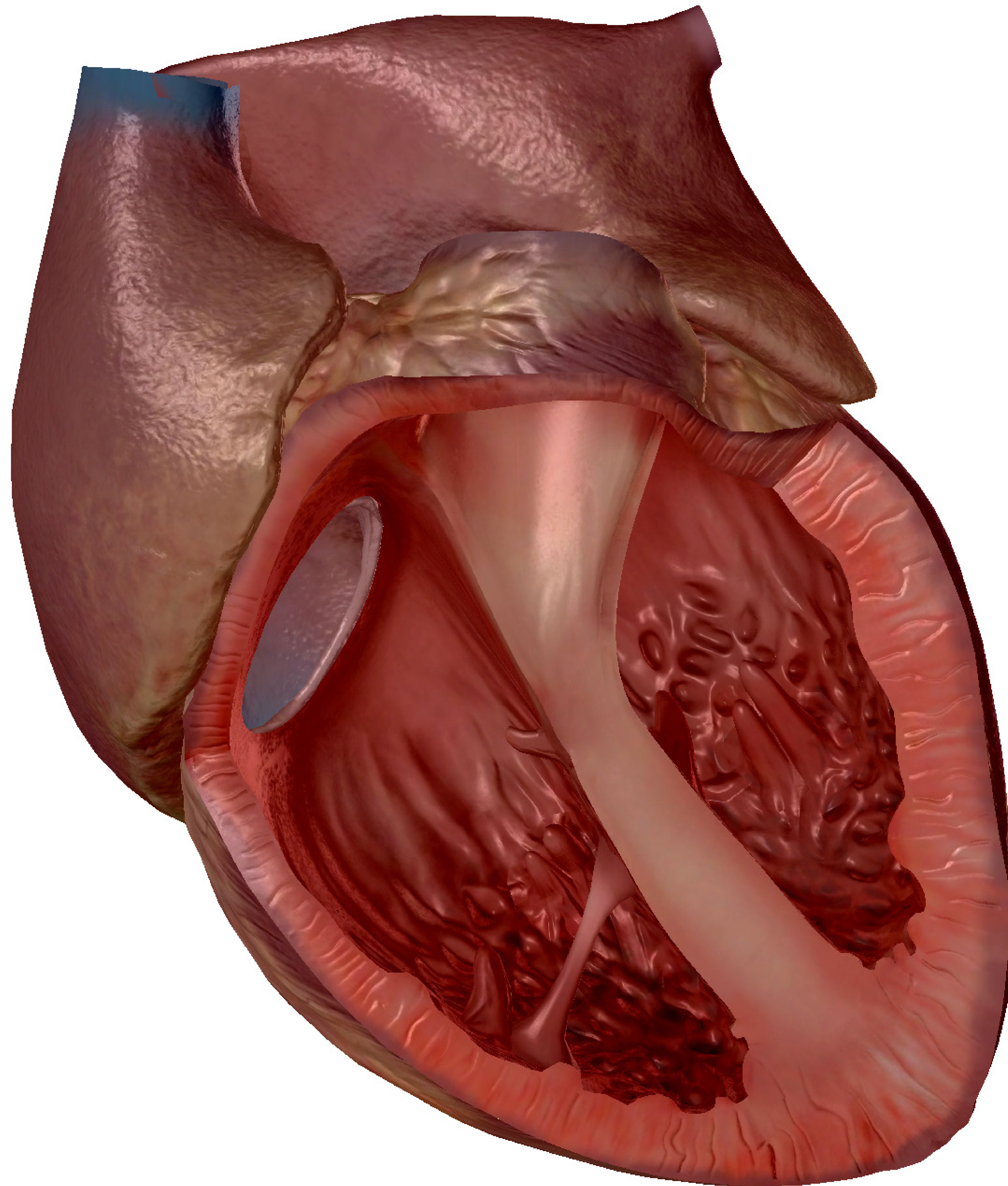


VISIBLE  BODY®

# Building a Heart

The human heart is an extraordinary machine, and like any machine it has several components enabling it to operate. Let's take a look at them!





The most basic component of the heart is its role as a four-chambered **muscle**.

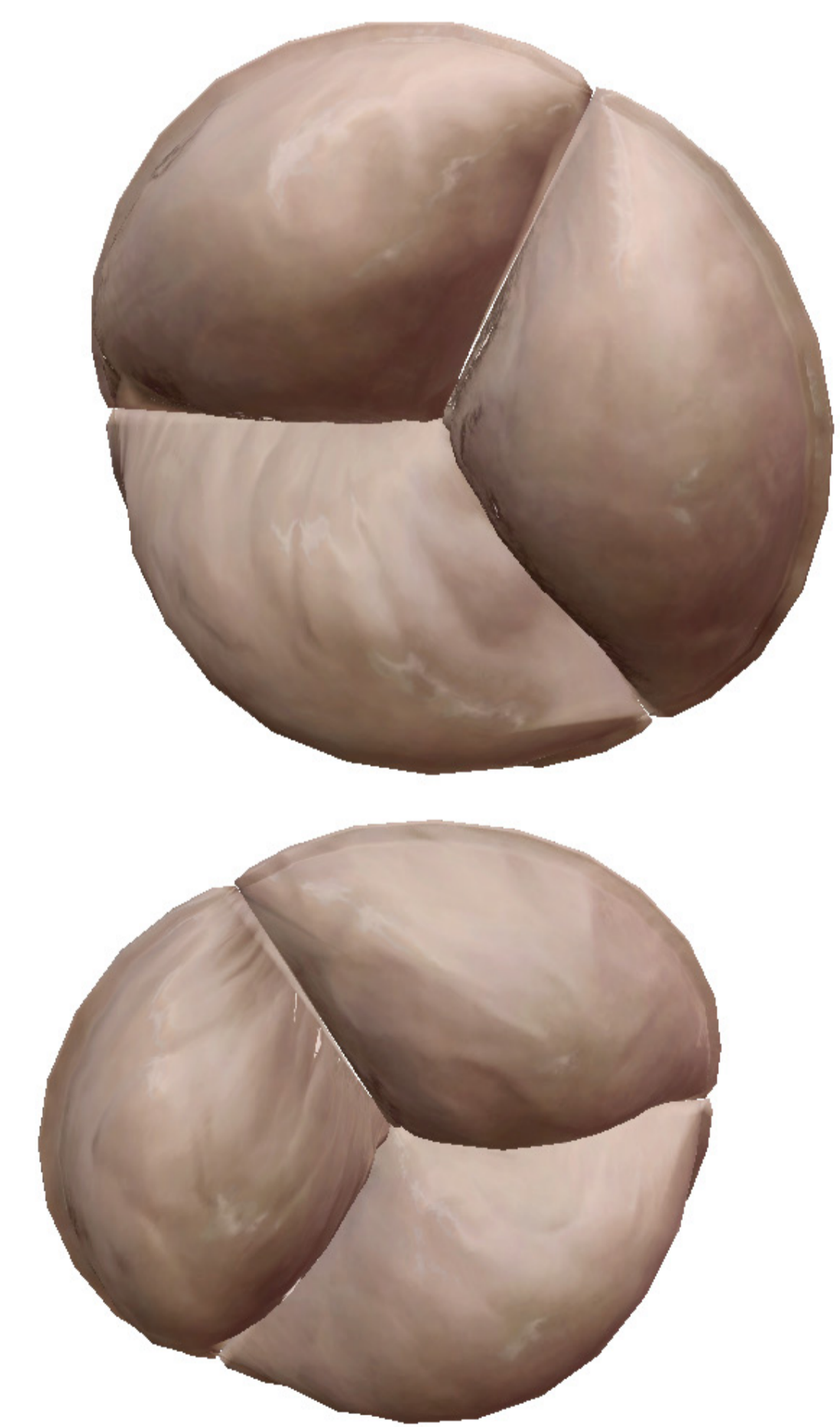
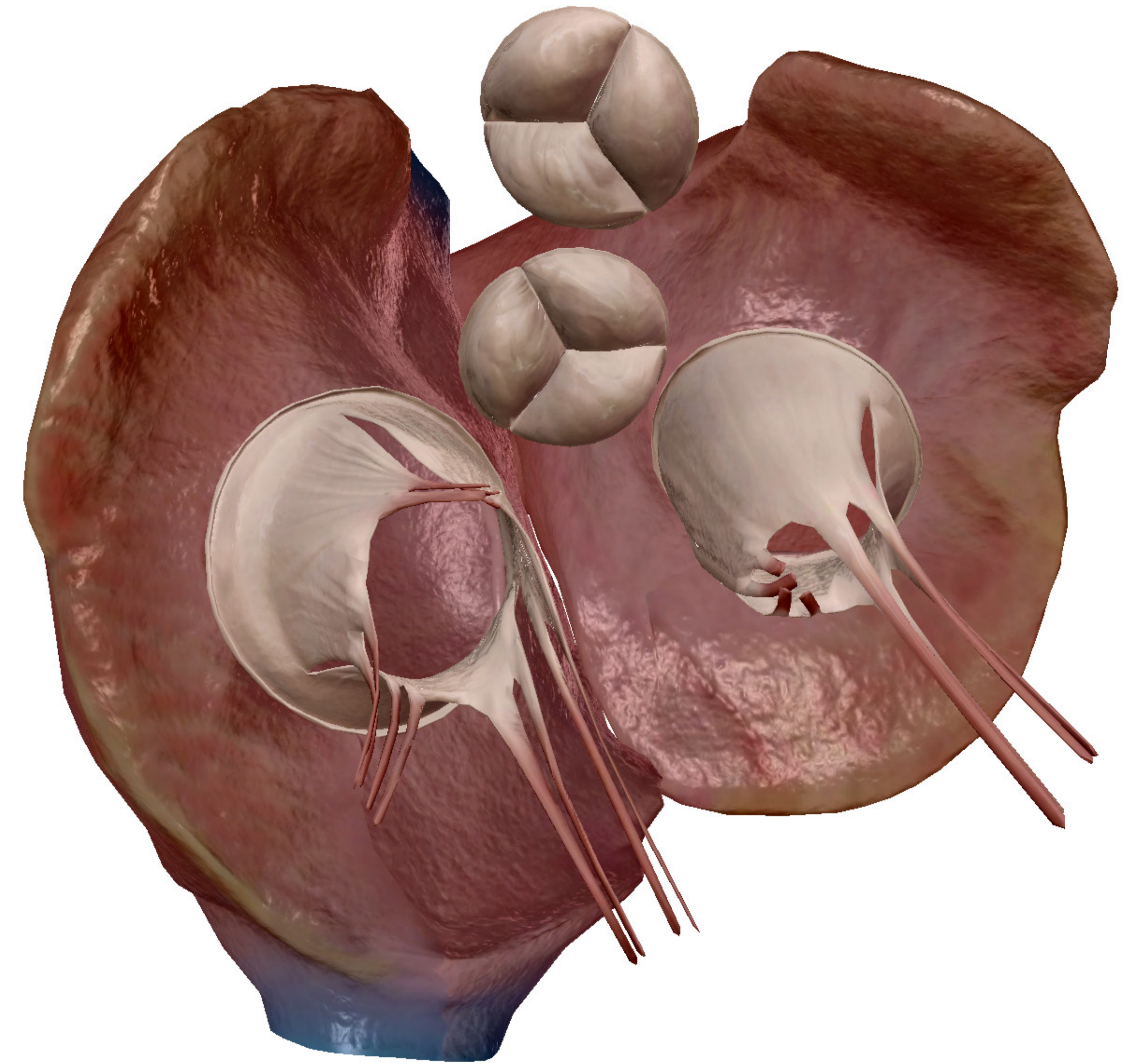
The top two chambers are the **atria** and the bottom two are the **ventricles**.

The right atrium receives **deoxygenated blood** and empties it into the right ventricle; the left atrium empties **oxygenated blood** into the left ventricle.



In order to pump blood in and out of the chambers, the heart needs doors.

The heart's **valves** open and shut, regulating the amount of blood that enters and its destination.

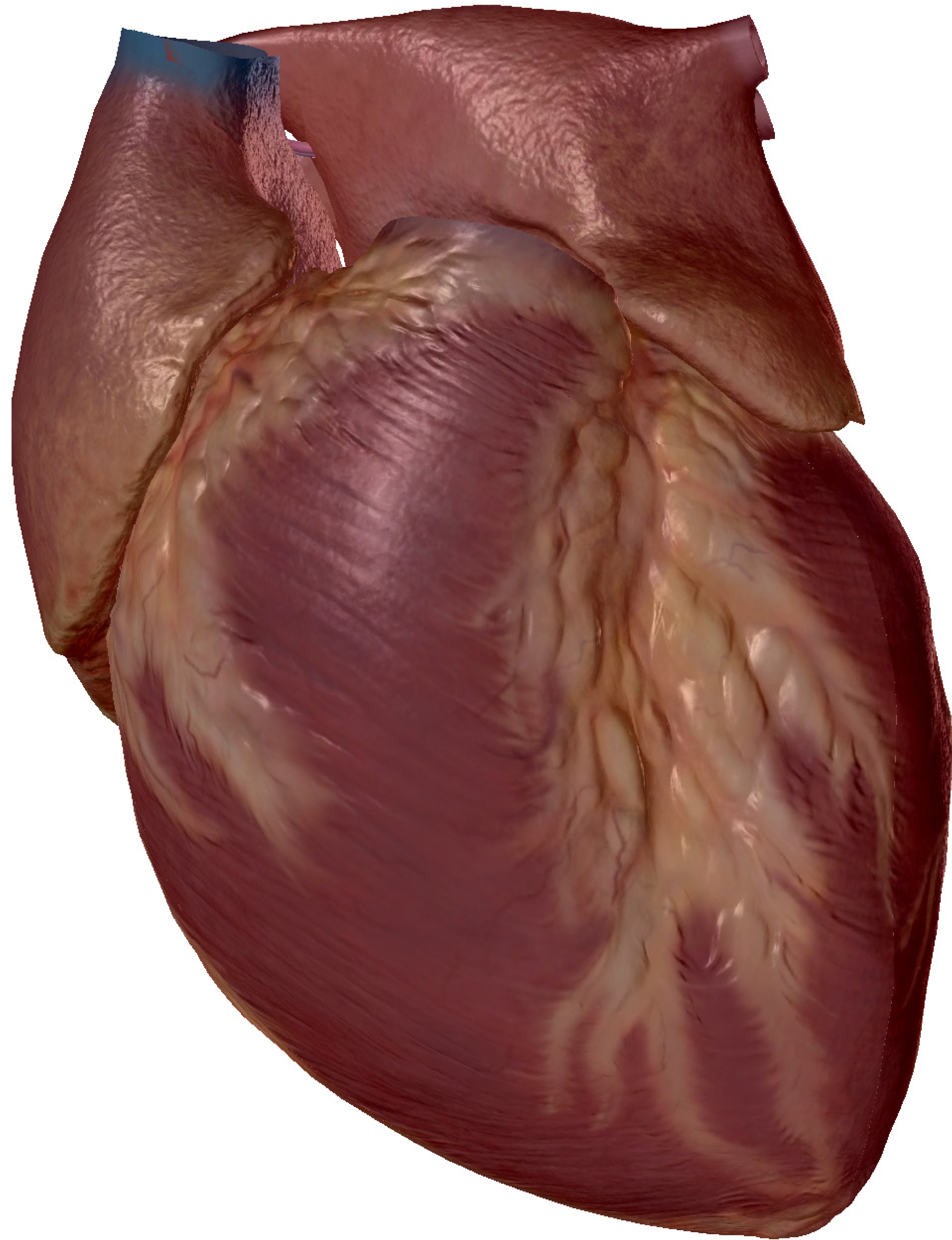


At the bases of the pulmonary artery and aorta are the **semilunar valves**, which support one-way flow of blood out of the ventricles. The **aortic valve** regulates blood flow from the left ventricle into the aorta, while the **pulmonary valve** regulates the flow from the right ventricle into the pulmonary trunk.



The **atrioventricular valves** control the blood flow from the right atrium to the right ventricle. They are attached to papillary muscles by fibrous cords called **chordae tendineae**, which prevent the AV valves from prolapsing back into the atria as they close.





The external surface of the heart is also known as **epicardium**, and is covered by fat.

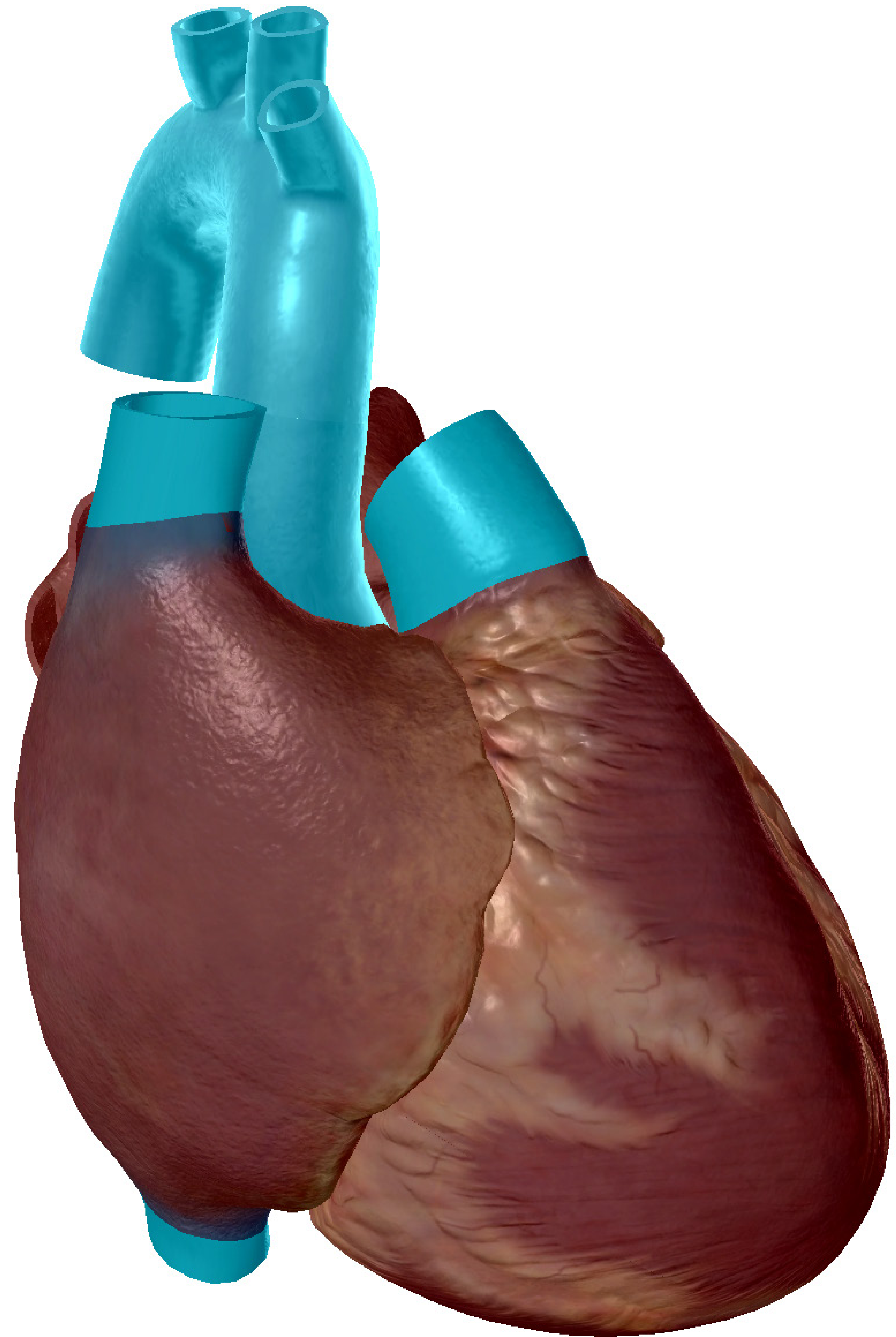
**FACTOID:** It is completely normal to have some fat on the surface of the heart. It's when the fat builds up on the surface or within the arteries that there's a problem.



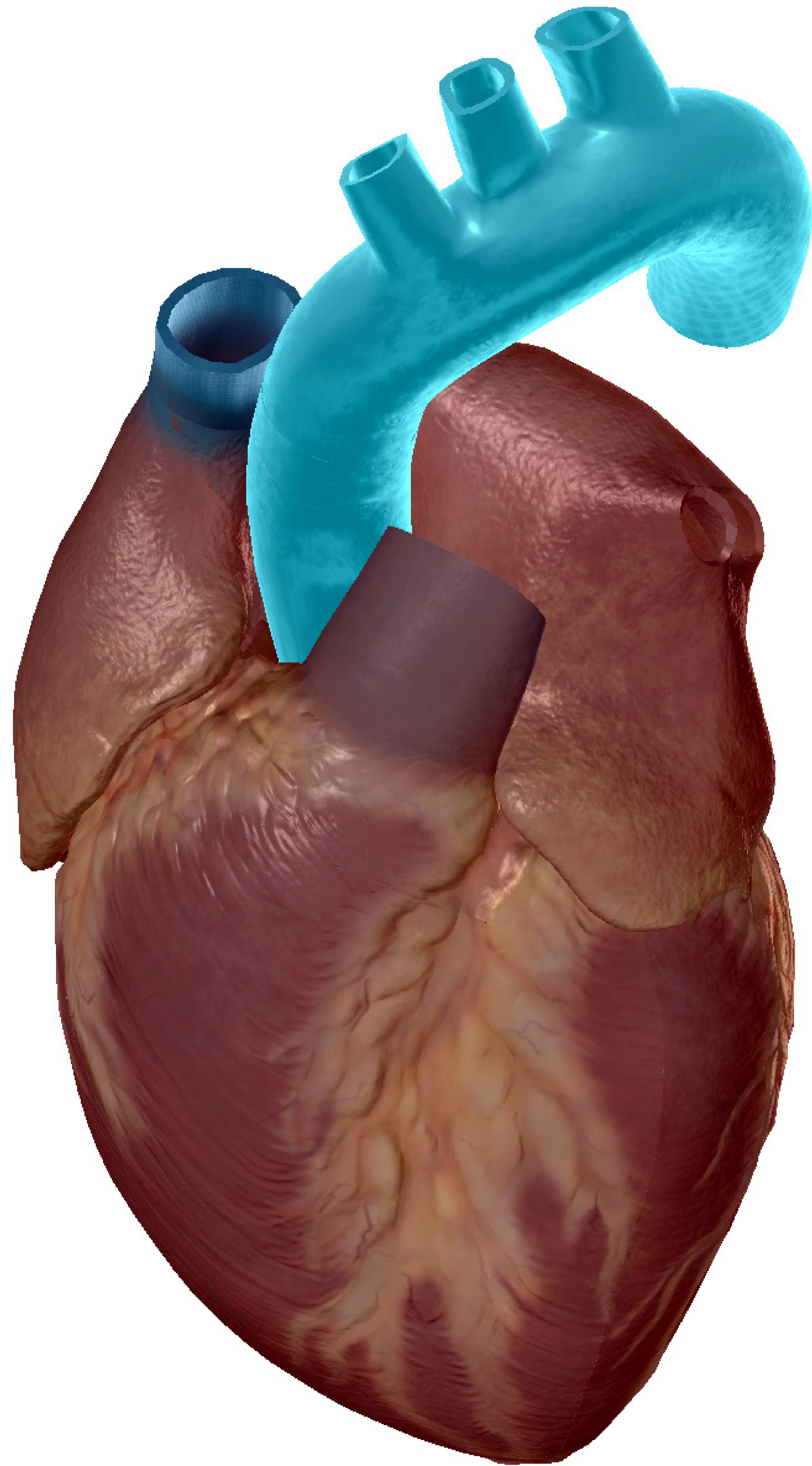
The **great vessels** connect the heart to the arteries and veins, which distribute blood throughout the body.

The great vessels are:

- The aorta
- The pulmonary trunk
- The vena cavae







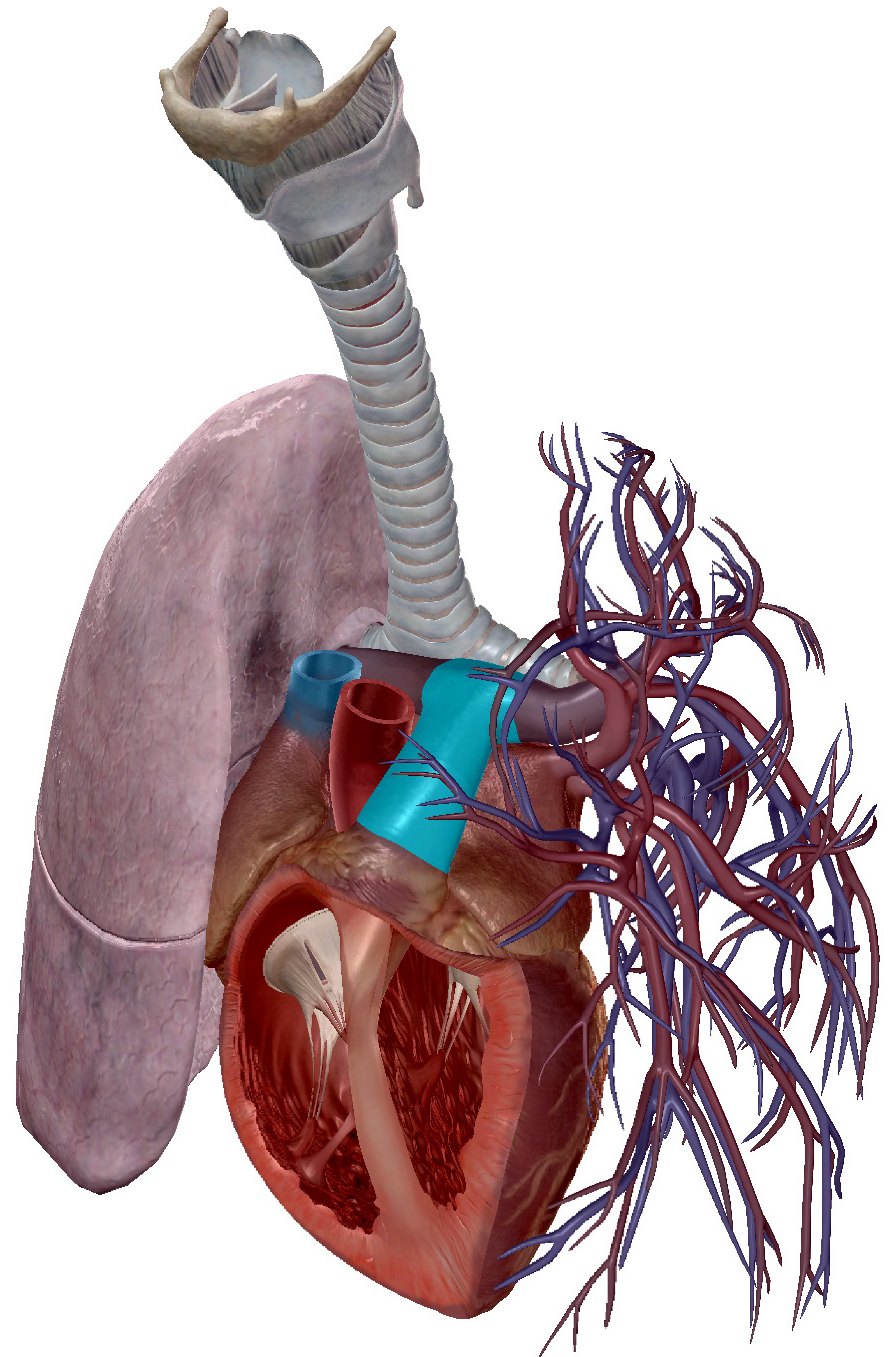
The aorta delivers oxygenated blood from the left ventricle to the rest of the body.

**FACTOID:** The aorta is approximately 2-3 cm in diameter, making it thicker than a standard garden hose!

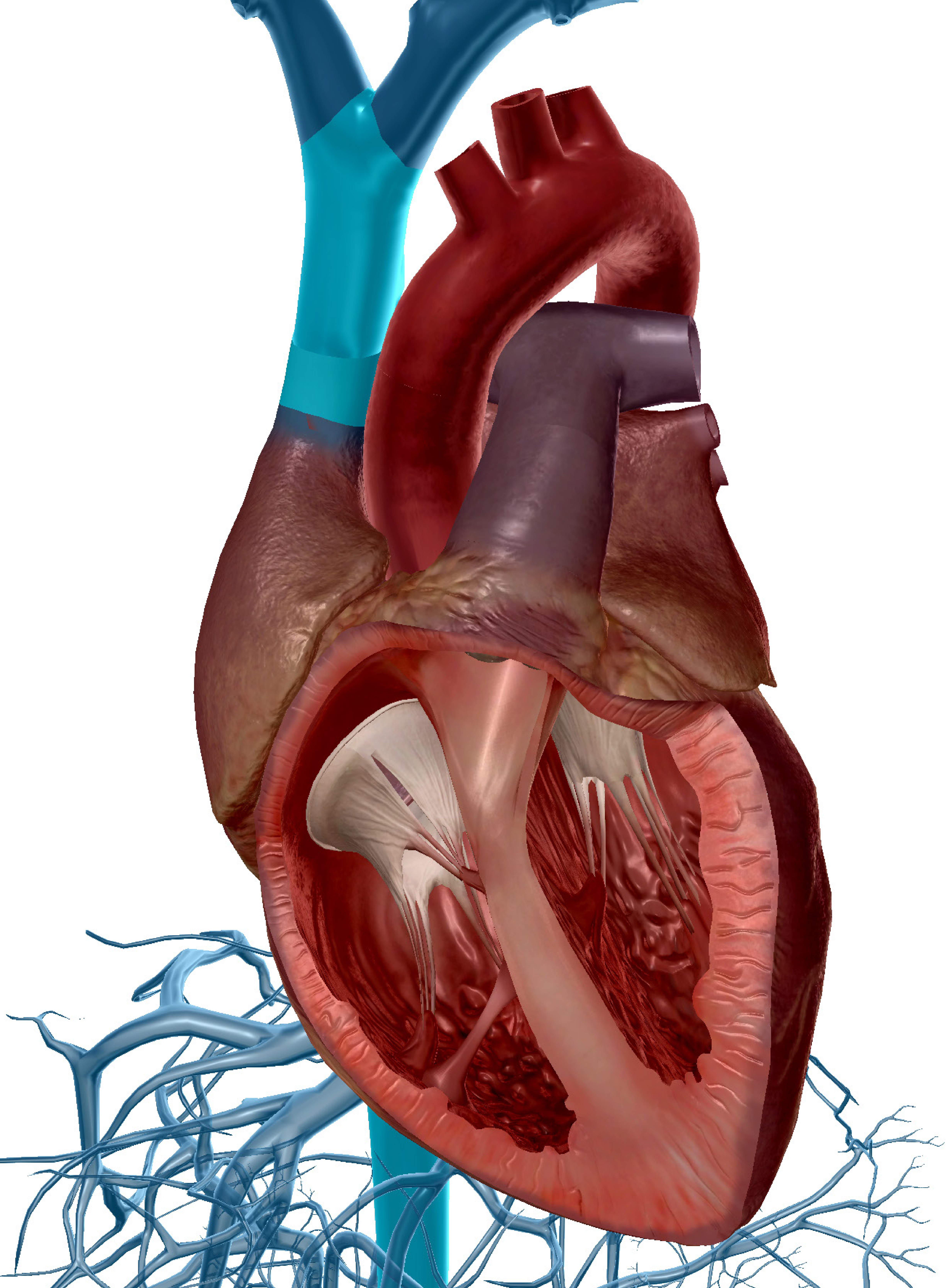


The **pulmonary trunk** delivers deoxygenated blood from the right ventricle to the lungs.

At the aortic arch, the pulmonary trunk splits into the pulmonary arteries, which extend into the lungs.







The **venae cavae** deliver deoxygenated blood from the top and lower halves of the body, respectively, to the right atrium.

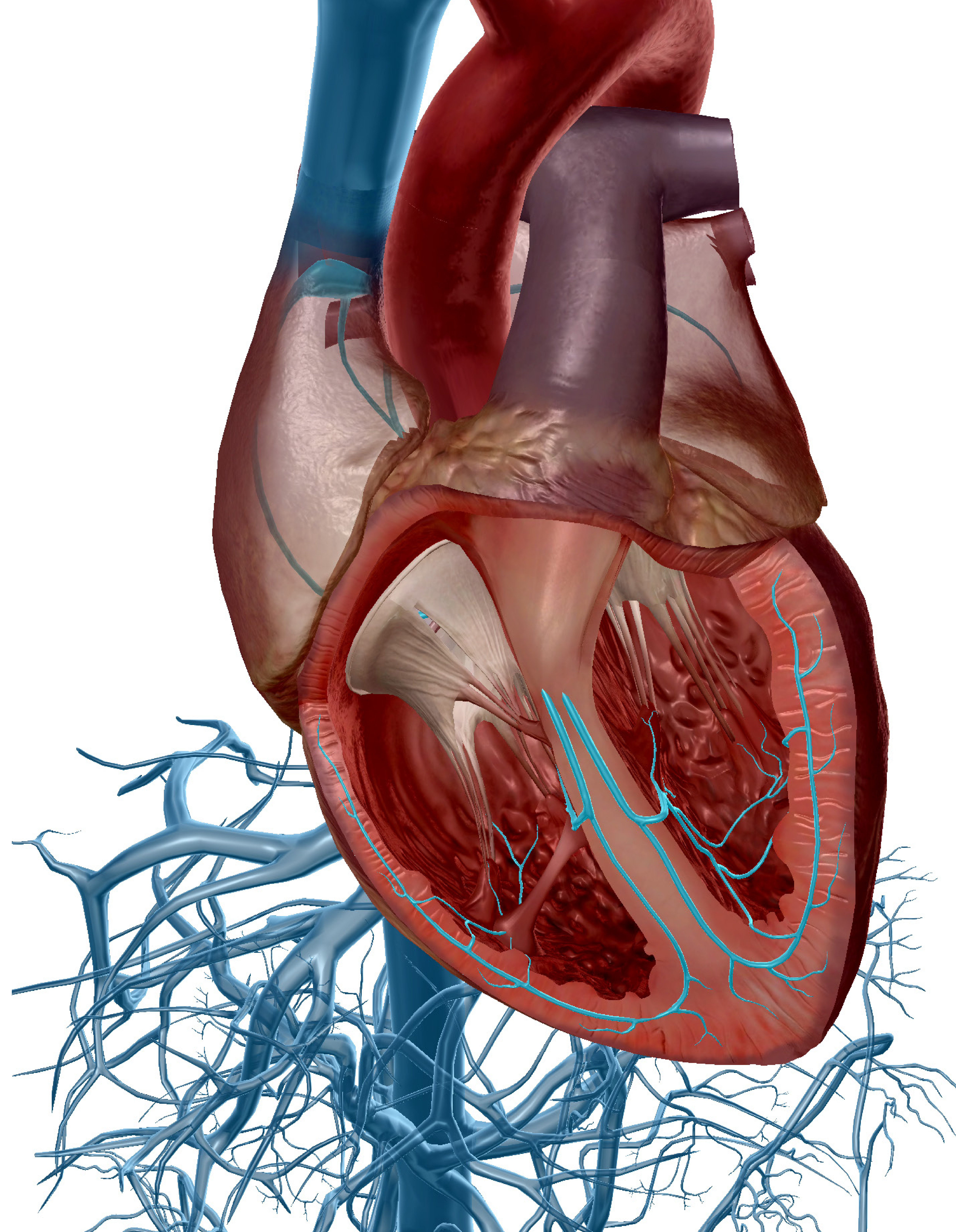
**FACTOID:** The vena cavae are the largest veins in the entire body.



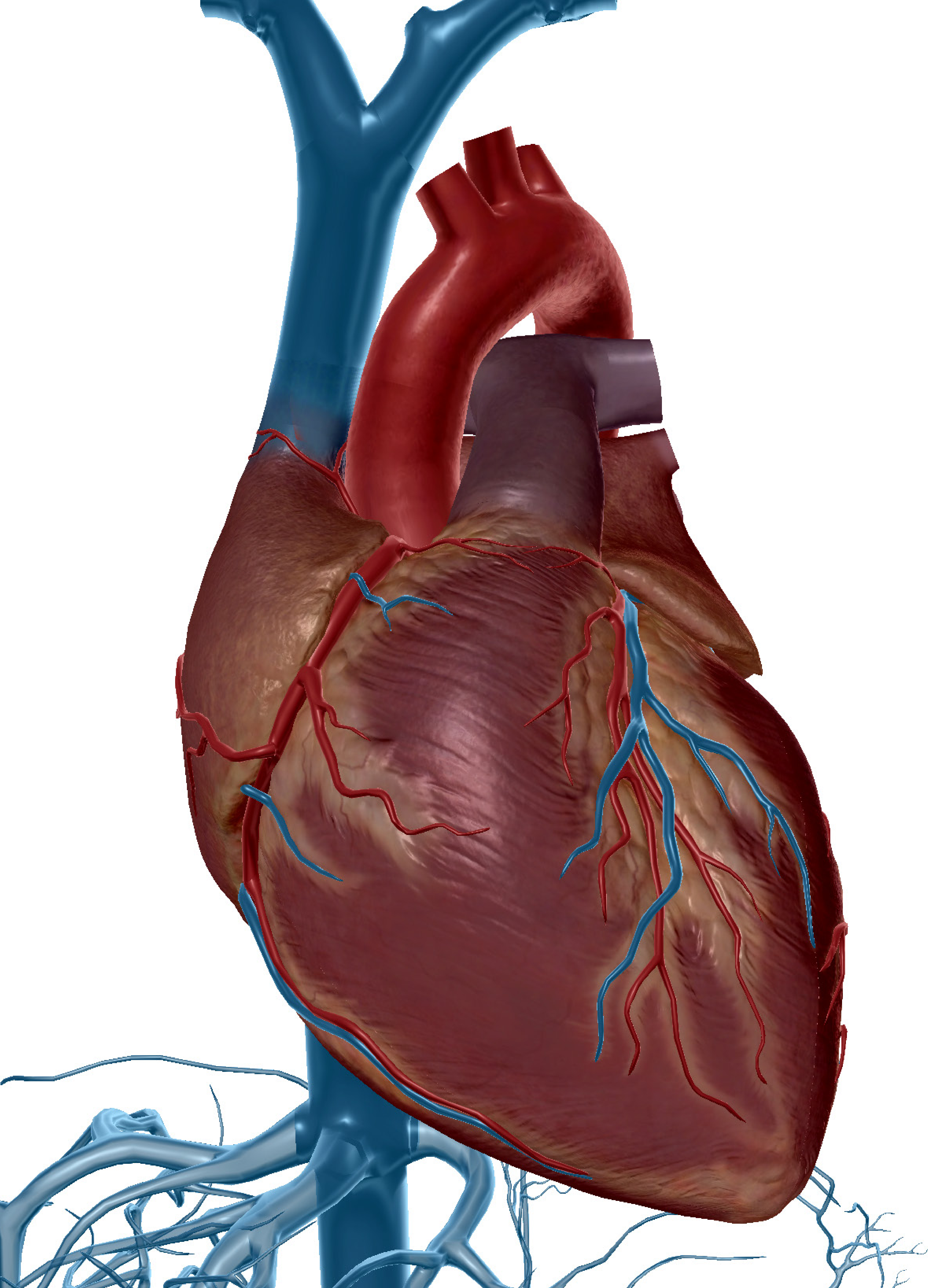
The heart's **conduction system** does exactly what it sounds like: it conducts electricity throughout the heart.

The pulses of electricity motivate the cardiac muscle to contract, or **beat**.

The pathways of the conduction system are made up of **bundles** and specialized muscle **fibers** within the heart. Electrical signals move down these pathways.







Not only does the heart provide blood for the body's organs and tissues, but also for itself. The **coronary vessels** supply blood to the heart.

The arteries supply the heart with blood, while the veins carry deoxygenated blood from the heart tissue into the right atrium.

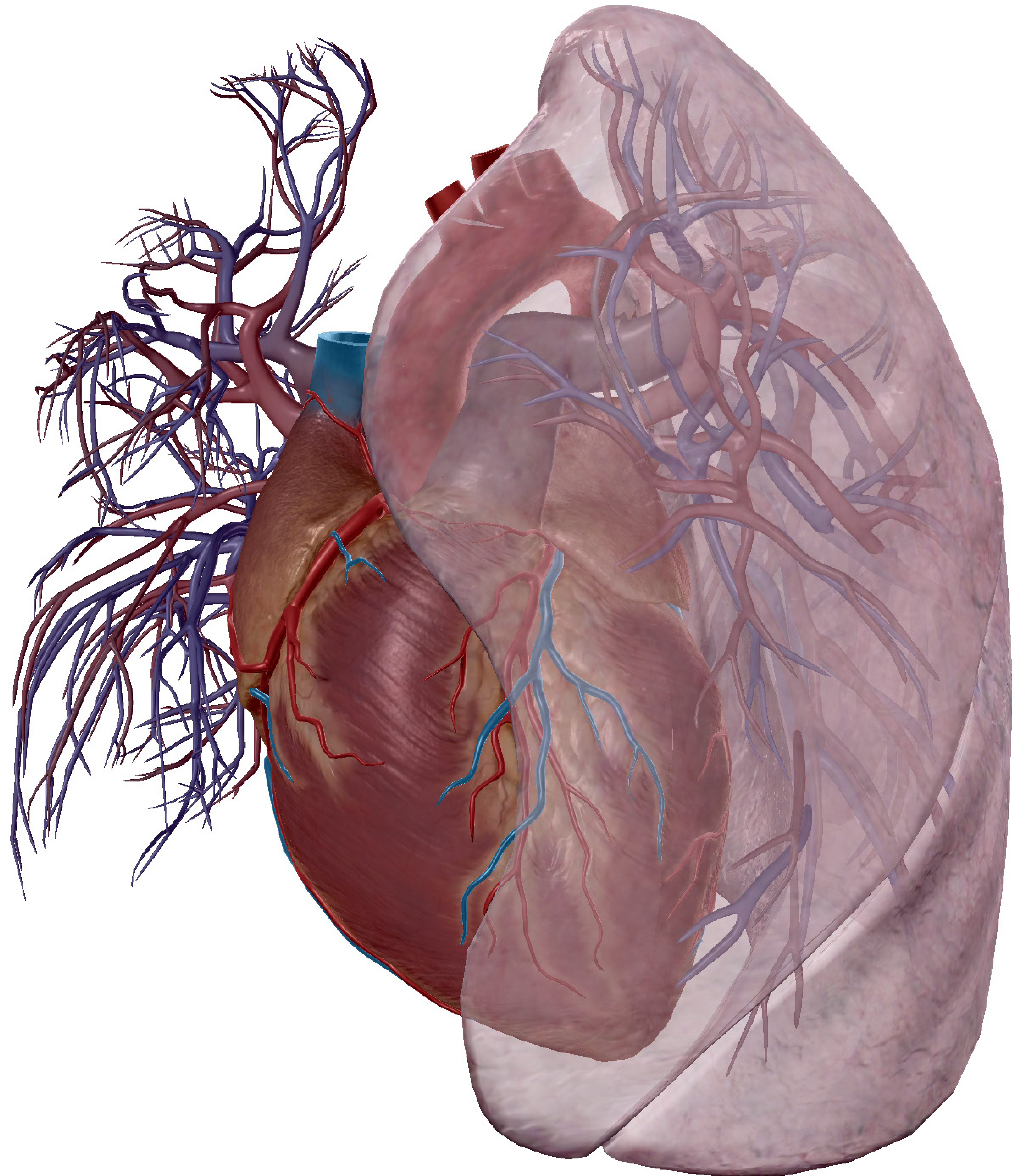


**Pulmonary vasculature** manages the passage of blood between the heart and the lungs, as well as gas exchange.

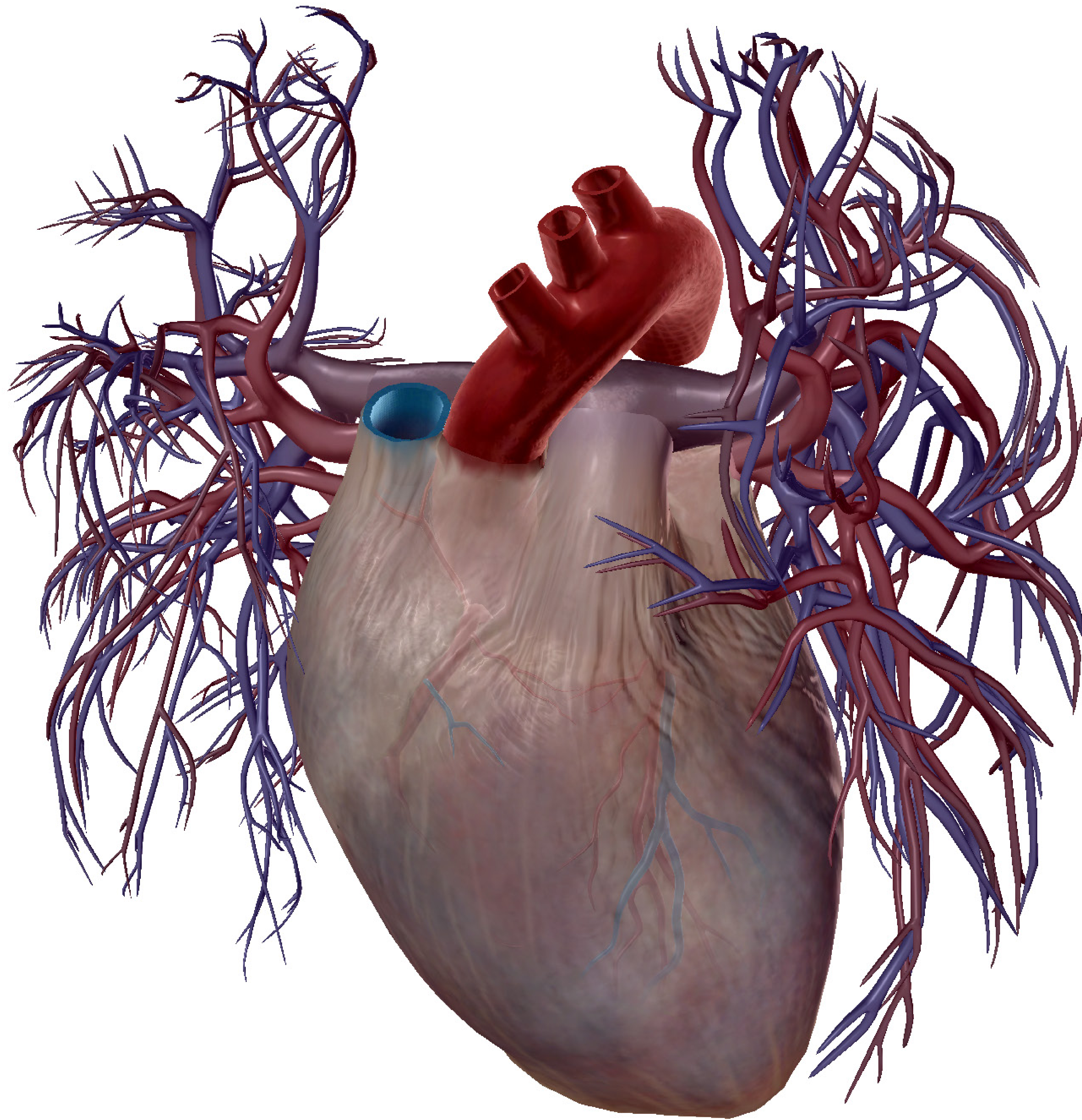
Pulmonary **arteries** move deoxygenated blood from the right ventricle to the lungs.

Pulmonary **veins** move oxygenated blood to the left atrium for distribution.

**FACTOID:** The pulmonary arteries are the only arteries in the body that carry **venous** blood!







Because the heart is super important, it has a protective fibrous sac around it called the **pericardium**.

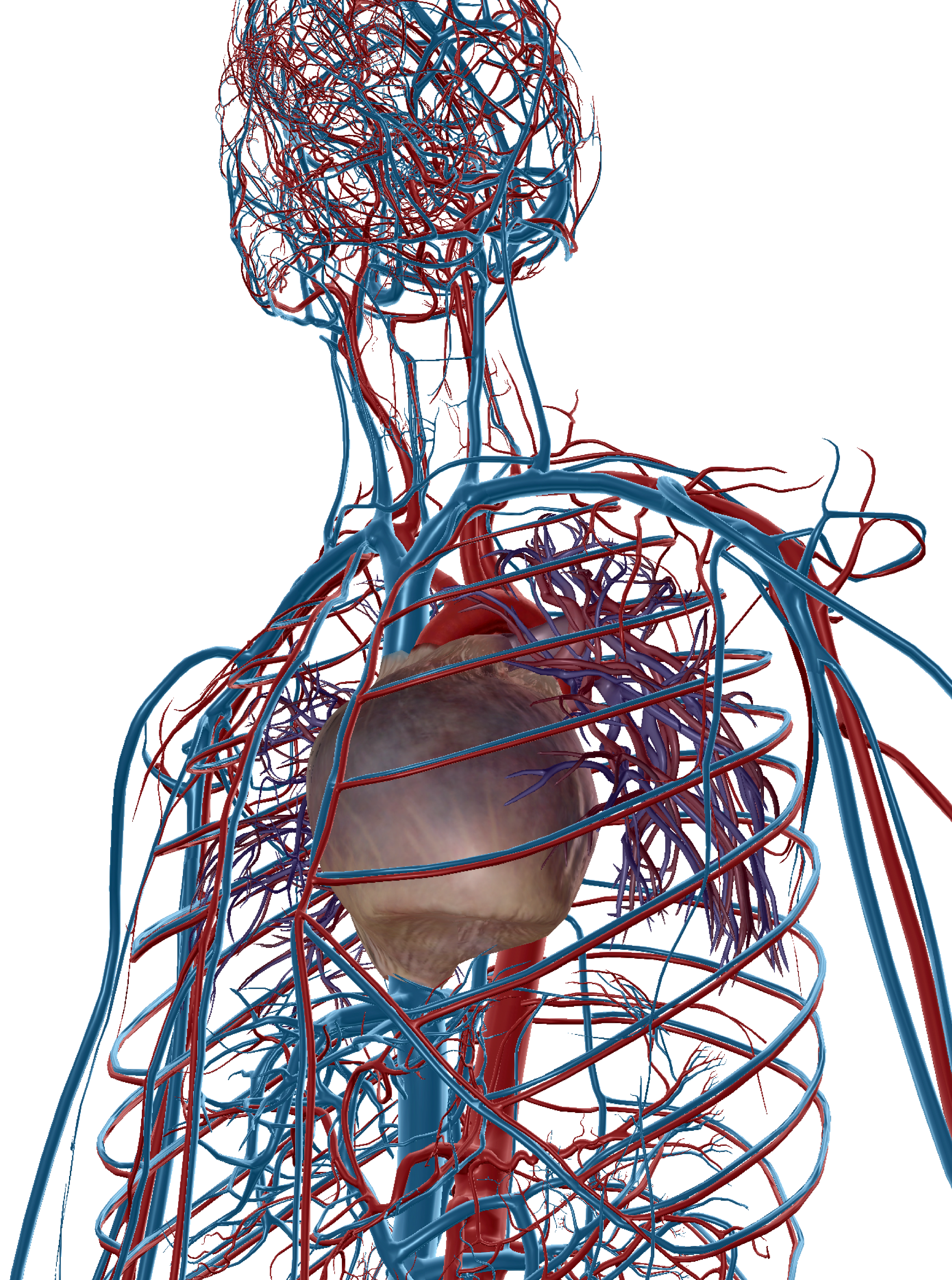
There are several layers of pericardium: the fibrous pericardium (the outer layer), the serous pericardium (which has two layers of its own, the parietal and visceral layers), and the fluid-filled space between the serous pericardium's layers.

**FACTOID:** The fluid between the parietal and visceral layers reduces friction on the heart as it beats.

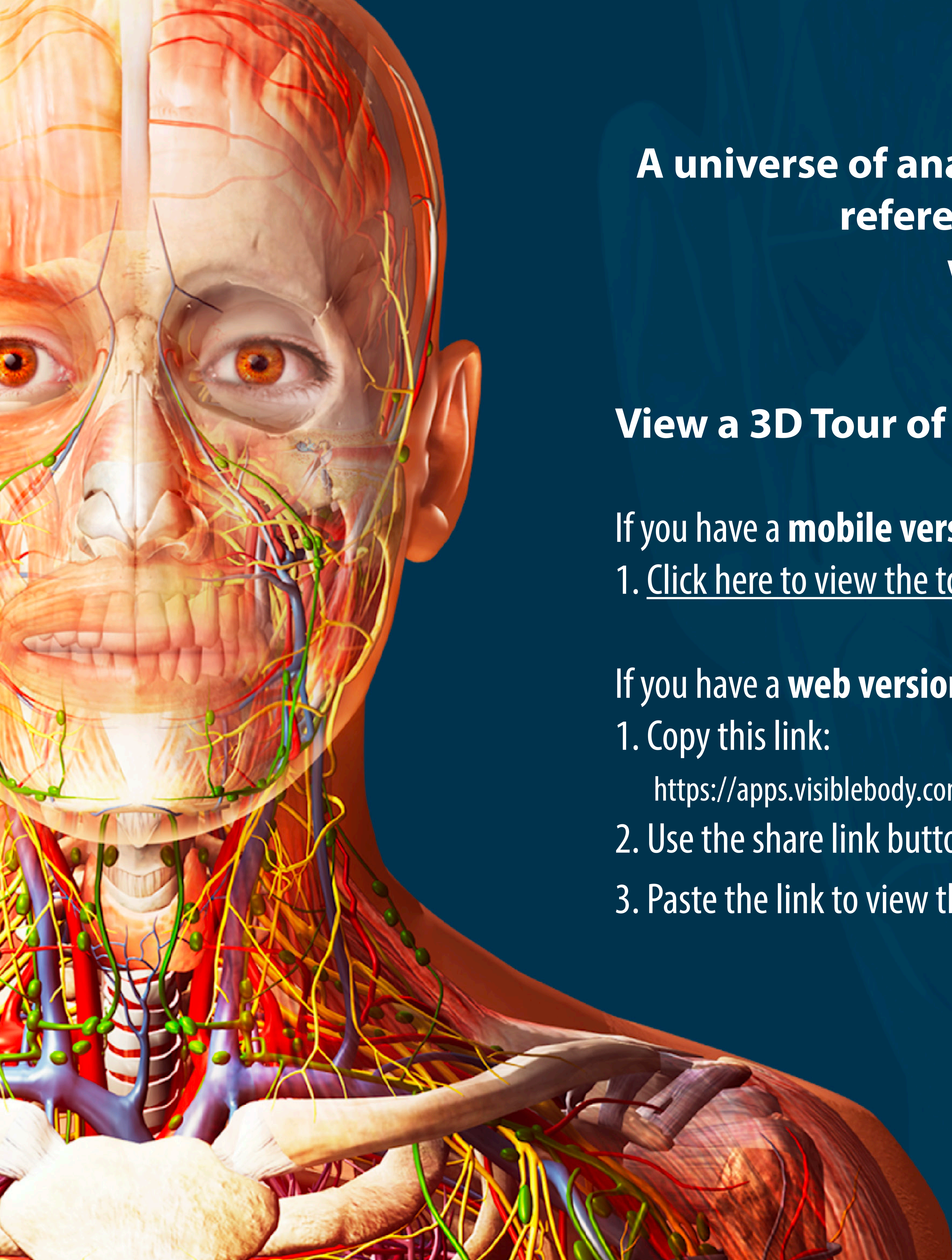


**Systemic vasculature** manages blood flow to other organs and tissues throughout the body.

**FACTOID:** Everyone has enough vasculature to wrap around the Earth 2.4 times!







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