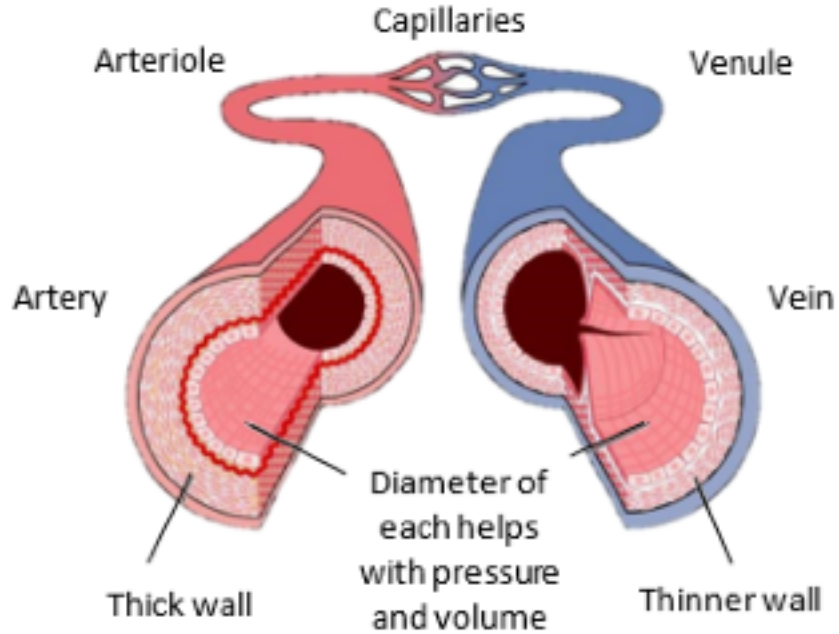
Paper 1: Cardiac system

Structure of Blood Vessels

Blood vessels carry blood around the body and back to the heart. Each has a different structure and their structure is directly linked to their function.

Vessel	Arteries	Capillaries	Veins
Size/ Diameter	Small, to elevate pressure	Large surface area for gaseous exchange	Large diameters to carry large volumes of blood
Wall Thickness	Thick, so that blood can be pumped around the body. The walls also allow vasodilation* and vasoconstriction* to occur.	Very thin so that oxygen and carbon dioxide can easily diffuse	Thin, as blood does not need to be under high pressure
Valves	No	No	Yes



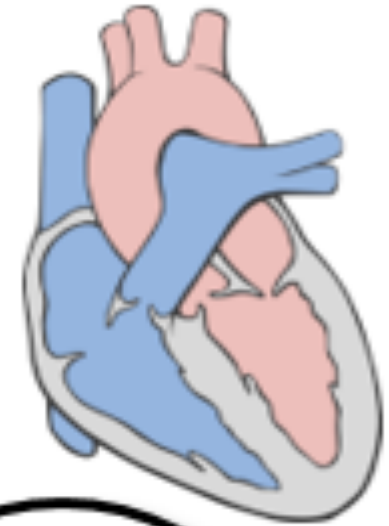
Blood Redistribution during Exercise

Blood is redistributed around the body during exercise so more blood is taken to the working muscles and less to the internal organs.

This occurs by the arteries' smooth muscle layer either:

- contracting (**vasoconstriction**), or
- widening (**vasodilation**)

Function of the Heart



The heart needs to supply the muscles with enough oxygen to work. In order to increase the amount of oxygen supplied, they can increase the stroke volume or the heart rate.

Cardiac Output
The volume of blood pumped out of the heart per minute
L per min

=

Stroke Volume
The amount of blood pumped out of the heart per beat
L

×

Heart Rate
The number of heart beats per minute
BPM