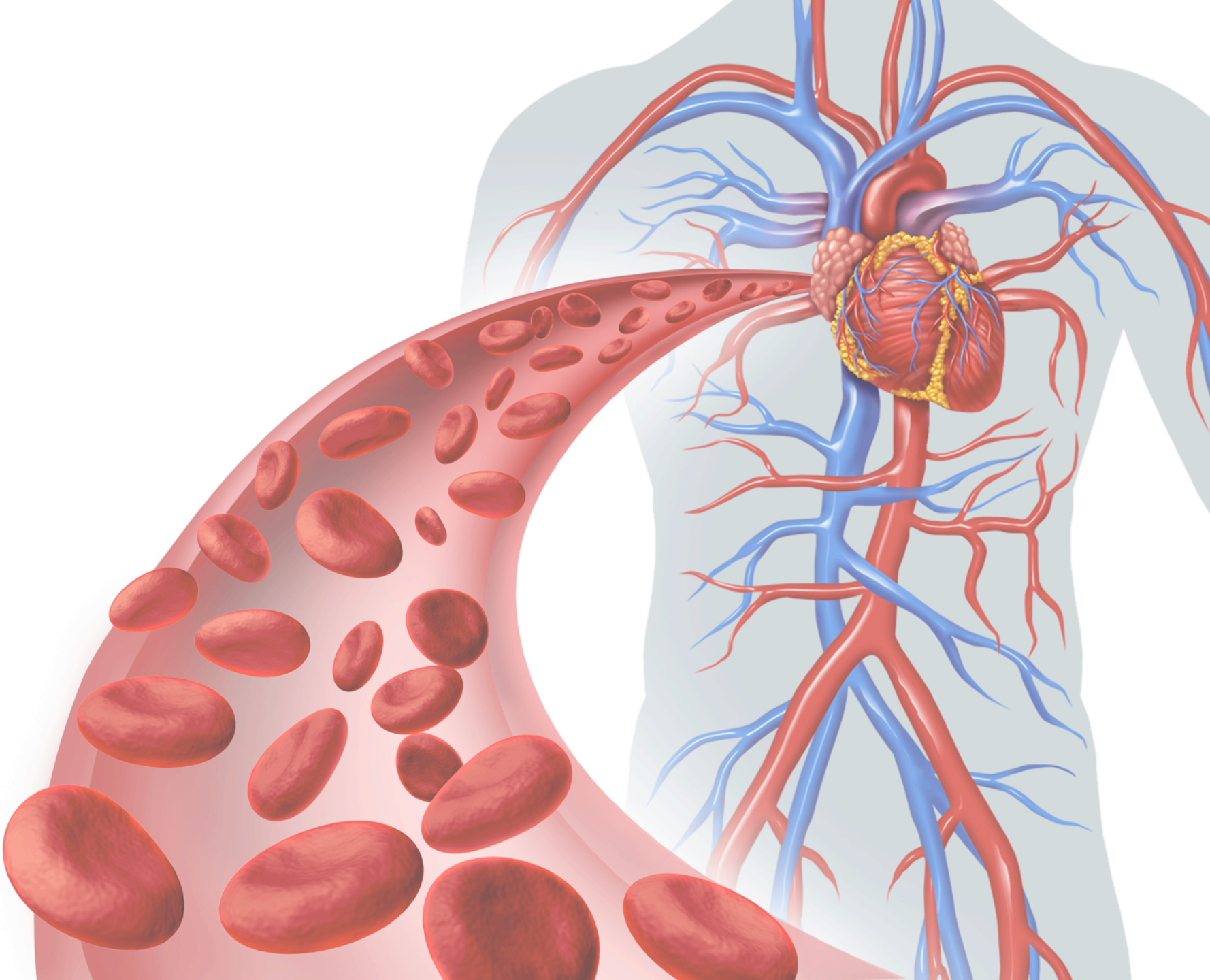


At the end of this section you should be able to:

Name the parts of the circulatory system, (heart, vessels).

Explain the role of the circulatory system

Describe the function of the main parts, (heart vessels).

PART TWO – CIRCULATORY SYSTEM

Anatomy of the Circulatory System

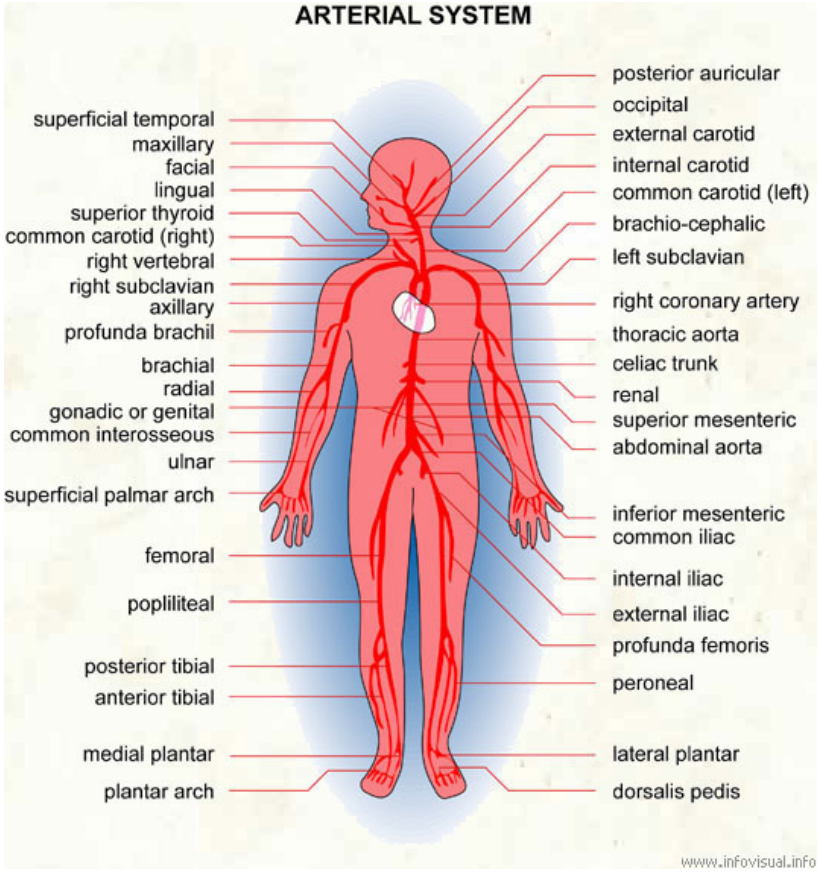
- There are **three main parts** of the circulatory system:
  - The heart
  - Blood vessels
  - Pulmonary and systemic circulation
- The **heart** is the pump that keeps blood circulating in our blood vessels.
- The **blood vessels** are broken down into many types, mainly depending on their size.
- There are two ways that blood circulates throughout the body.

Blood Vessels

- The bodies blood vessels form a closed-circuit network.
- Blood vessels are divided into three categories:
  - **Arteries**
  - **Capillaries**
  - **Veins**

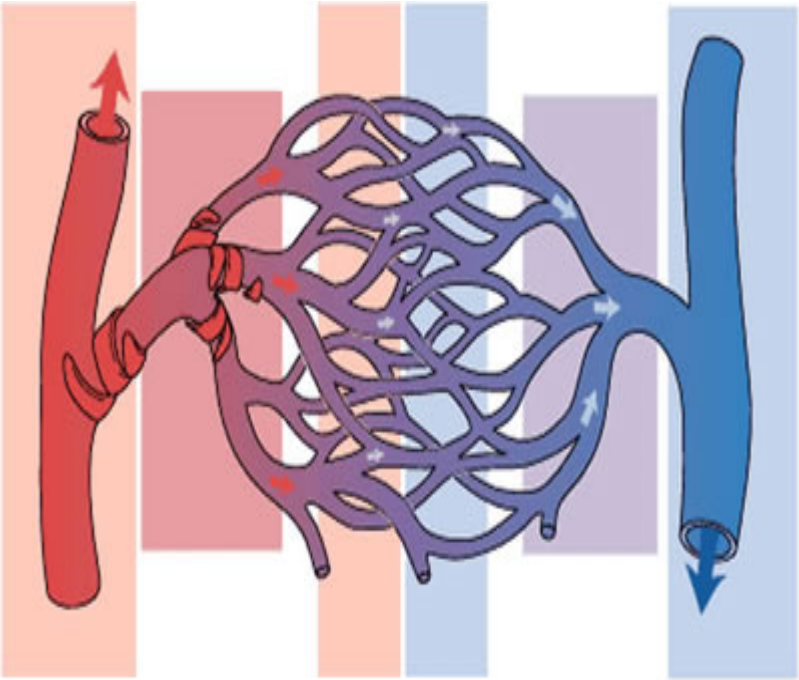
Arteries

- A blood vessel that carries blood **<u>from</u>** the heart to other parts of the body.
- They have very thick walls, allowing them to withstand high amounts of pressure.
- They branch into smaller arterioles, before becoming small capillaries.



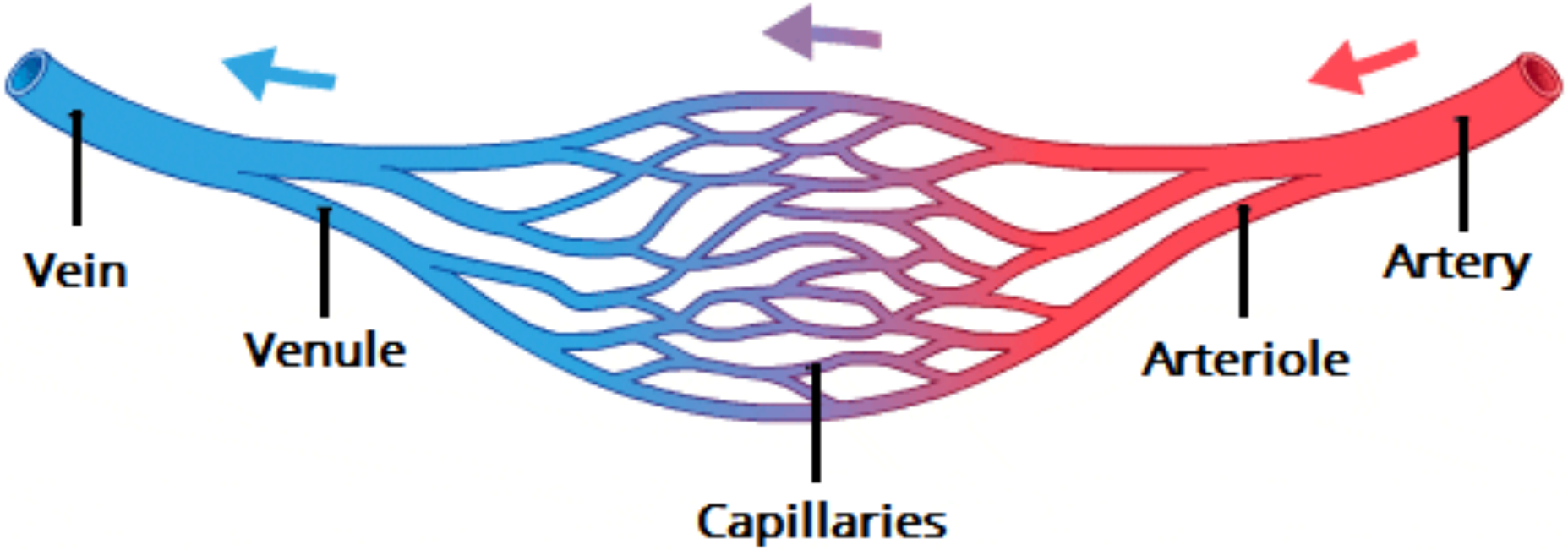
Capillaries

- A blood vessel that has a small diameter and thin walls. **Responsible for exchanges between the blood and cells.**
- Capillaries are so small that the blood cells must pass one at a time.



Veins

- A blood vessel that carries blood **back** to the heart.
- Once capillaries start to reconnect, they form venules, which become the larger veins.


Vein
Venule
Capillaries
Arteriole
Artery

The Heart

- The heart is roughly the size of your fist, located between your lungs, protected by the rib cage.
- It is composed of four chambers:
  - Right atrium
  - Right ventricle
  - Left atrium
  - Left ventricle

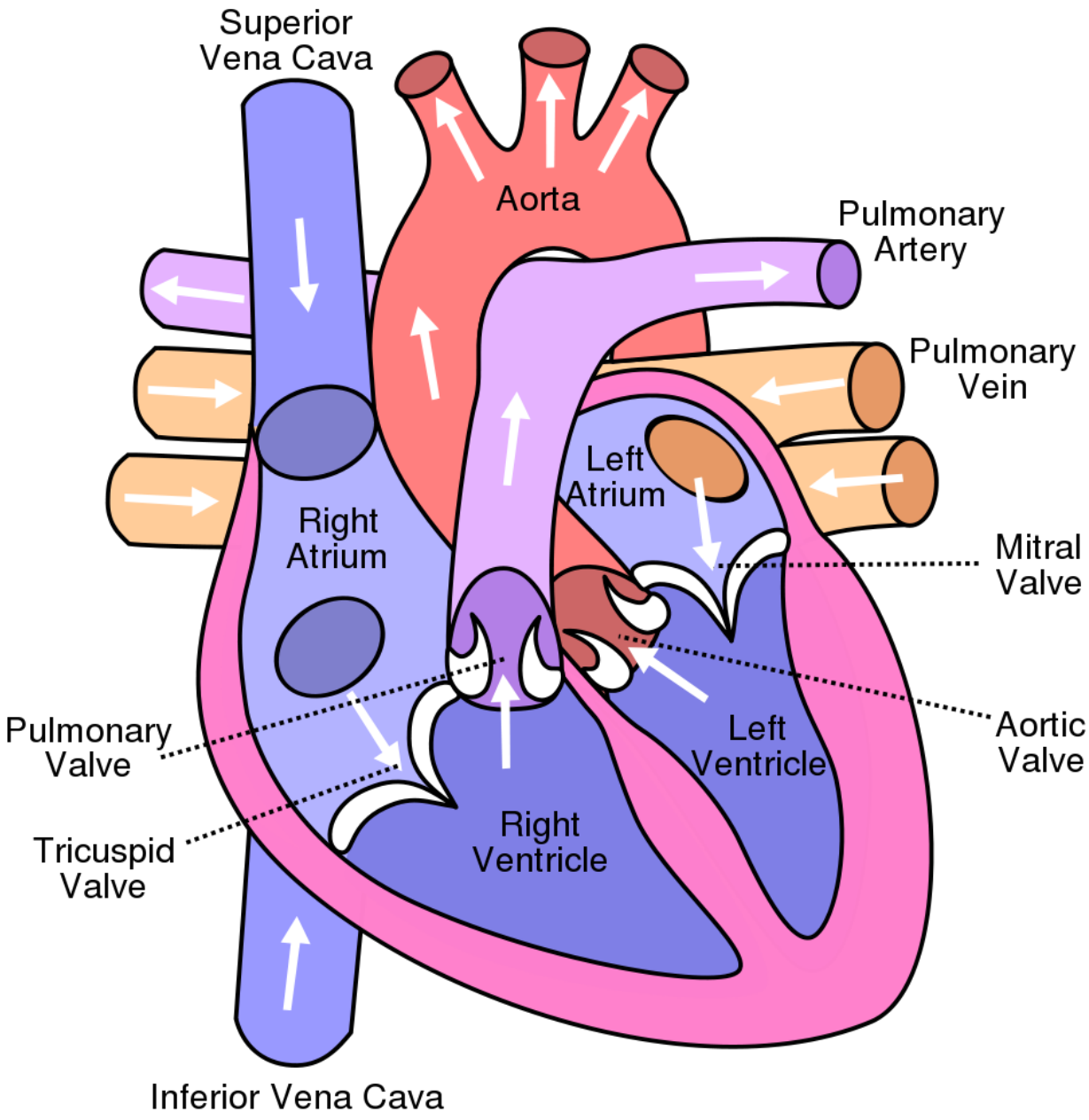
directly linked

directly linked

Separated by a partition

…

- There are **5 major blood vessels** that are connected to the heart.
  - Superior and inferior vena cava, (veins)
  - Pulmonary vein
  - Pulmonary artery
  - Aorta, (artery).


Superior
Vena Cava
Aorta
Pulmonary
Artery
Pulmonary
Vein
Left
Atrium
Right
Atrium
Mitral
Valve
Aortic
Valve
Pulmonary
Valve
Left
Ventricle
Tricuspid
Valve
Right
Ventricle
Inferior Vena Cava

…

- Valves are also present in the heart.
- Without these valves, blood would flow backwards in the heart. They are called **atrioventricular valves**.
- Several blood vessels are attached to the heart.
  - **Veins**, (superior and inferior vena cava, pulmonary veins), attached to both atria.
  - **Arteries**, (aorta and pulmonary arteries), are attached to the ventricles.

Function of the Heart

- The contraction and relaxation of the heart muscles is what circulates blood throughout the body.
- **For blood to enter the heart:**
  - It must enter the atria from the veins.
  - It must enter when the heart is at rest, or is relaxed.
  - The filling of the heart is called **diastole.**

…

- **For blood to leave the heart:**
  - The atria must contract, pushing blood into the ventricles.
  - Then, the ventricles contract, pushing blood into the arteries attached to the heart, (aorta and pulmonary). This is called **systole**.

- The pulse that you feel corresponds to the contractions of the left ventricle, (it is larger). 75 beats per minute when at rest.

Circulation Routes

- The heart is a double pump. Because the two sides of the heart are separated, the blood is pumped in and out by different routes.
- On the right side of the heart, the mechanism is called **pulmonary circulation**.
- On the left side, it is called **systemic circulation**.

Pulmonary vs. Systemic

Pulmonary

- Right side.
- Shorter circuit.
- Blood is rich in CO_2
- Blood exits the right ventricle and flows to the capillaries of the lungs.
- CO_2 exchanges with O_2.
- Now rich in O_2, blood returns to the heart and enters the left atrium through a pulmonary vein.

Systemic

- Left side.
- Longer circuit.
- Blood is rich in O_2.
- Blood exits the left ventricle through the aorta.
- Aorta divides into arteries and capillaries which shed O_2 at the cells and pick up CO_2.
- Now rich in CO_2, blood returns to the left atrium, entering via the Vena Cava.

Circulation Routes