NUTRITION: THE CIRCULATORY AND EXCRETORY SYSTEMS

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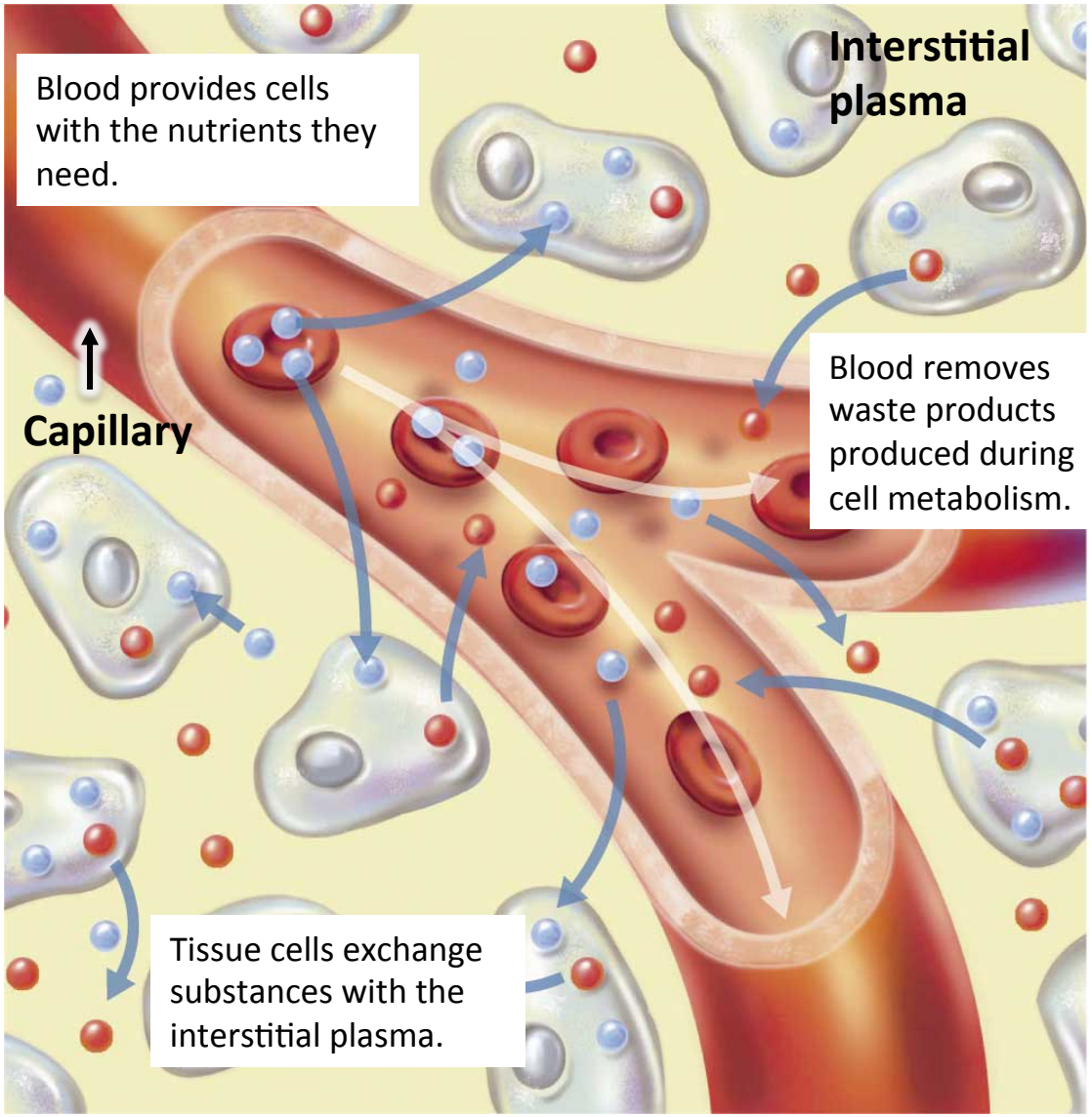
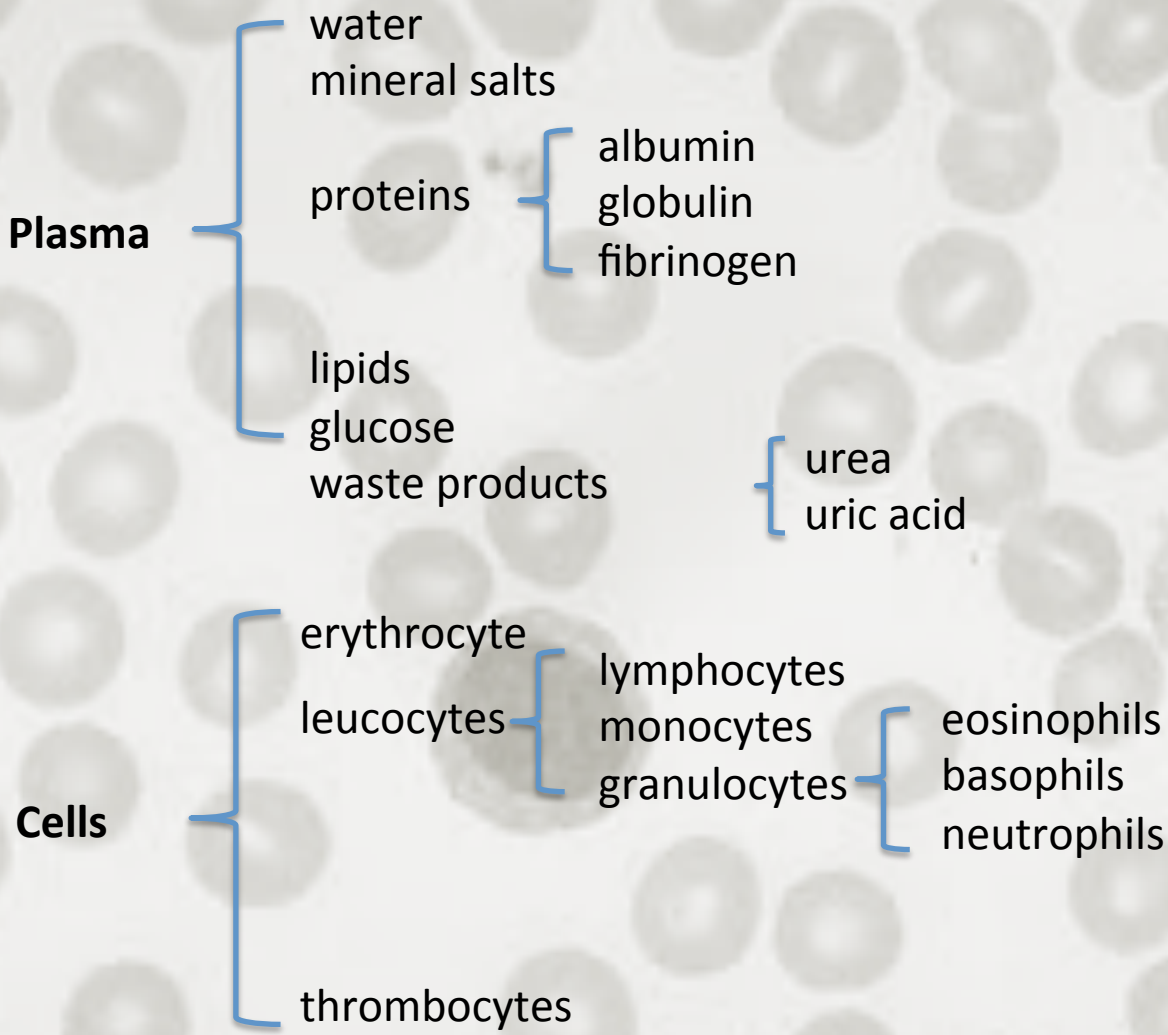
THE INTERNAL ENVIRONMENT

All cells need to live in a **environment** that provides them with all the nutrients they need. In addition, the same environment allows cells to release waste substances resulting from their metabolism.

The internal environment is formed by **interstitial plasma.**



BLOOD COMPOSITION



BLOOD VESSELS

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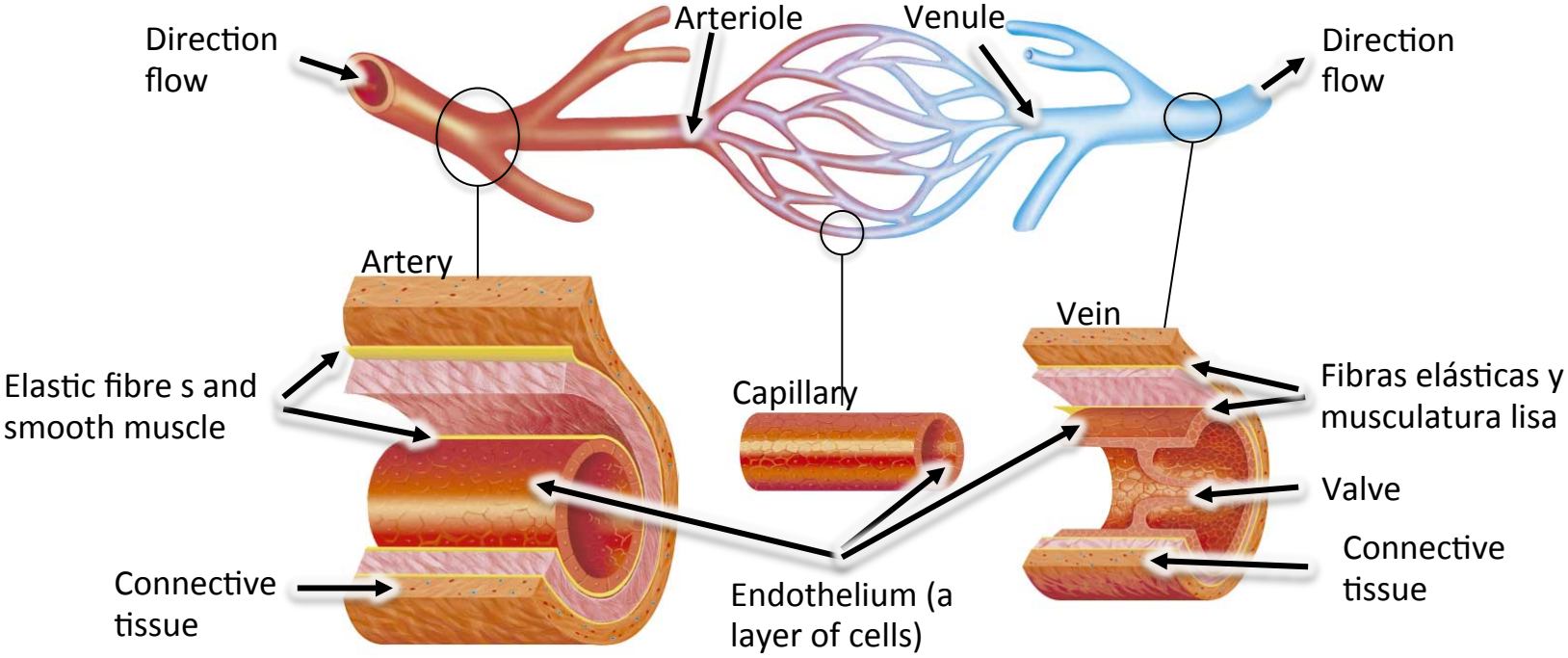
Blood flows through the **circulatory system,** which is constructed by some channels called **blood vessels**, and by a driver organ, the **heart**.

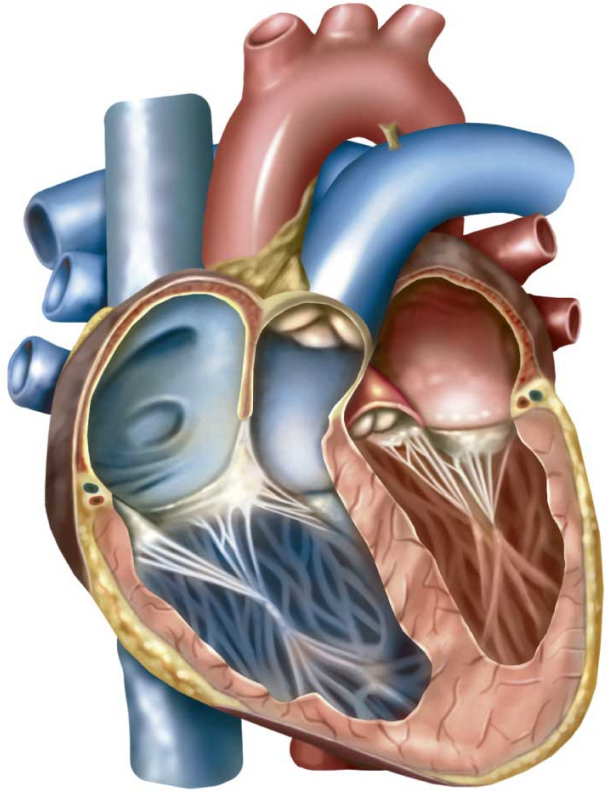


- **Arteries**: these carry blood from the heart to other organs. They have wide muscular walls and are elastic.
- **Veins**: these carry blood from tissues to the heart. They have thinner walls than arteries . In addition, they have valves that stop blood from going backwards.
- **Capillaries**: these are microscopic blood vessels located in all the organism's tissues. Capillaries are formed by walls that only have one layer of cells.

HEART

The **heart** is a hollow muscular organ. It is divided into two parts, the left and right, which are completely separate.

Each half of the heart is subdivided into two chambers: an upper smaller chamber named the **atrium**, and a larger lower chamber named the **ventricle**.

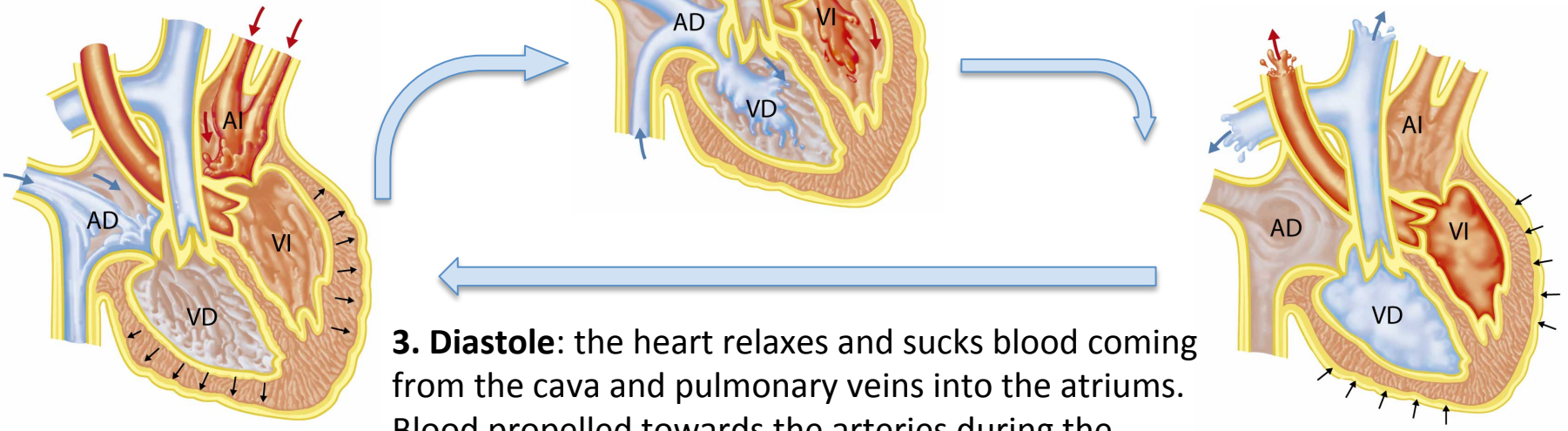


HEARTBEATS

A **heartbeat** is the movement that pumps blood.
It performs three phases:

1. Atrial systole: the atriums contract and blood is propelled through the opened atrioventricular valves into the ventricles.

2. Ventricular systole: ventricles contract, the sigmoid valves open and the blood contained in them exits through the pulmonary artery and the aorta. Simultaneously, the valves that connect with ventricles close.



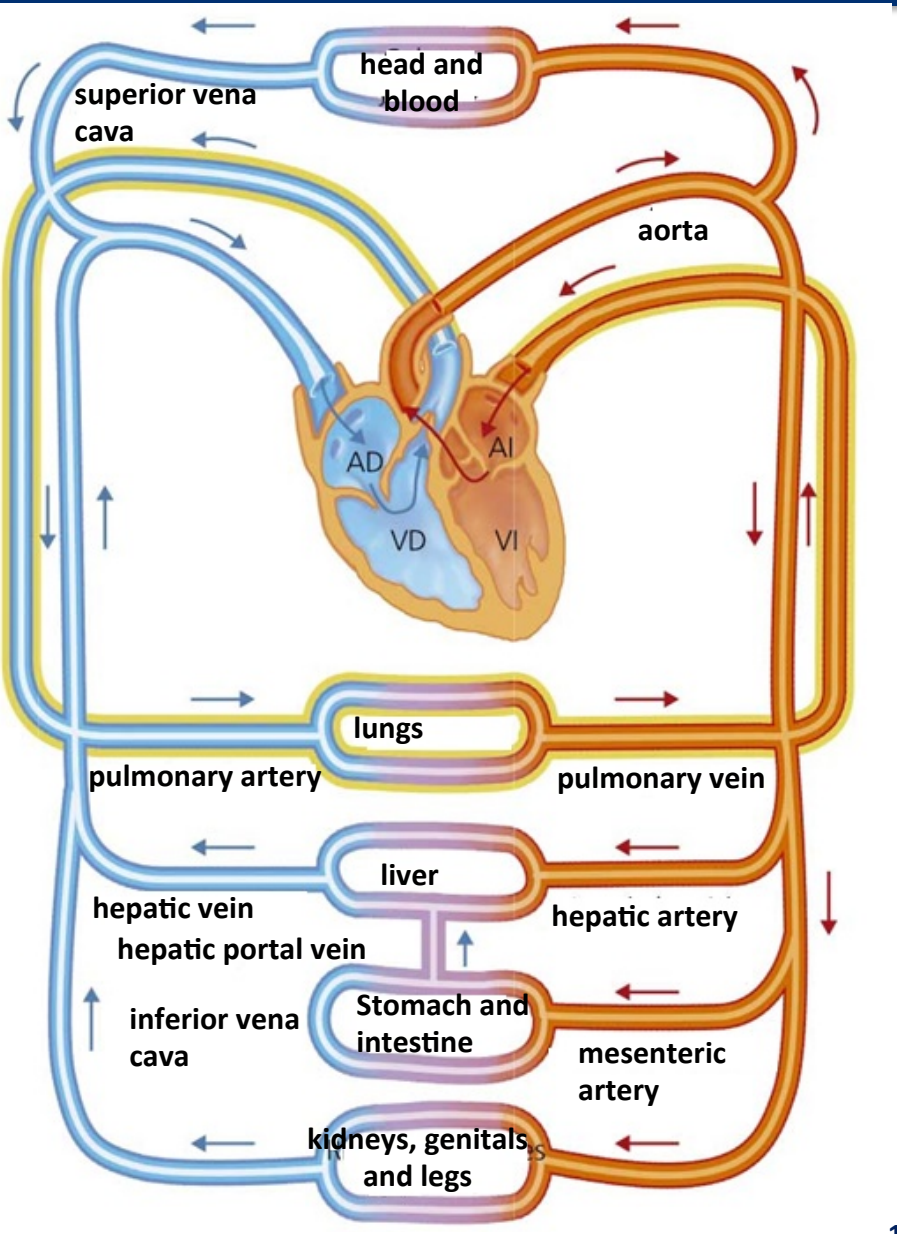
3. Diastole: the heart relaxes and sucks blood coming from the cava and pulmonary veins into the atriums. Blood propelled towards the arteries during the ventricular systole doesn't return to the ventricles thanks to the action of the sigmoidal valves, which close up and prevent this from happening.

BLOOD CIRCULATION

Our **cardiovascular system** is a **double** system and goes through **two separate circuits**: systemic and pulmonary.

Systemic circuit: blood starts in the left ventricle and goes through the aorta, which branches into arterioles, and then into capillaries, reaching all the tissues and organs except the lungs.

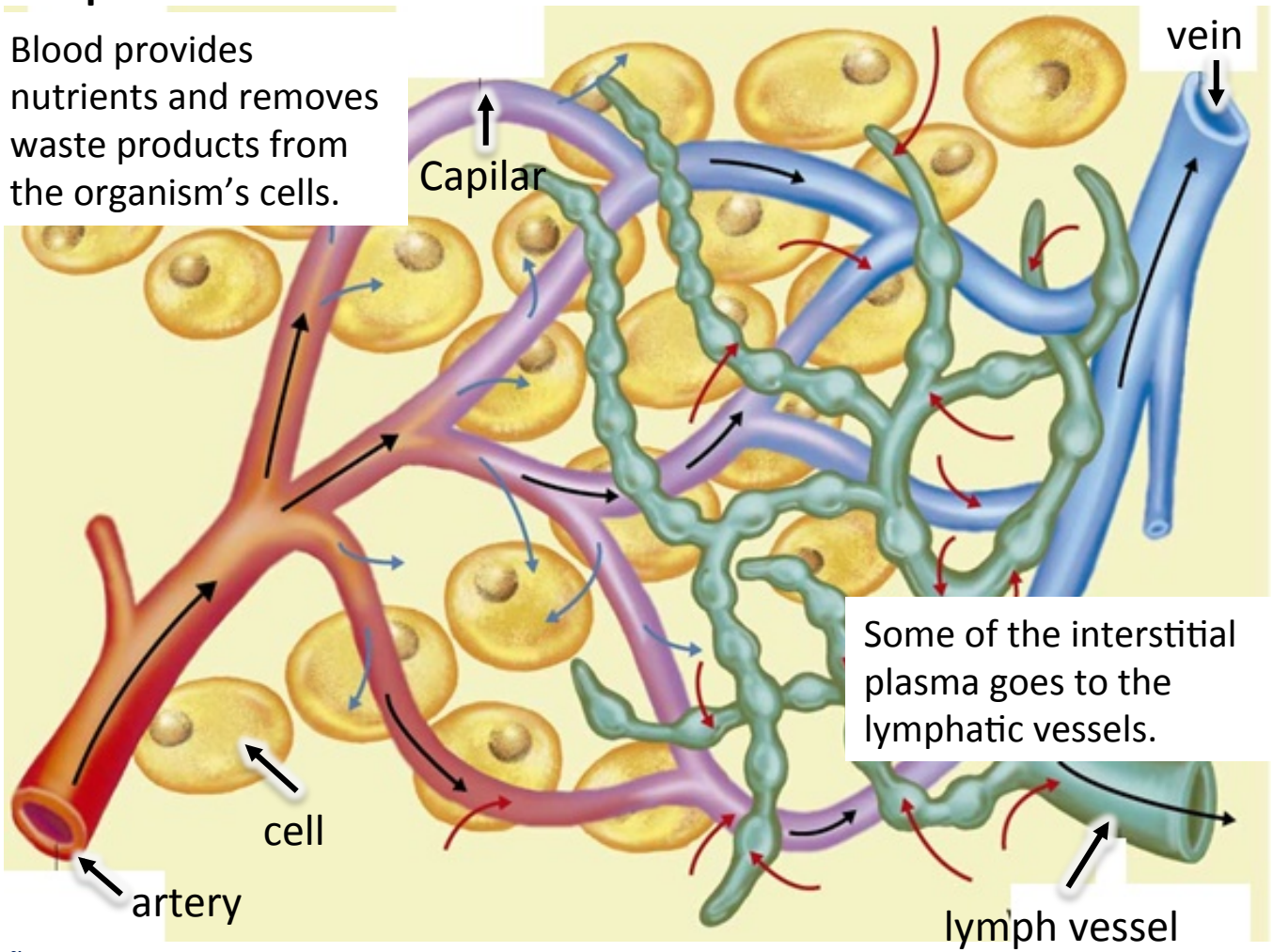
Pulmonary circuit: it begins in the right ventricle from which the pulmonary artery starts (this artery branches into two, with each branch connecting with a lung).



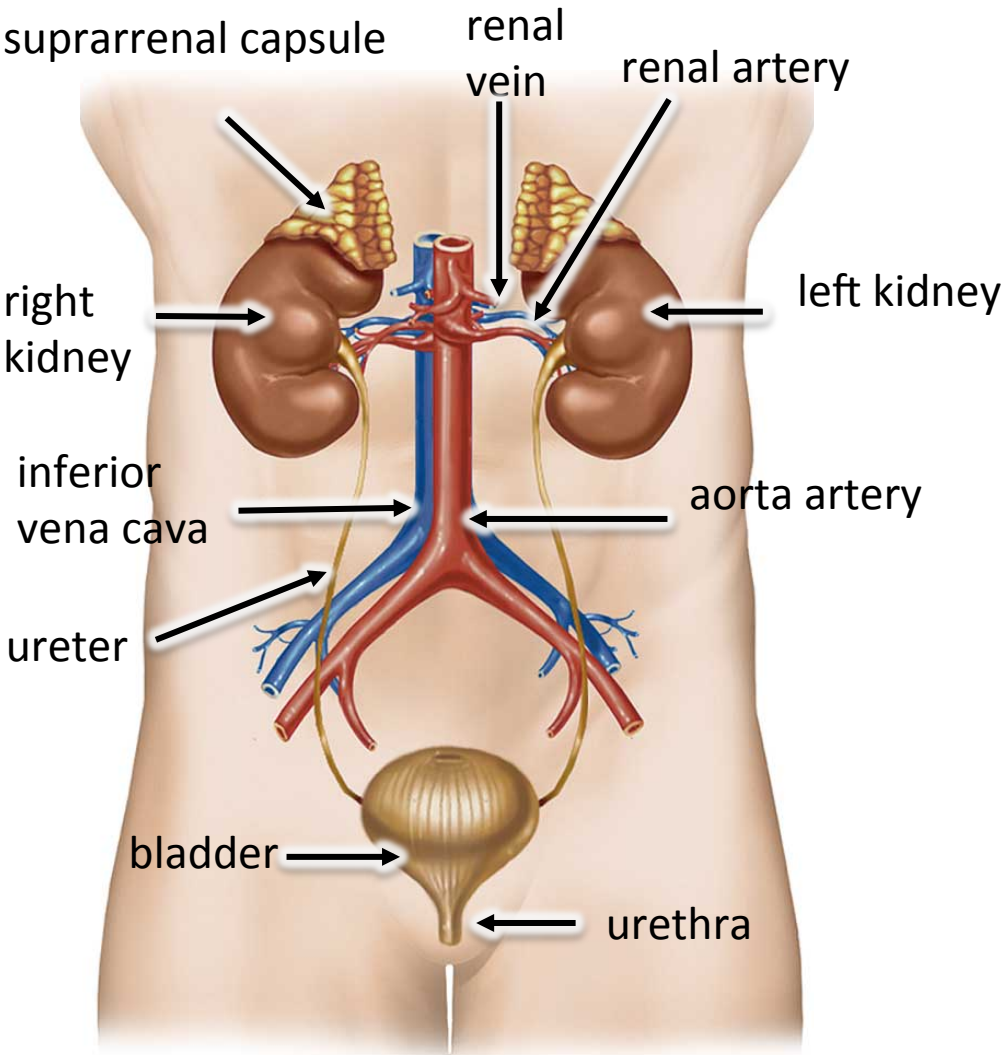
LYMPHATIC SYSTEM

Lymph: a transparent liquid composed of lymphocytes and interstitial plasma. Interstitial plasma is formed when blood plasma is filtered as it travels to the tissues. From there, it's collected by **lymphatic capillaries**.

Lymphatic vessels: lymphatic capillaries are closed on one end and are found in tissues joining into increasingly bigger conduits known as lymph veins.



EXCRETORY SYSTEM



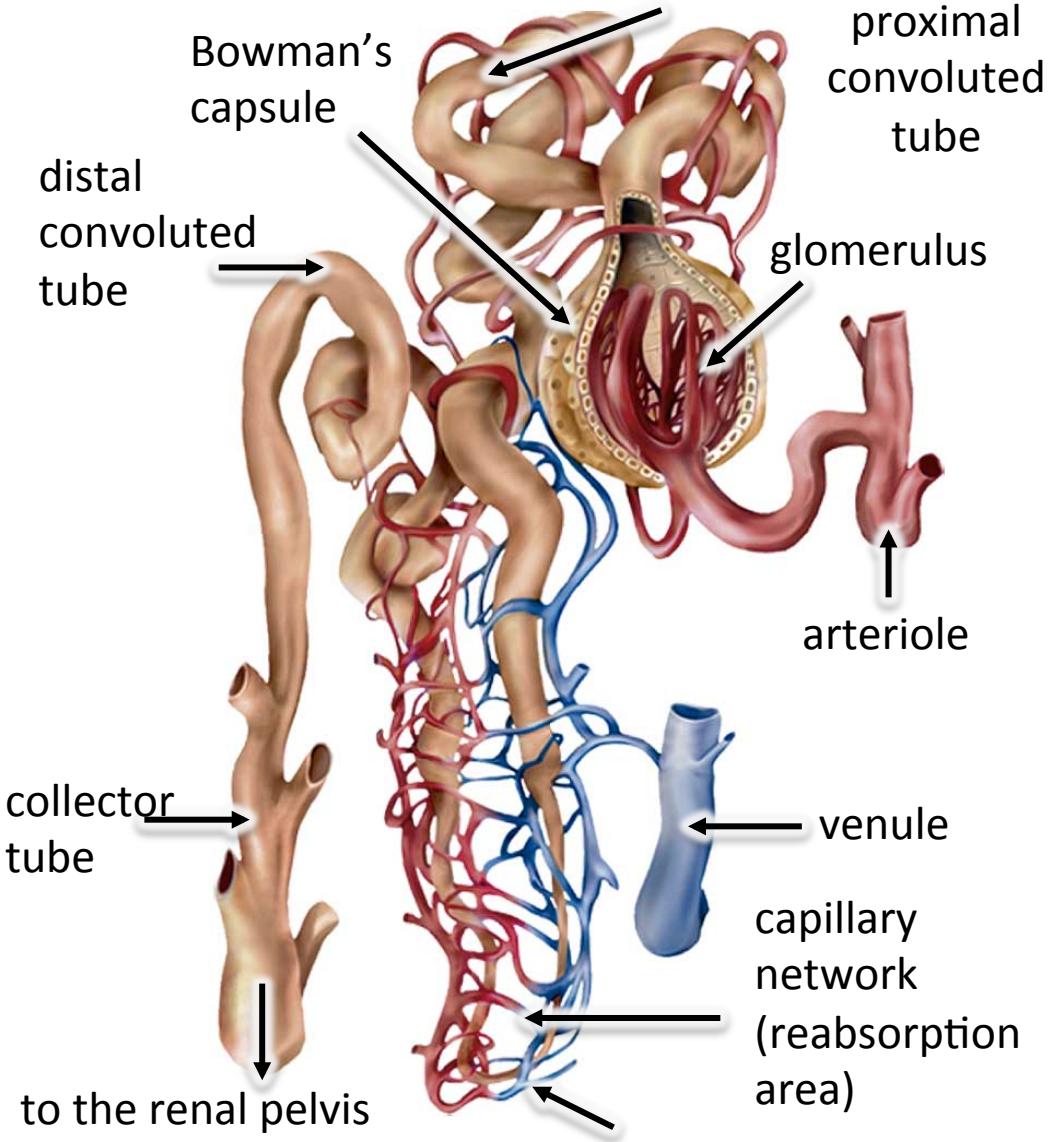
The **excretory system** is the group of organs that facilitate the elimination of waste products produced by cells after cell metabolism.

The **urinary system** plays an important role in the **excretory system**, formed by the **kidneys** and the **urinary tracts**.

NEPHRON

Nephrons are the structural and functional units of the kidneys. They are tubes with one closed end and are surrounded by blood capillaries.

They are responsible for **filtering blood** and forming urine, as well as regulating water and mineral content in the blood. Each kidney is formed by over a million nephrons.



HEALTHY HABITS IN THE CIRCULATORY AND EXCRETORY SYSTEMS

In order to ensure that our circulatory and excretory systems function adequately, it's essential to incorporate healthy habits into our lifestyle.

A **balanced diet**, adequate **hygiene** and **exercising** regularly, as well as avoiding stress, are keys to maintaining both systems healthy.