Al-Mustaqbal University
College of Science
Forensic Evidence Department

جامعة المستقبل
AL MUSTAQBAL UNIVERSITY

كلية العلوم
قسم الادلة الجنائية

Lecture (7)

عنوان المحاضرة

Circulatory system; Blood

المادة : بايلوجي

المرحلة : الاولى

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Circulatory System; Blood

Introduction

The circulatory system is one of the most important systems in the human body. It is responsible for transporting oxygen, nutrients, hormones, and waste products to and from body cells. It also plays a major role in maintaining homeostasis and protecting the body against diseases.

The circulatory system consists of the heart, blood vessels, and blood.

Functions of the Circulatory System

The main functions include:

1. Transporting oxygen from the lungs to body tissues.
2. Removing carbon dioxide and metabolic waste.
3. Transporting nutrients from the digestive system.
4. Carrying hormones from endocrine glands to target organs.
5. Regulating body temperature.
6. Protecting the body through immune responses.
7. Maintaining fluid balance and blood pH.

Main Components of the Circulatory System

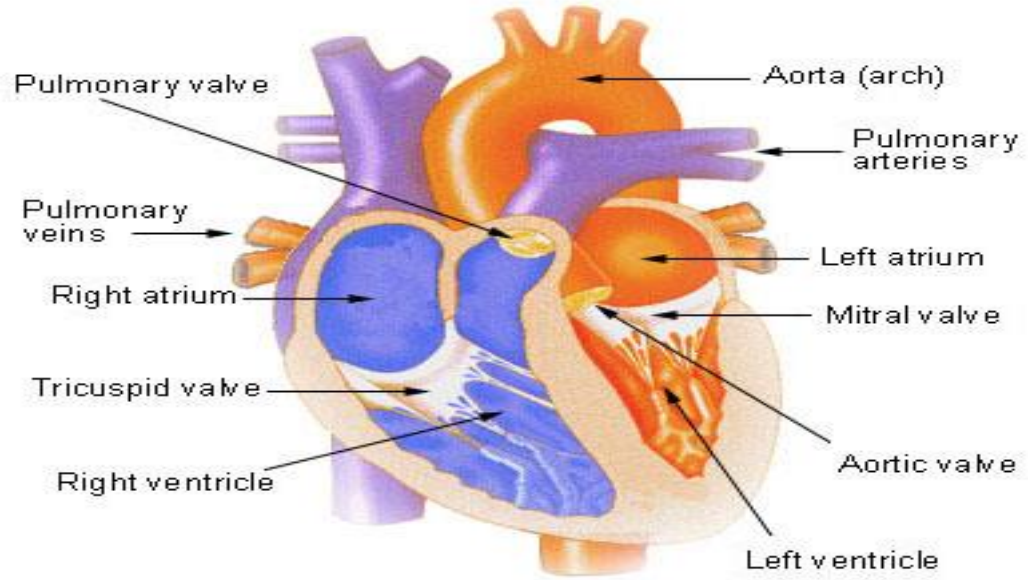
1. Heart
2. Blood Vessels
3. Blood

The Heart

Location and Shape

The heart is a hollow muscular organ located in the thoracic cavity between the lungs, slightly to the left. It is about the size of a clenched fist and is surrounded by a protective membrane called the pericardium.

Internal View of the Heart



Chambers of the Heart

The heart has four chambers:

- Right atrium
- Right ventricle
- Left atrium
- Left ventricle

The right side of the heart carries deoxygenated blood, while the left side carries oxygenated blood.

Heart Valves

Heart valves prevent backflow of blood:

1. Tricuspid valve
2. Mitral (bicuspid) valve
3. Pulmonary valve
4. Aortic valve

Function of the Heart

The heart pumps blood continuously through rhythmic contraction and relaxation, known as the cardiac cycle.

Blood Vessels

Arteries

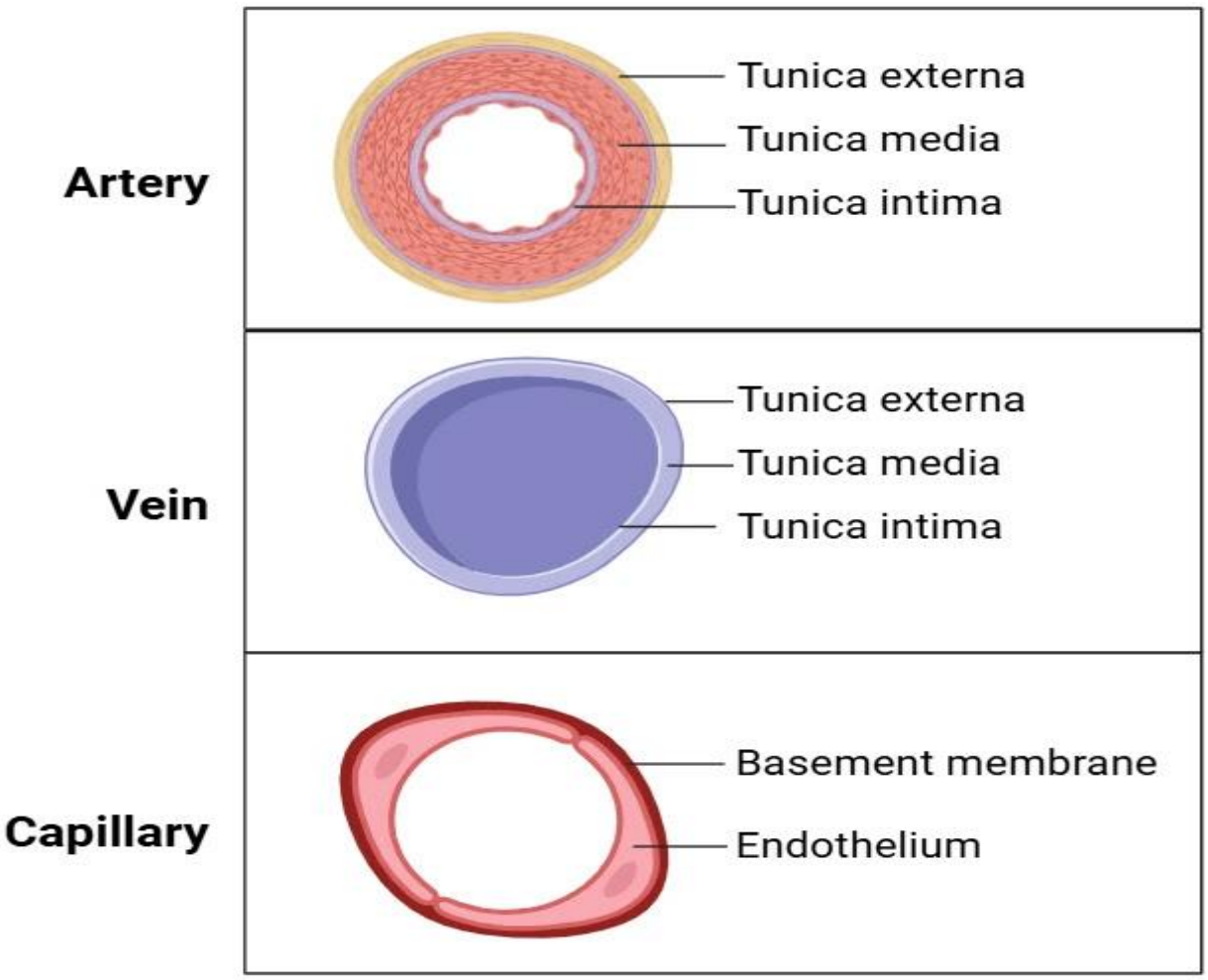
- Carry blood away from the heart.
- Have thick, elastic walls.
- Usually carry oxygenated blood.

Veins

- Carry blood back to the heart.
- Have thinner walls.
- Contain valves to prevent backflow.

Capillaries

- Microscopic vessels connecting arteries and veins.
- Allow exchange of gases, nutrients, and wastes.



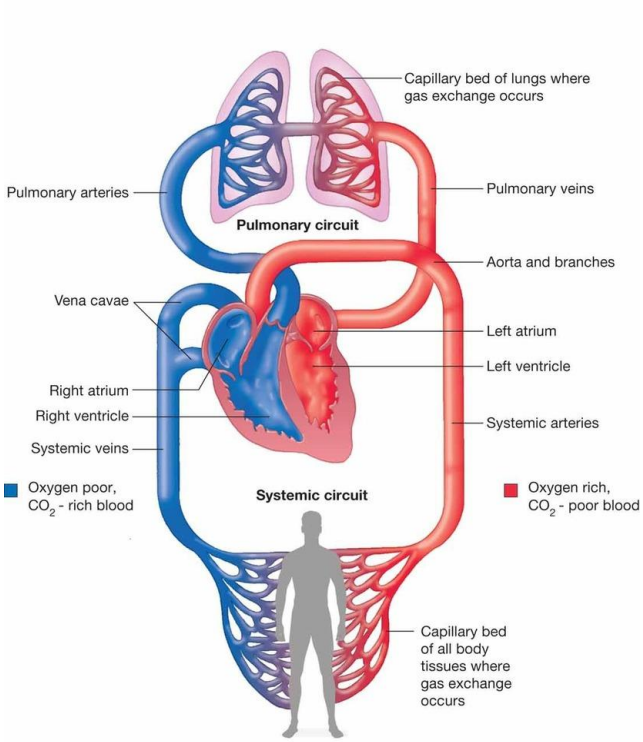
Blood Circulation

Pulmonary Circulation

Blood travels from the heart to the lungs and back to the heart for oxygenation.

Systemic Circulation

Blood flows from the heart to all body tissues and back to the heart.



Blood

Blood is a fluid connective tissue that circulates through blood vessels. It represents about 7–8% of body weight.

Components of Blood

1. Plasma
2. Red Blood Cells (RBCs)
3. White Blood Cells (WBCs)
4. Platelets

Plasma

Plasma makes up about 55% of blood volume and is a yellowish fluid composed mainly of water, proteins, nutrients, hormones, and waste products.

Functions of Plasma

- Transport of nutrients and wastes
- Regulation of body temperature
- Maintenance of blood pressure

Red Blood Cells (RBCs)

Structure

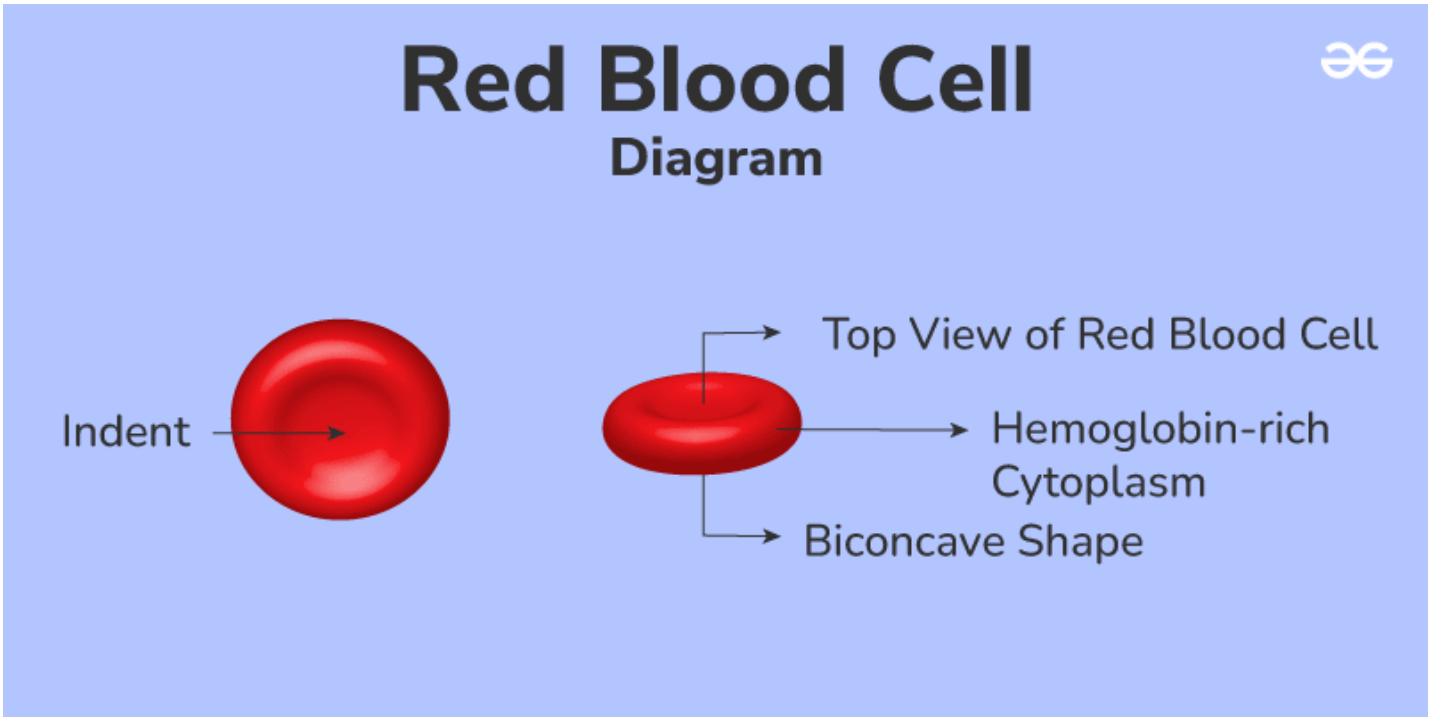
- Biconcave disc shape
- No nucleus
- Contain hemoglobin

Function

Transport oxygen and carbon dioxide.

Life Span

Approximately 120 days.



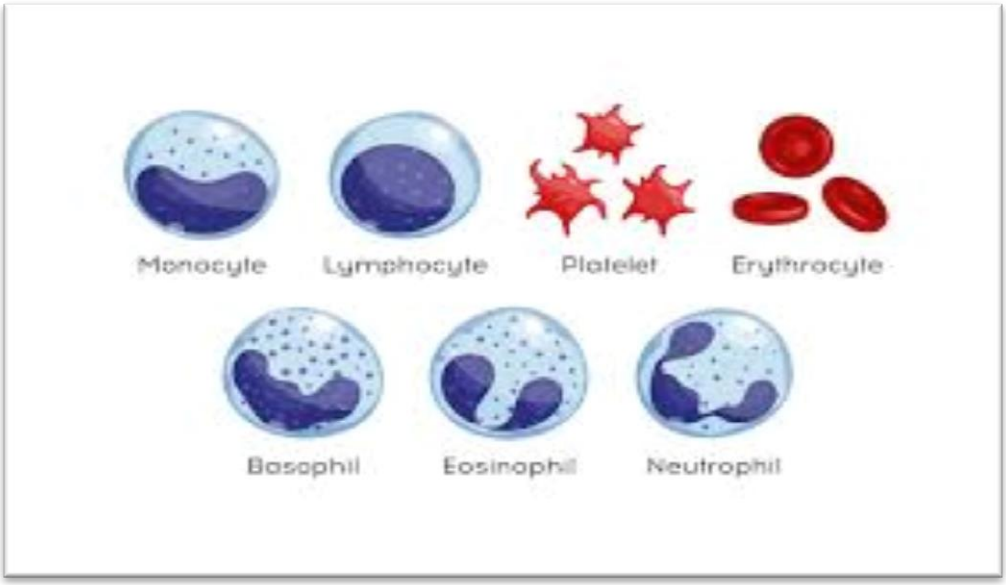
White Blood Cells (WBCs)

Function

Protect the body against infections and foreign substances.

Types

- Neutrophils
- Lymphocytes
- Monocytes
- Eosinophils
- Basophils



Platelets

Function

Platelets help in blood clotting and prevent excessive bleeding.

Blood Groups

ABO System

- A
- B
- AB
- O

Rh Factor

- Rh positive (+)
- Rh negative (−)

Blood grouping is essential for safe blood transfusion.

Blood Clotting

Blood clotting is a protective process that stops bleeding. It involves platelets, clotting factors, and vitamin K.

Common Circulatory System Disorders

1. Anemia
2. Hypertension
3. Atherosclerosis
4. Blood clots
5. Coronary heart disease

Maintaining a Healthy Circulatory System

- Balanced diet
- Regular exercise
- Avoid smoking
- Stress management
- Regular medical check-ups

Conclusion

The circulatory system and blood are essential for survival. Understanding their structure and function helps students appreciate the importance of maintaining good health.