GENERAL ANATOMY

DPT

1ST SEMESTER

DR DANISH

The Circulatory System

- The circulatory system consists of two major divisions:
- **Cardiovascular system**
- **Lymph vascular system**

Cardiovascular System

- The body's transport system
- Made up of the **heart**, **blood vessels**, and **blood**
- Delivers oxygen and nutrients to tissues
- Removes waste products like carbon dioxide

Blood

- **Overview:**
- A **specialized connective tissue** that circulates through the cardiovascular system.
- Consists of **cells suspended in a fluid medium**.
- Performs essential functions including:
  - Transportation of gases, nutrients, and waste
  - Protection through immune cells
  - Regulation of temperature, pH, and fluid balance

Components

- Blood Has Two Main Components:
- **Plasma**
- **Formed (Cellular) Elements**

Plasma (Fluid Component)

- **Clear, pale-yellow liquid** forming about **55%** of total blood volume.
- Acts as the **transport medium** for cells and substances.

Composition of Plasma

- Water (about 90%)
- Plasma Proteins (about 7%)
  - **Albumin** – maintains osmotic pressure; helps transport molecules.
  - **Globulins** – immune protection and transport.
  - **Fibrinogen** – essential for blood clotting.

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- Solutes (about 3%)
  - **Electrolytes**
  - **Nutrients (glucose, amino acids, lipids)**
  - **Hormones, enzymes, and metabolic wastes (urea, uric acid)**

Formed Elements

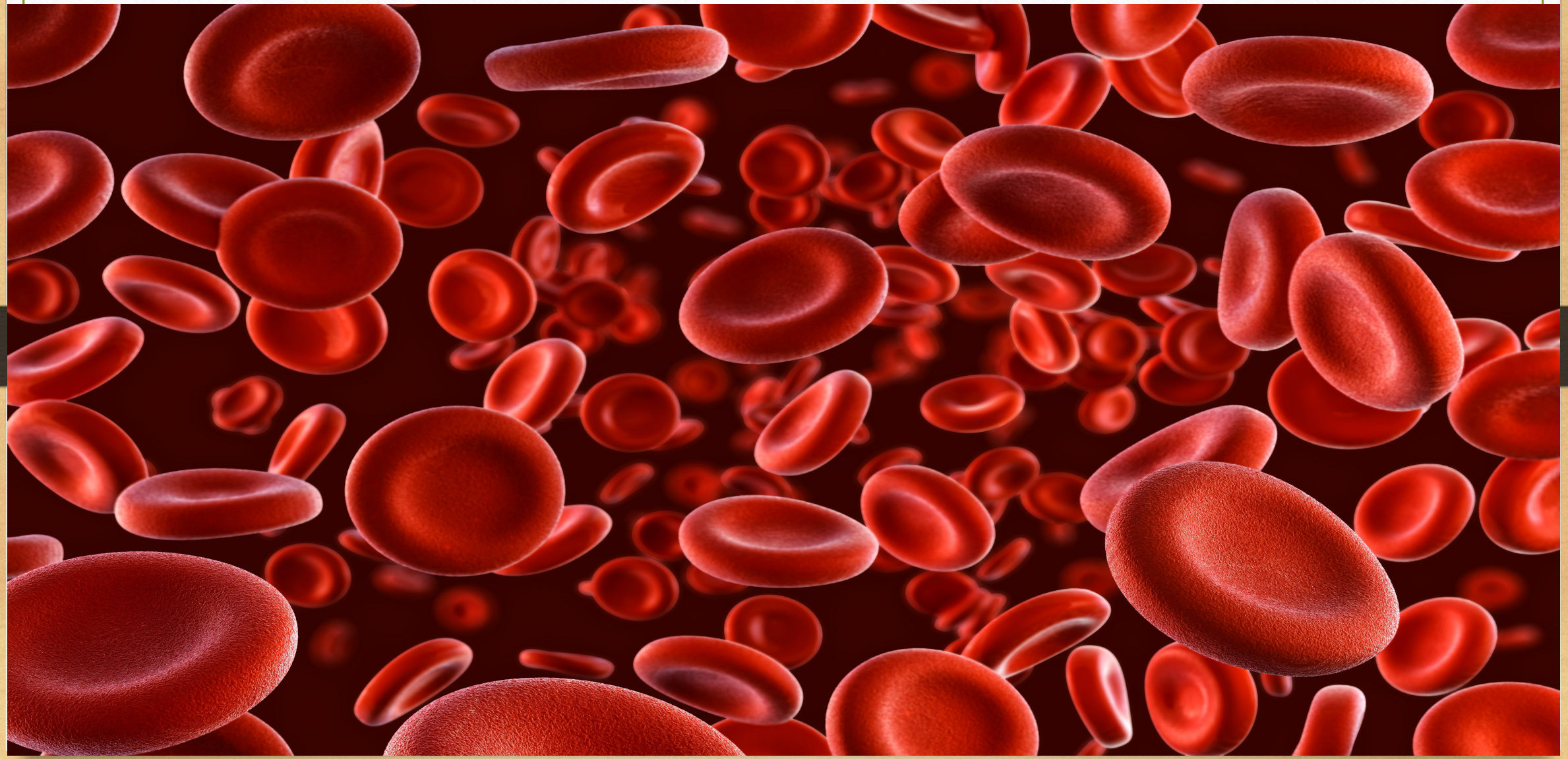
- Red blood cells(erythrocytes).
- White blood cells(leukocytes).
- Platelets

1. Red Blood Cells (RBCs / Erythrocytes)

- Most abundant cells in blood
- Specialized for **transport of oxygen and carbon dioxide**
- Formed in **red bone marrow**

Structure of RBCs

- **Biconcave disc shape** → increases surface area
- **No nucleus or organelles** in mature cells
- Packed with **hemoglobin (Hb):** Iron-containing protein responsible for **oxygen binding**
- Flexible membrane → allows passage through narrow capillaries
- Average lifespan: **~120 days**



White Blood Cells (WBCs / Leukocytes)

- White blood cells are the **defensive cells** of the body.
- Present in blood, lymphatic tissues, and body fluids.
- Their main role is **protection against infection and foreign substances**.
- Unlike RBCs, WBCs are **true cells** with nuclei and organelles.

Types of White Blood Cells

- WBCs are divided into two main groups:
- **A. Granulocytes**
- **B. Agranulocytes**

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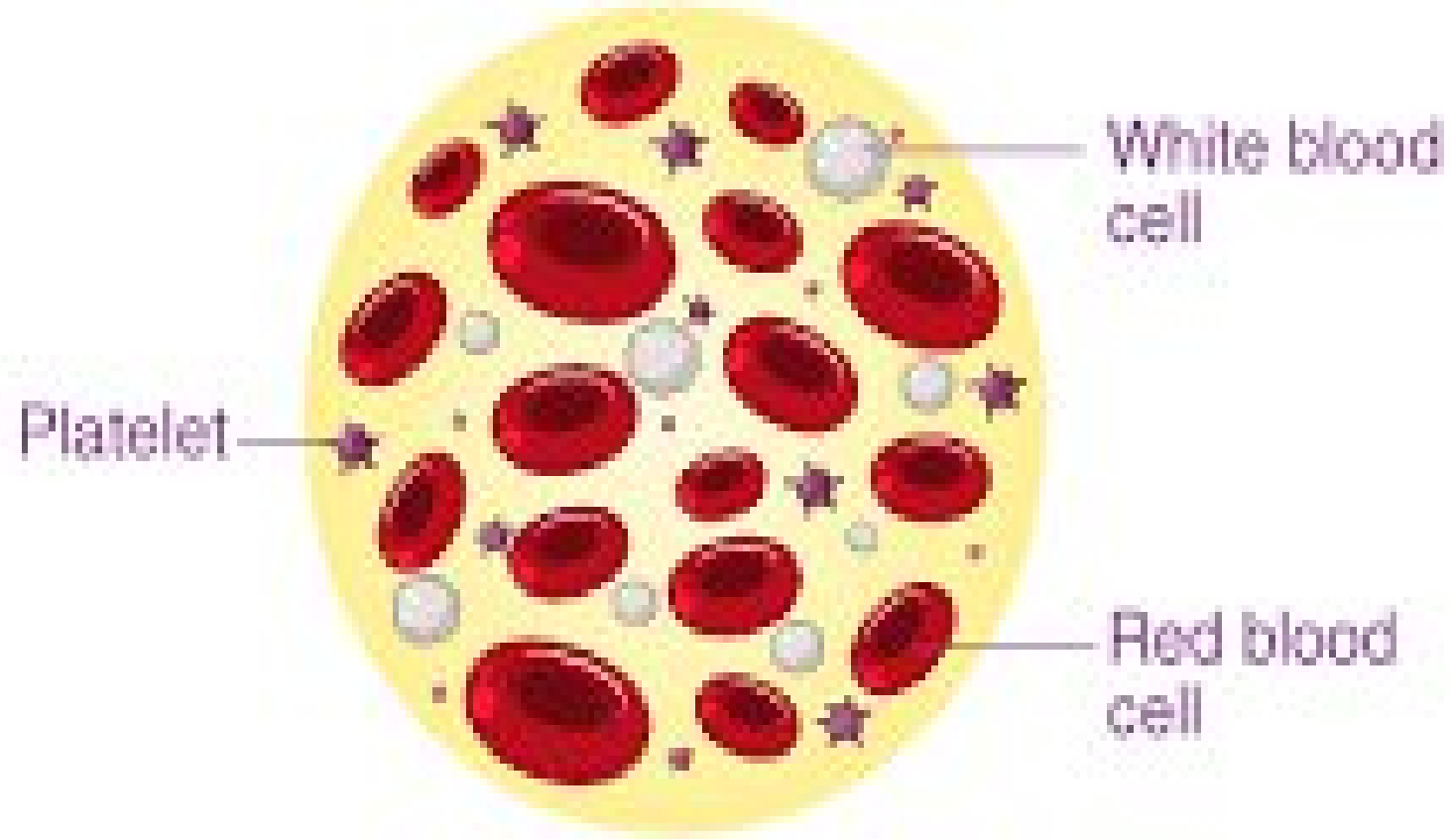
- **A. Granulocytes**
- (contain visible granules in their cytoplasm)
- **Neutrophils**
- **Eosinophils**
- **Basophils**
- **B. Agranulocytes**
- (no visible granules in cytoplasm)
- **Lymphocytes**
- **Monocytes**

Functions of WBCs

- **Defense against pathogens** (bacteria, viruses, parasites).
- **Phagocytosis** of harmful particles and dead cells.
- **Antibody production** and immune memory.
- Regulation of **inflammation**.
- Removal of toxins and damaged tissue.

Platelets

- Platelets are called thrombocytes.
- **Primary role: Blood clotting (hemostasis)**.
- Small ,flat cytoplasmic fragments.
- Do not contain nucleus


White blood cell
Platelet
Red blood cell


THANK YOU
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