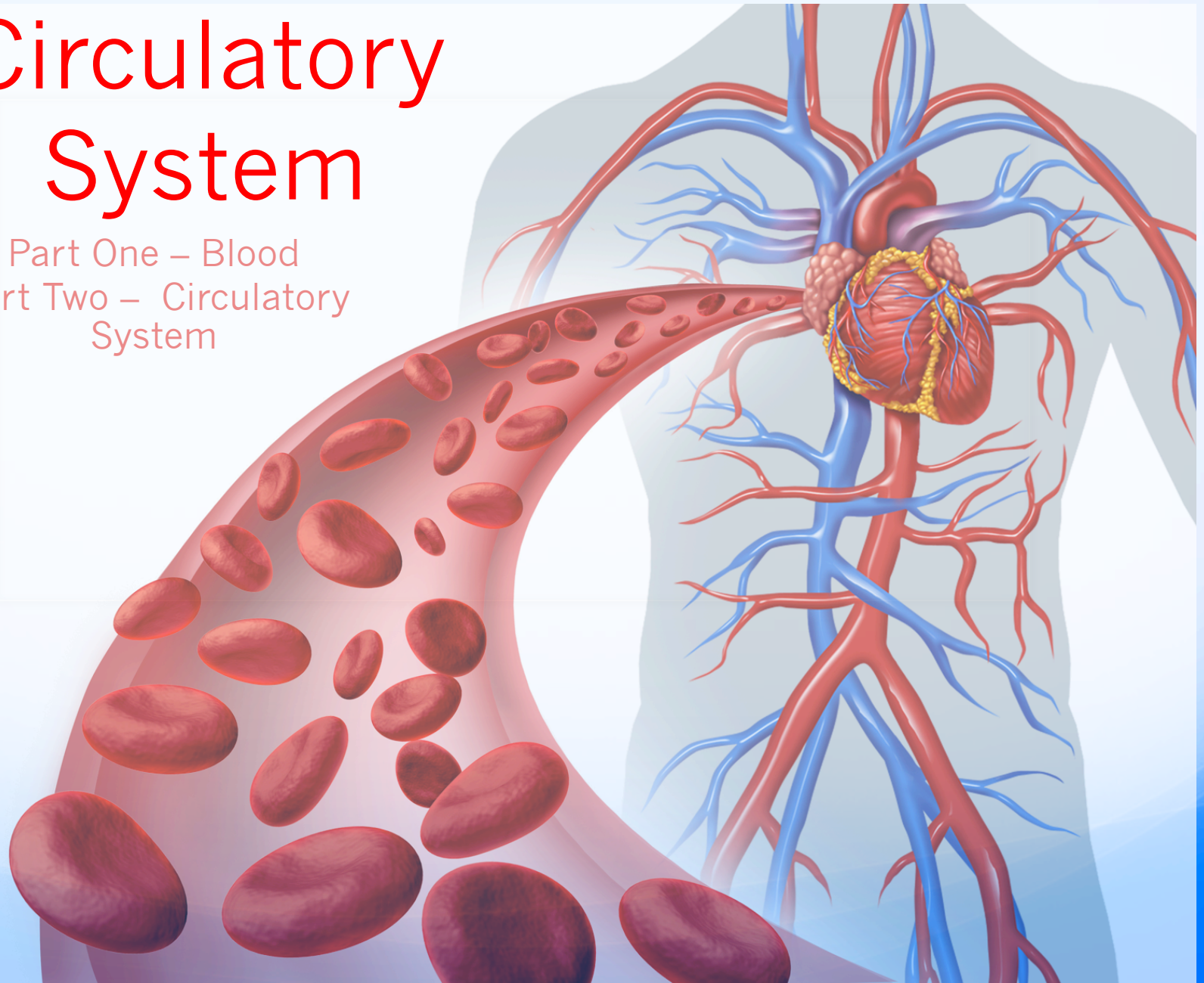
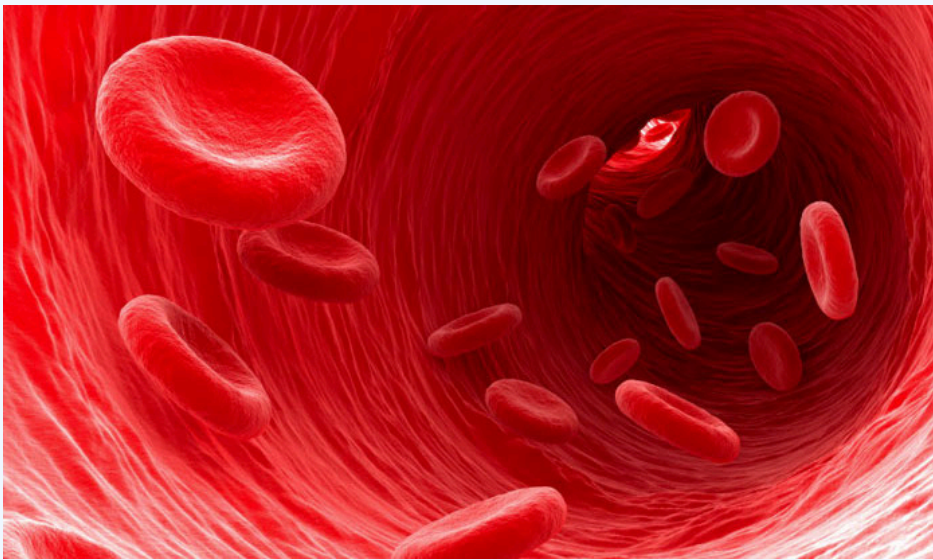


The Circulatory System

Part One – Blood
Part Two – Circulatory
System





Part One - Blood

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

Identify the liquid and formed elements of blood.

Identify their functions.

Identify different blood types and their compatibility.

Characteristics of Blood

- RED
 - Salty
 - Viscous, (thick)
 - Odourless
-
- Males have 5-6 litres of blood.
 - Females have 4-5 litres of blood.

Components of Blood

- Blood may seem homogenous, but is composed of **formed elements** called blood cells, (white and red), and platelets.
- Plasma is what makes it liquid.
- The formed elements and the plasma can be separated through a process called **centrifugation**.
- 45% - formed elements, 55% plasma.



Plasma

Formed
elements

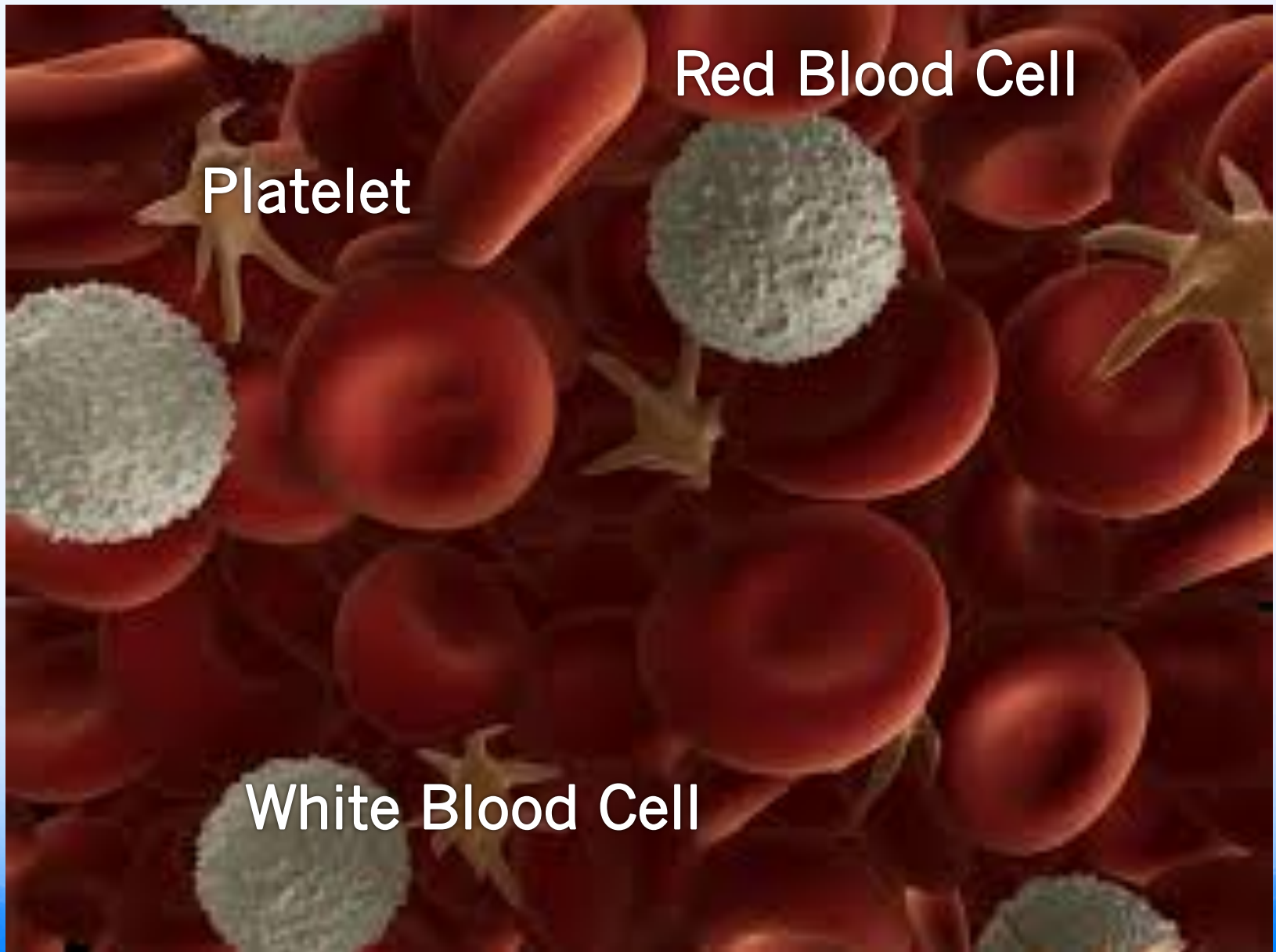
Components of Blood

Liquid Element

- Plasma

Formed Elements

- Red blood cells, (RBC)
- White blood cells, (WBC)
- Platelets



Red Blood Cell

Platelet

White Blood Cell

Liquid Element - Plasma

- **Description:**

- Yellowish liquid, composed of 90% water. Many substances become dissolved in the plasma as they're being transported, like nutrients, hormones and waste.

- **Functions:**

- Transportation of nutrients to cells.
- Transportation of waste from cellular respiration to excretory organs.
- Transportation of hormones, antibodies, etc.



Formed Elements – RBC's

- **Description:**

- There are 4-6 billion RBC's in your body.
- Red-coloured cells. They are concave, (donut-shaped).

- **Functions:**

- Transportation of **oxygen** using a protein called hemoglobin.
- Transportation of **carbon dioxide**.
- Blood carrying oxygen is bright red. Blood carrying carbon dioxide is dark red.



Formed Elements – WBC's

- **Description:**

- There are 4-11 billion WBC's in the body.
- They are transparent.

- **Functions:**

- Provide immunity and defense against disease. This is why the numbers vary. Someone who is very ill will have a lower count of WBC's than someone who is healthy.
- **Phagocytosis:** surround and destroy foreign substances.



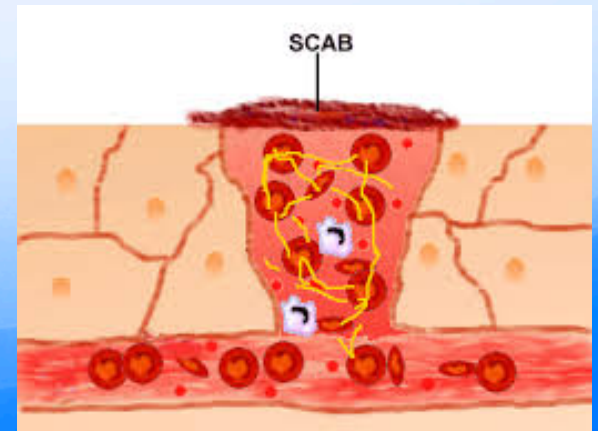
Formed Elements - Platelets

- **Description:**


- There are 150-400 million platelets in your body.
- They are irregular fragments coming from large cells in bone marrow.

- **Function:**

- Coagulation or blood-clotting. This process allows your skin to scab and heal.



Blood Types

- There are 4 main blood types: **A, B, AB and O**
 - Blood types are first categorized by the presence or absence of two substances.
 - Substance A
 - Substance B
-  Found on the membrane of RBC
- In addition, cells can carry another substance on their membrane: Rhesus Factor, or **RH Factor**.
 - Blood types can be either RH positive or RH negative.

Blood Type	A+	A-	B+	B-	AB+	AB-	O+	O-
Substance A								No substances present
Substance B								
RH Factor								

Blood Transfusions

- **An injection or transfer of blood** to a person who has undergone an accident, surgery or has a disorder which requires it.
- A transfusion requires a **donor and a recipient**. But, because people have different blood types, the process must be done with care.
- Before blood typing was discovered in 1902, many people died as a result of blood transfusions.



- Donation is possible between two people with the same blood type. But some types are rarer than others.
- Some blood types are compatible with others.
- The rule of thumb for blood donation:
 - Don't give what they don't already have.
- Consider the substances in blood, **A and B**, and the **RH factor**.

RECIPIENT	DONOR								
		O-	O+	B-	B+	A-	A+	AB-	AB+
	AB+	★	★	★	★	★	★	★	★
	AB-	★		★		★		★	
	A+	★	★			★	★		
	A-	★				★			
	B+	★	★	★	★				
	B-	★		★					
	O+	★	★						
	O-	★							

Blood Compatibility

- Two people are blood compatible when:
 - They are both of the same blood type.
 - Type O- blood can donate to anyone, regardless of blood type because they have no substances, nor RH factor. **Universal donor.**
 - Type AB+ blood can receive blood from anyone because they have both substances and RH factor. **Universal recipient.**

NEXT TIME

Part 2: Circulatory System