

Circulatory, Respiratory and excretory systems - Circulatory system



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المزيد من مادة
أحياء:

إعداد: Adel Rania

التواصل الاجتماعي بحسب الصف الثاني عشر



صفحة المناهج
الإماراتية على
فيسبوك

المزيد من الملفات بحسب الصف الثاني عشر والمادة أحياء في الفصل الأول

درس أنماط الوراثة البشرية - بريدج

1



Circulatory , Respiratory and excretory systems

Circulatory system



التاريخ

1/9/2026



المعلمة

Rania Adel



الصف

ثاني / حادي
عشر
عام أنسباير



المادة

Biology



افهم



اكتشف



استكشف

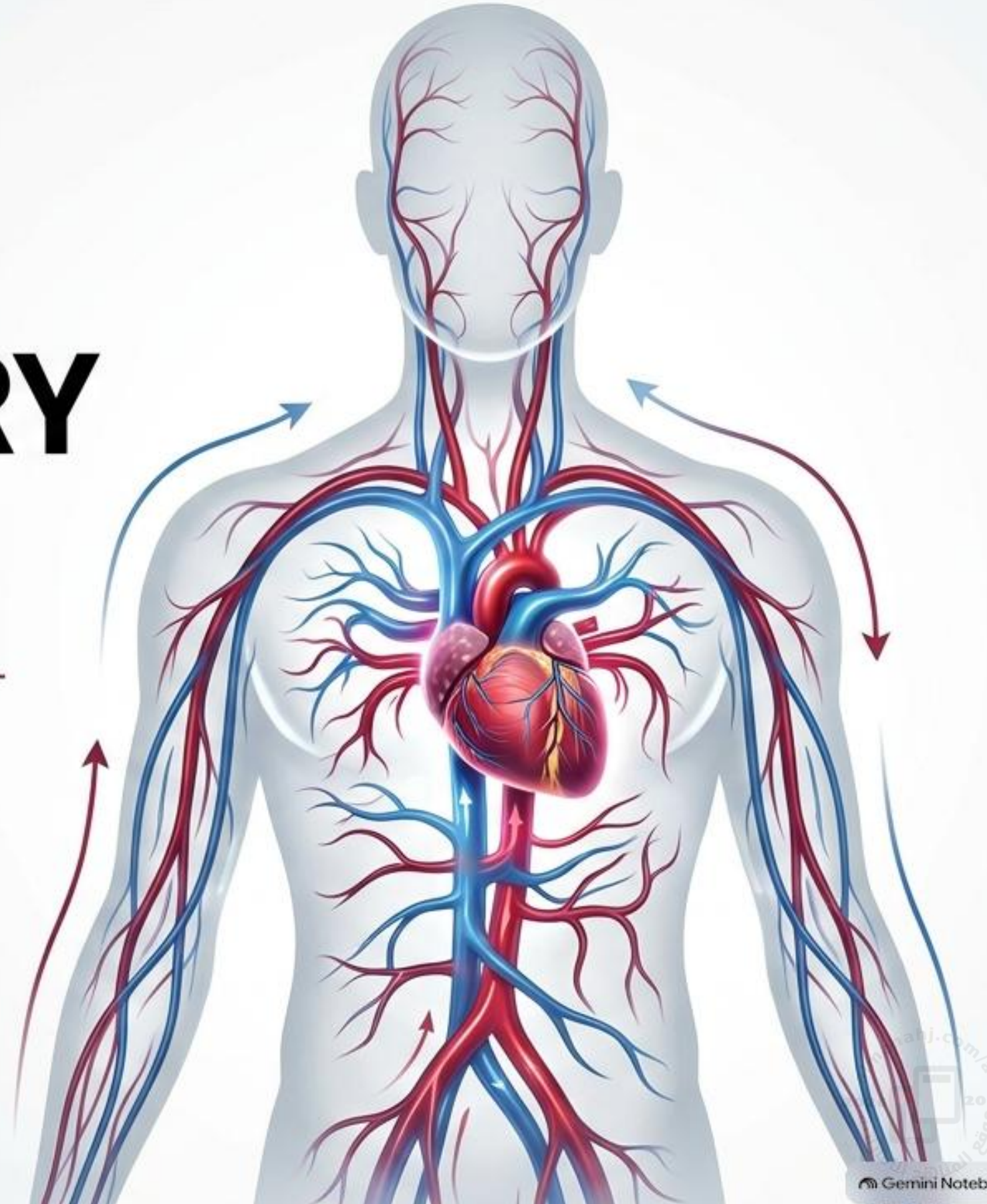
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THE CIRCULATORY SYSTEM

Prepared by: Rania Adel



Lesson Roadmap

The Infrastructure

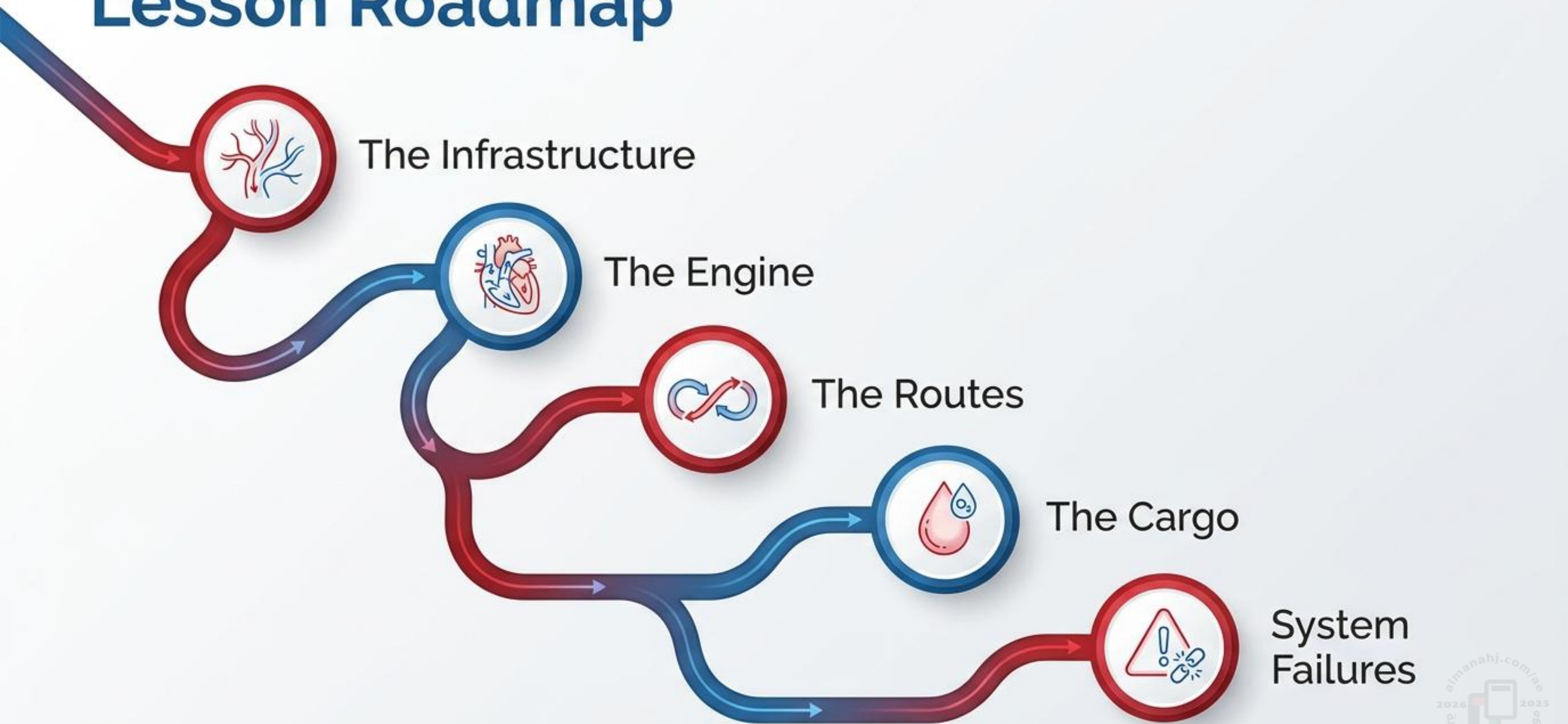
The Engine

The Routes

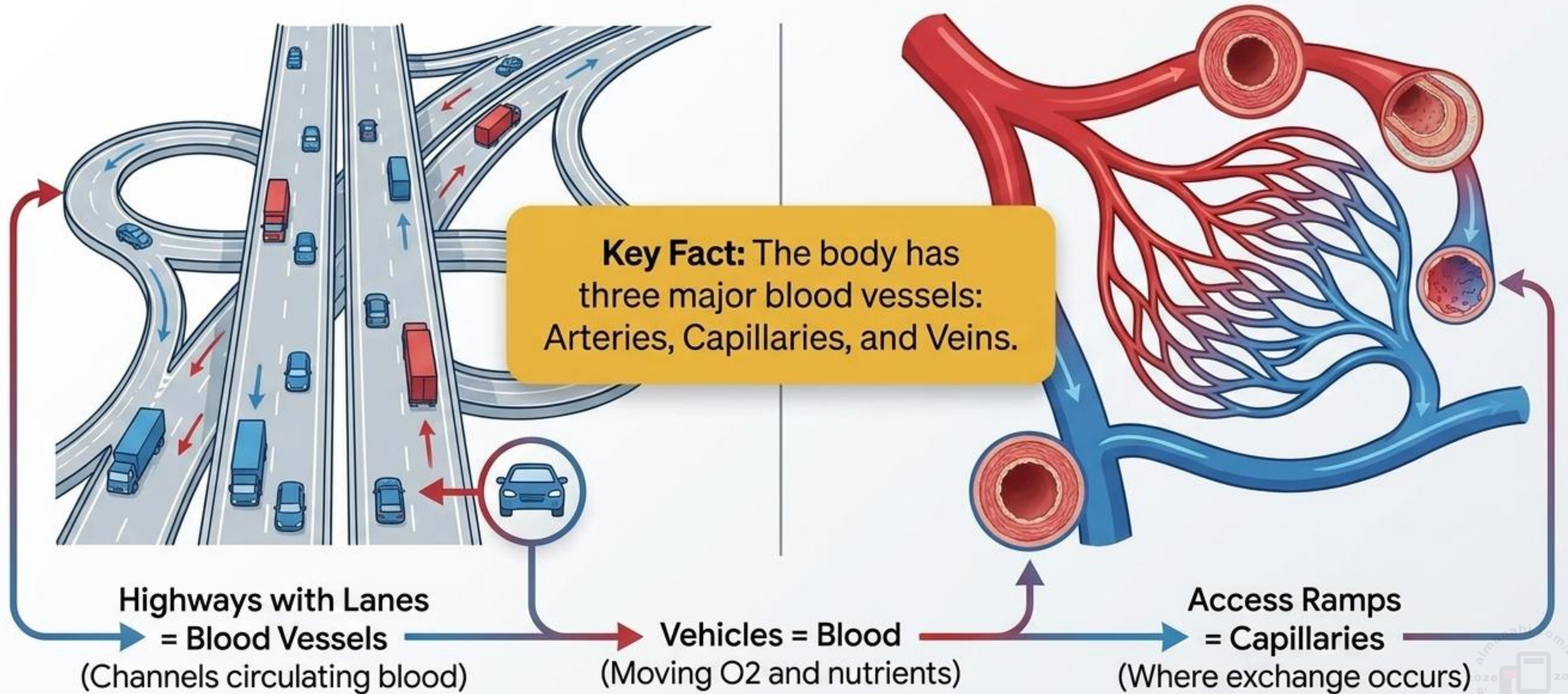
The Cargo

System Failures

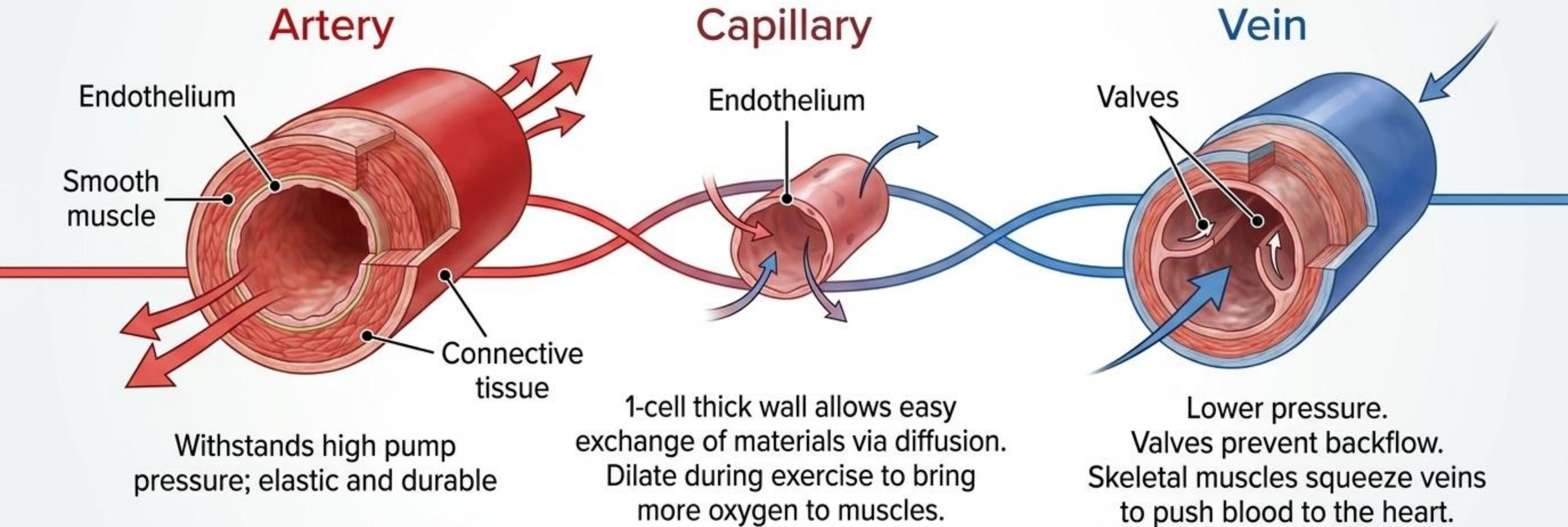
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Blood Vessels: The Body's Highway



Deep Dive: Arteries, Capillaries & Veins

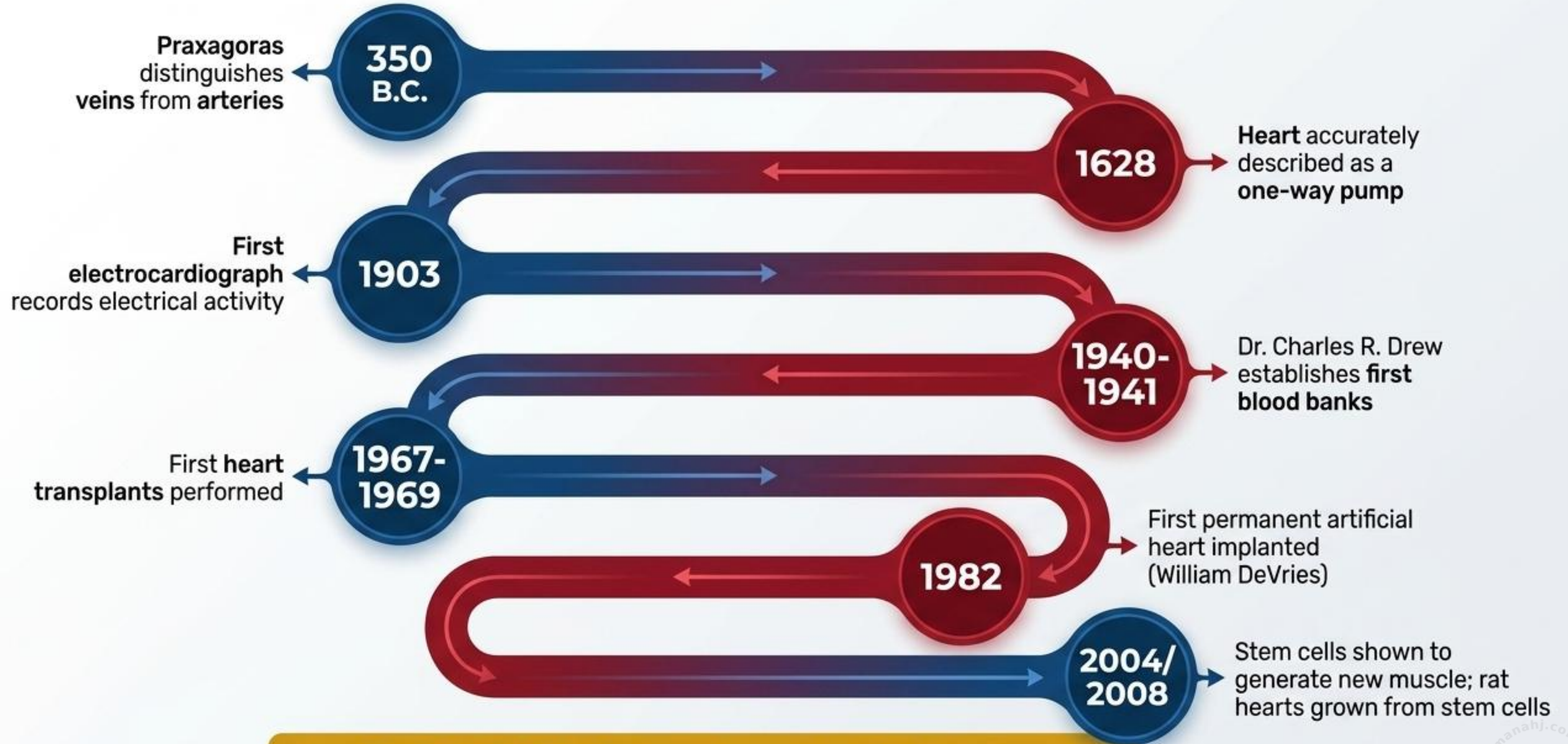


💡 EASY TO REMEMBER: A is for **Away** – Arteries carry oxygen-rich blood **Away** from the heart.

Blood Vessel Comparison Matrix

Feature	Arteries	Veins	Capillaries
Function	Carry blood AWAY from heart	Carry blood BACK to heart	Exchange substances/waste
Blood Type	Oxygen-rich (usually)	Oxygen-poor (usually)	Mixed (transition zone)
Wall Structure	Thick, 3 layers, elastic	Thinner, 3 layers, contains valves	Microscopic, only 1 cell thick
Blood Pressure	High	Low	Low
Flow Mechanism	Heart's pumping force	Skeletal muscle squeezing, breathing	Diffusion (single-file cell movement)

Historical Medical Milestones



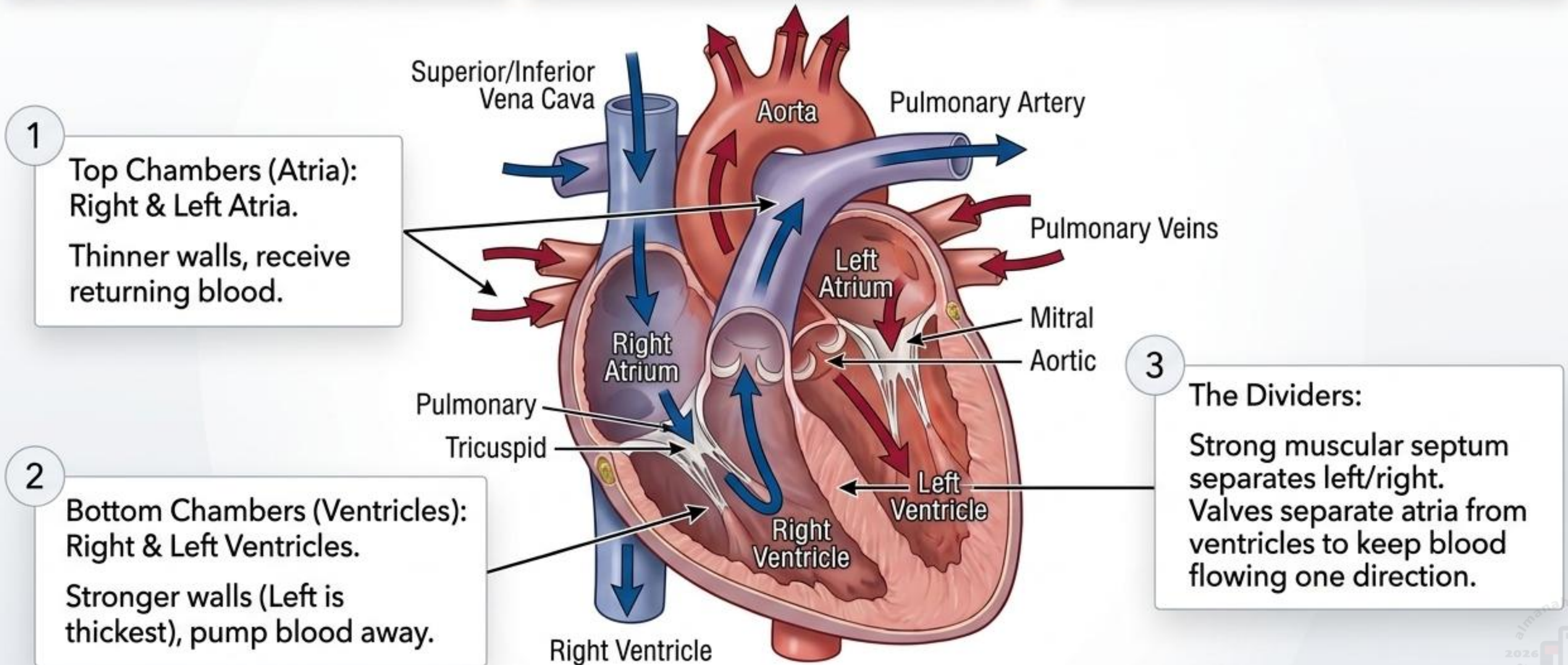
EASY TO REMEMBER: The journey from ancient distinctions to modern regeneration reflects centuries of accumulated medical knowledge.

The Heart: Structure & Engine

Muscular organ

Size of a fist, center of chest

Two simultaneous pumping functions (to body / to lungs)



How the Heart Beats



Pacemaker

Step 1: SA Node (Pacemaker) in Right Atrium sends signal



Step 2: Both Atria contract (fills ventricles)

Step 3: Signal travels to AV Node



Step 4: Signal moves through excitable fibers; Ventricles contract

Pulse

Alternating expansion/relaxation of artery wall (avg 70 times/min)

Blood Pressure

Force against vessel walls. Measured with a sphygmomanometer.



Systole (contraction) = High point (e.g., 120)



Diastole (relaxation) = Low point (e.g., 80)

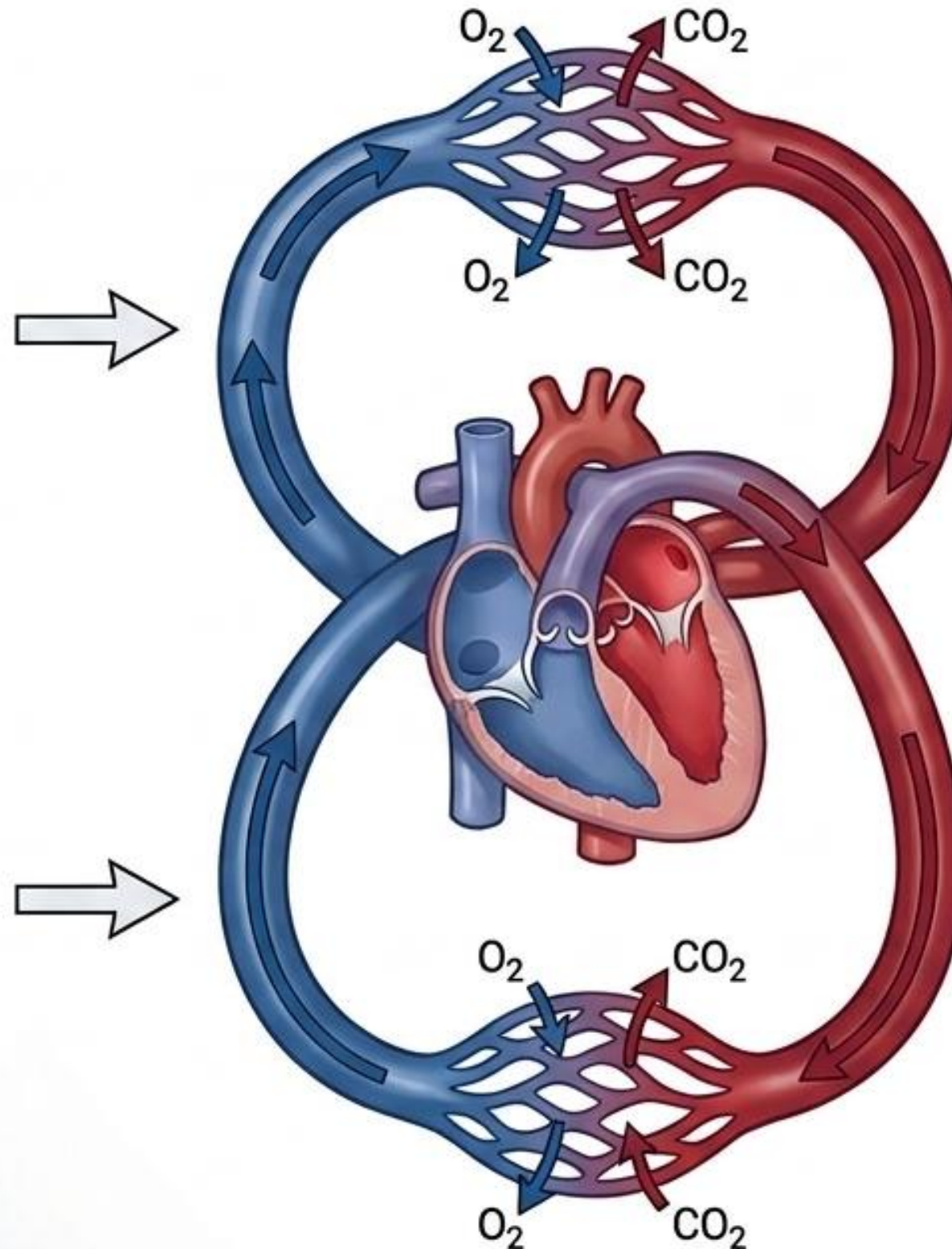
Blood Flow: The Two Loops

To the Lungs & Back (Top Loop):

Right Ventricle
→ Pulmonary Arteries
→ Lungs (O_2 diffuses in,
 CO_2 out)
→ Pulmonary Veins
→ Left Atrium.

To the Body & Back (Bottom Loop):

Left Ventricle
→ Aorta (largest artery)
→ Body Capillaries
(O_2 out, CO_2 in)
→ Vena Cava
→ Right Atrium.



The 4 Core Functions

1. Transport O_2 and nutrients.
2. Carry away waste (CO_2).
3. Fight disease / clot blood.
4. Maintain homeostasis and gnlæity (distribute body heat).

Blood Components: The Fluid of Life



Plasma

Definition:

The clear, yellowish fluid portion of blood (more than 50% of total volume).

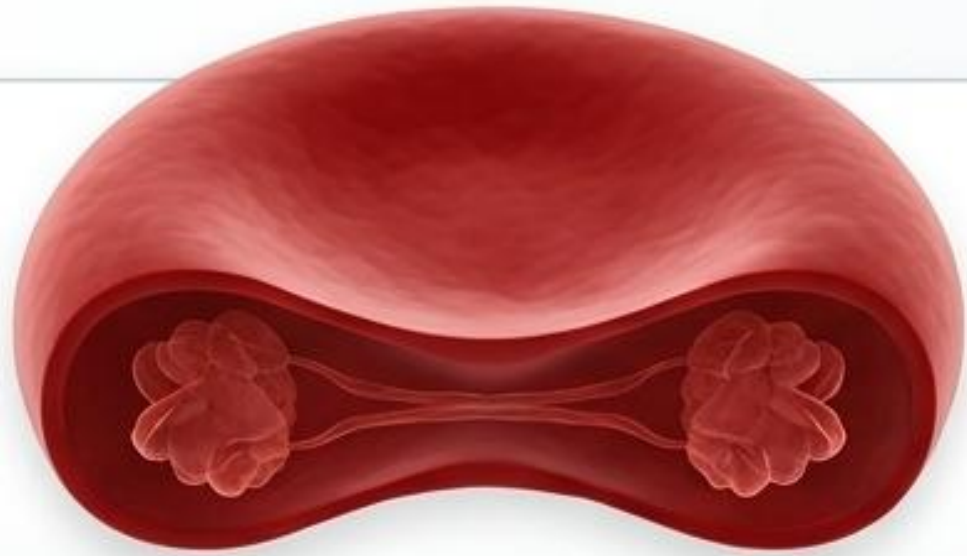
Composition:

90% water, 10% dissolved materials (glucose, fats, vitamins, minerals, hormones, cell waste).

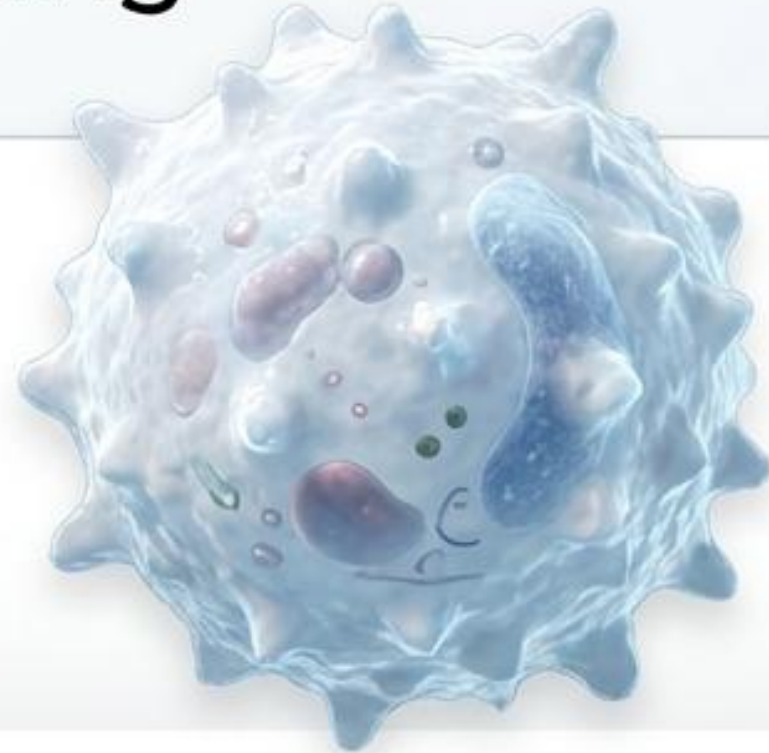
3 Protein Groups in Plasma

1. Regulates amount of water.
2. Produced by WBCs to fight disease.
3. Helps form blood clots.

Blood Cells & Clotting



Red Blood Cells (RBCs): Carry O_2 . Mostly consist of hemoglobin (iron-containing protein that binds to O_2).



White Blood Cells (WBCs): Disease fighters. Recognize invaders and produce chemicals to fight them.

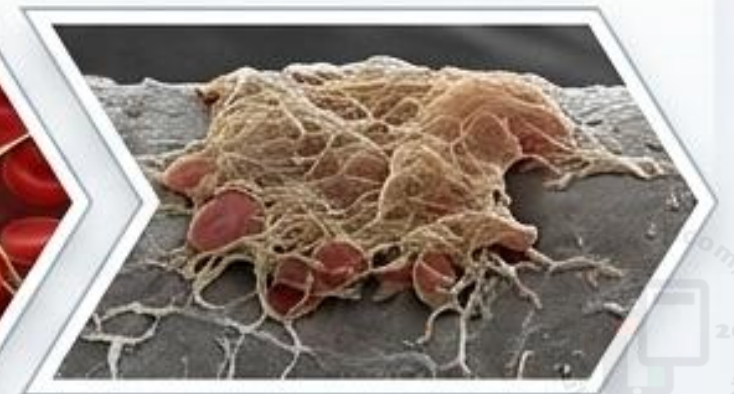
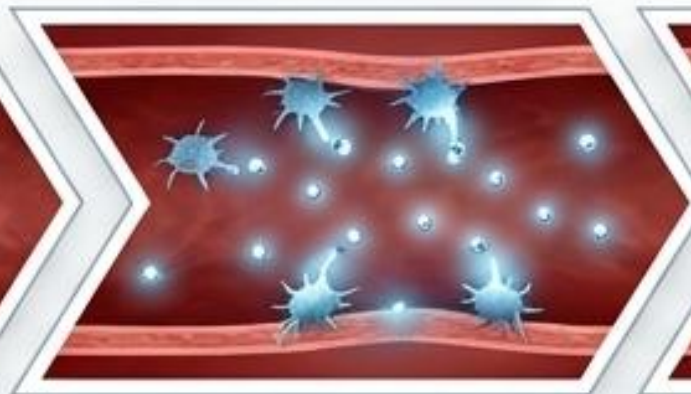
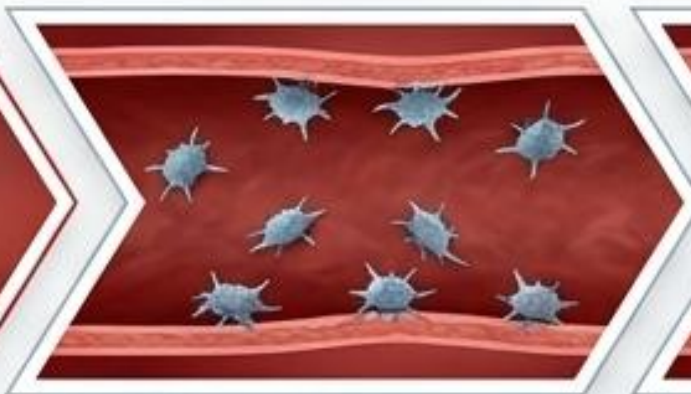
Step 1
(Cut)

Step 2
(Platelets Stick)

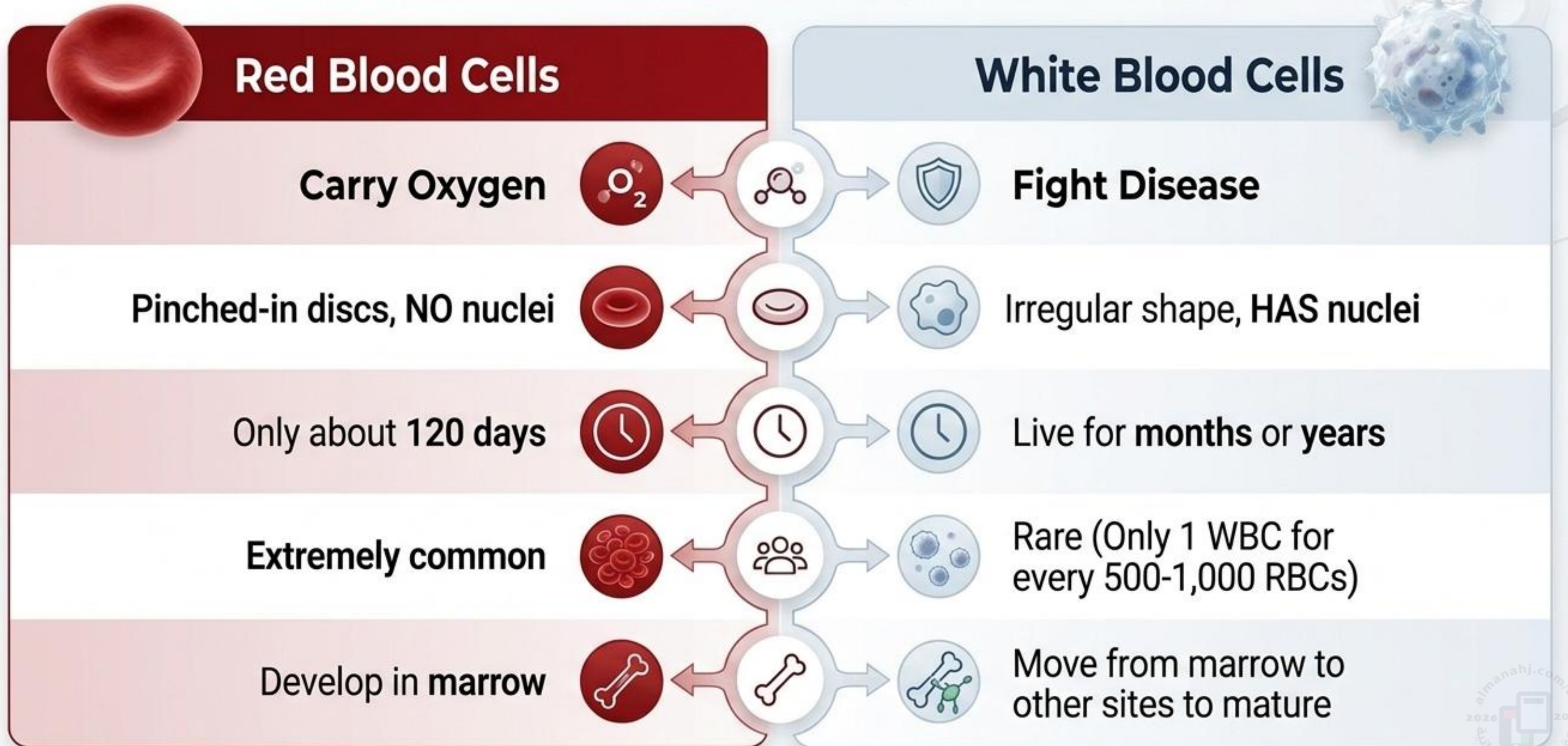
Step 3
(Release Chemicals)

Step 4
(Fibrin Network Forms)

Result
(Trap cells to form scab)



RBC vs. WBC Comparison



Blood Groups & Transfusions

The Rule: Plasma contains antibodies that cause clumped cells if foreign markers are detected.

Type A



Marker A
Anti-B Antibodies

Can Donate to:
A, AB

Can Receive:
A, O

Type B

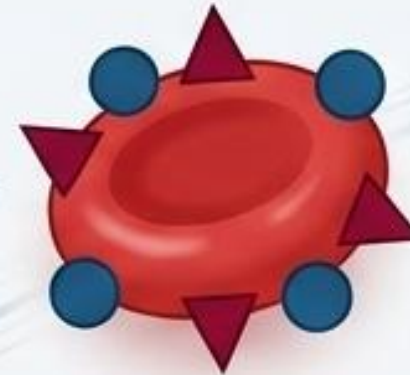


Marker B
Anti-A Antibodies

Can Donate to:
B, AB

Can Receive:
B, O

Type AB



Markers A & B
NO Antibodies

Can Donate to:
AB

Can Receive:
A, B, AB, O
(Universal Receiver)

Type O



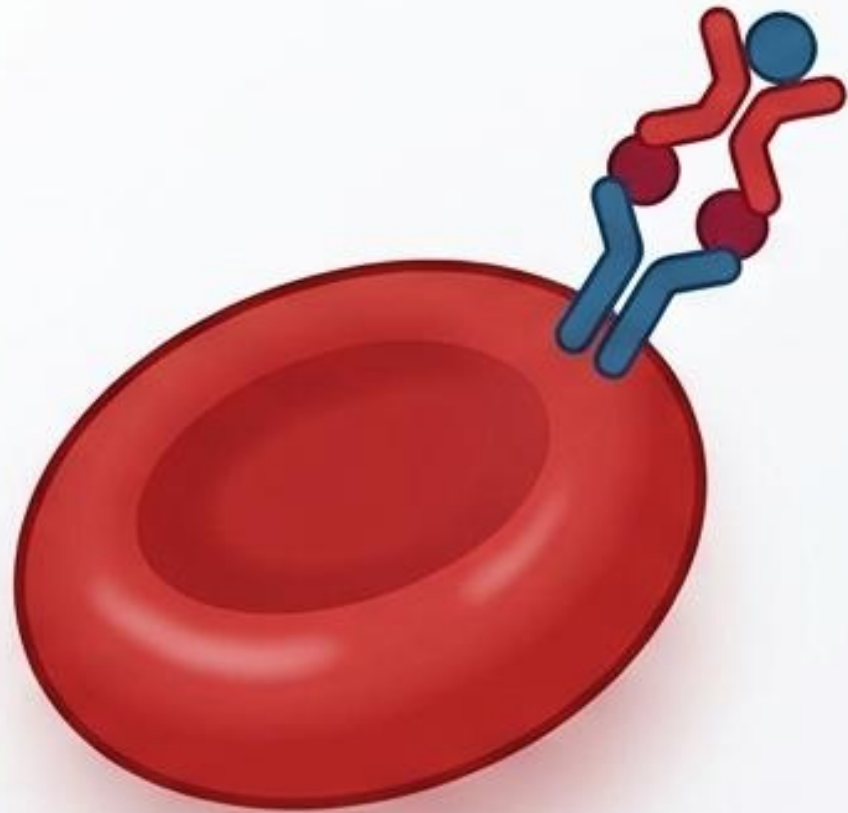
NO Markers
Anti-A & Anti-B

Can Donate to:
A, B, AB, O
(Universal Donor)

Can Receive:
O

The Rh Factor & Pregnancy

Rh Factor Basics



Another marker on red blood cells
(Rh-positive or Rh-negative).

The Complication Scenario

Condition

Mother is Rh-negative, Fetus is Rh-positive.

Trigger

Fetus's Rh-positive blood mixes with
Mother's Rh-negative blood.

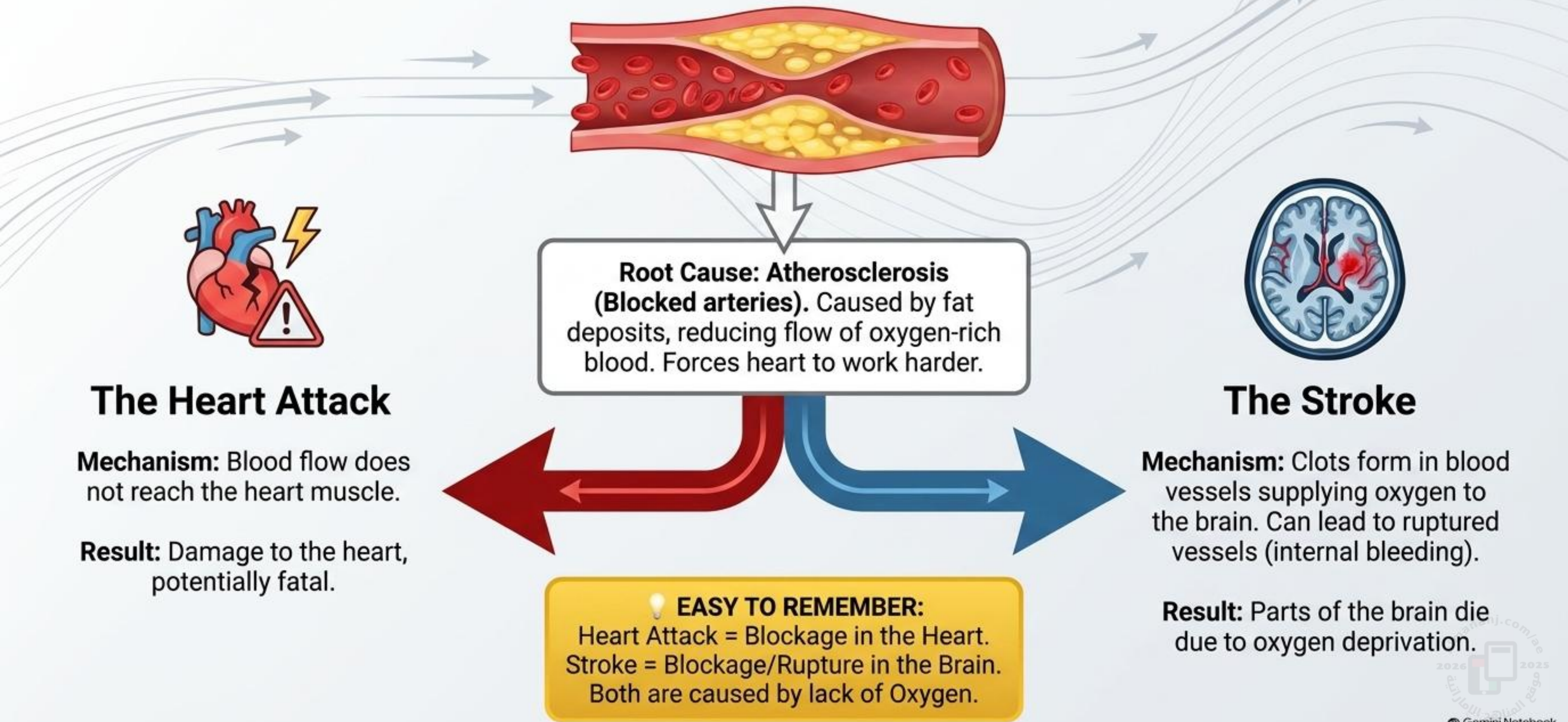
Reaction

Mother's body produces anti-Rh antibodies.

Danger

During another pregnancy, these antibodies
can cross the placenta and destroy red blood
cells if the new fetus is Rh-positive.

Circulatory System Disorders





Teacher Rania Adel