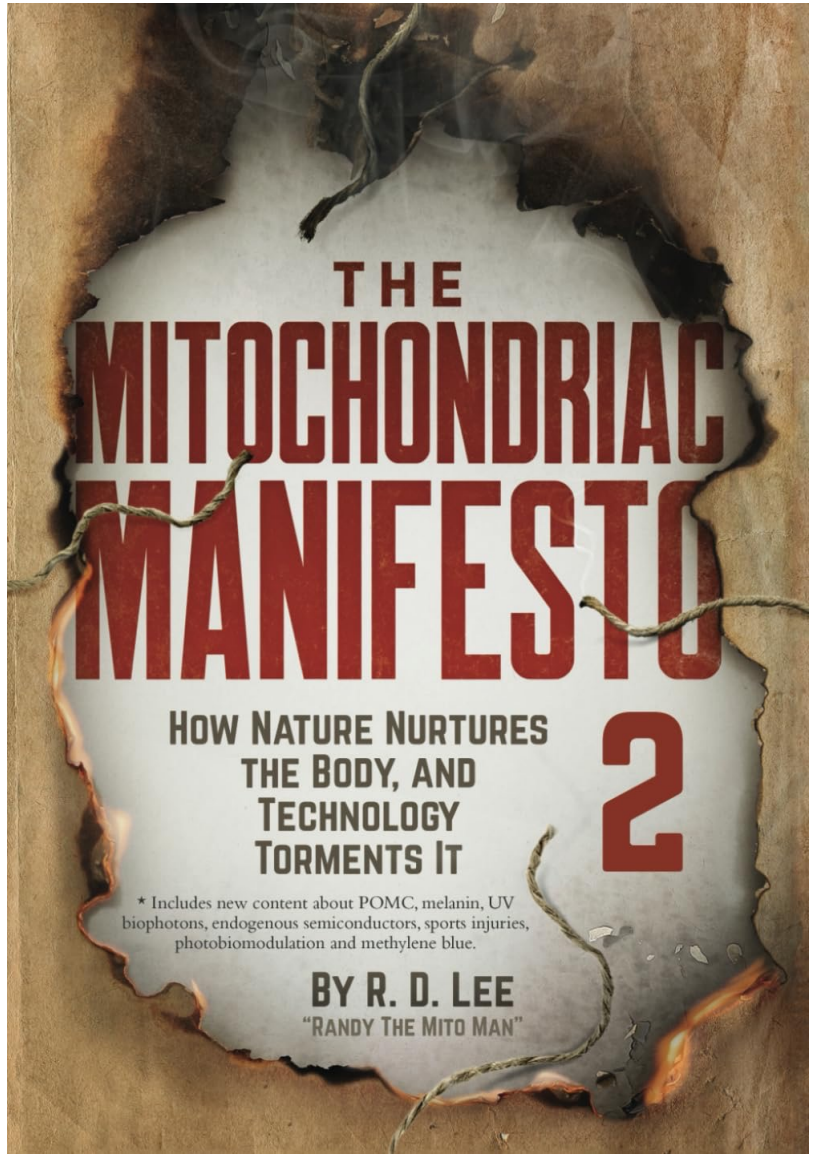
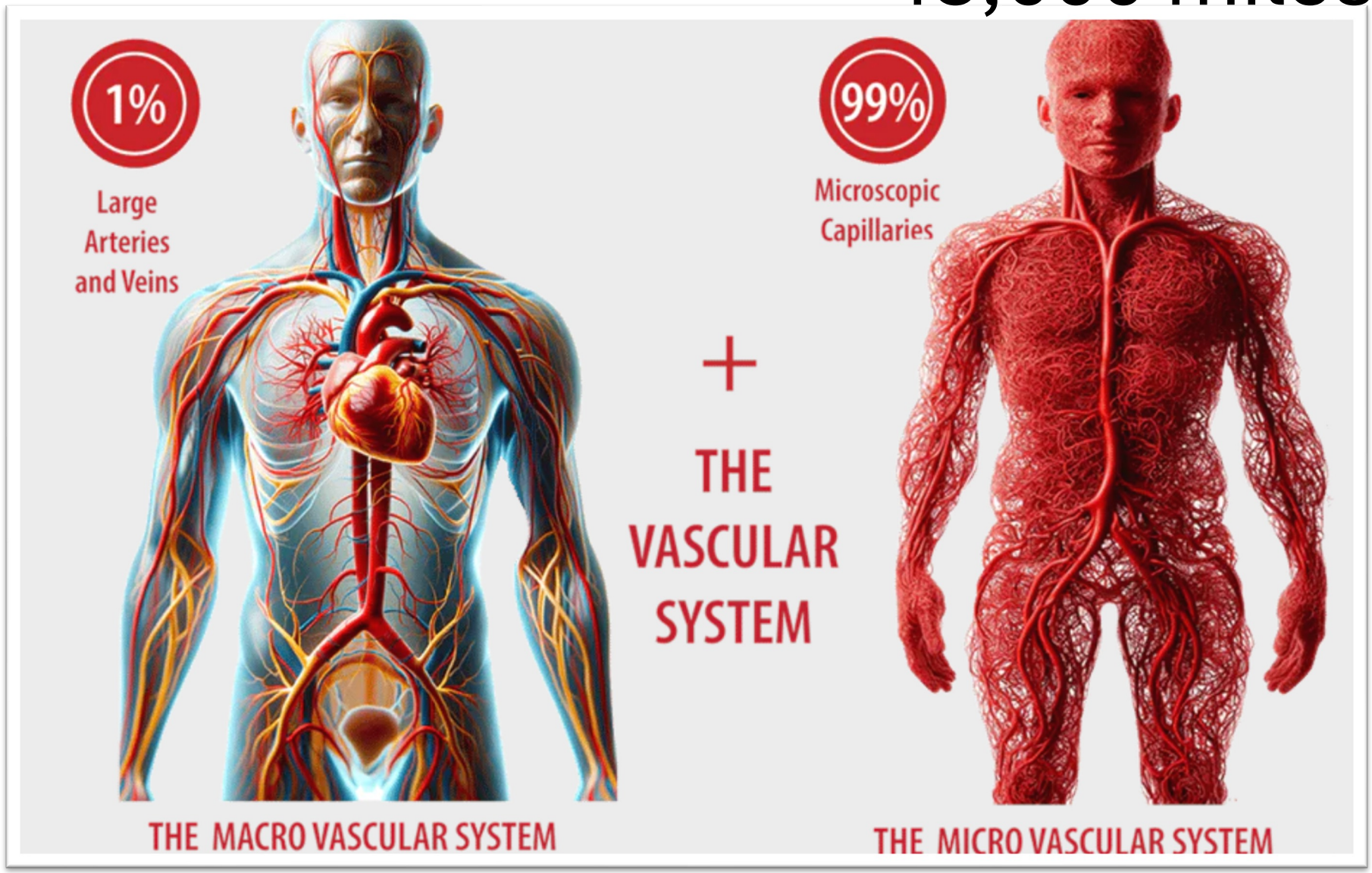
- If you have chronic illness, you’re deficient in electrons

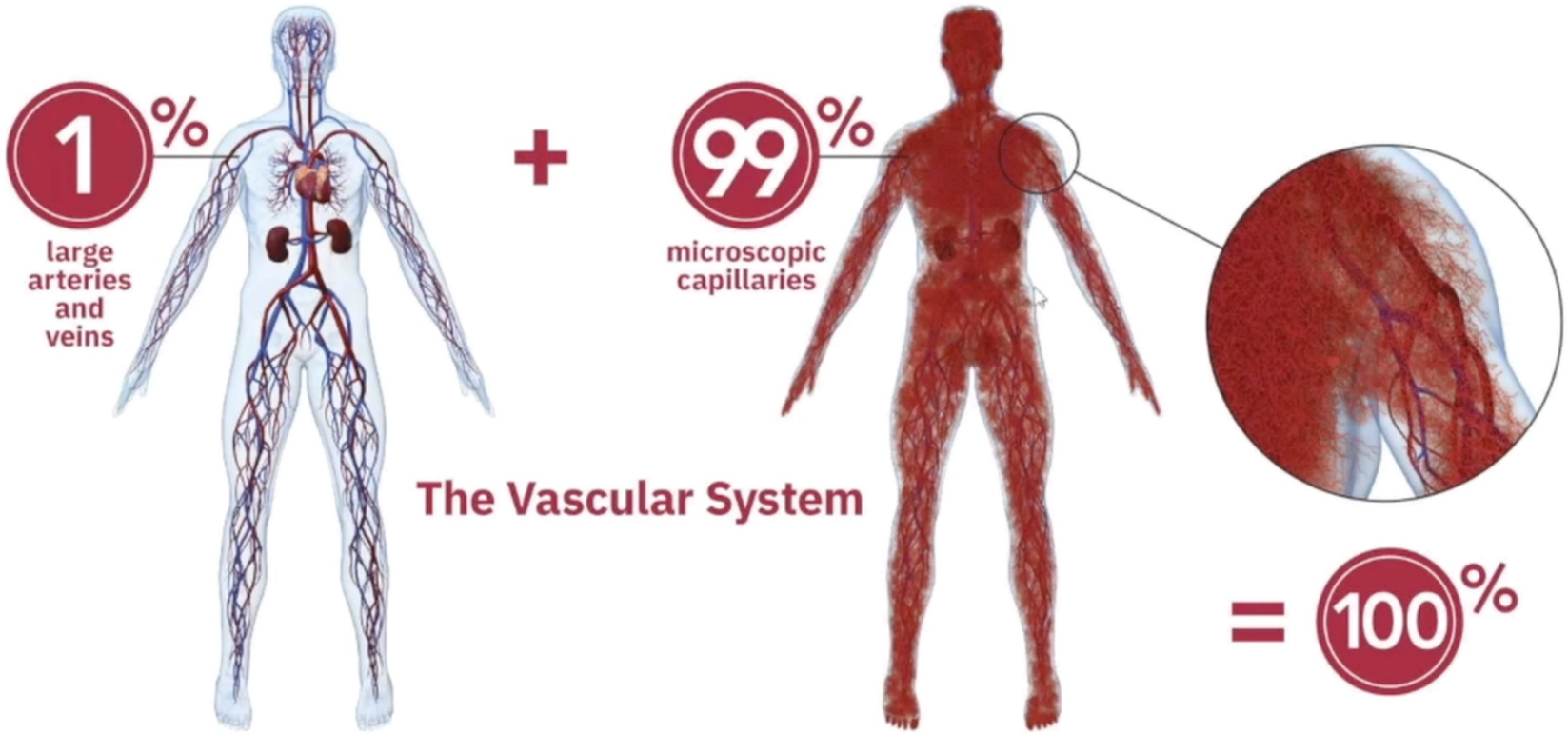

THE
MITOCHONDRIAC
MANIFESTO
2
How Nature Nurtures the Body, and Technology Torments It
* Includes new content about POMC, melanin, UV biophotons, endogenous semiconductors, sports injuries, photobiomodulation and methylene blue.
By R. D. Lee
"Randy The Mito Man"

48,000 miles



https://glycocalyx.com/pages/the-glycocalyx?srsltid=AfmBOooiB3ZdVw76lXLOcE2S0UgGt3KIsuamA_h6hxhilNfnf2zMNv-c

Microvascular dysfunction leads to organ starvation



microvascular healthsolutions

https://www.youtube.com/watch?v=Sj8NaxnPCg8

How many miles of capillaries are in the body?

AI Overview

An adult has approximately 60,000 miles of total blood vessels, with capillaries making up about 80% of this total length. Therefore, a more precise estimate for the total length of capillaries is around 48,000 miles, while older and less precise estimates place the total length of all capillaries at up to 100,000 miles.

- **Capillaries are the vast majority:** The smallest blood vessels, capillaries, constitute nearly 80% of the total length of the body's blood vessels.
- **Total blood vessel length:** The total length of all arteries, veins, and capillaries combined is estimated to be around 60,000 miles.

https://www.google.com/search?q=How+many+miles+of+capillaries+are+in+our+body?&sca_esv=d124881140f2a97d&rlz=1C5CHFA_enUS1118US1118&prmd=ivns&sxsrf=AE3TifPVsnrXdouPj8U_etz8r1cxAvlOTA:1763998858121&source=lnms&fbs=AIIjpHxU7SXXniUZfeShr2fp4giZ1Y6MJ25_tmWITc7uy4KIeiAkWG4OlBE2zyCTMjPbGmPgfe_7ak8LUsonpWCvT6w6ml6_wCpBRy3ZZPXcxoVkA-9yDIcjhcFKLE9uhbB539TtmvT33k_EZBb1SrgtCP7u_BOK69akyOrlGLfvXF4afKiv_zHA5j_-3S50H1b8ReEyjSU5xISVpPG_dit7kbIOPZyMlg&sa=X&ved=2ahUKEwjRhsrqj4uRAxUTtokEHTgxIe8Q0pQJegQIBhAF&biw=1860&bih=932&dpr=1.8

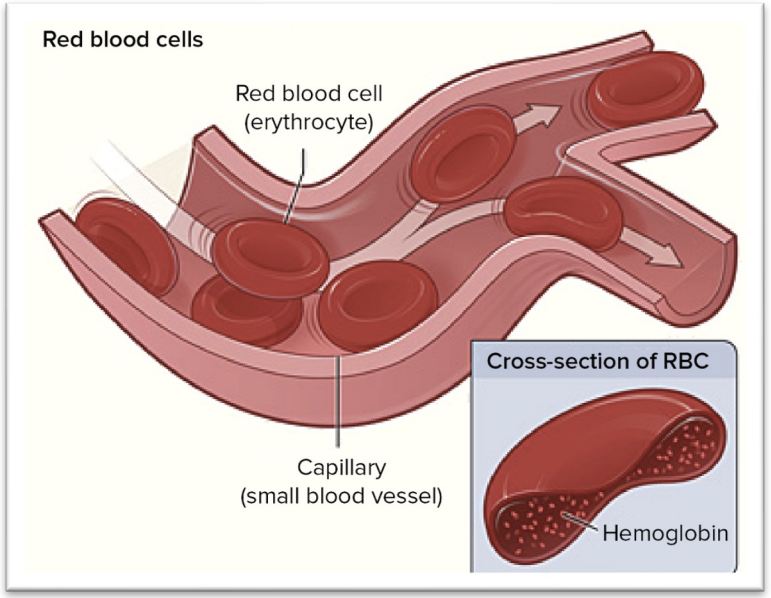
What's the size of a red blood cell versus a capillary?

AI Mode | All | Images | Shopping | Videos | Web | Forums | More | Tools

AI Overview

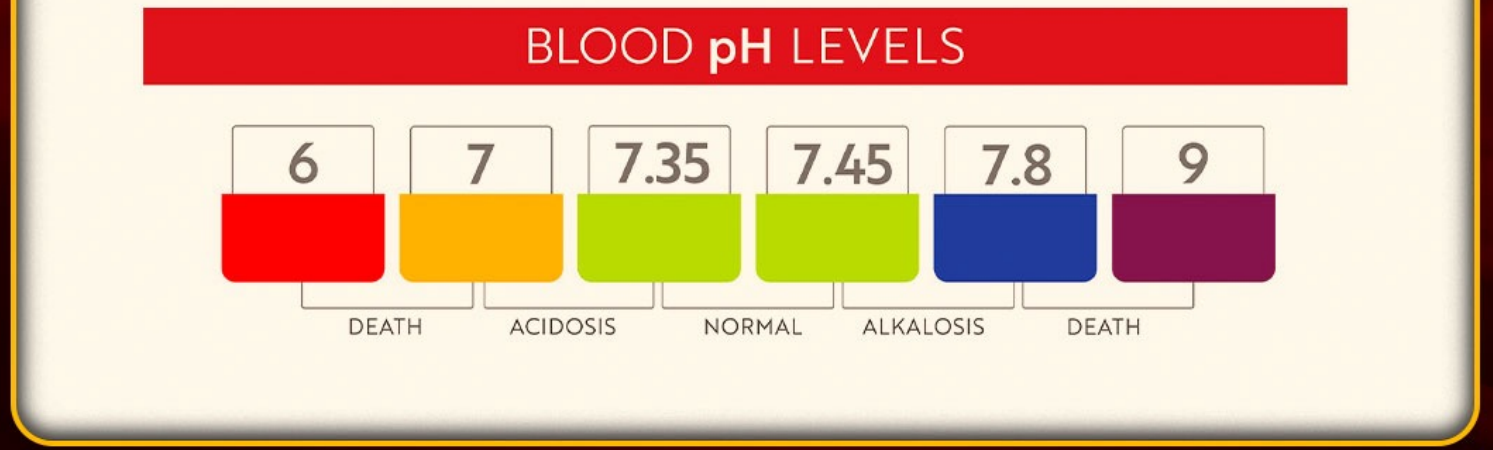
A healthy red blood cell is approximately 8 micrometers (µm) in diameter, while capillaries are typically around 5-7 µm in diameter. This size difference means red blood cells must deform and squeeze through capillaries in a single file to pass through the body.

	Red Blood Cell	Capillary
Diameter	Approx. 8 µm	Approx. 5-7 µm
Shape	Biconcave disc	Tubular vessel
Relationship	Deforms to fit through the capillary in single file	Narrow enough to require single-file flow for red blood cells

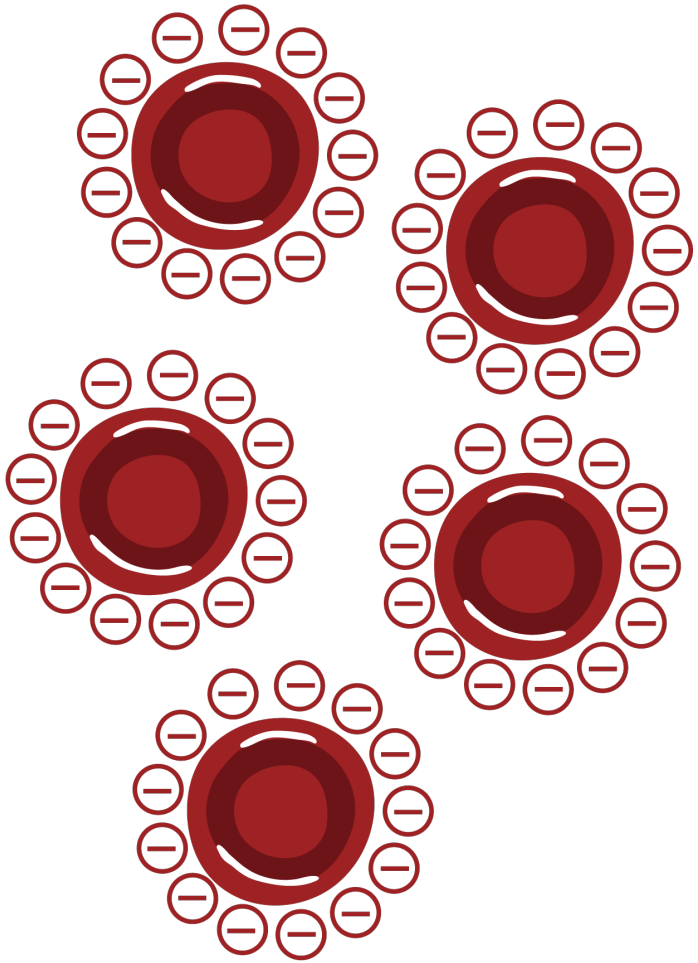


https://www.google.com/search?q=What%27s+the+size+of+a+red+blood+cell+versus+a+capillary%3F&rlz=1C5CHFA_enUS1118US1118&oq=What%27s+the+size+of+a+red+blood+cell+versus+a+capillary%3F&gs_lcrp=EgZjaHJvbWUqBggAEEUYOzIGCAAQRRg7MgcIARAAGO8FMgcIAhAAGO8FMgoIAxAAGKIEGIkFMgoIBBAAGKIEGIkFMgoIBRAAGIAEGKIE0gEIMzIyOWowajeoAgiwAgHxBZFa_03yrNFM&sourceid=chrome&ie=UTF-8

pH OF BLOOD


BLOOD pH LEVELS
6
7
7.35
7.45
7.8
9
DEATH
ACIDOSIS
NORMAL
ALKALOSIS
DEATH

Zeta potential of RBC



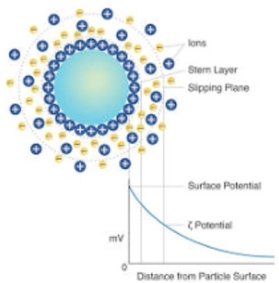
Abnormality in zeta potential

What's the zeta in blood potential?

AI Mode | All | Images | Videos | Shopping | Short videos | Forums | More | Tools

AI Overview

Zeta potential in blood refers to **the electrical charge on the surface of blood cells (like red blood cells, or RBCs), which creates a repulsive force keeping them from clumping, ensuring smooth blood flow and stability**; healthy cells have a strong negative charge (high zeta potential, e.g., around -20 to -26 mV for RBCs), while a weakened or lower zeta potential (less negative) leads to cell aggregation (clumping), increased viscosity, and potential cardiovascular issues. It's a measure of cell stability, indicating how well particles in a fluid repel each other.



https://www.google.com/search?q=rbc+and+capillary&sca_esv=abeb4f522ce11e62&rlz=1C5CHFA_enUS1118US1118&udm=2&biw=1898&bih=872&sxsrf=AE3TifNdqykHe6PD23b1R2KwSbkJnFgdxA%3A1765815247961&ei=zzNAadW1OsHOp84PhtrIqQI&ved=0ahUKEwiV2d-0_r-RAxVB58kDHQYtMiUQ4dUDCBI&uact=5&oq=rbc+and+capillary&gs_lp=Egtnd3Mtd2l6LWltZyIRcmJjIGFuZCBjYXBpbGxhcnlIyTFQswVYli9wAXgAkAEAmAGfAaABxAiqAQQxMy4xuAEDyAEA-AEBmAIKoAKOBsICDRAAGIAEGLEDGEMYigXCAggQABiABBixA8ICChAAGIAEGEMYigXCAgUQABiABMICEBAAGIAEGLEDGEMYgwEYigXCAgQQABgewgIGEAAYCBgemAMAiAYBkgcDOS4xoAf1J7IHAzguMbgHigbCBwUwLjcuM8gHGIAIAA&sclient=gws-wiz-img

Sedimentation Rate-Westergren

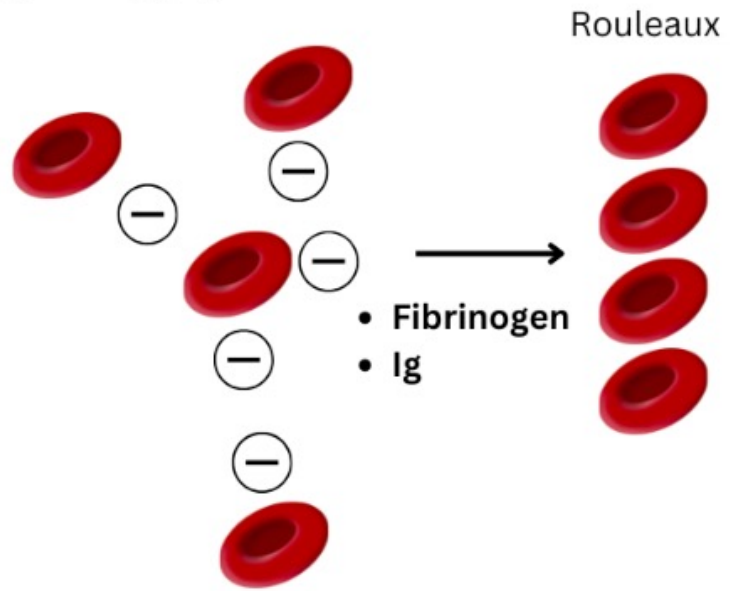
	Test	Current Result and Flag		Previous Result and Date	Units	Reference Interval
	Sedimentation Rate-Westergren [01]	**40**	**High**		mm/hr	0-30

A high erythrocyte sedimentation rate (ESR) indicates that the red blood cells (RBCs) are settling more quickly [2, 3]. This occurs because there is a reduction in the negative surface charge (fewer electrons) on the RBCs [3, 4]. This reduced charge lessens the electrostatic repulsion between the cells, allowing them to clump together more easily and form larger aggregates called rouleaux [3].

https://www.google.com/search?sourceid=chrome&udm=50&aep=42&q=The+sedimentation+rate+is+high+that+would+indicate+that+the+red+blood+cells+have+less+electrons+on+them+and+the+zeta+potential+is+lower&mtid=pVtAaa6qBfSzptQPgI-t4AY&mstk=AUtExfAU4XRZ3vgKvm5NafcS1aGnWVBdpK24YPTNHpBR1YSbSbqyHbtt20NyCoub4puUeeFwnbq-U3aq7OJZqr4iuxSMyaob1Nc2AyFgSrazBPRaz2KPH_eoSObPHDPchwpcmpqmxzaDyusjgv3dAhGx28i7FGHn2SrhcEjWevvCQB5Wx99lWZEXV3JEl1-kwxeqAKkTrIDksYDYHNyNFR-IHhPArahf1-2w-To5S0CL890Nz_7syB5e7E1SgqHb9VN9ckASRLuL4NpFRH5KuKhWu-1GeaVJ7WKygRw&csuir=1

Erythrocyte Sedimentation Rate

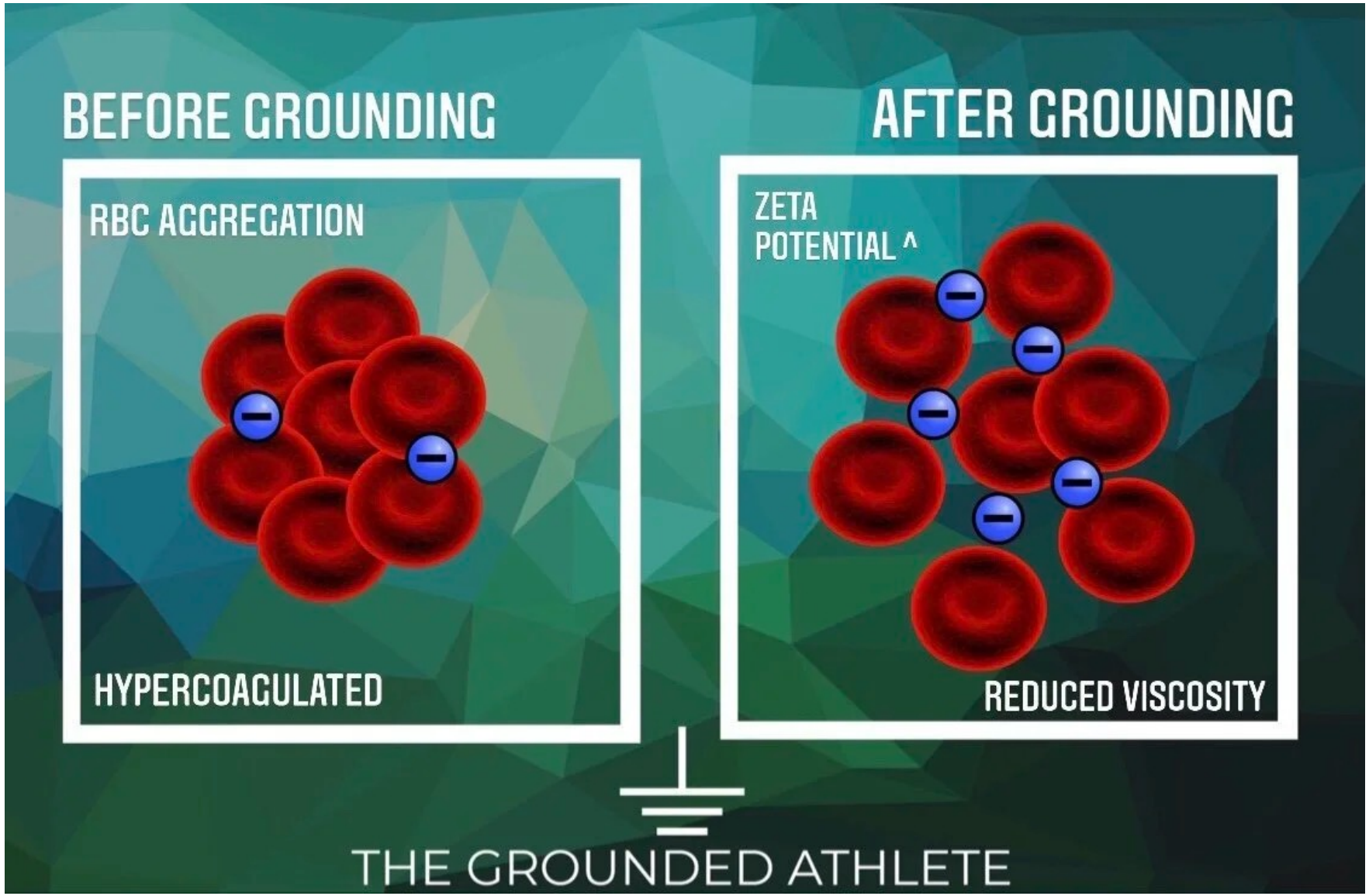
Normally, negative charges on the surface of RBCs repel one another and physiologically oppose aggregation



ESR: **Normal** **Increased**


Solutions

Vitamin G


BEFORE GROUNDING
RBC AGGREGATION
HYPERCOAGULATED
AFTER GROUNDING
ZETA
POTENTIAL ^
REDUCED VISCOSITY
THE GROUNDED ATHLETE

Earthing (Grounding) the Human Body Reduces Blood Viscosity—a Major Factor in Cardiovascular Disease

Gaétan Chevalier [1], Stephen T Sinatra [2], James L Oschman [3,✉], Richard M Delany [4]

Author information Copyright and License information

PMCID: PMC3576907 PMID: 22757749

Conclusions

Grounding increases the surface charge on RBCs and thereby reduces blood viscosity and clumping. Grounding appears to be one of the simplest and yet most profound interventions for helping reduce cardiovascular risk and cardiovascular events.

https://pmc.ncbi.nlm.nih.gov/articles/PMC3576907/?utm_source=chatgpt.com

Biomed J. 2022 Dec 15;46(1):11–16. doi: 10.1016/j.bj.2022.12.002

Grounding – The universal anti-inflammatory remedy

Stephen T Sinatra [a,1], Drew S Sinatra [b], Stephen W Sinatra [c,*], Gaetan Chevalier [d]

Author information · Article notes · Copyright and License information

PMCID: PMC10105021 PMID: 36528336

Abstract

When earth connection is restored through grounding, electrons flood throughout the body, reducing inflammation and oxidative stress while also reinforcing the body's own defense mechanisms. Electron transfers are the basis of virtually all antioxidant and anti-inflammatory activity. And the earth may very well be the ultimate supplier! When the supply is restored, humans have the potential to thrive. Touching our skin to the earth, is perhaps the perfect natural anti-inflammatory supporting biochemical and physiological effects that enhance healing

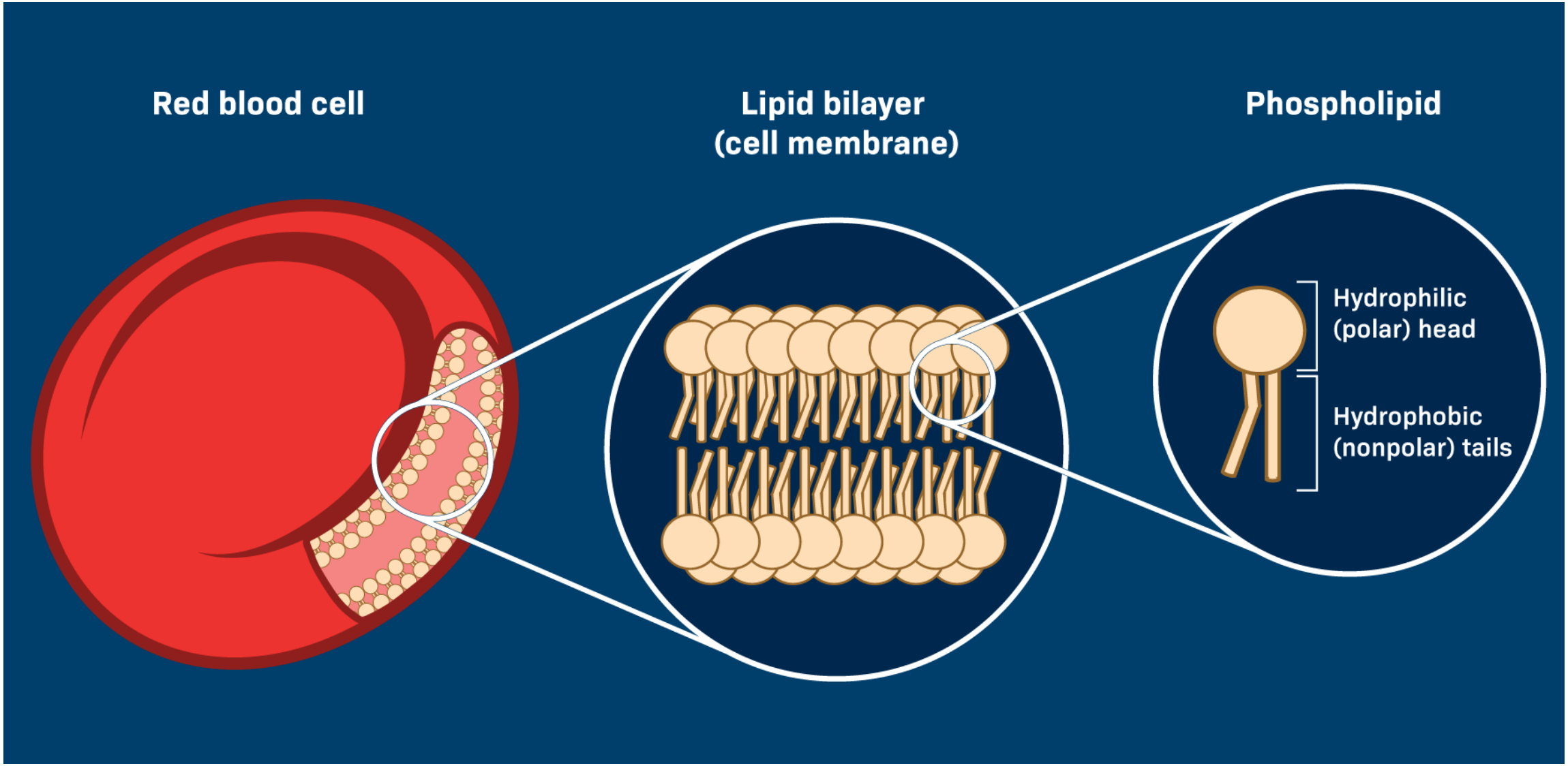
https://pmc.ncbi.nlm.nih.gov/articles/PMC10105021/

The Shocking Science Behind Grounding Sheets!

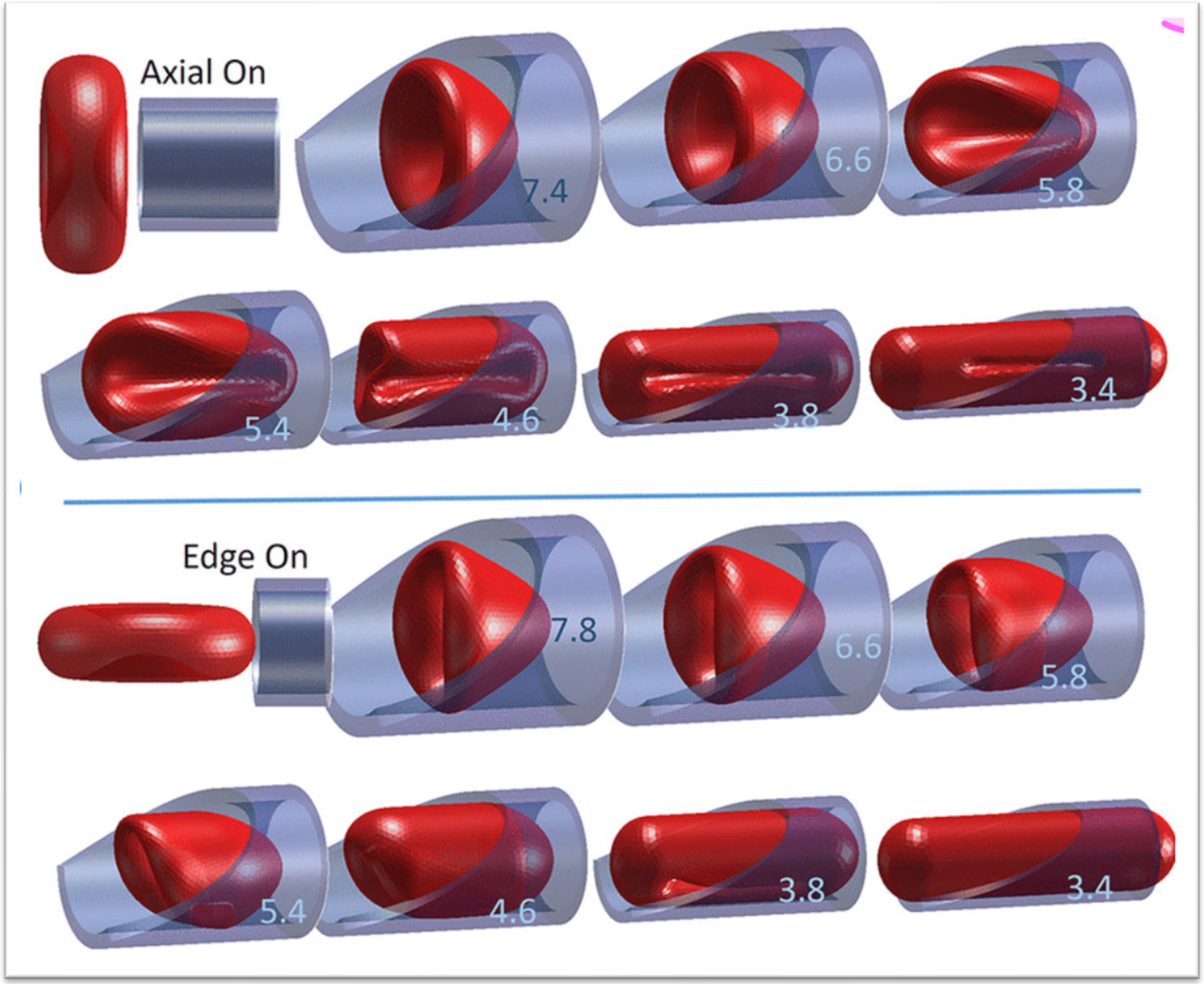
Why Grounding Matters

Click Here for Lecture Notes

Solution



https://www.labxchange.org/library/items/lb:LabXchange:fc119cce:lx_image:1

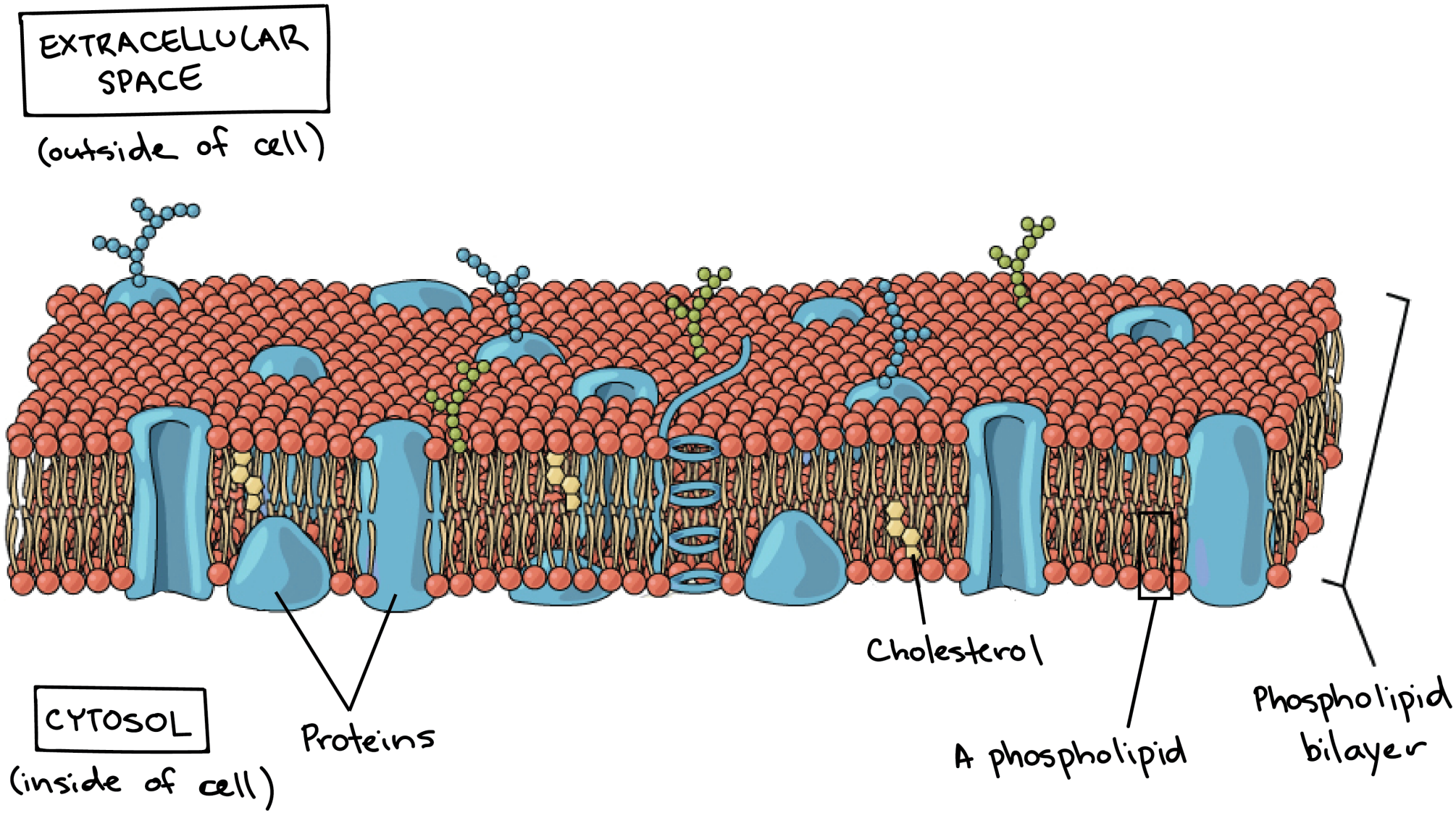


https://www.researchgate.net/figure/RBC-shapes-in-the-capillaries-with-different-sizes-under-a-given-shear-force-The-first_fig3_356393505

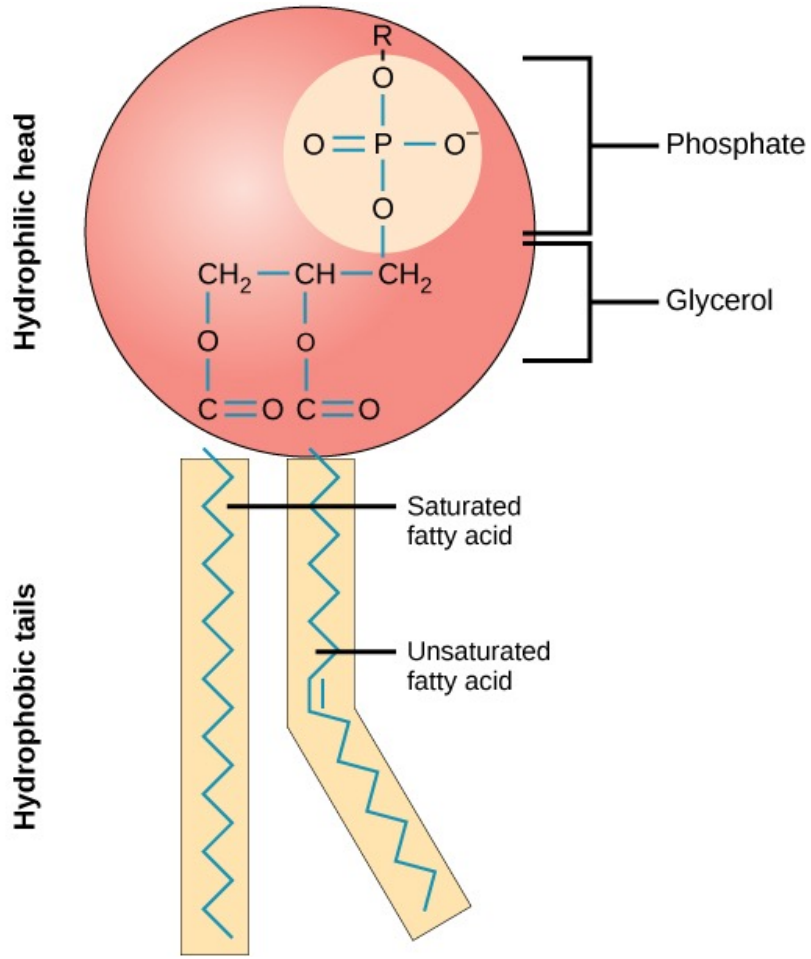
Yes, red blood cell membranes are made partly from phospholipid choline, specifically from the choline-containing phospholipids **phosphatidylcholine** and **sphingomyelin**. These molecules are concentrated in the outer leaflet of the membrane, while other phospholipids like phosphatidylserine and phosphatidylethanolamine are found predominantly on the inner leaflet, creating an important phospholipid asymmetry.

Composition and function

https://www.ncbi.nlm.nih.gov/books/NBK26871/#:~:text=The%20lipid%20compositions%20of%20the,by%20membrane%2Dbound%20phospholipid%20translocators.

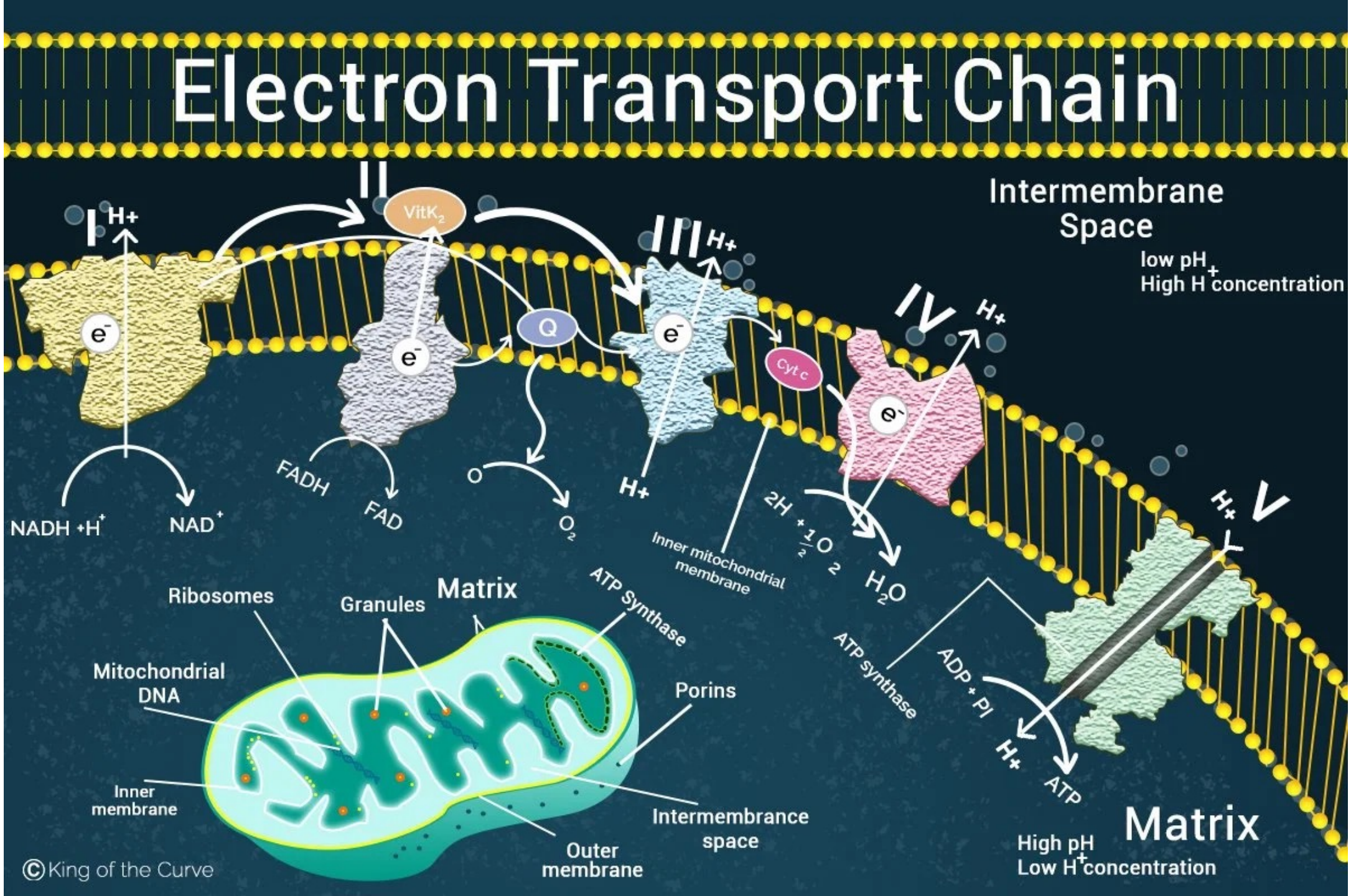

EXTRACELLULAR SPACE
(outside of cell)
CYTOSOL
(inside of cell)
Proteins
Cholesterol
A phospholipid
Phospholipid bilayer

- The **negative phosphate** still contributes to local electrical effects, especially in:
  - Membrane surface charge
  - Zeta potential
  - Mitochondrial and neuronal function



Cell Membrane Detoxification Could Be Why You're Still Sick

What Is Phosphatidylcholine? A Common-Sense Look at Cell Health


Electron Transport Chain
I
II
III
IV
V
H+
VitK2
e-
Q
Cyt c
Intermembrane Space
low pH+
High H+ concentration
NADH +H+
NAD+
FADH
FAD
O
O2
2H + 1/2 O 2
H2O
Inner mitochondrial membrane
ATP synthase
ADP + PI
ATP
Matrix
High pH
Low H+ concentration
Ribosomes
Granules
Matrix
ATP Synthase
Mitochondrial DNA
Porins
Inner membrane
Intermembrance space
Outer membrane
©King of the Curve

The mitochondrial membranes have a distinct phospholipid composition compared to other cellular membranes, and it differs between the outer mitochondrial membrane (OMM) and the inner mitochondrial membrane (IMM).

As a percentage of total phospholipids in mammalian mitochondria:

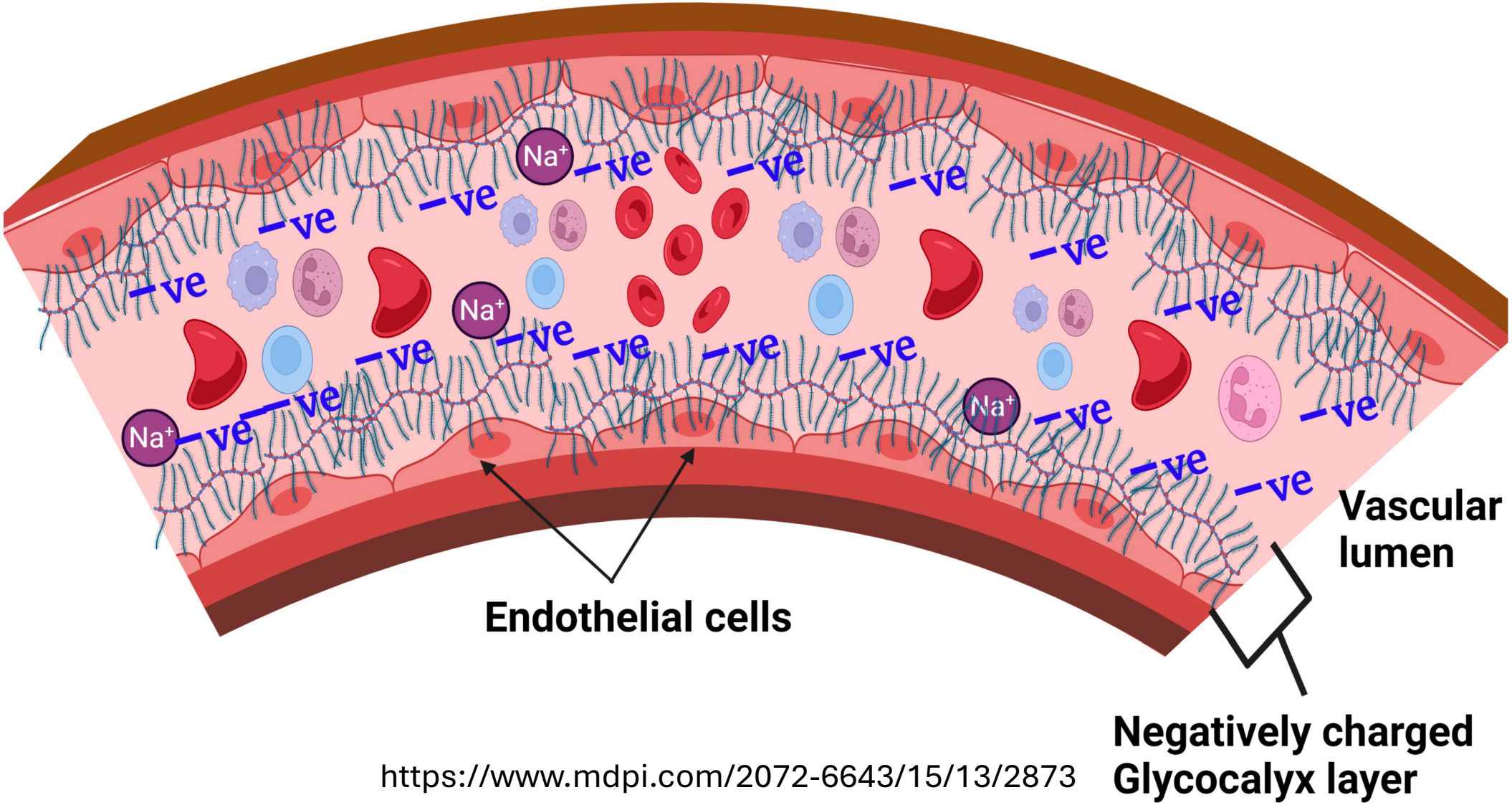
Phospholipid	Outer Membrane (OMM)	Inner Membrane (IMM)
Phosphatidylcholine (PC)	~50%	~40%
Phosphatidylethanolamine (PE)	~30%	~40%
Phosphatidylserine (PS)	<5%	<5%

Key Differences in Composition:

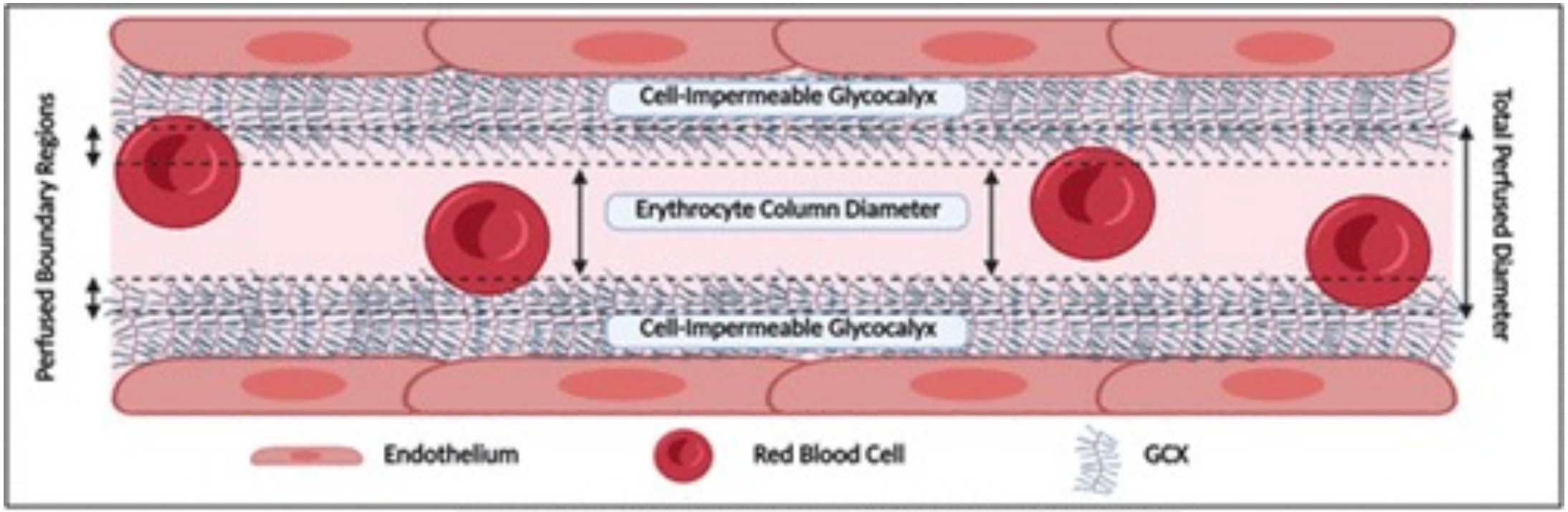
- **Phosphatidylcholine (PC):** PC is the most abundant lipid overall in mitochondrial membranes, especially in the OMM, and helps form the standard bilayer structure.
- **Phosphatidylethanolamine (PE):** PE is notably enriched in the IMM (~40% of total phospholipids). Its conical shape is important for inducing the negative curvature required for the formation of mitochondrial cristae, where oxidative phosphorylation occurs.
- **Phosphatidylserine (PS):** PS is present in low amounts in both membranes (<5%). It is synthesized in the ER and imported into the IMM where it is quickly decarboxylated to form PE, making it a critical metabolic intermediate rather than a major structural component.

https://www.google.com/search?q=What+are+the+different+phosphates+that+phosphatidylcholine+breaks+down+into&sa=X&sca_esv=fb3147f266a54277&rlz=1C5CHFA_enUS1118US1118&sxsrf=AE3TifNssdMCYNXG076-IrdB0Qtvz9cuaQ%3A1764433262191&udm=50&fbs=AIIjpHz30rPMyW-0vSP0k1VTNmO_kCOARpjPjQRkBWH2HwUIz5XUSIJvSK0oms7XOxizDlnr_4ZY5sR6MhoHu3TFlth2rG29N-ZS27Ewg3pWkHJuKnhNmmrfF6bzjXx0gOJYfAzamL9SDMg2Dyg9e3uhhjns085YHsLUYTjwJa7P-v7KsHTQlG-m_NpKZqhje7R8Jv5oE_1qOWMtzaEvMH90bpuFDj-BVWT86BNz8GcvmkhyBrnfPOg&aep=1&ntc=1&ved=2ahUKEwjhrsqO4peRAxX478kDHRDaO68Q2J8OegQICRAD&mstk=AUtExfBtyuOqMzaEXx84mMgDa_t2kznAA_Lt8B2kCLyTmJuTu72_Rsu2FrhVCkWO3PE5leGs0KOKTx_K2Ax0VcSMapYSjRw0g4zjGEmfrHNJU2pjuMIZlj56sRllzUoWcZRwX2KJtLPowMQ-dxDYNIuIb0JQPfRMJ4q5A57NVffPVe4oC413r7aLbBxR06CngNmTCZ2fxA1owheSFeON2giYETH4GbUKaS7T0uXw44eJppaJWi3mebT7FiA-Xj2mNtd_B0fuS5SVaUuGLz6RkjepU6lPtD18YXD--WqPh2-rqZvr6-jH8ZG7uzBhSOlI3CHcv6RvpJY4VjBVbCZrZtZYeghHV27bVDYP7Z3JE-vArHO5_mHmb1G_4eMIInX2lV_JH3KhdgaxvYsKRUlTo9EIEXvwPsQveRxaEZvOBGFji4YjZBVIk-Uv9g&csuir=1&biw=1788&bih=933&dpr=1.8&mtid=9xwraeKjG6mqptQP-cvPwAI

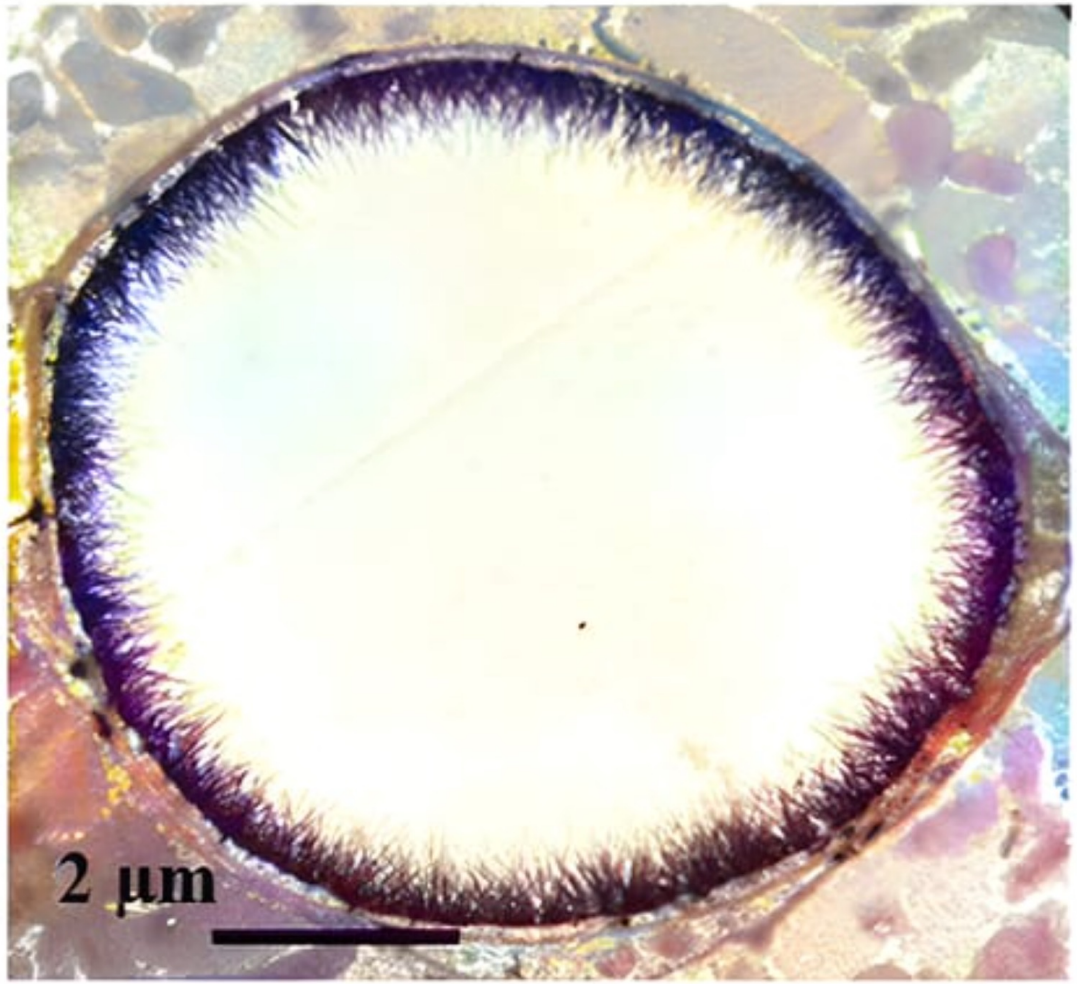
Solution

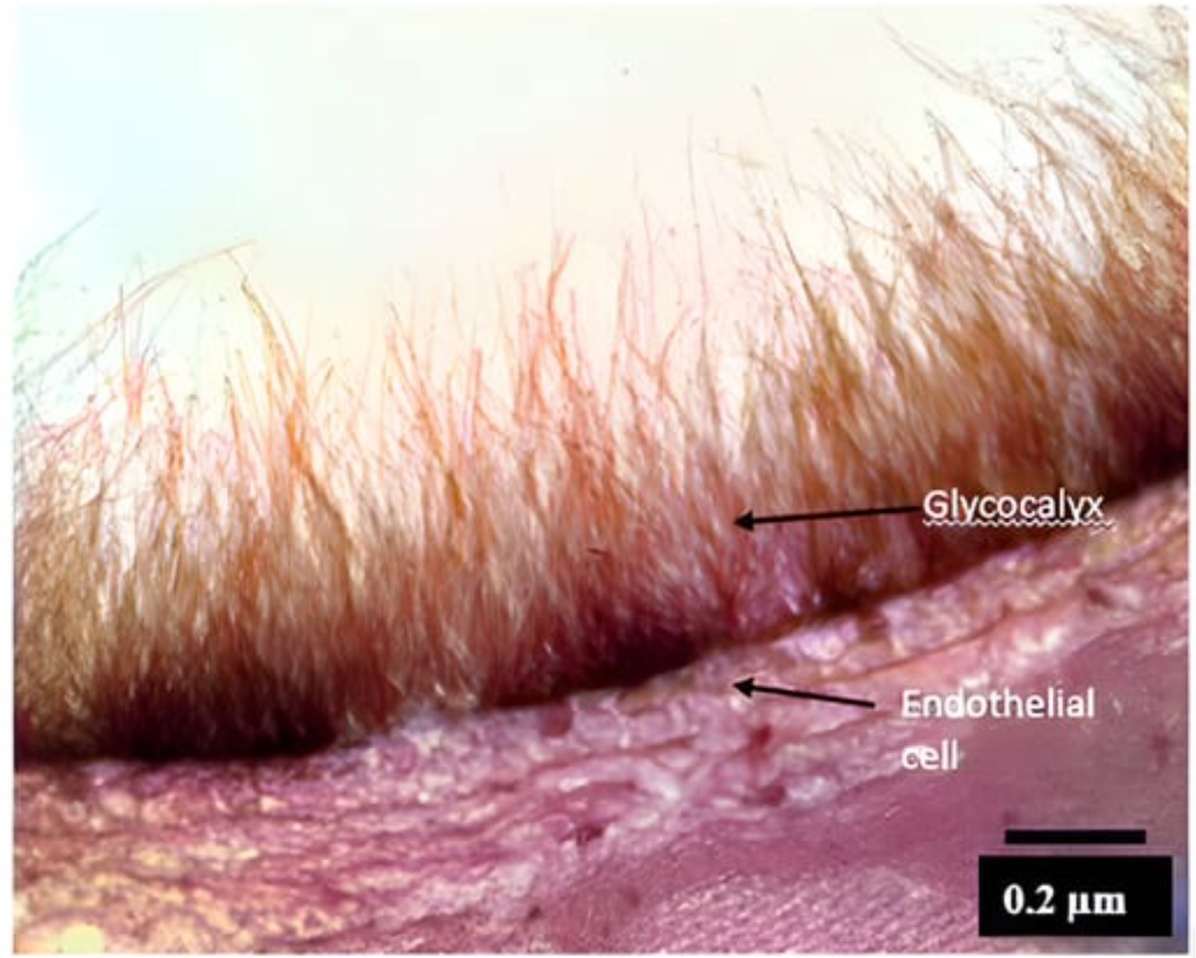


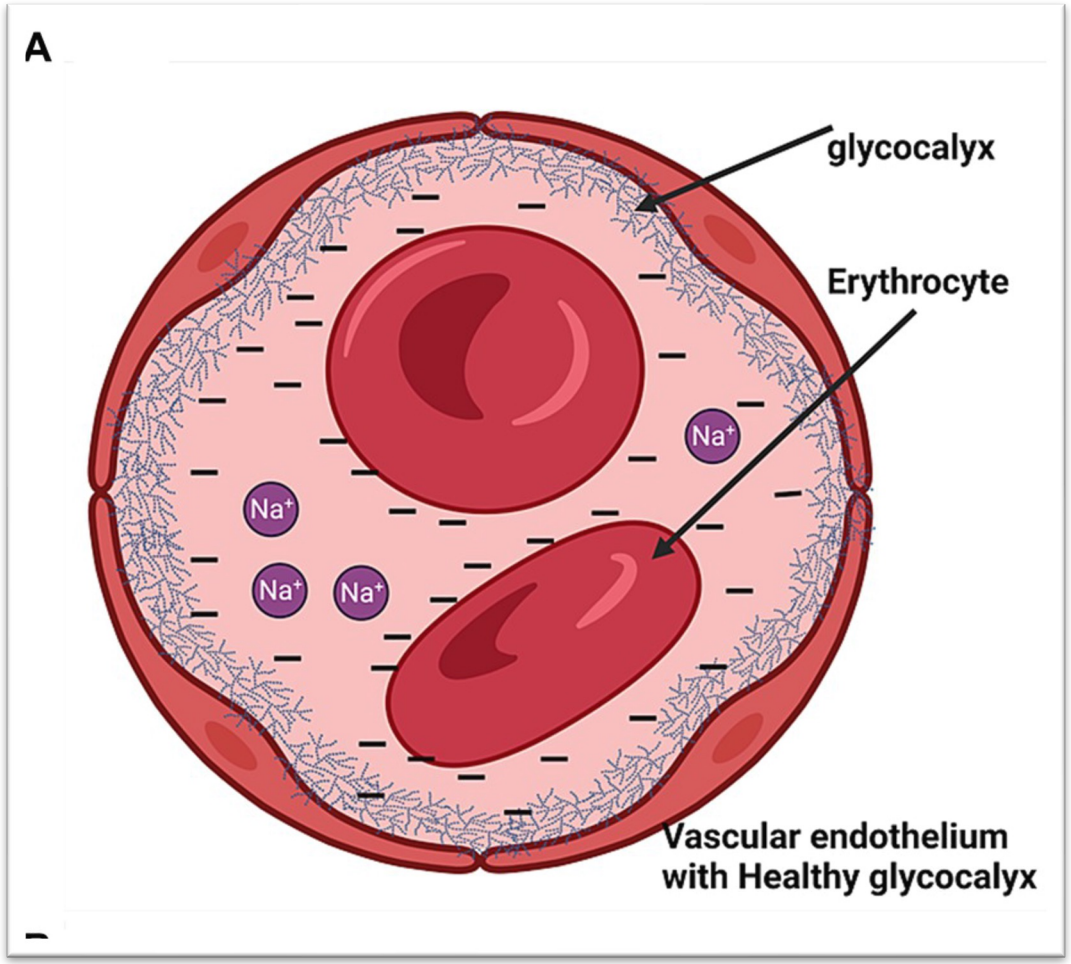
https://www.mdpi.com/2072-6643/15/13/2873

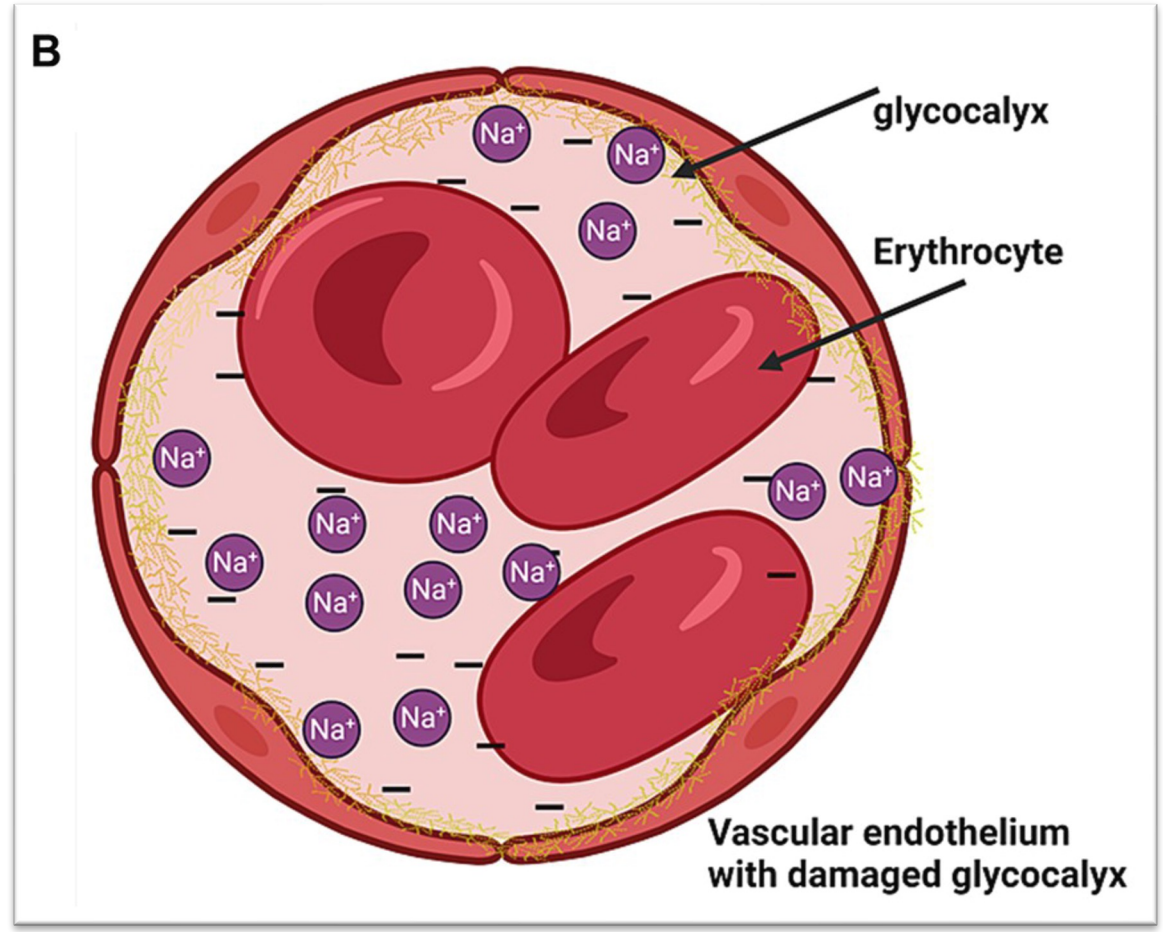


$$PBR = \frac{Total\ Perfused\ Diameter - Erythrocyte\ Column\ Diameter}{2}$$

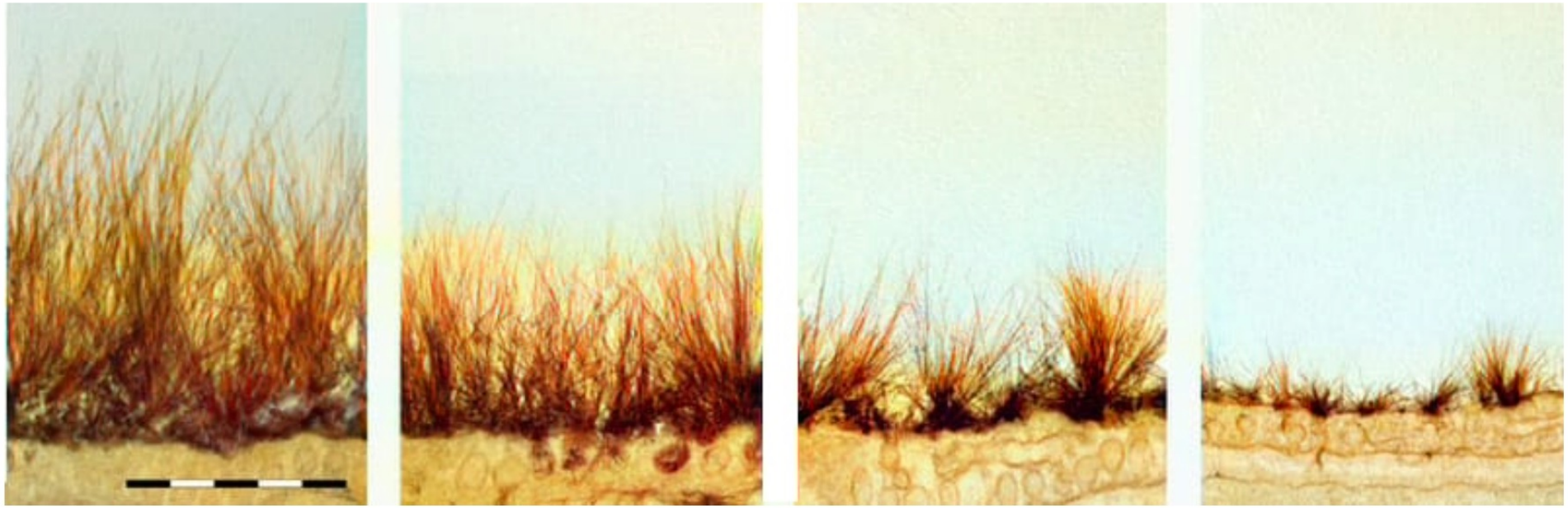

2 µm


Glycocalyx
Endothelial cell
0.2 µm


A
glycocalyx
Erythrocyte
Na+
Na+
Na+
Na+
Vascular endothelium
with Healthy glycocalyx


B
glycocalyx
Erythrocyte
Na+
Na+
Na+
Na+
Na+
Na+
Na+
Na+
Na+
Na+
Na+
Na+
Na+
Vascular endothelium
with damaged glycocalyx

A Healthy vs Unhealthy Glycocalyx



https://glycocalyx.com/pages/the-glycocalyx?srsltid=AfmBOooiB3ZdVw76lXLOcE2S0UgGt3KIsuamA_h6hxhilNfnf2zMNv-c

1. Phosphatidylcholine (PC)

- Rebuilds cell membranes
- Anchors the glycocalyx
- Stabilizes negative charge

2. Stable Blood Sugar

- Avoid glucose spikes
- Walk after meals

3. Sulfur & Sulfation

- Sulfur = negative charge
- Eggs, garlic, MSM

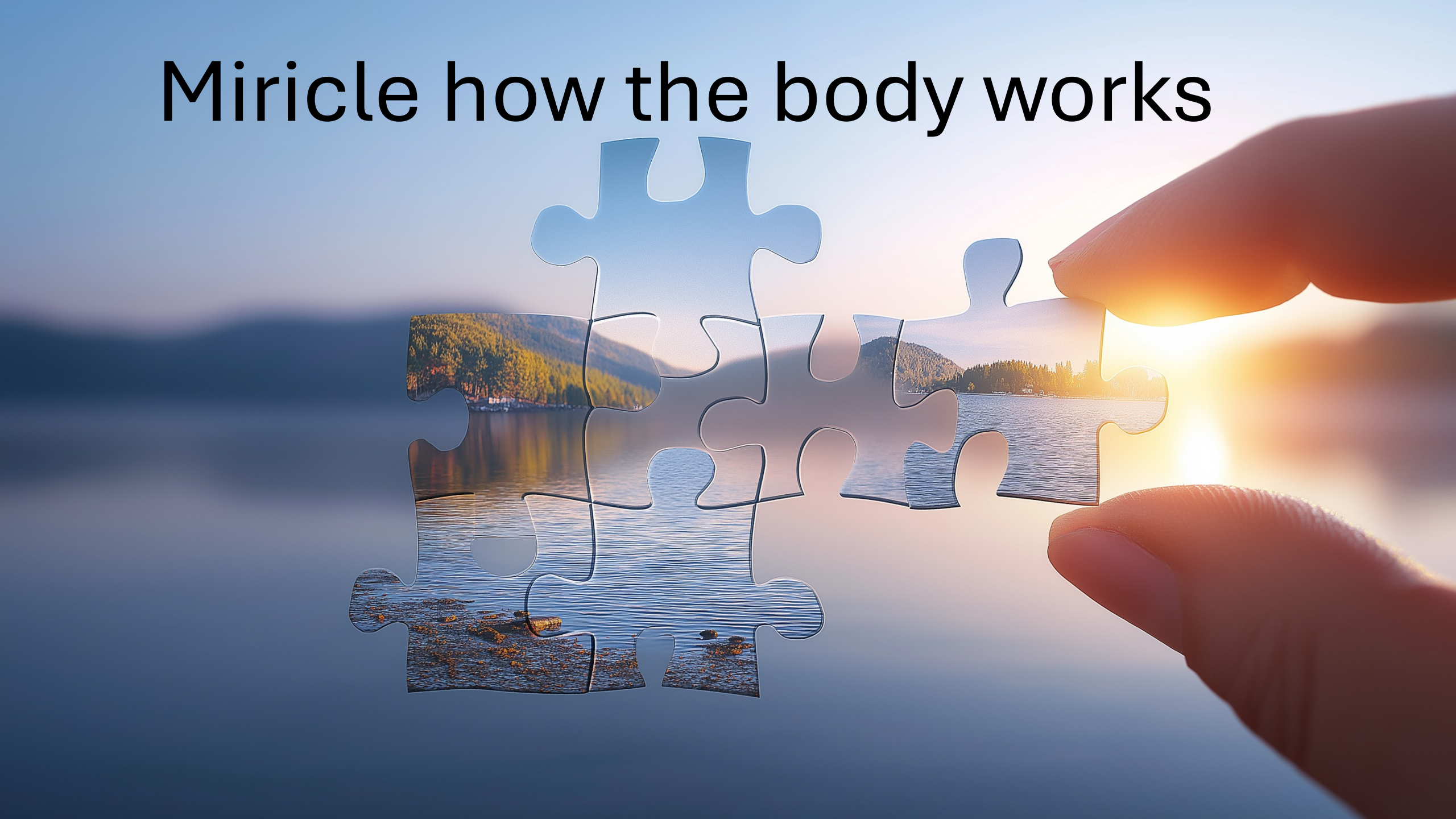
4. Minerals & Hydration

- Magnesium is key
- Hydrate with minerals

5. Low Inflammation + Blood Flow

- Fix the gut
- Daily movement / nasal breathing

Miricle how the body works



⭐ Bottom Line Difference

Cell Type	Approx. Charge	Clinical Meaning
RBC	Strongly negative (–10 to –20 mV)	High zeta potential → prevents clumping → smooth flow
WBC	Mildly negative (–1 to –5 mV) and variable	Designed to stick to vessel wall during inflammation

👉 **RBC charge drives microcirculation and zeta potential.**

👉 **WBC charge changes depending on immune activation.**

⭐ 3. WBC Charge Is More Variable

WBCs **do** have a negative charge, but it:

- Is **weaker** than RBC charge
- Varies depending on the WBC type (neutrophils, lymphocytes, monocytes, etc.)
- Changes dramatically when WBCs are activated by inflammation or infection
- Can even become **less negative** during immune activation so they can adhere to blood vessel walls

This is important:

When WBCs become activated (like during inflammation), they purposely reduce their negative charge.

Why?

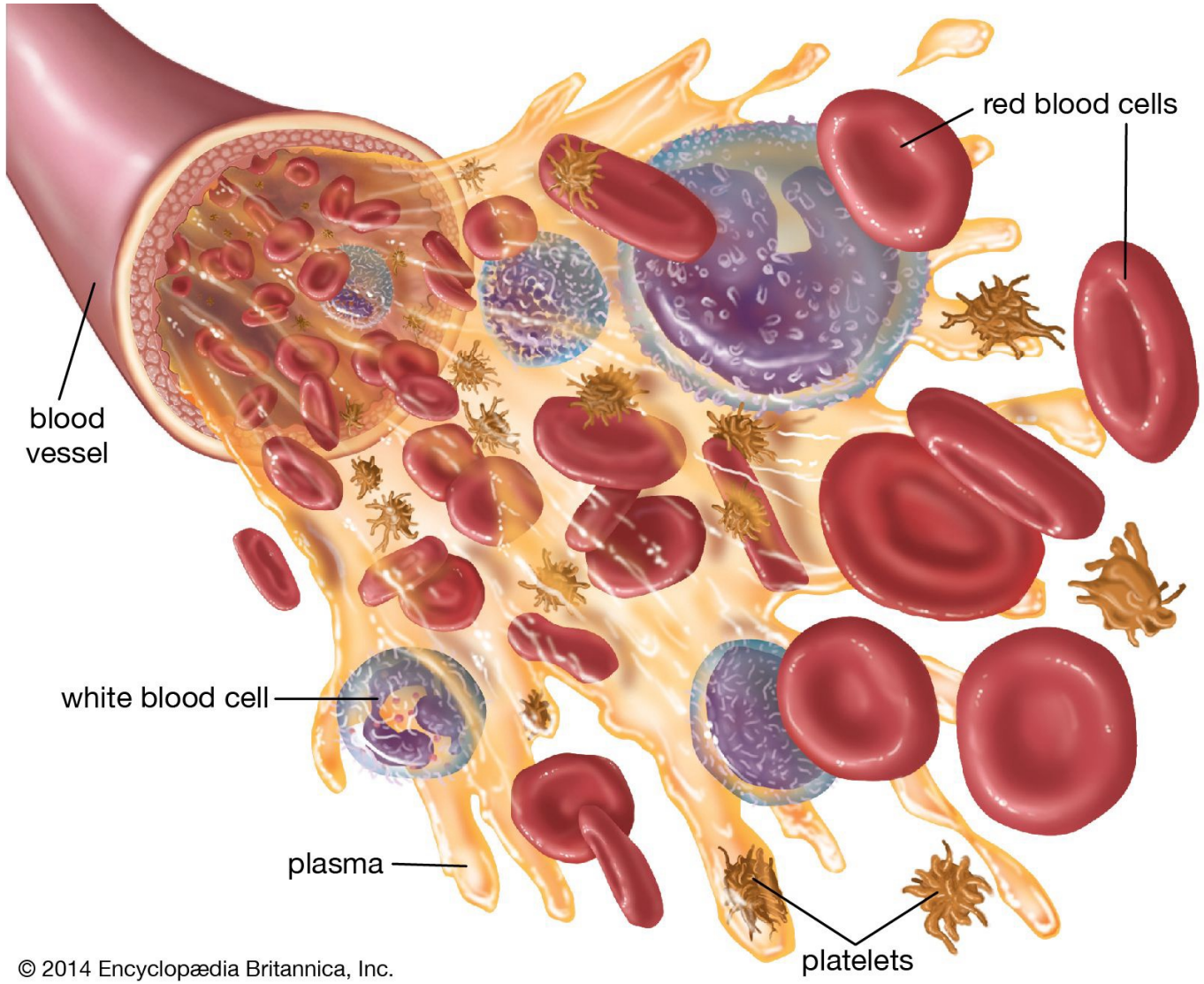
Because they need to "stick" to the endothelium to exit the bloodstream and attack pathogens.

This sticking process is called **margination**.

https://www.youtube.com/watch?v=4yBMY9Wj7z0

Major Positively Charged Minerals in Plasma

- **Sodium** (Na^+): Sodium is the most abundant cation in the extracellular fluid, which includes plasma. It is crucial for maintaining blood volume, fluid balance, and the transmission of nerve impulses.
- **Potassium** (K^+): While the majority of potassium is found inside cells, a necessary amount is present in the plasma. It is vital for nerve transmission, muscle function (especially heart rhythm), and maintaining cellular fluid volume and pH balance.
- **Calcium** (Ca^{2+}): Calcium plays a key role in blood clotting, muscle contraction, nerve function, and maintaining strong bones.
- **Magnesium** (Mg^{2+}): Magnesium is involved in numerous cellular functions, including energy production, DNA and protein synthesis, and regulation of calcium and potassium transport across cell membranes.

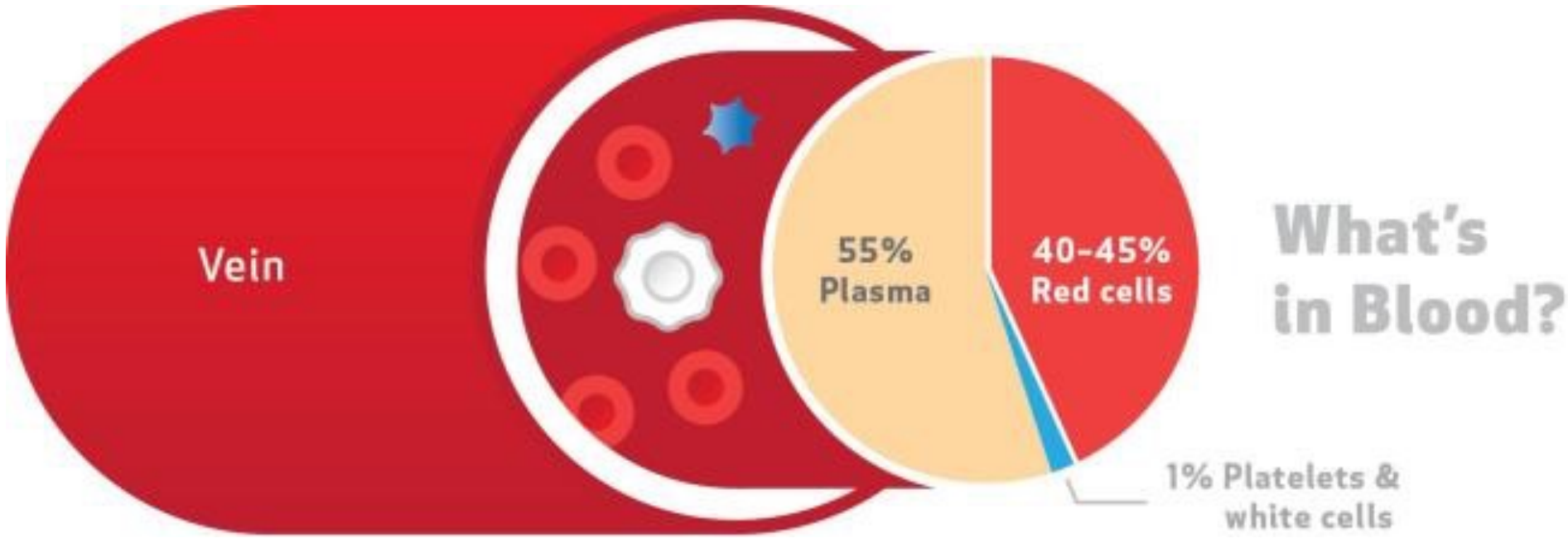


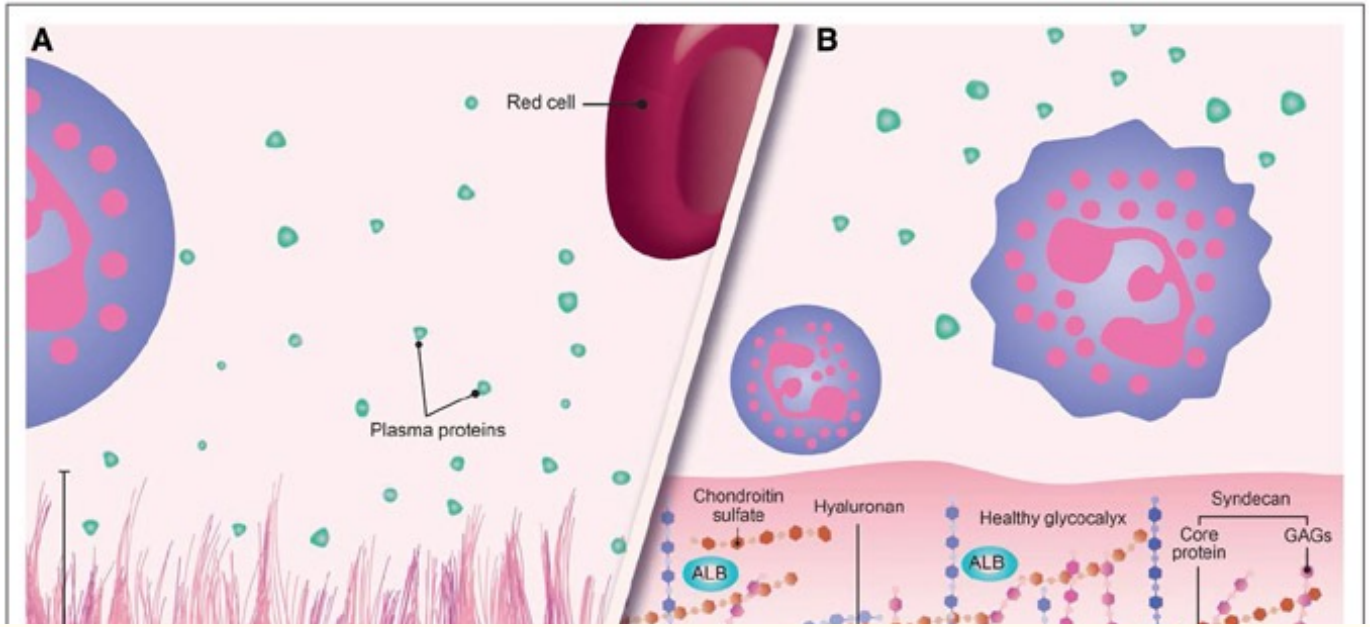
⭐ 2. BUT RBCs Have a Much Stronger, More Consistent Negative Charge

RBCs have a **very high zeta potential** because:

- They have a thick, uniform glycocalyx
- Their membranes are engineered for repulsion and smooth flow
- They lack internal organelles, so the membrane properties dominate

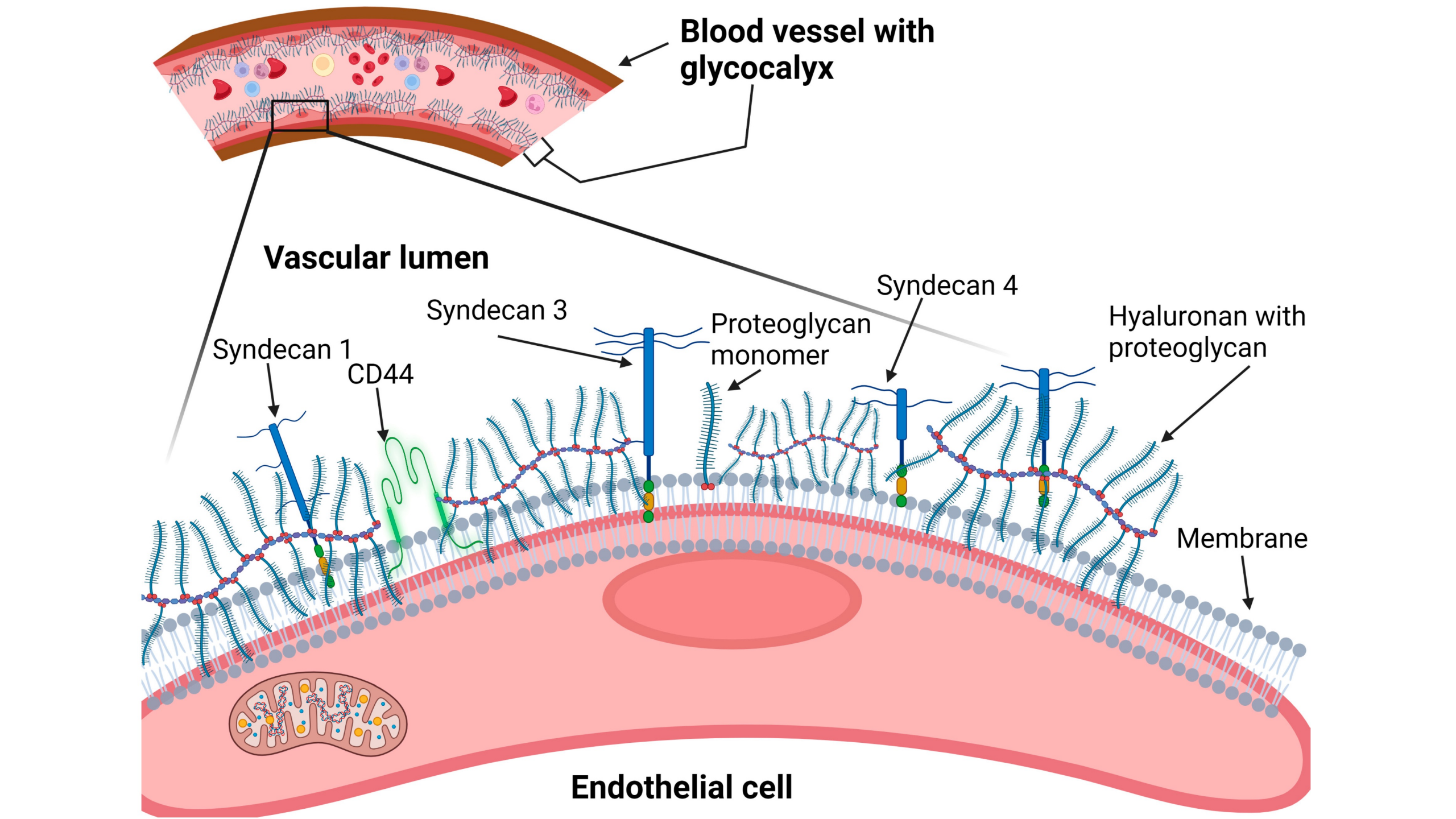
RBCs rely heavily on this negative charge to keep from clumping.


Vein
55%
Plasma
40-45%
Red cells
1% Platelets &
white cells
What's
in Blood?

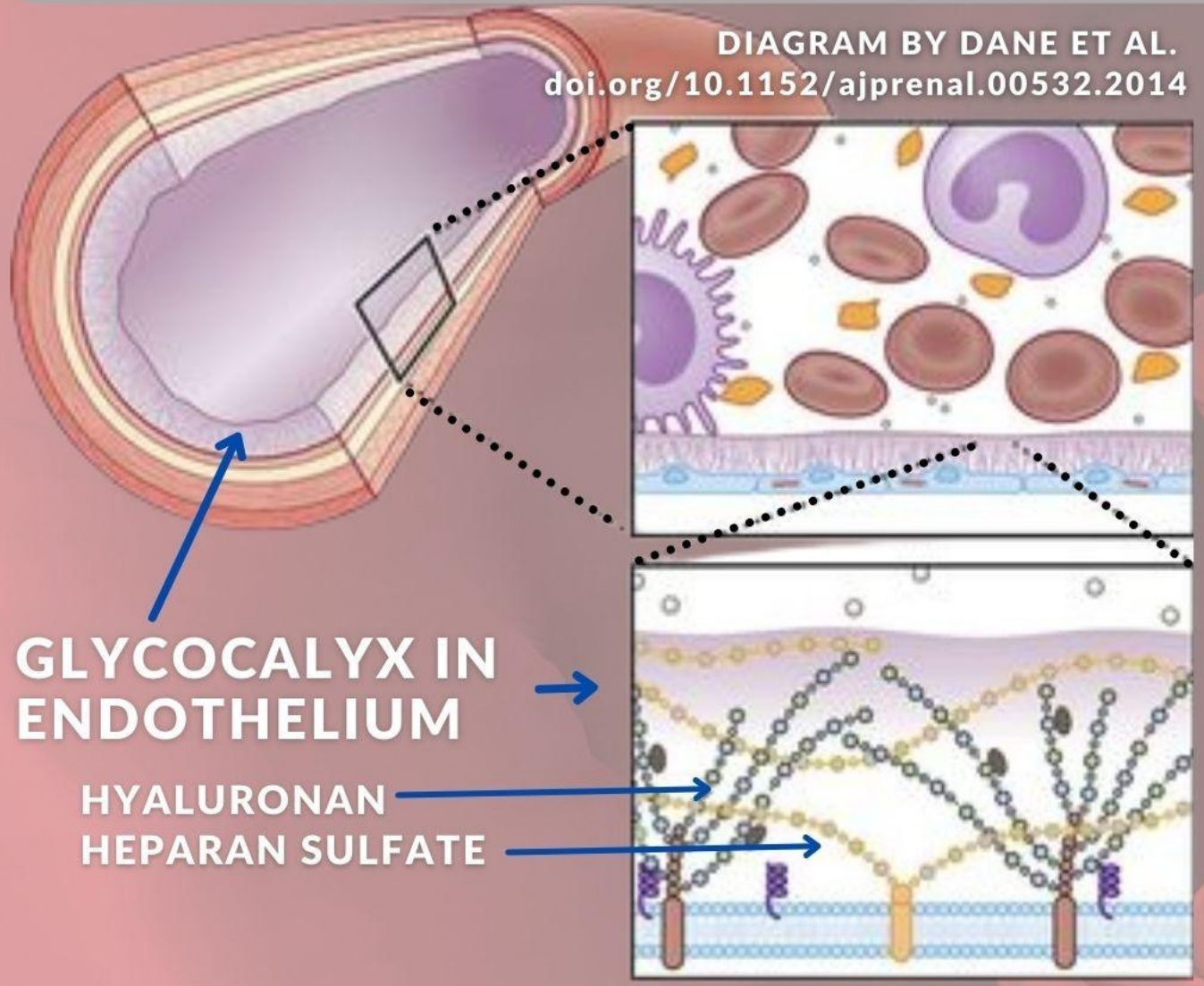


An approximate graphic representation of the glycocalyx. **A**, A graphic representation of the healthy glycocalyx and its relation to vascular structures and plasma proteins. **B**, An enlargement of the image. The proteoglycans are shown, principally syndecan with its transmembrane protein core joined to the glycosaminoglycans (GAGs) and interacting with proteins such as albumin (ALB-green). The other glycocalyx component is also shown as the glycoproteins (adhesion molecule).

https://pmc.ncbi.nlm.nih.gov/articles/PMC9084566/#:~:text=Proteoglycans%20are%20considered%20to%20be,d%20(14%2D16).

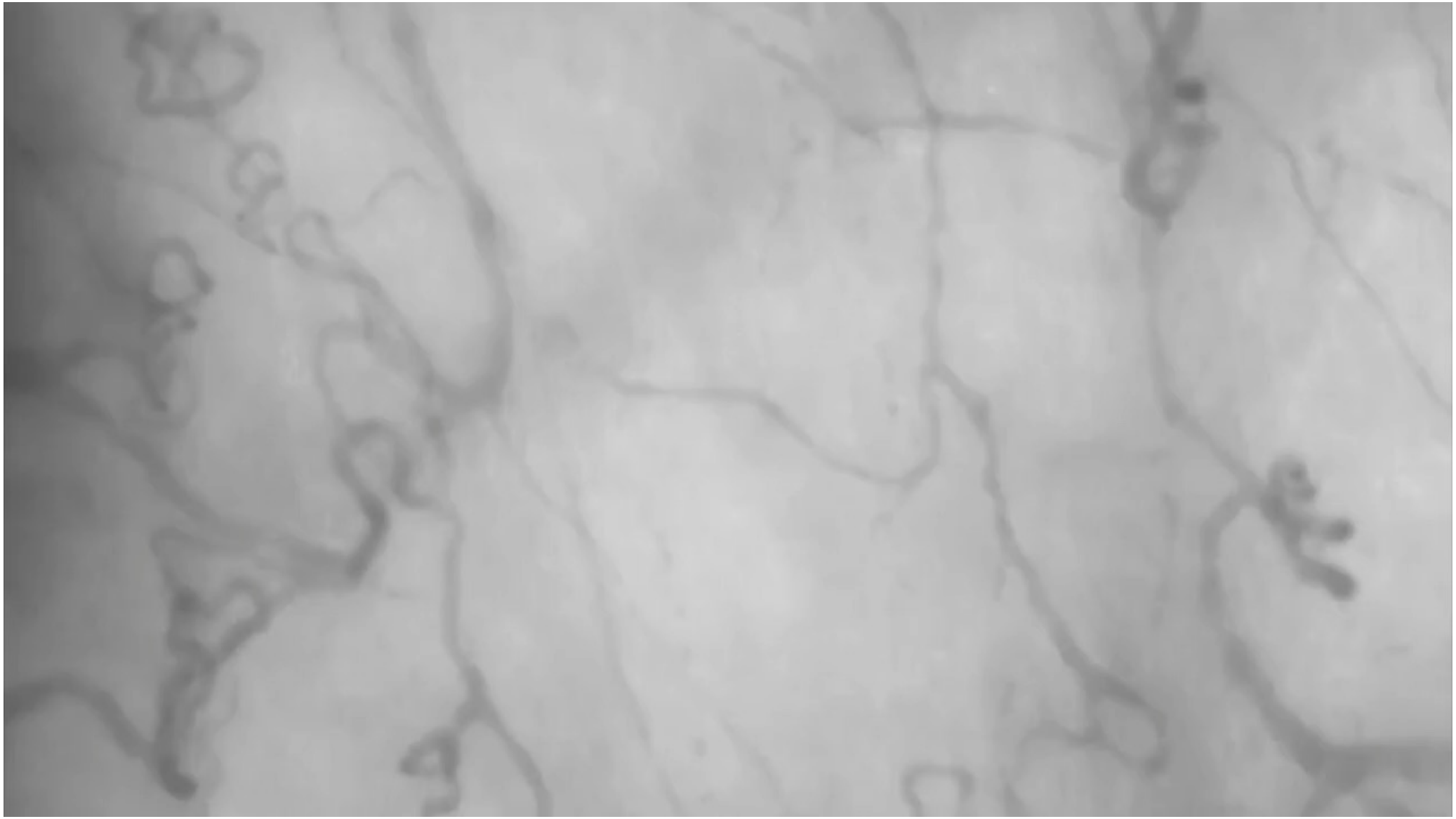

Blood vessel with glycocalyx
Vascular lumen
Syndecan 1
CD44
Syndecan 3
Proteoglycan monomer
Syndecan 4
Hyaluronan with proteoglycan
Membrane
Endothelial cell

Glycocalyx



What is Glycocalyx?

The glycocalyx is the fuzzy, gel-like, sticky layer made up mainly of proteins and sugars. It surrounds the outermost cellular membrane of cells.



https://glycocalyx.com/pages/the-glycocalyx?srsltid=AfmBOooiB3ZdVw76lXLOcE2S0UgGt3KIsuamA_h6hxhilNfnf2zMNv-c

The Difference

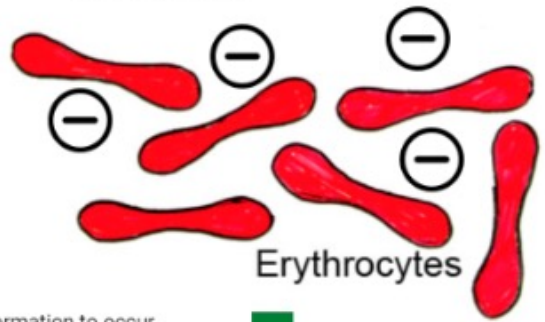
The red blood cell is vastly larger than the magnesium ion. To compare:

- A red blood cell (8,000 nm) is approximately **100,000 times larger** in diameter than a magnesium ion (0.072 nm).
- The difference in scale is comparable to the difference between a person and a small grain of sand. Red blood cells are microscopic cells visible under a light microscope, while magnesium atoms are subatomic particles and require specialized scientific instruments to observe their effects.

Mechanisms underlying the erythrocyte sedimentation rate (ESR)

Normally, rouleaux formation is limited by the **negative charge on the red blood cell** conferred by cell surface sialic acid (zeta potential). If this charge is neutralized, RBC stack into chains, or rouleaux, and fall more rapidly.

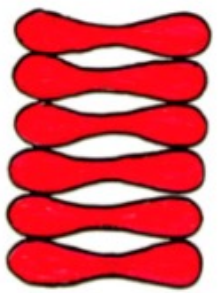
Monodispersed



For rouleaux formation to occur, macromolecules must be present in the suspending medium, especially:

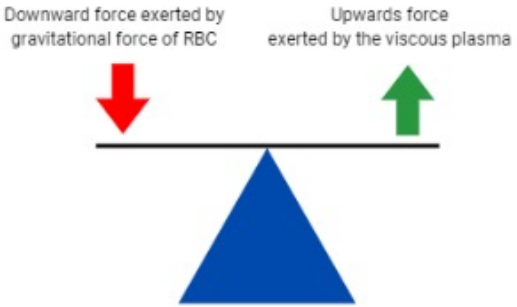
- Fibrinogen
- Immunoglobulins

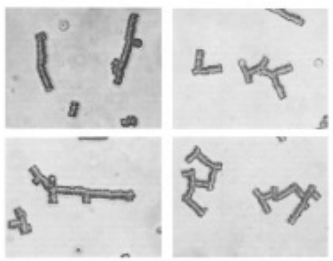
When red cells aggregate along a single axis to **form rouleaux**, the weight of the particles increases relative to their surface area, and the red cells' rate of fall through the plasma increases



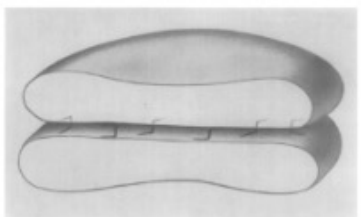
Rouleaux

- **Red blood cells settle in vitro because the density of the cells is greater than the density of the plasma.**
- **As RBC fall in the tube, the downwards force of gravity is countered by an upwards force exerted by the viscous plasma**
- **These forces are relatively equal when RBC remain as individual cells, resulting in little settling, but when agglutinated, RBCs descend downwards**



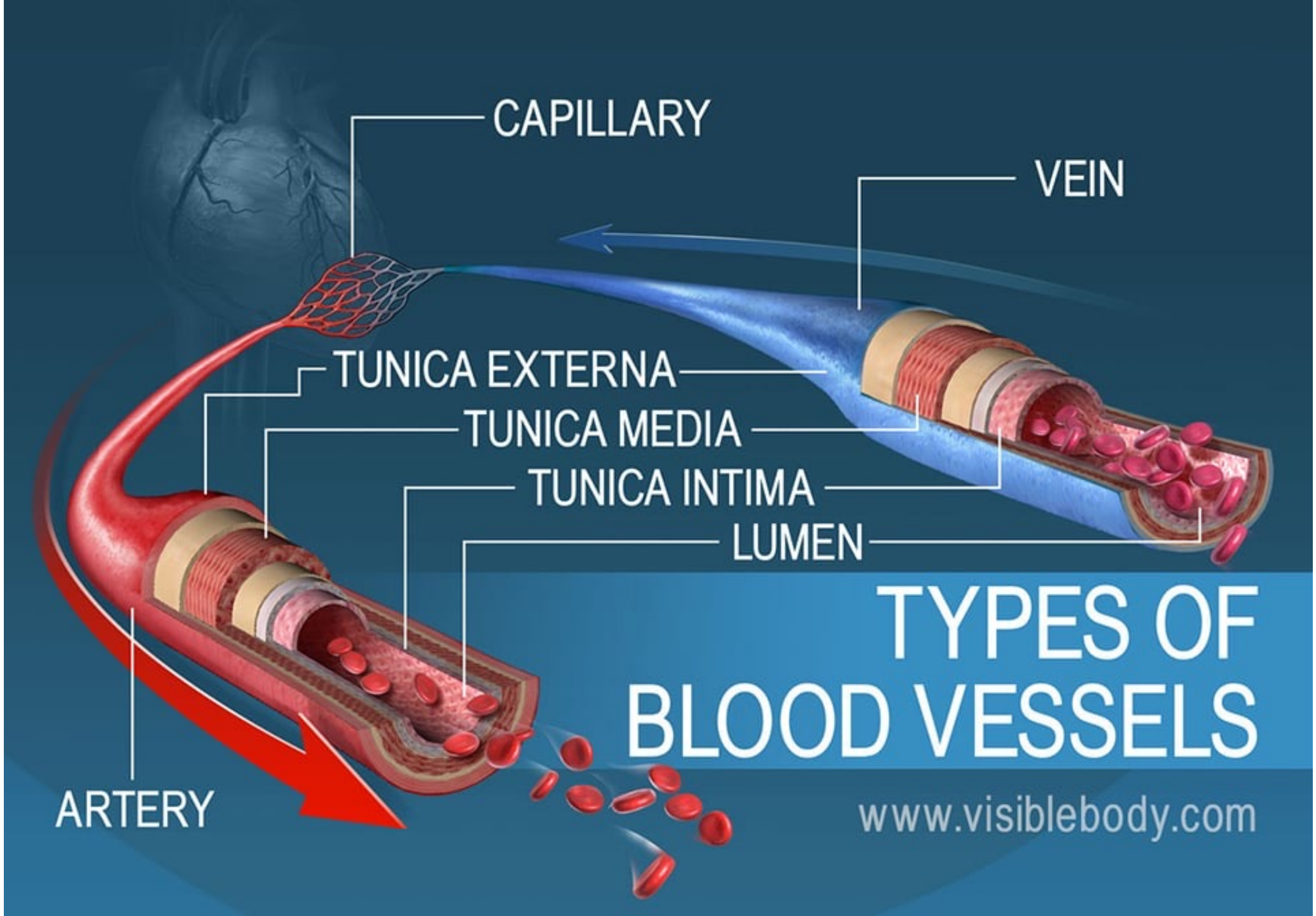


Rouleaux formation

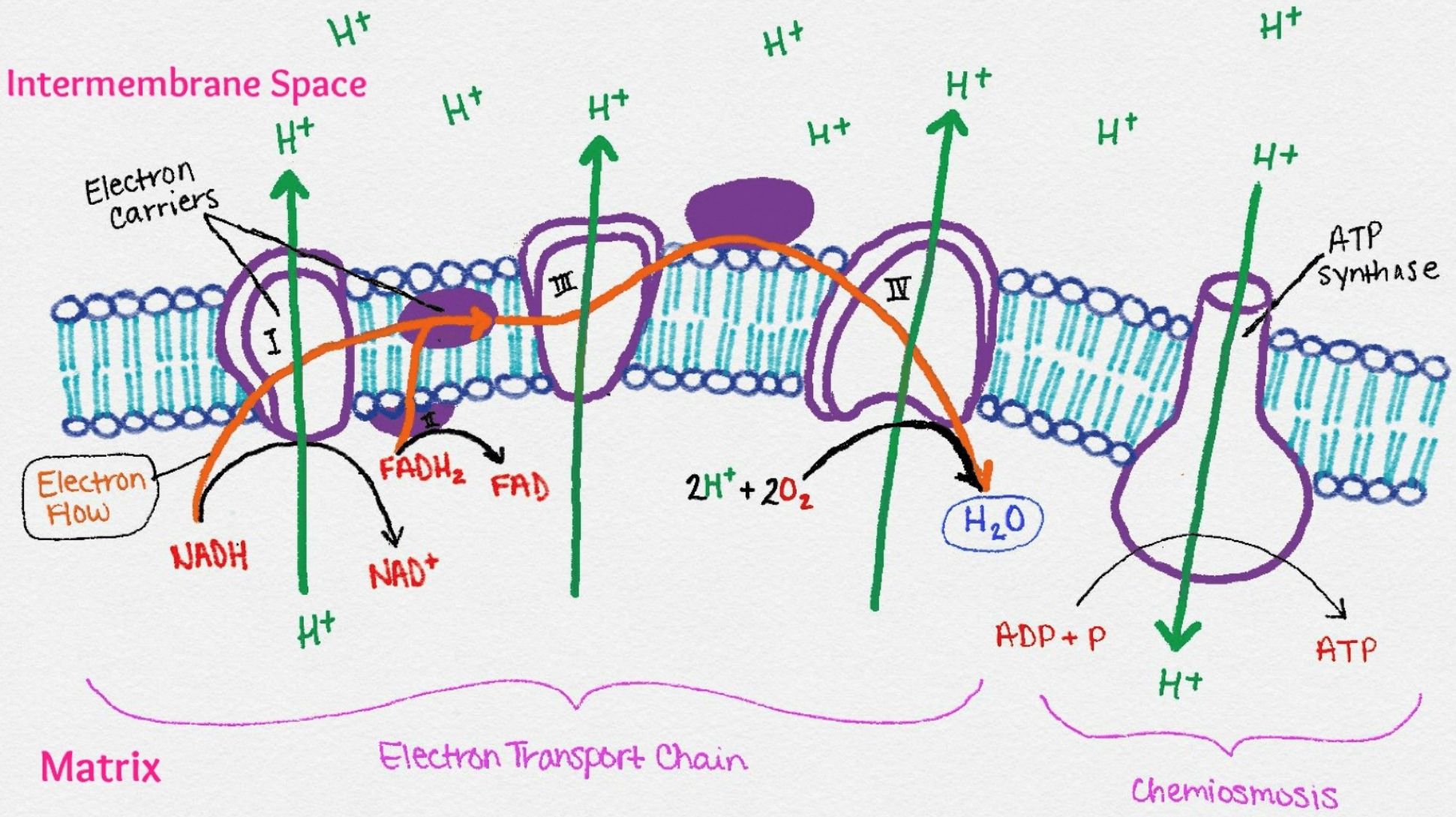


Schematic of Molecular bridges between two RBCs consisting of fibrinogen or Ig molecules

https://www.thebloodproject.com/cases-archive/esr-2/

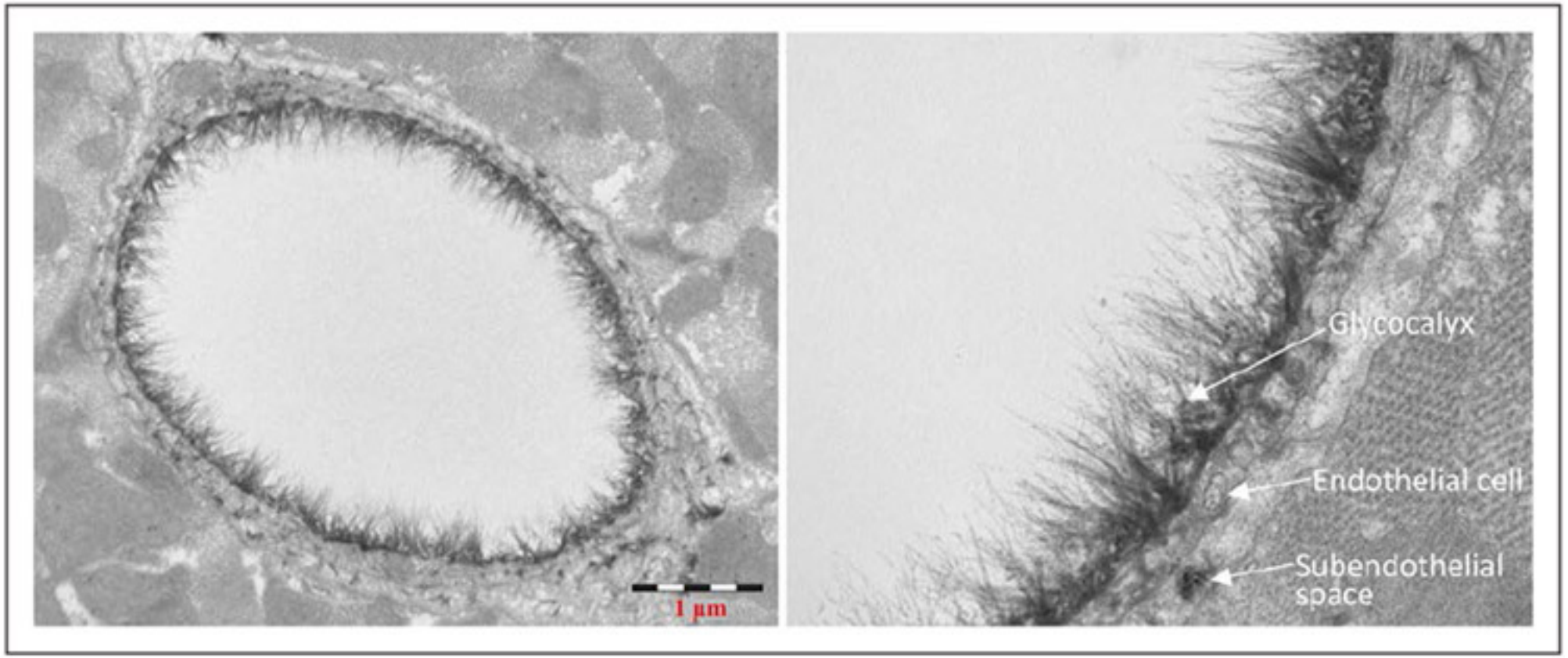

CAPILLARY
VEIN
TUNICA EXTERNA
TUNICA MEDIA
TUNICA INTIMA
LUMEN
ARTERY
TYPES OF BLOOD VESSELS
www.visiblebody.com

The Electron Transport Chain

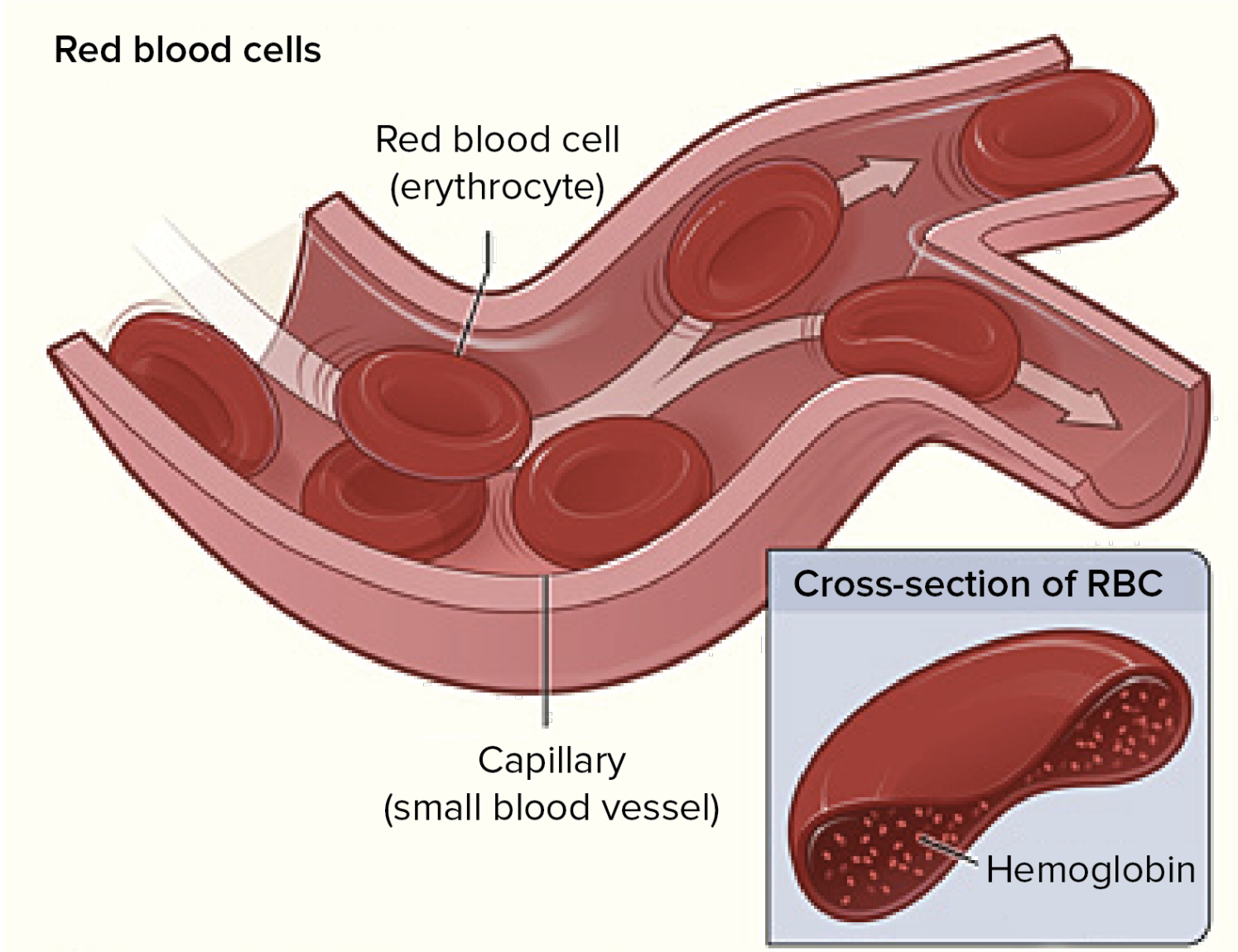


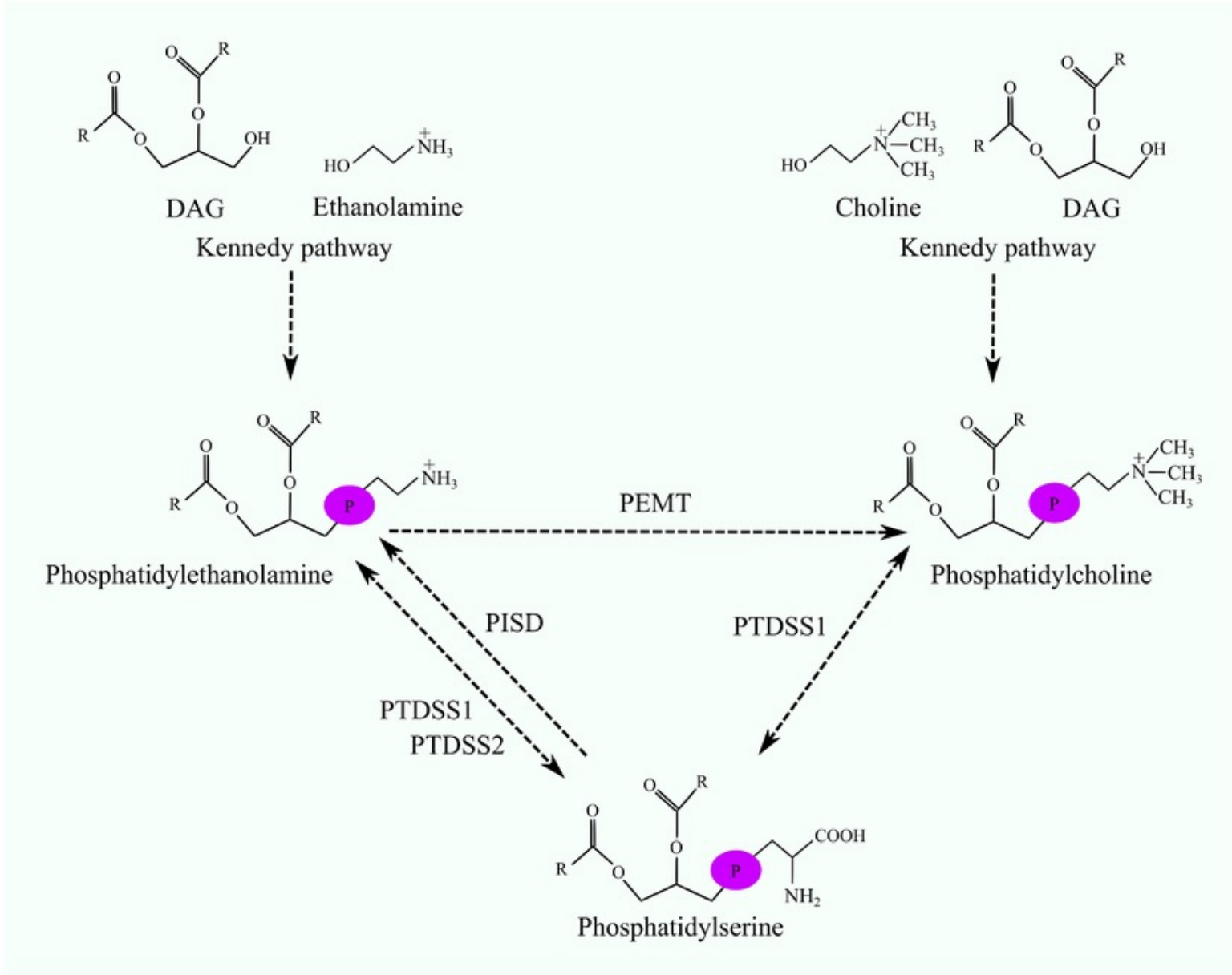
The Electron Transport Chain is a series of electron carriers in the inner membrane of the mitochondria. Electrons are passed from NADH to oxygen, moving photons (H+) from the matrix to the intermembrane space. FADH2 also donates electrons to the chain, releasing hydrogen ions into the intermembrane space. Eventually, the high H+ concentration in the intermembrane space causes some of the ions to flow down the concentration gradient and back into the matrix through ATP synthase, producing ATP.

Whitney, E., & Rolfes, S. (2002). Energy Metabolism. In *Understanding Nutrition* (9th ed.). Belmont, California: Wadsworth.



https://pmc.ncbi.nlm.nih.gov/articles/PMC9084566/#:~:text=Proteoglycans%20are%20considered%20to%20be,d%20(14%2D16).


Red blood cells
Red blood cell
(erythrocyte)
Capillary
(small blood vessel)
Cross-section of RBC
Hemoglobin


DAG
Ethanolamine
Kennedy pathway
Choline
DAG
Kennedy pathway
PEMT
Phosphatidylethanolamine
Phosphatidylcholine
PISD
PTDSS1
PTDSS1
PTDSS2
Phosphatidylserine

In human red blood cell (RBC) membranes, phospholipids make up about 40% of the membrane's weight. The approximate percentages of the major phospholipids, as a percentage of **total phospholipids**, are:

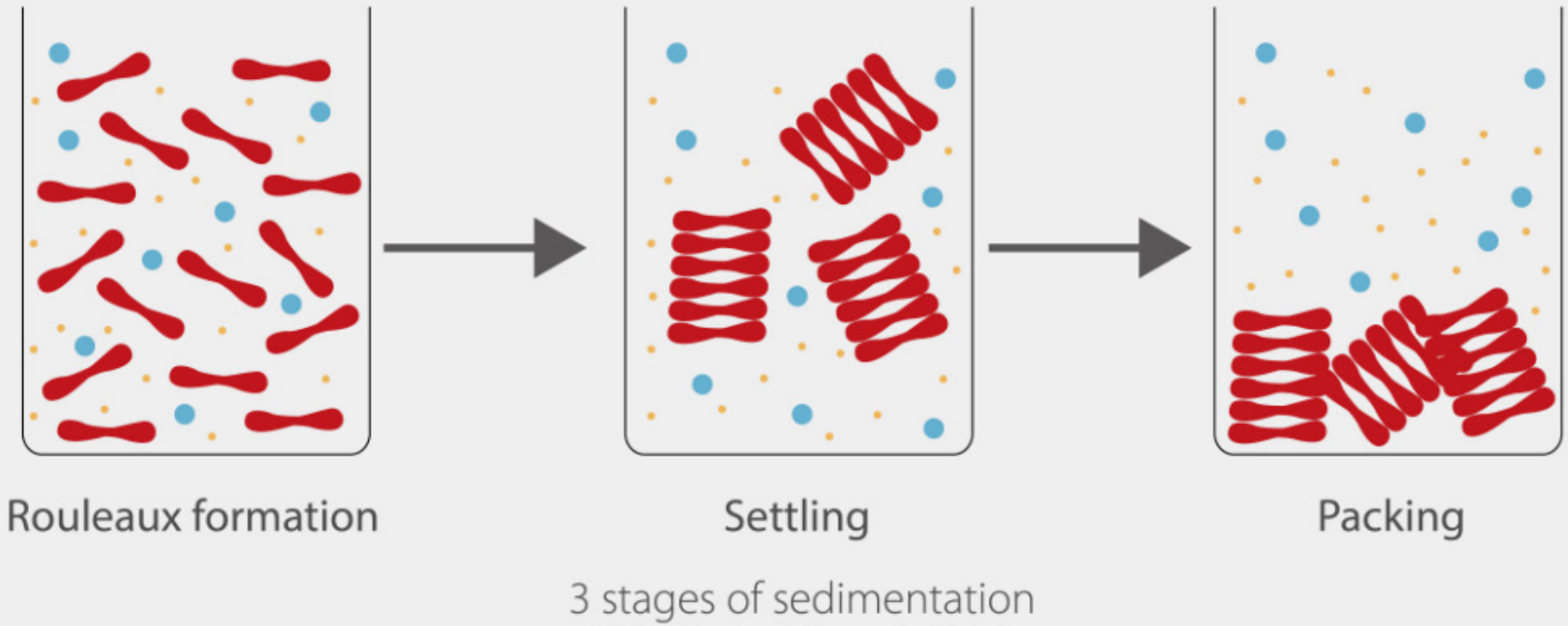
- **Phosphatidylcholine (PC):** 29–30%
- **Phosphatidylethanolamine (PE):** 27–31%
- **Phosphatidylserine (PS):** 13–15%

Note that sphingomyelin (SM), another major choline-containing phospholipid, makes up another 25-26%.

A key characteristic of the red blood cell membrane is its asymmetry:

- PC resides mainly in the **outer leaflet** of the membrane bilayer.
- PE and PS are located almost exclusively in the **inner leaflet**.
- The exposure of PS on the outer surface typically signals the cell for destruction.

https://www.google.com/search?q=What+are+the+different+phosphates+that+phosphatidylcholine+breaks+down+into&sa=X&sca_esv=fb3147f266a54277&rlz=1C5CHFA_enUS1118US1118&sxsrf=AE3TifNssdMCYNXG076-lrdB0Qtvz9cuaQ%3A1764433262191&udm=50&fbs=AIIjpHz30rPMyW-0vSP0k1VTNmO_kCOARpjPjQRkBWH2HwUIz5XUSlJvSK0oms7XOxizDlnr_4ZY5sR6MhoHu3TFlth2rG29N-ZS27Ewg3pWkHJuKnhNmmrfF6bzjXx0gOJYfAzamL9SDMg2Dyg9e3uhhjns085YHsLUYTjwJa7P-v7KsHTQlG-m_NpKZqhje7R8Jv5oE_1qOWMtzaEvMH90bpuFDj-BVWT86BNz8GcvmkhyBrnfPOg&aep=1&ntc=1&ved=2ahUKEwjhrsqO4peRAxX478kDHRDaO68Q2J8OegQICRAD&mstk=AUtExfAMtEEvY9zHVDFzr8CA0xrs7UoE3wdJfzDciLV5yj15ozSkJ5_OPrvexxuhx4HuMiFKiazPvC90EPJAs2AQMeTgeLgY95MsdV7uSy-hv4pBBapEAezu0pMo5Zuc_O_4xiaL-Zgx9f402xZRqHuQo66TKVGfhqIzUY9IMTtC6Fub3U6ff0dyFZeZ-slrkGpJsD_yLZNX22qhhoW9GLBgh1l2wGEBbeD2BVNp8B35QJ2pVUzXaa7X0-4F8gq2blelx2ZvPgSdn4ZVzZAi52Ypbsi1bYLvExA0scXbNQtrMzVp7ZyKWUy68nPJiPRLfMmMpJR1tFB_v-YF30rpotU9DjOdDgRKM0aR5muf_L28V0hVLQoqjBjX4cvbhLq9h4zXX7VivEbCMJ21qsOi_3XH43SmRd9ODSb4o-4C5CdFO-1ep--lhTpw0Q&csuir=1&biw=1788&bih=933&dpr=1.8&mtid=9xwraeKjG6mqptQP-cvPwAI



3 stages of sedimentation

https://www.thebloodproject.com/cases-archive/esr-2/