



...Fun lab week with much personal data!

BI 121 Lecture 10

- I. Announcements** Remember to read Lab 5 before Thursday. Thanks for helping us be well-prepared. Q from last time? Calculating grade from estimated final. Keys to success? Q?
- II. CVDs Prevention & Treatment** Exercise, dietary modifications anti-inflammatory oils? PTCA, CABG, ... Torstar, S&W ch 5+...
- III. Blood Form & Function** LS ch 11 pp 296-304, 309-12
DC Module 5 + SI Fox + *National Geographic* Lennart Nilsson
 - A. Formed vs. nonformed/cells vs. plasma fig+tab 11-1
 - B. Red blood cells/erythrocytes: O₂-carrying
sickle cells, ABO blood typing, Rh factor pp 299-304.
 - C. White blood cells/leukocytes: Defense/immunity
differential + general functions pp 309-12
 - D. Platelets/thrombocytes: Initial clotting p 304
- IV. Blood Glucose & Diabetes Mellitus** LS ch 17, DC Module 13

Q? What do I need on the final, if I want to get...?

A? You can actually calculate given assumptions...

e.g., 62 for midterm & desire $\geq B^-$ (assume ≥ 80)

Assume 100% for lecture (20% of grade)

+ lab attendance & participation (20% of grade!)

$$X = [\cancel{80} + ((0.3 \times \text{MT}) + (0.2 \times \text{Lecture}) + (0.2 \times \text{Lab}))]/0.3$$

$$X = [80 - [(18.6) + (20) + (20)]]/0.3$$

$$X = [21.4]/0.3 = 71.3$$

Need this on final for B^- for course!



...Fortunately, lecture & lab attendance buffer the grade!

👉😊...I ♥ U of O!

Students who succeed are usually those who:

- (1) **Attend** class regularly
- (2) **Ask** questions
- (3) **Come** to office hours & problem-solving sessions
- (4) **Study** outside class both alone & in study groups
- (5) **Seek** to understand methods & overarching principles/concepts rather than specific answers
- (6) **Teach** or tutor others &
- (7) **Discuss** concepts informally with fellow students.



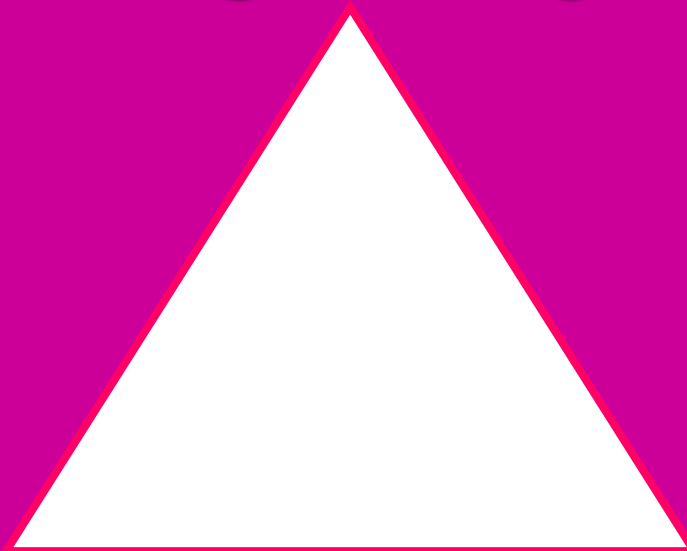
Science Teaching Reconsidered, National Academy Press, 1997.

Treatment Triad

NB: Last blasted resort!!



Drugs/Surgery



Exercise

*Dietary
Modification*

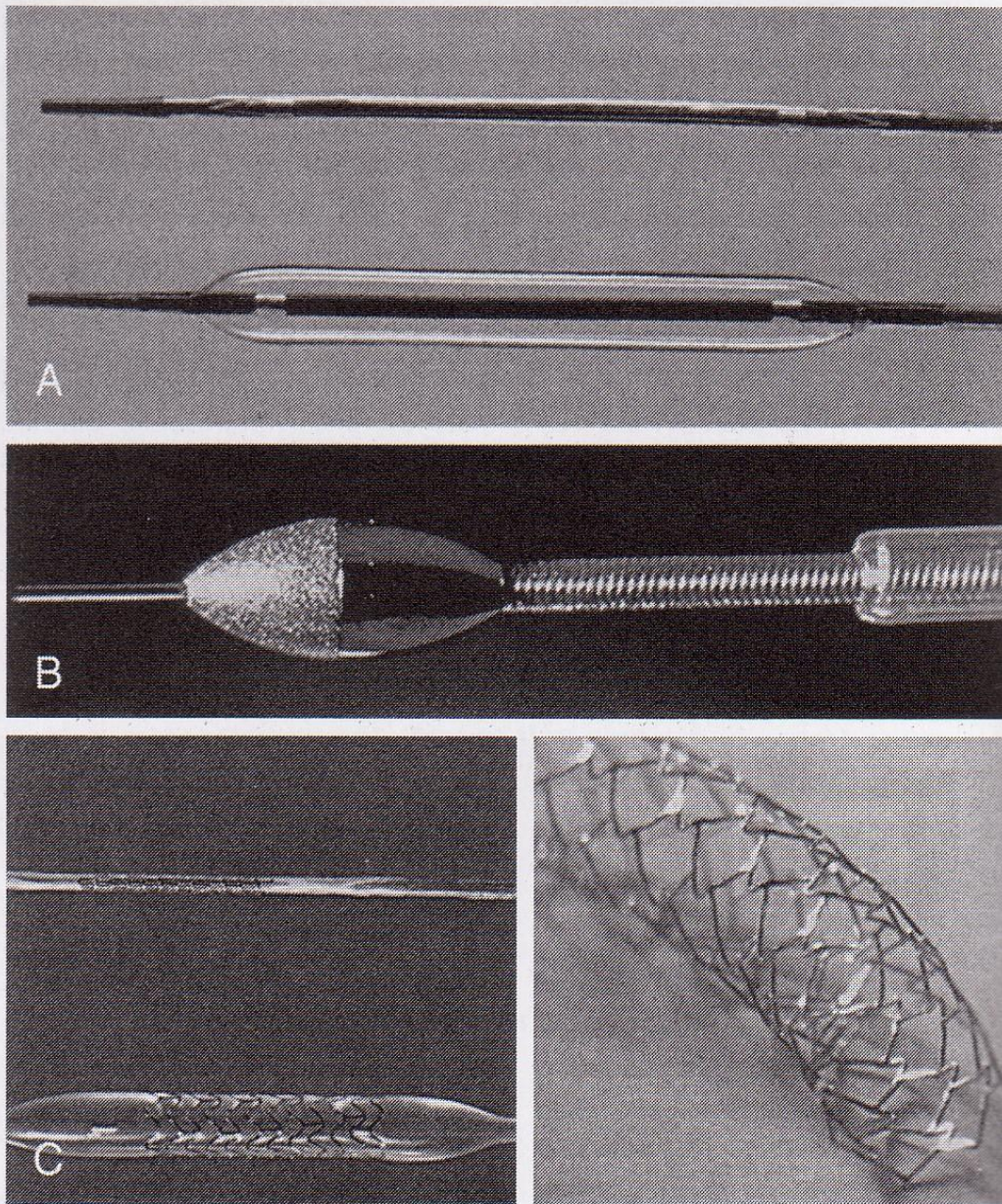
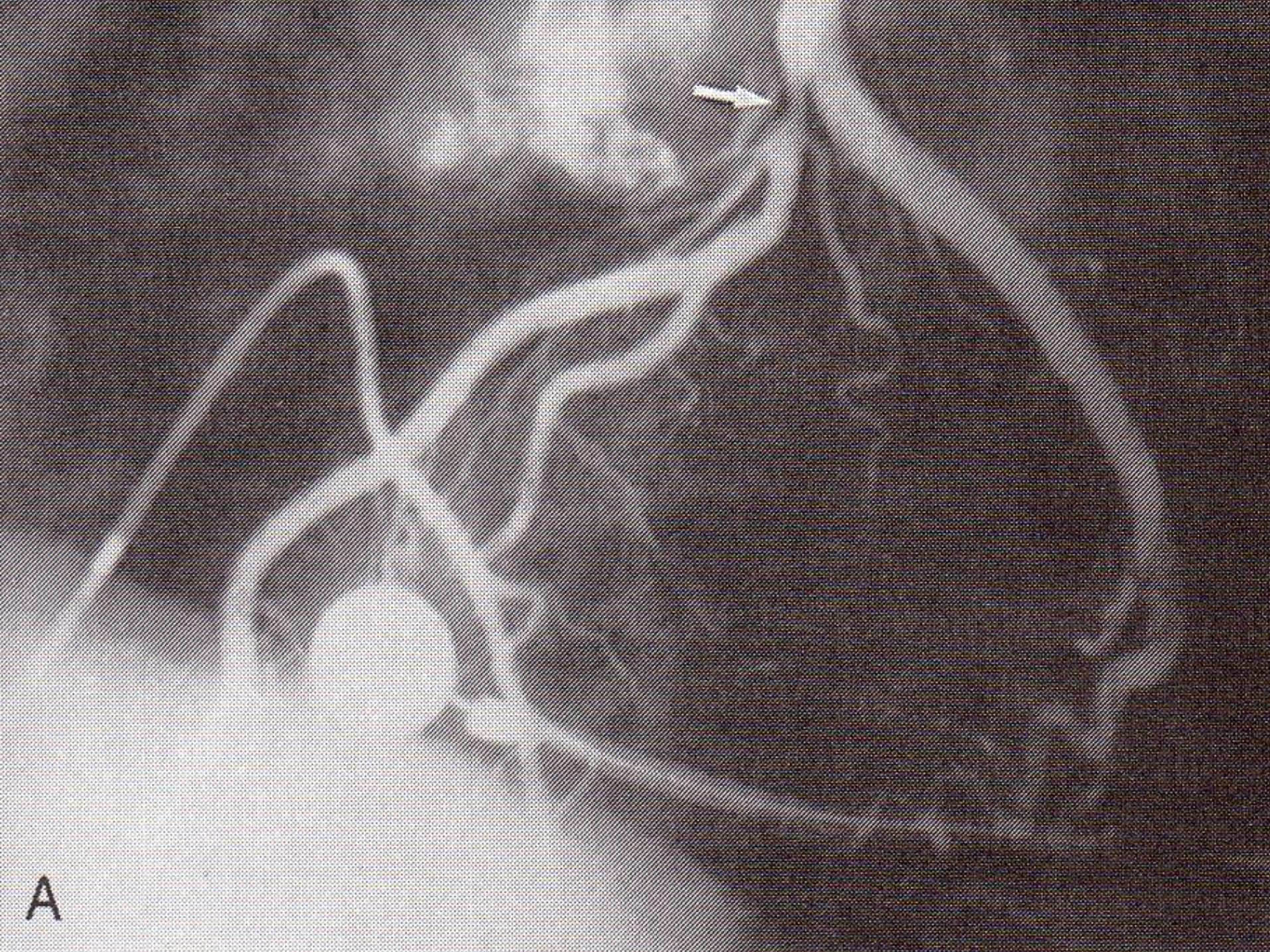
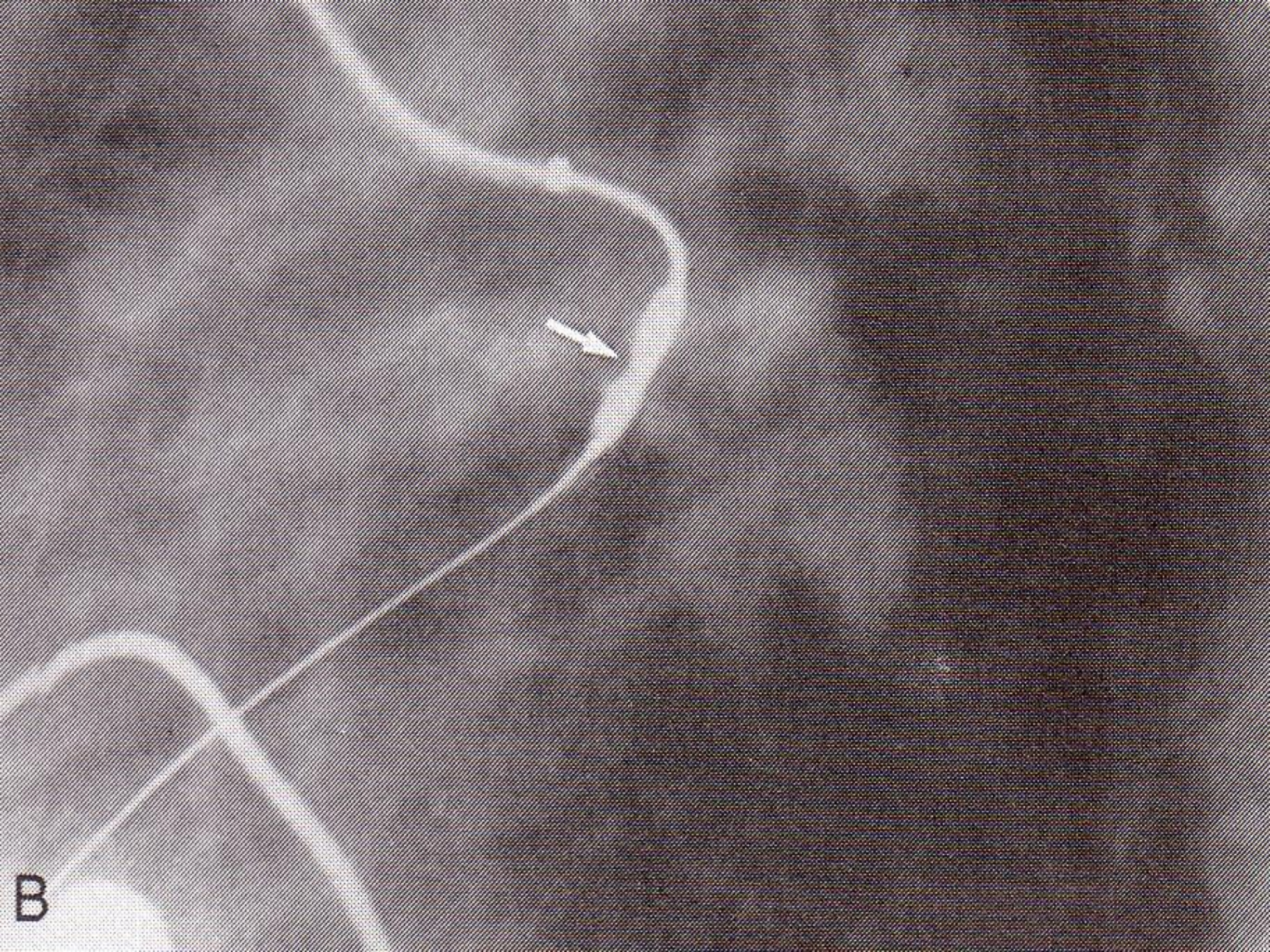
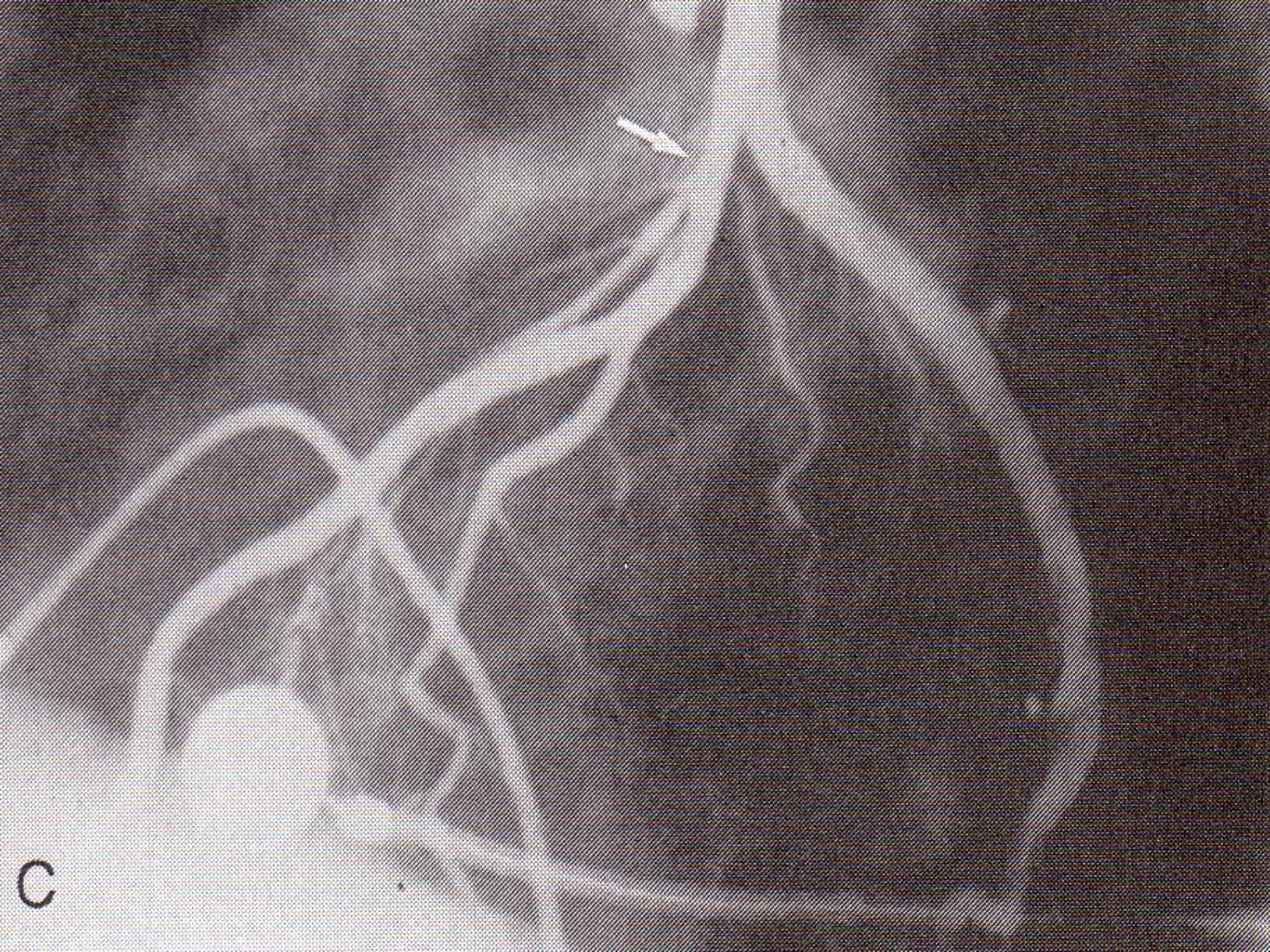


FIGURE 37-1 Devices for percutaneous transluminal coronary interventions. **A**, Coronary balloon. **B**, Rotational atherectomy burr (Rotablator). **C**, Coronary stent.

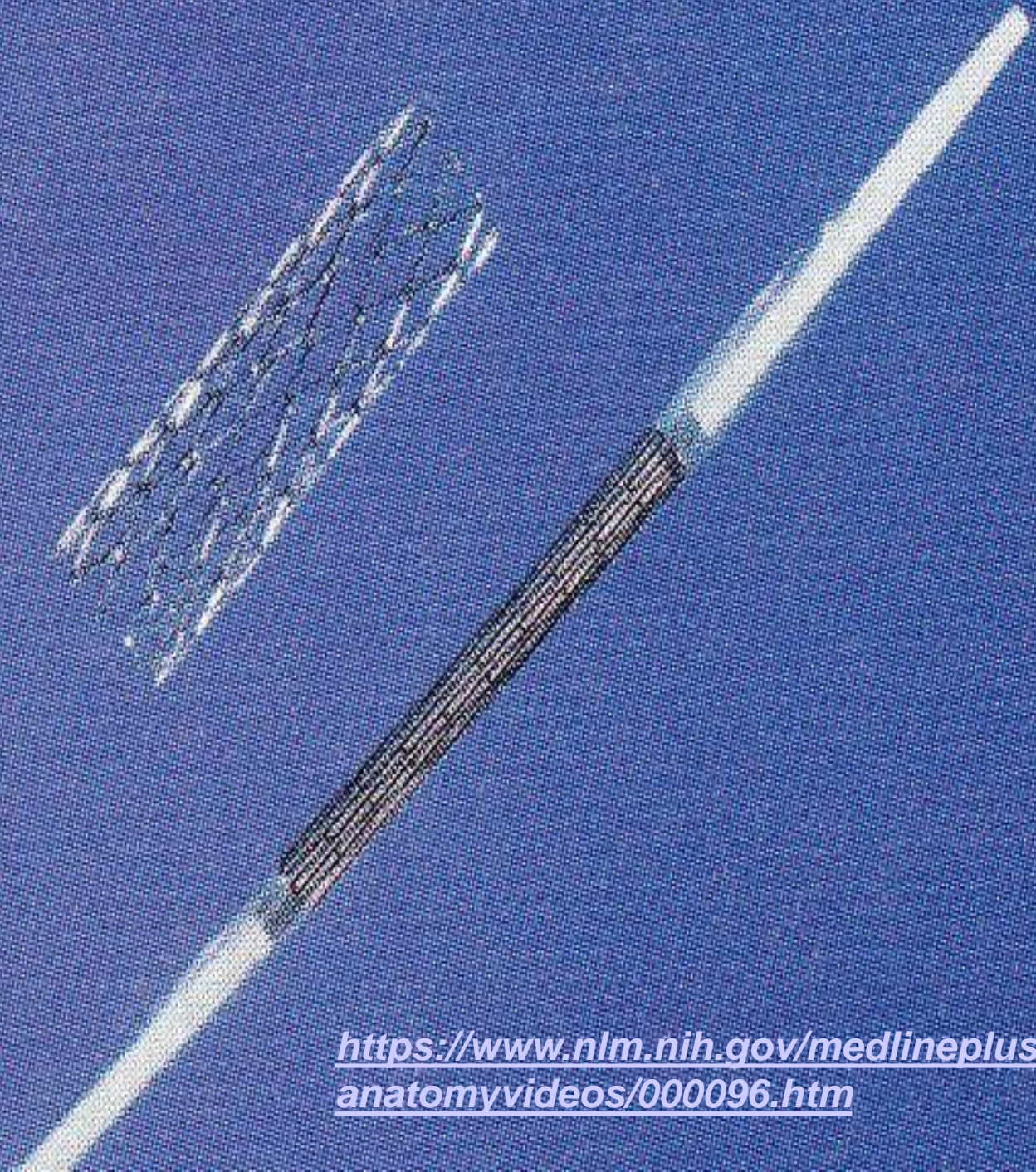




B

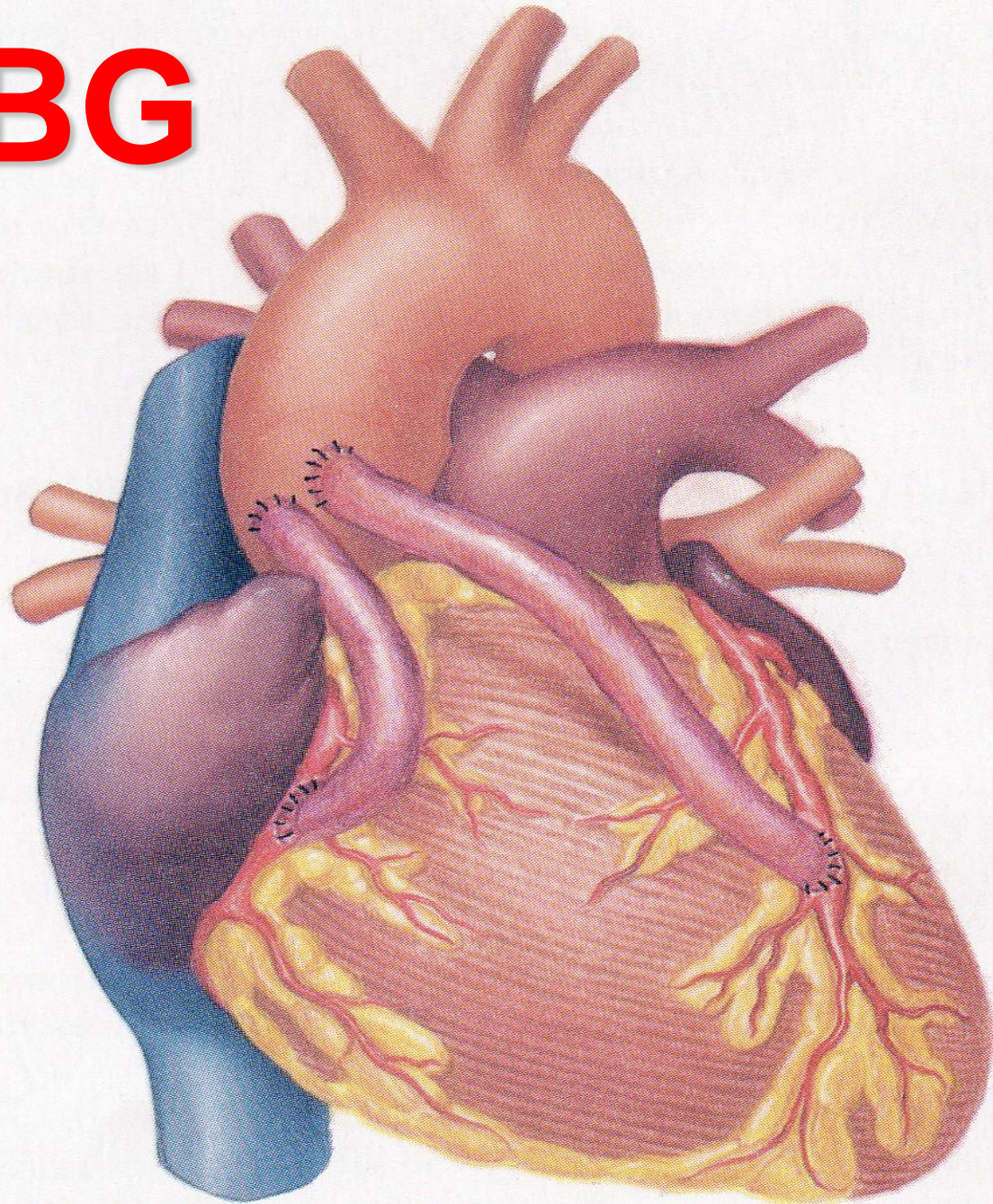


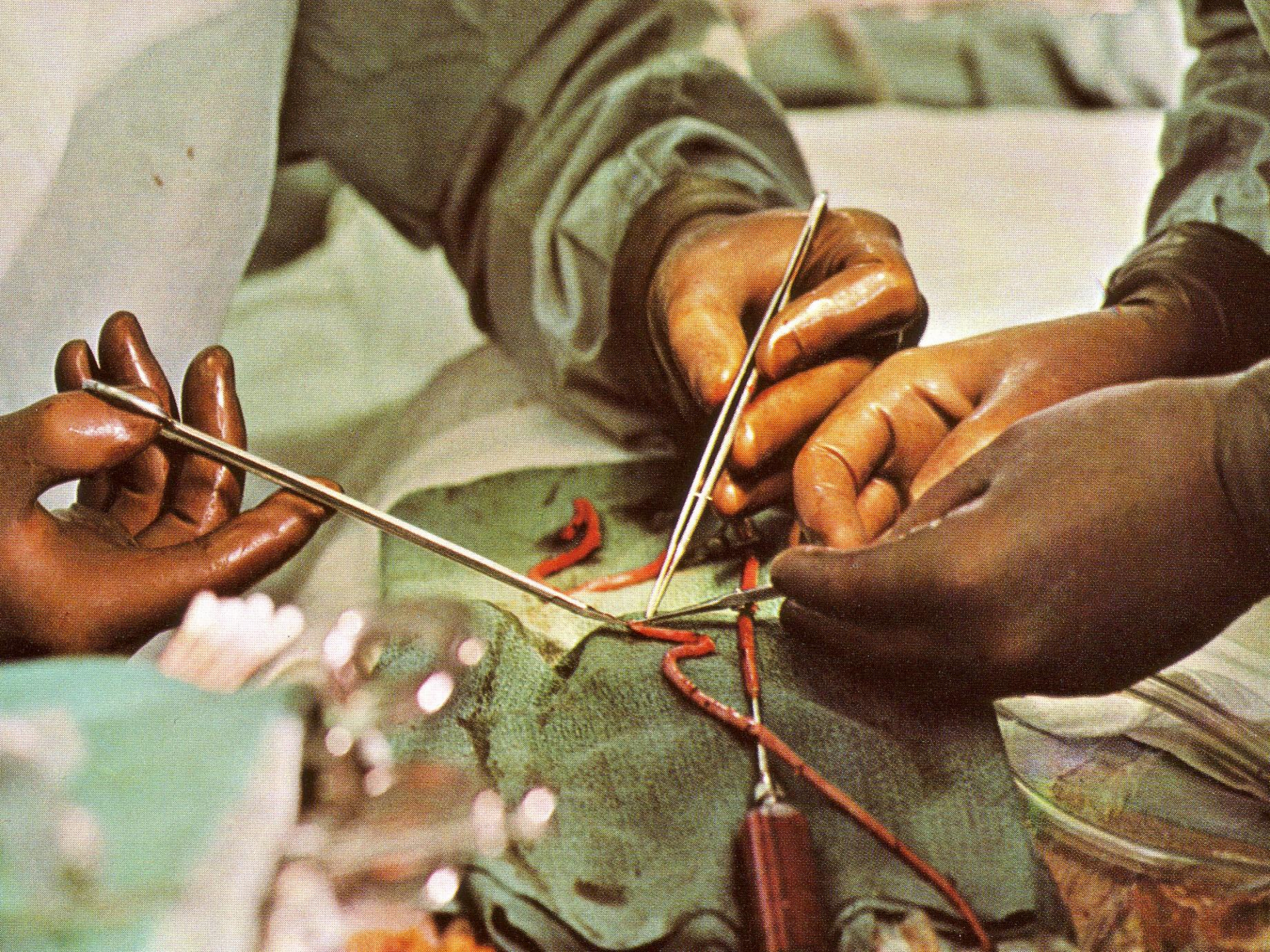
C

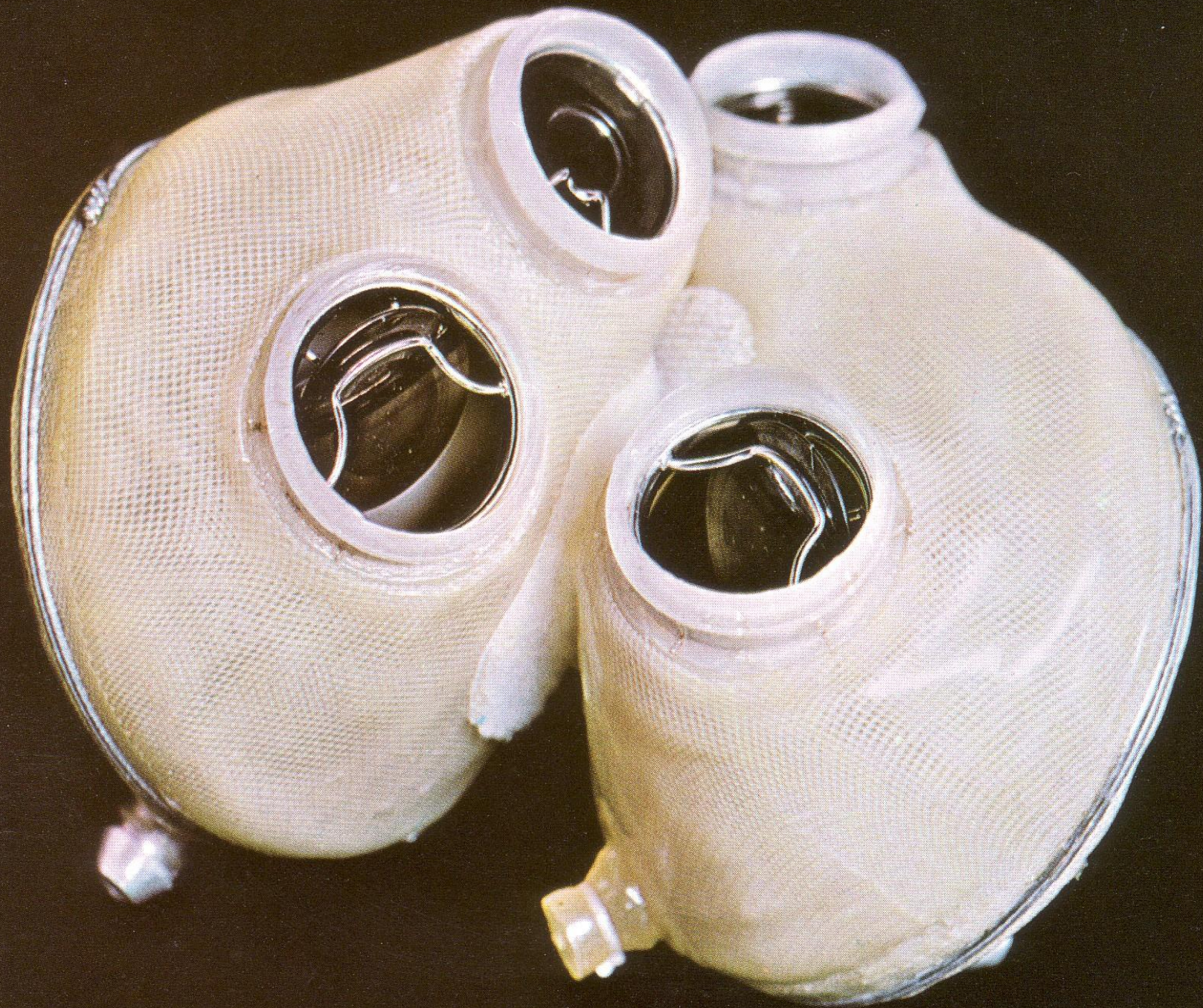


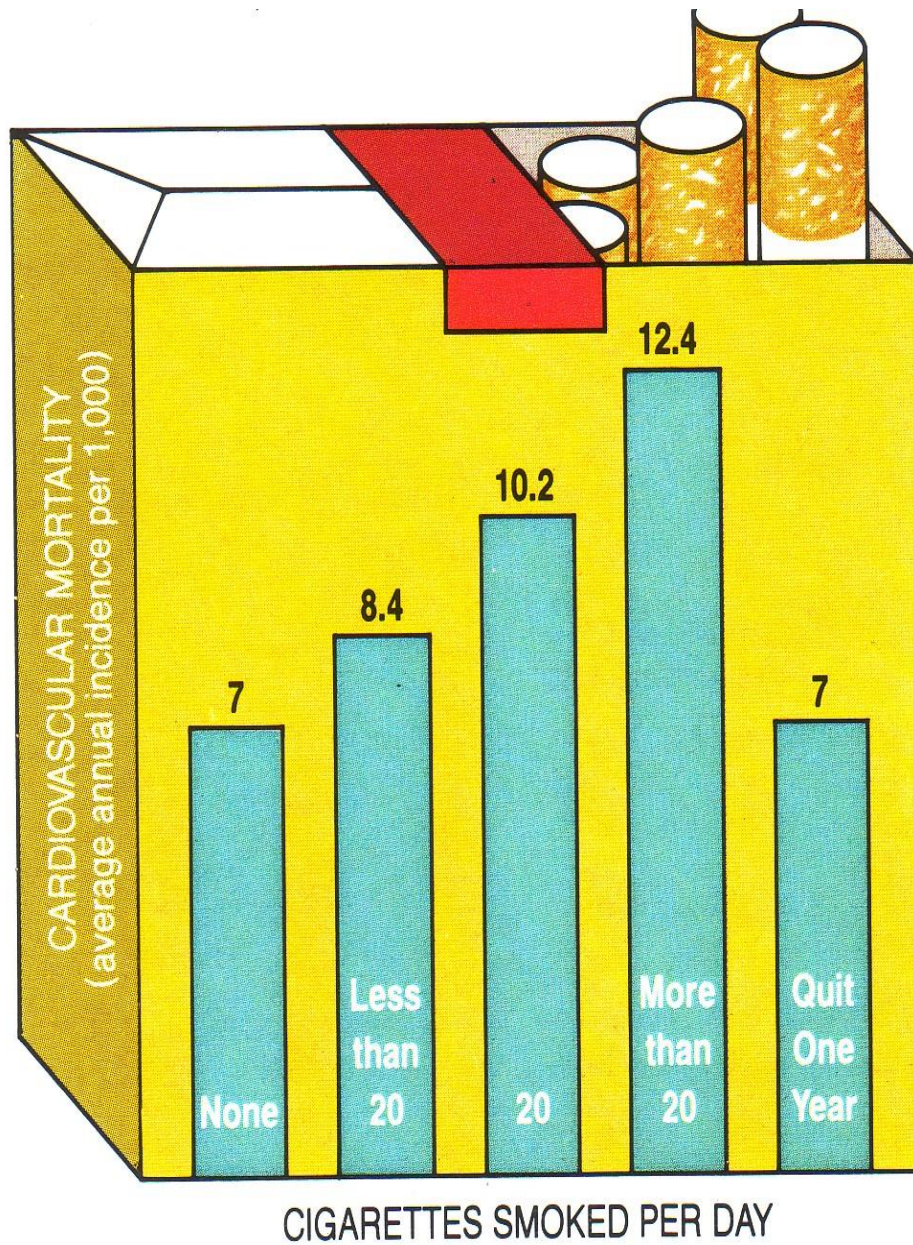
[https://www.nlm.nih.gov/medlineplus/ency/
anatomyvideos/000096.htm](https://www.nlm.nih.gov/medlineplus/ency/anatomyvideos/000096.htm)

CABG









Tobacco-free Campus

For better health,
smoking and use of
tobacco products are
prohibited everywhere
on our property.



UO's Josh Buehler

U.S. Surgeon General
Regina Benjamin

SMOKE AND TOBACCO-FREE UNIVERSITY



September 1, 2012

For a healthier community and cleaner
environment, the University of Oregon
will be smoke and tobacco free



Ready to Quit Tobacco?

Visit tobaccofree.uoregon.edu for free and low cost resources

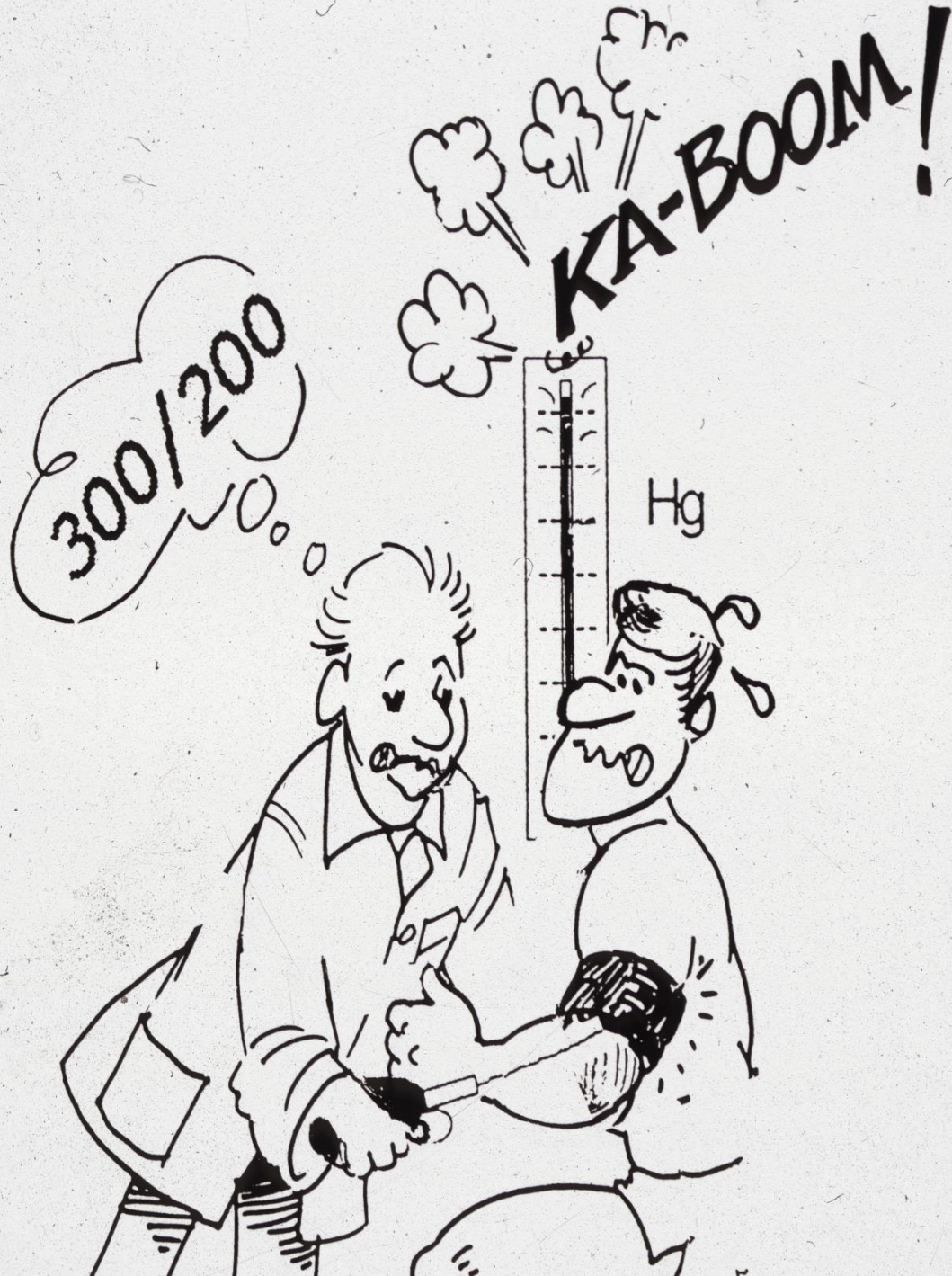


UNIVERSITY OF OREGON

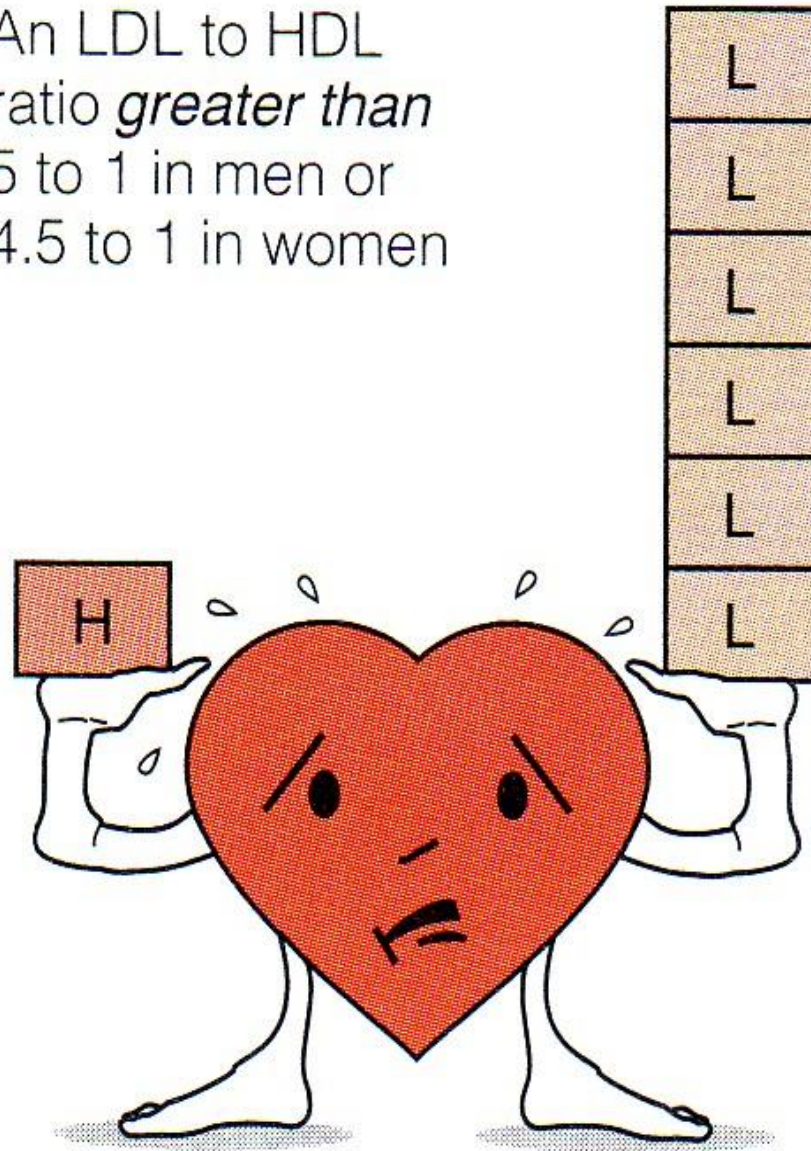
tobaccofree.uoregon.edu



For a healthier community and cleaner
environment, the University of Oregon
is smoke and tobacco-free.



An LDL to HDL
ratio *greater than*
5 to 1 in men or
4.5 to 1 in women



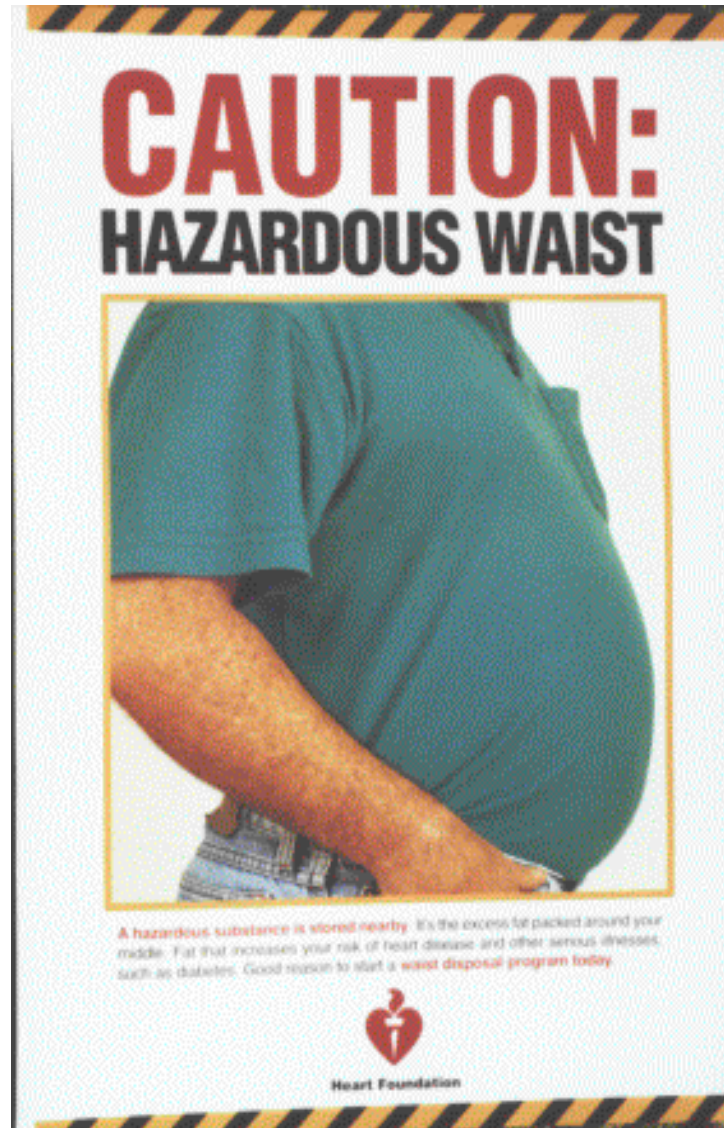
Increased risk of
heart disease

Apple type of obesity predisposed to CVD!

Pear type of fat pattern...



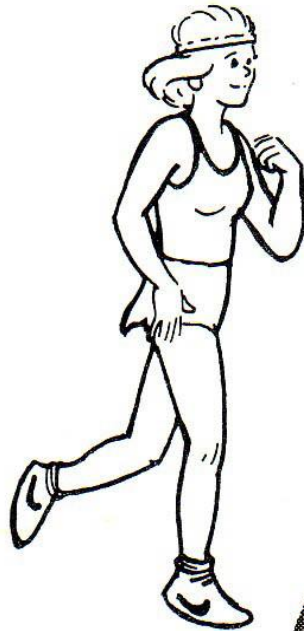
implies lower disease risk!



Eat more apples...



to help prevent the apple type of obesity!



**Cardiorespiratory
Endurance**



**Muscular
Strength/Endurance**

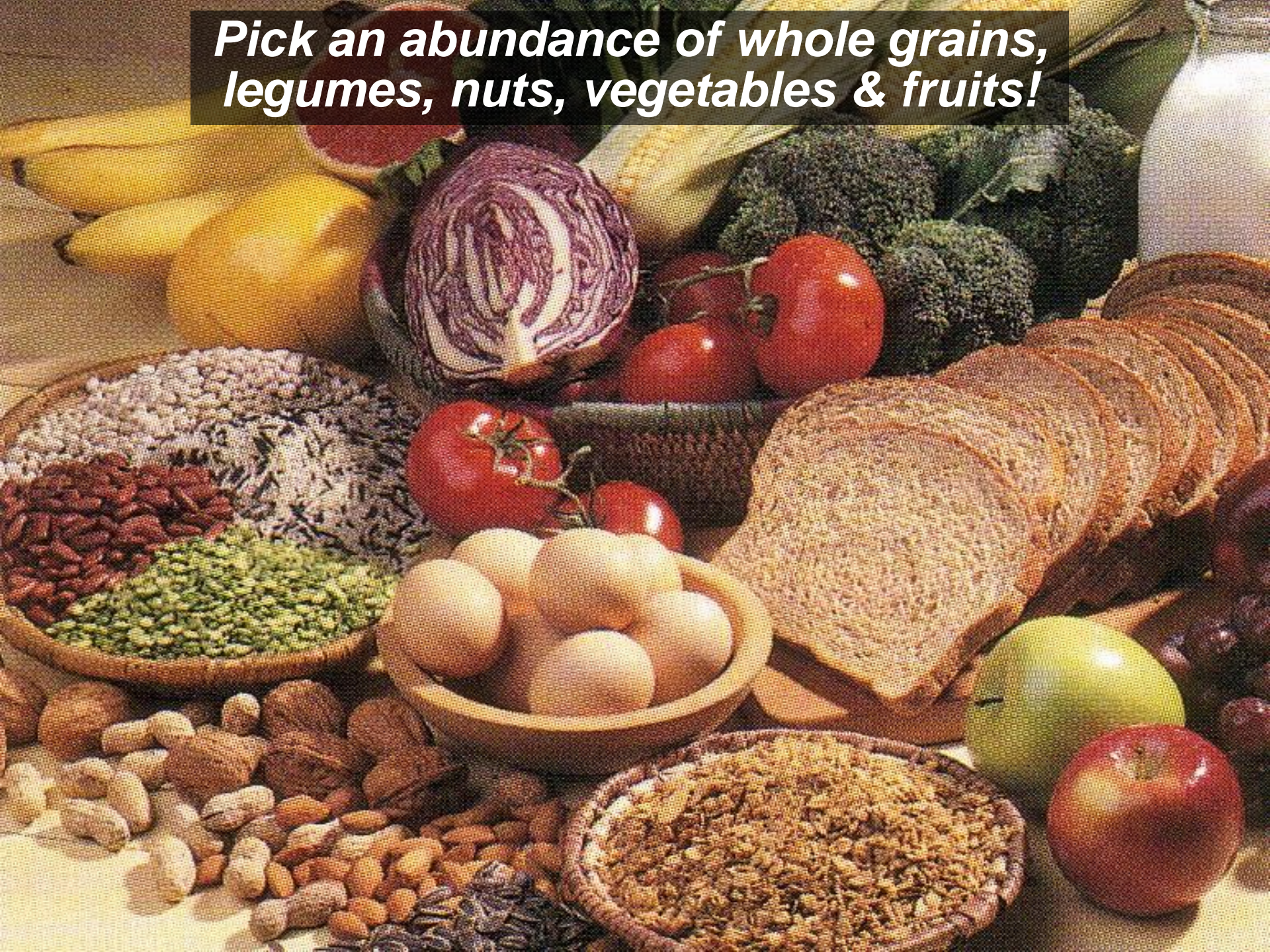


Flexibility



Neuromuscular Relaxation

Pick an abundance of whole grains, legumes, nuts, vegetables & fruits!





Healthy Oils to Minimize Atherosclerosis HAPOC?

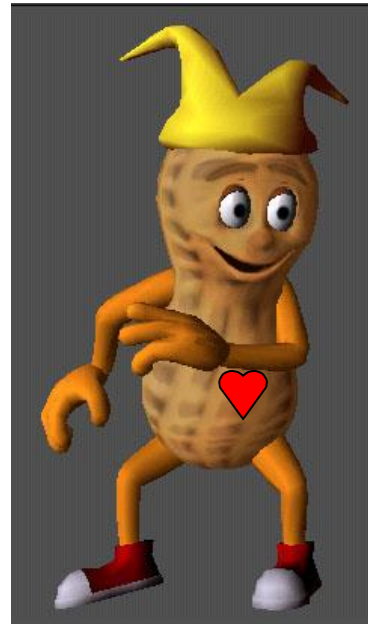
H

A

P

O

C



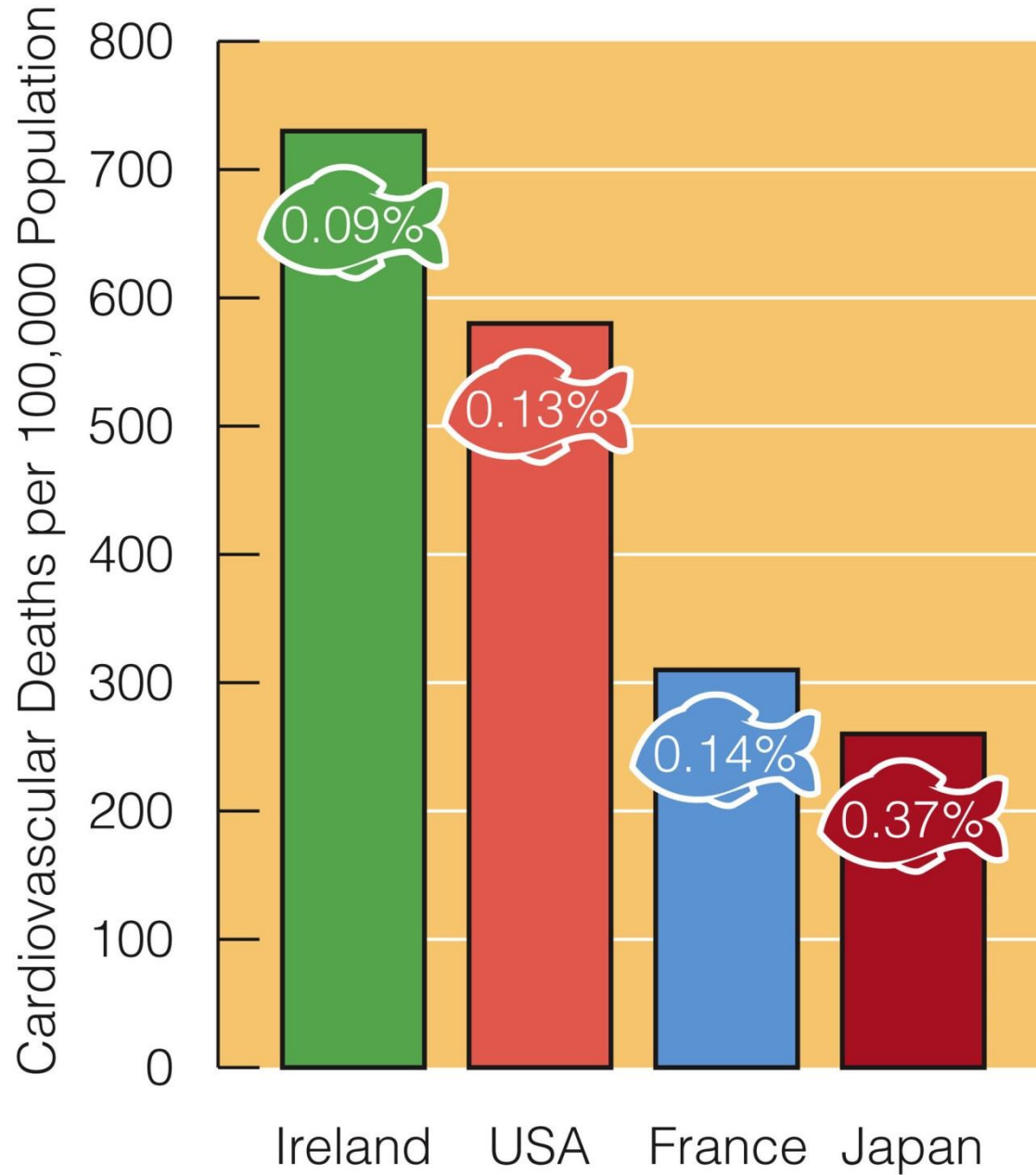
Olive Oil Loves Olive Oil & has some heartfelt advise for Popeye!!



Yes for the
spinach! — but get
rid of the pipe!!



Fish Oil Intakes & Cardiovascular Death Rates



Essential Fatty Acids: Ω -6 Linoleic & Ω -3 Linolenic Acids



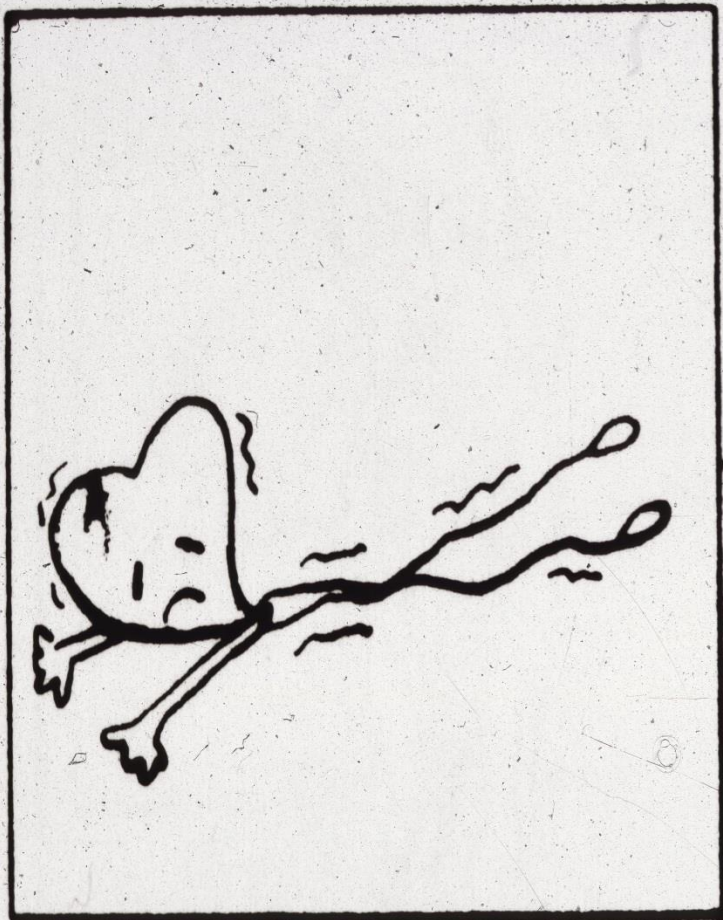
Linoleic \rightarrow Arachadonic Acid \rightarrow Inflammatory Cascade

Linolenic \rightarrow EPA, DHA \rightarrow Anti-inflammatory

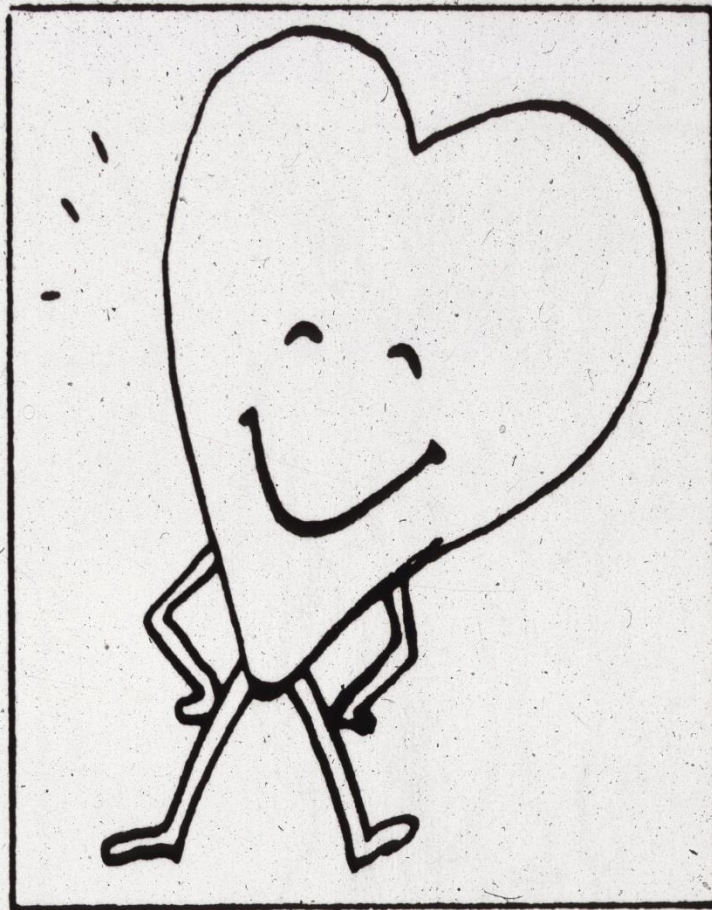


***Deep cold
water fish
are fabulous
sources of
 Ω -3 fatty
acids!***



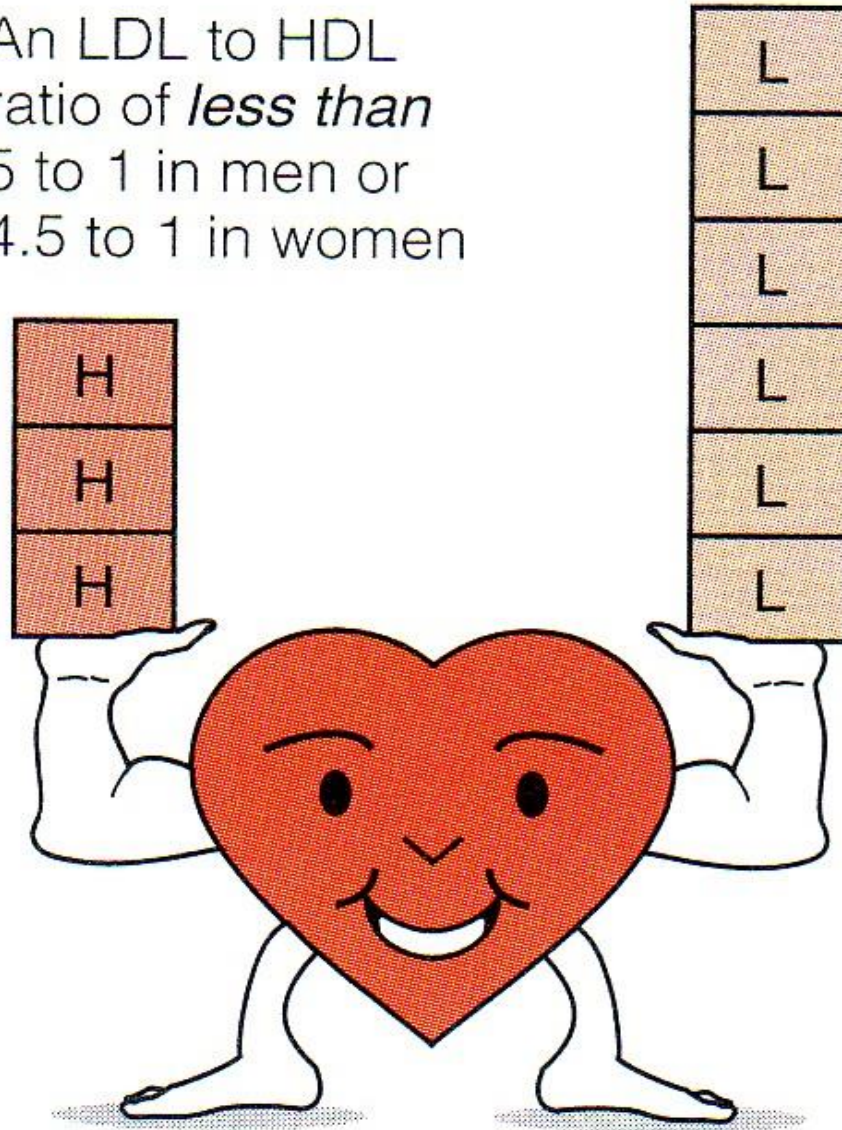


Before



After

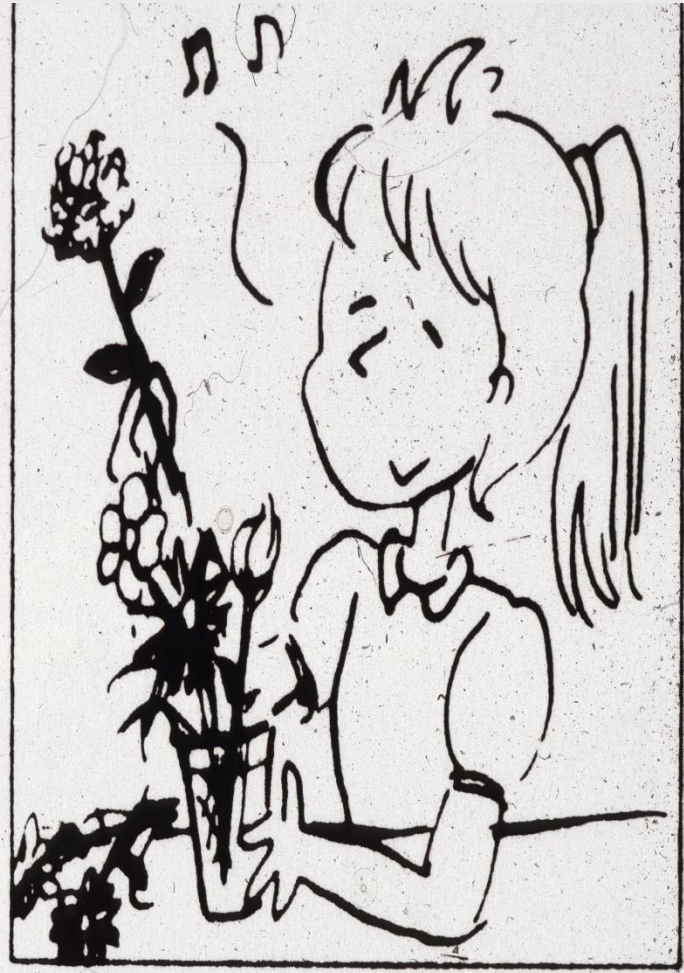
An LDL to HDL
ratio of *less than*
5 to 1 in men or
4.5 to 1 in women



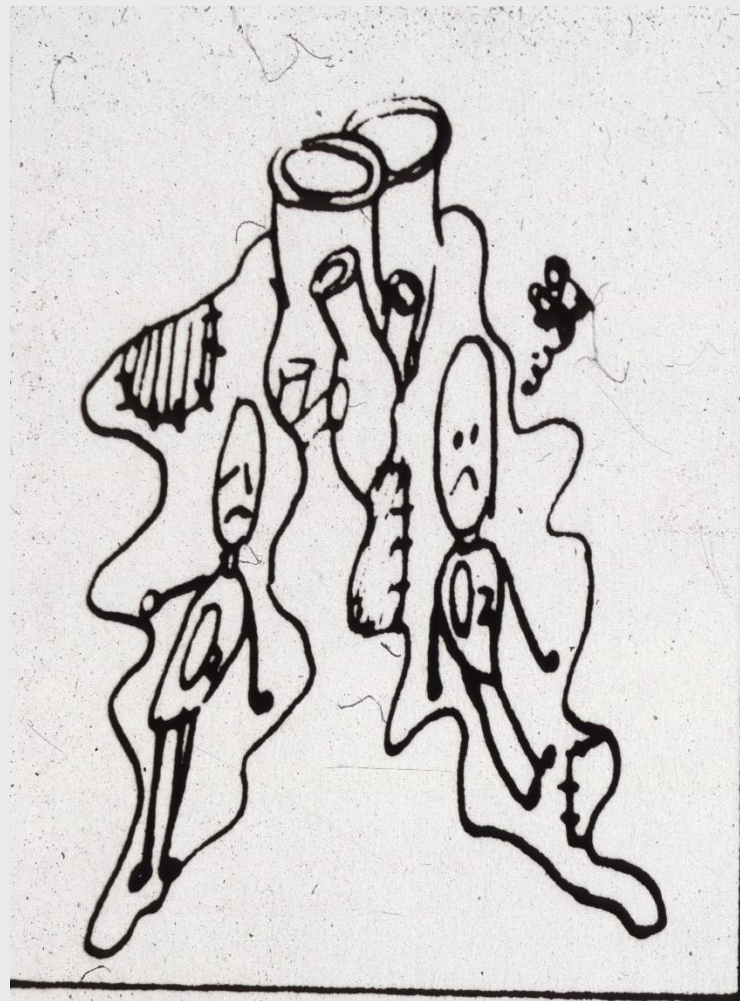
Reduced risk of
heart disease



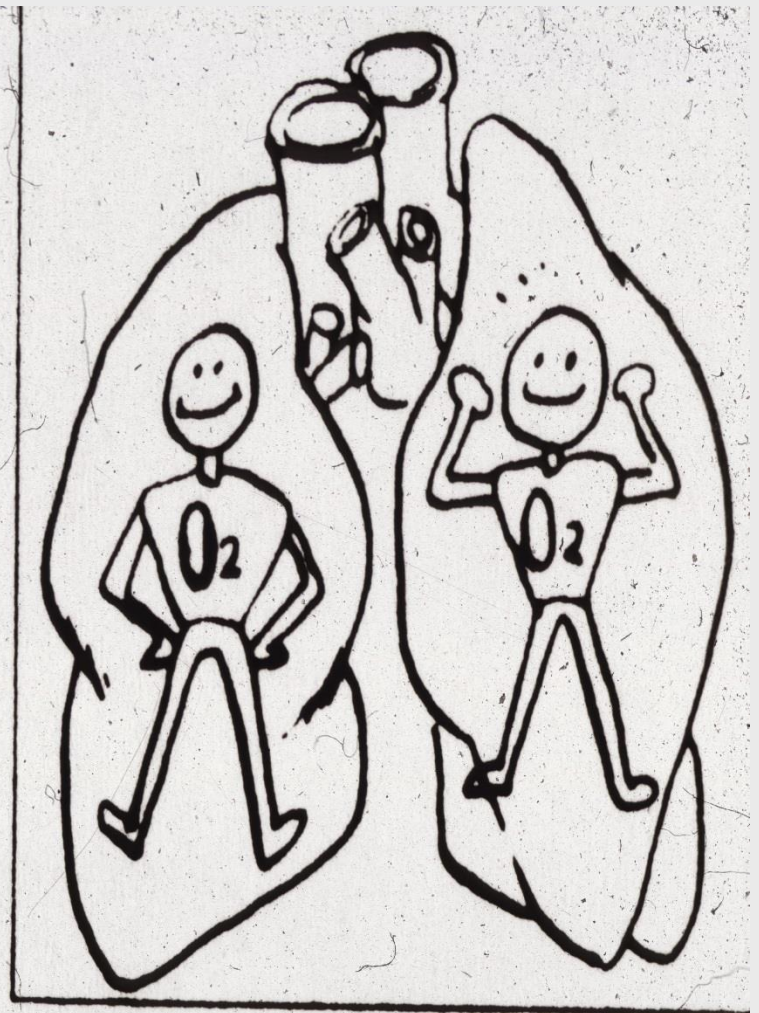
Before



After



Before



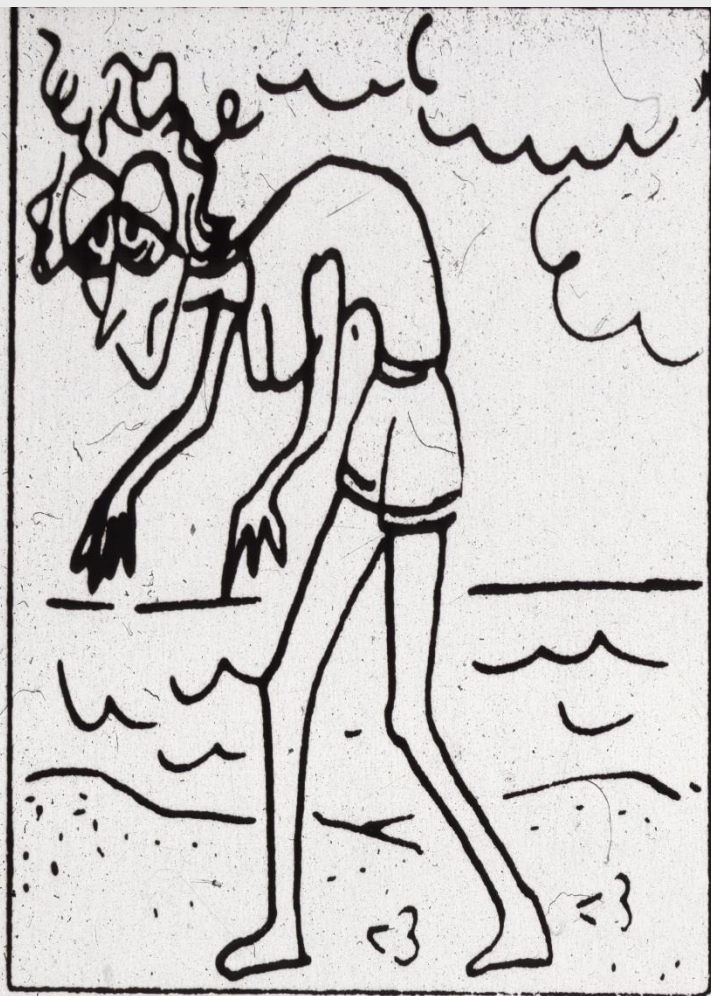
After



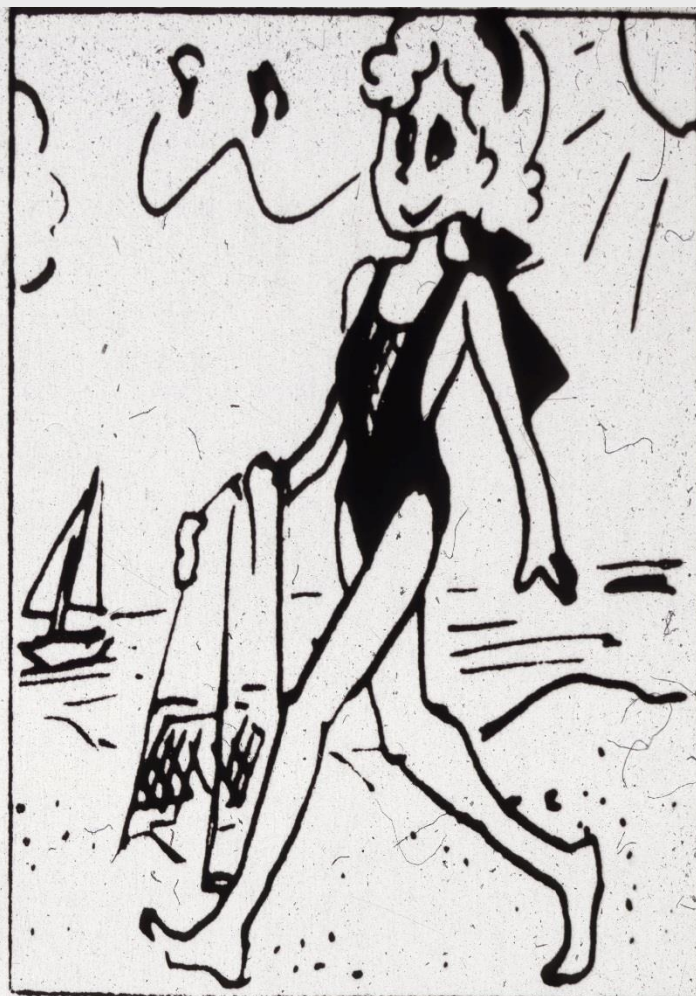
Before



After



Before

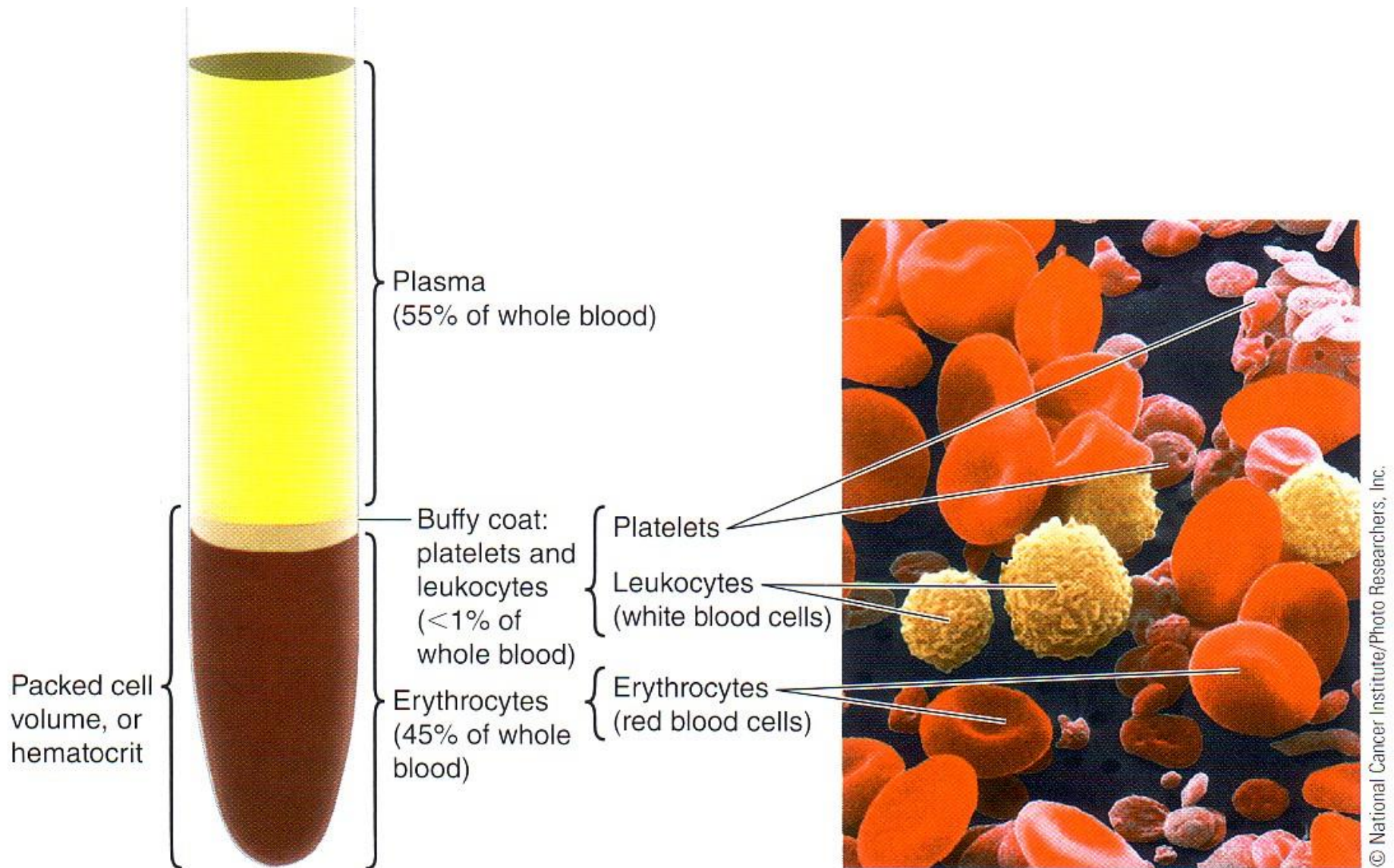


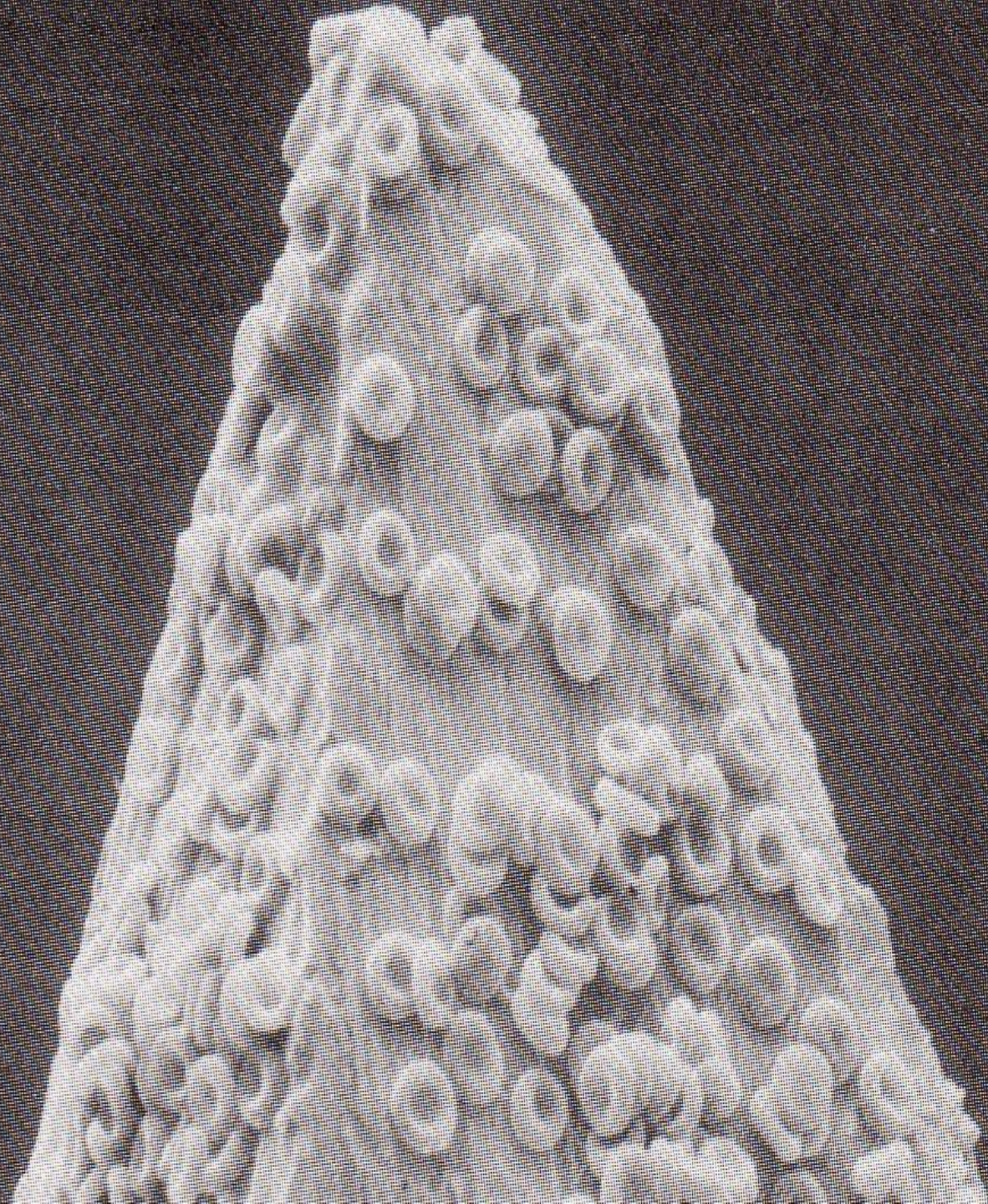
After

Break for discussion/questions!

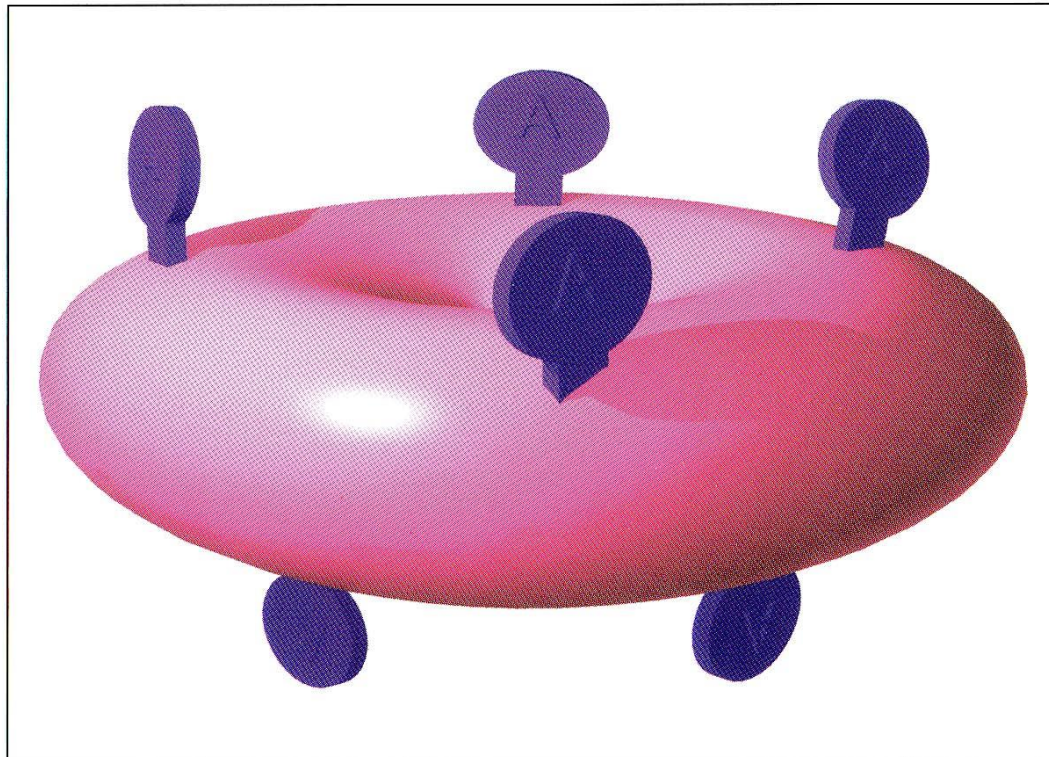


What's in Blood? Plasma & Blood Cells



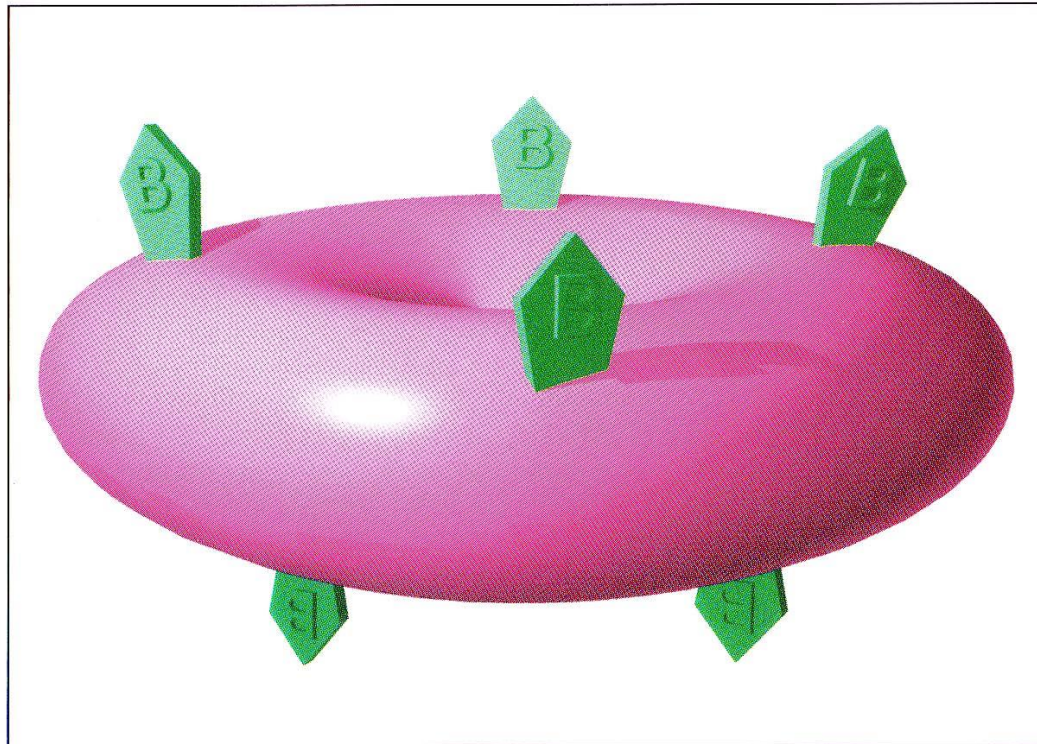


A



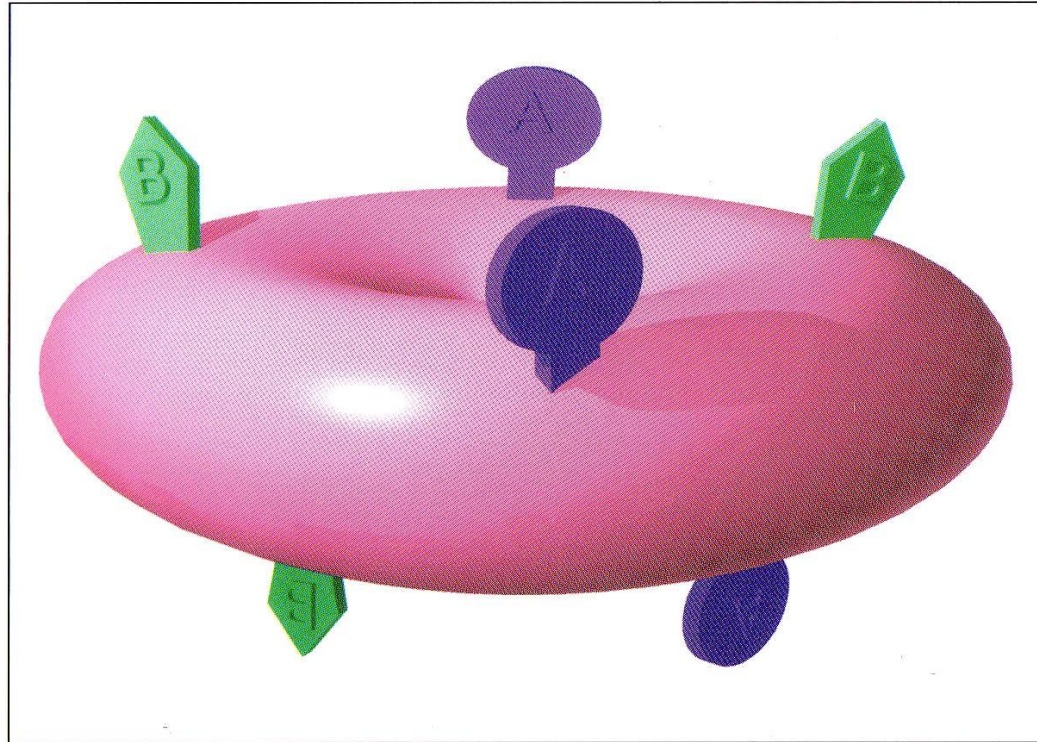
A Antigens
(Agglutinogens)

B

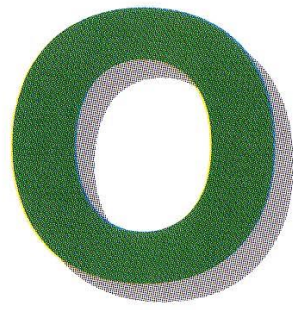


B Antigens
(Agglutinogens)

AB



A & B Antigens
(Agglutinogens)

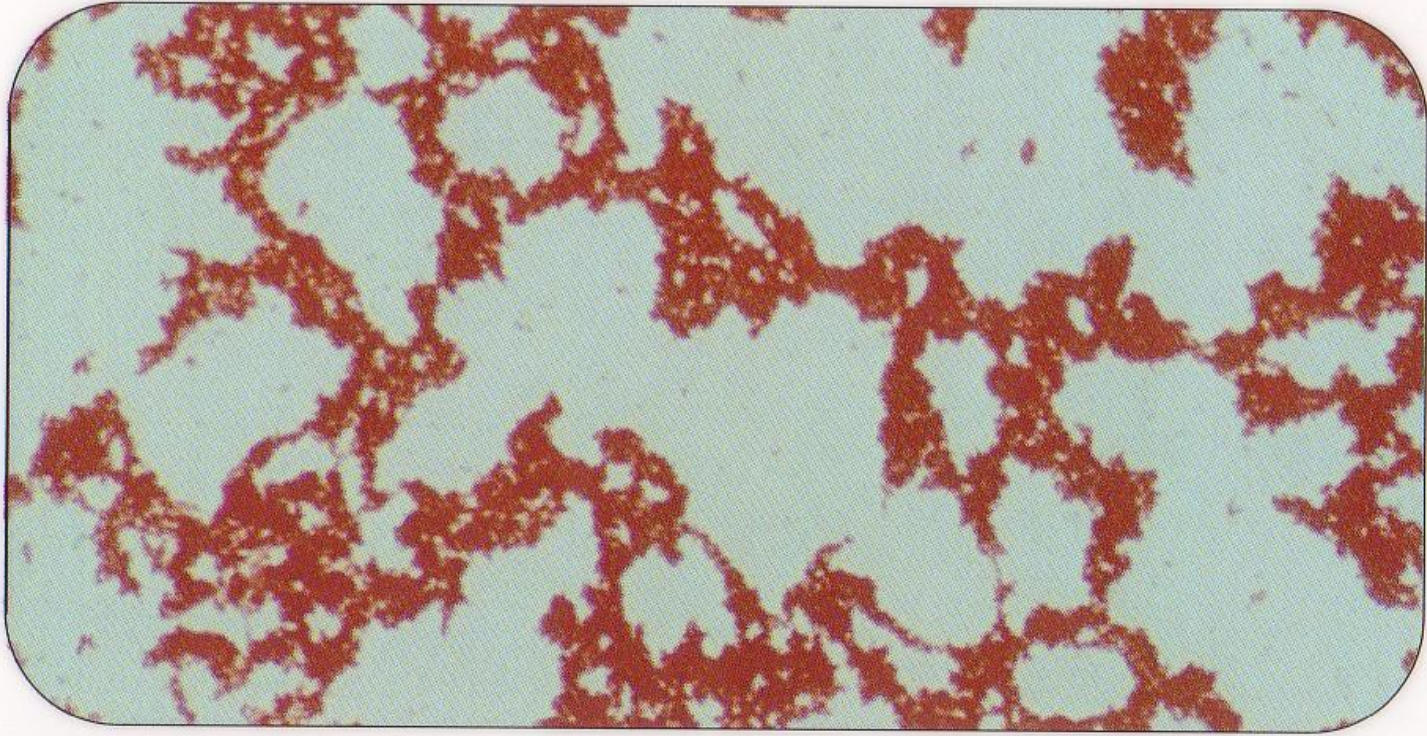


No Antigens
(Agglutinogens)

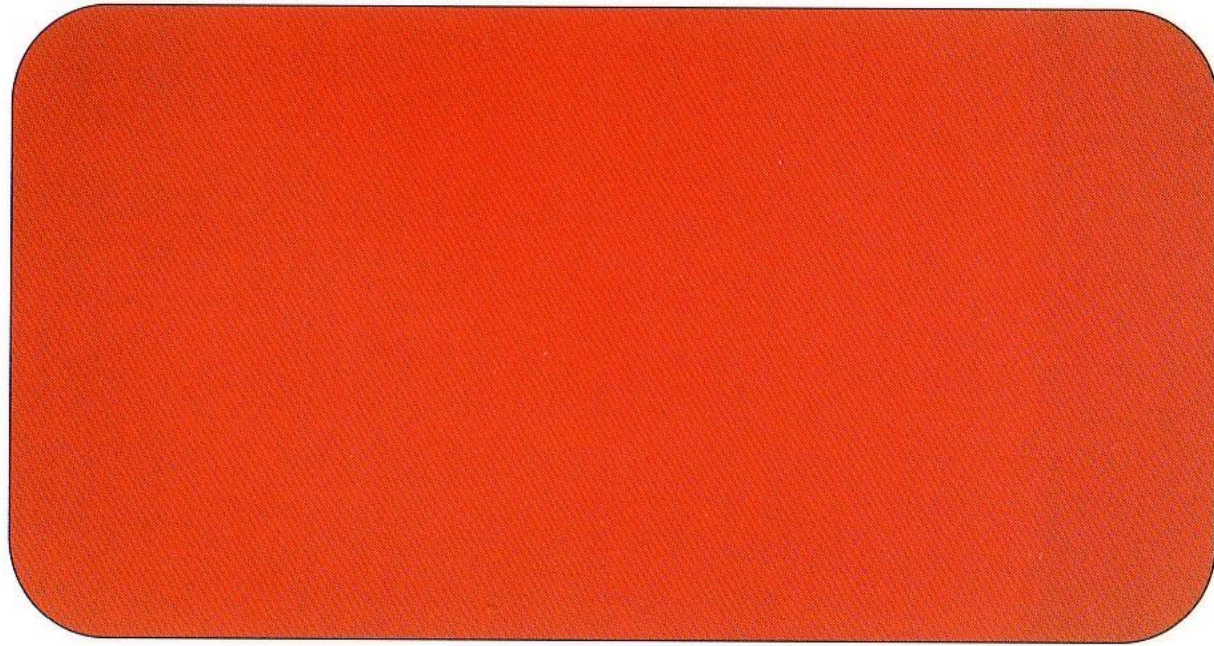


A Antibodies

(Agglutinins)

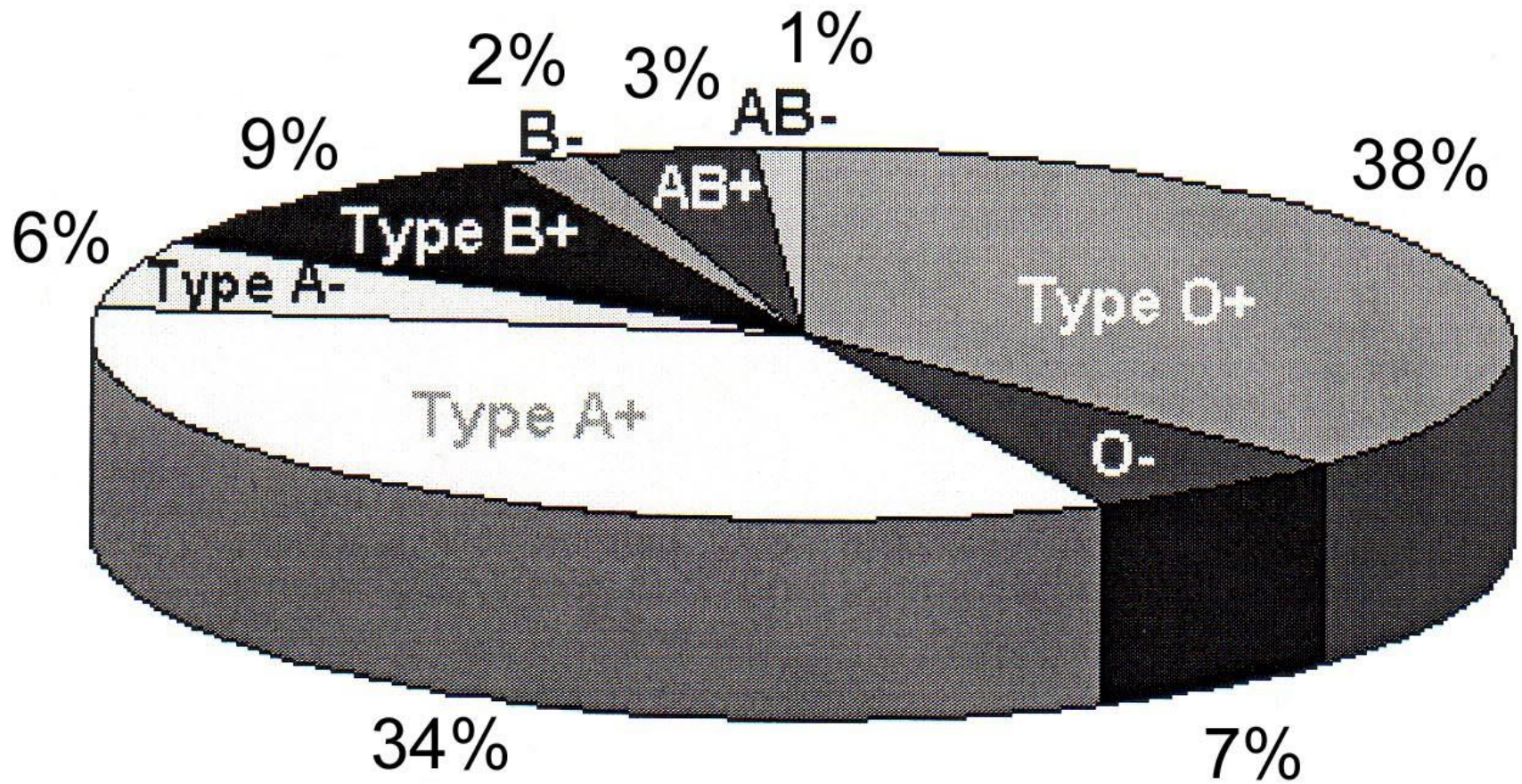


Clumping with
anti-A serum



No Clumping with
anti-A serum

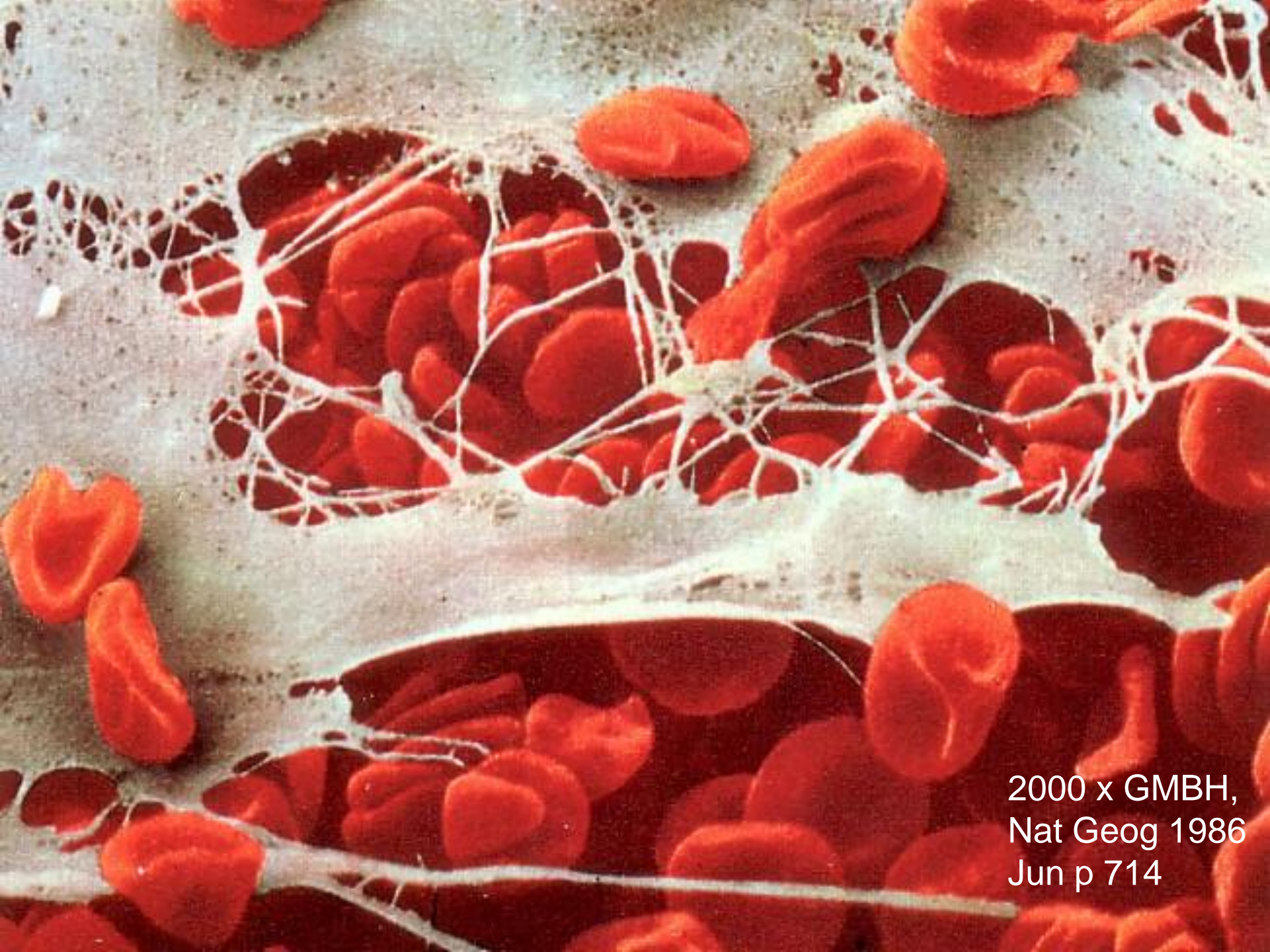
Blood Type Distribution, General Population



Erythroblastosis Fetalis?

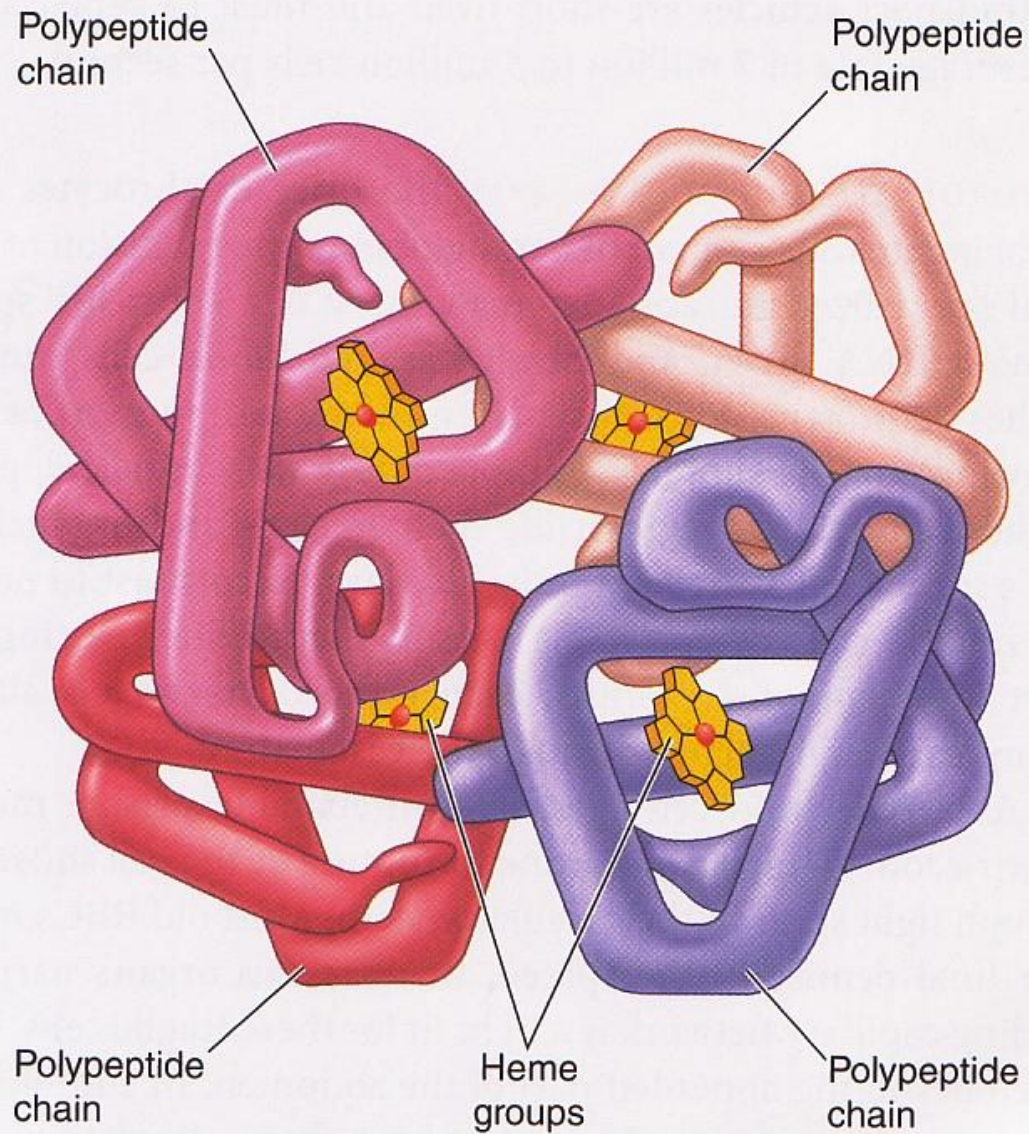
**eg, Rh- mom
Rh+ baby**

<http://www.nlm.nih.gov/MEDLINEPLUS/ency/article/001298.htm#Alternative%20Names>



2000 x GMBH,
Nat Geog 1986
Jun p 714

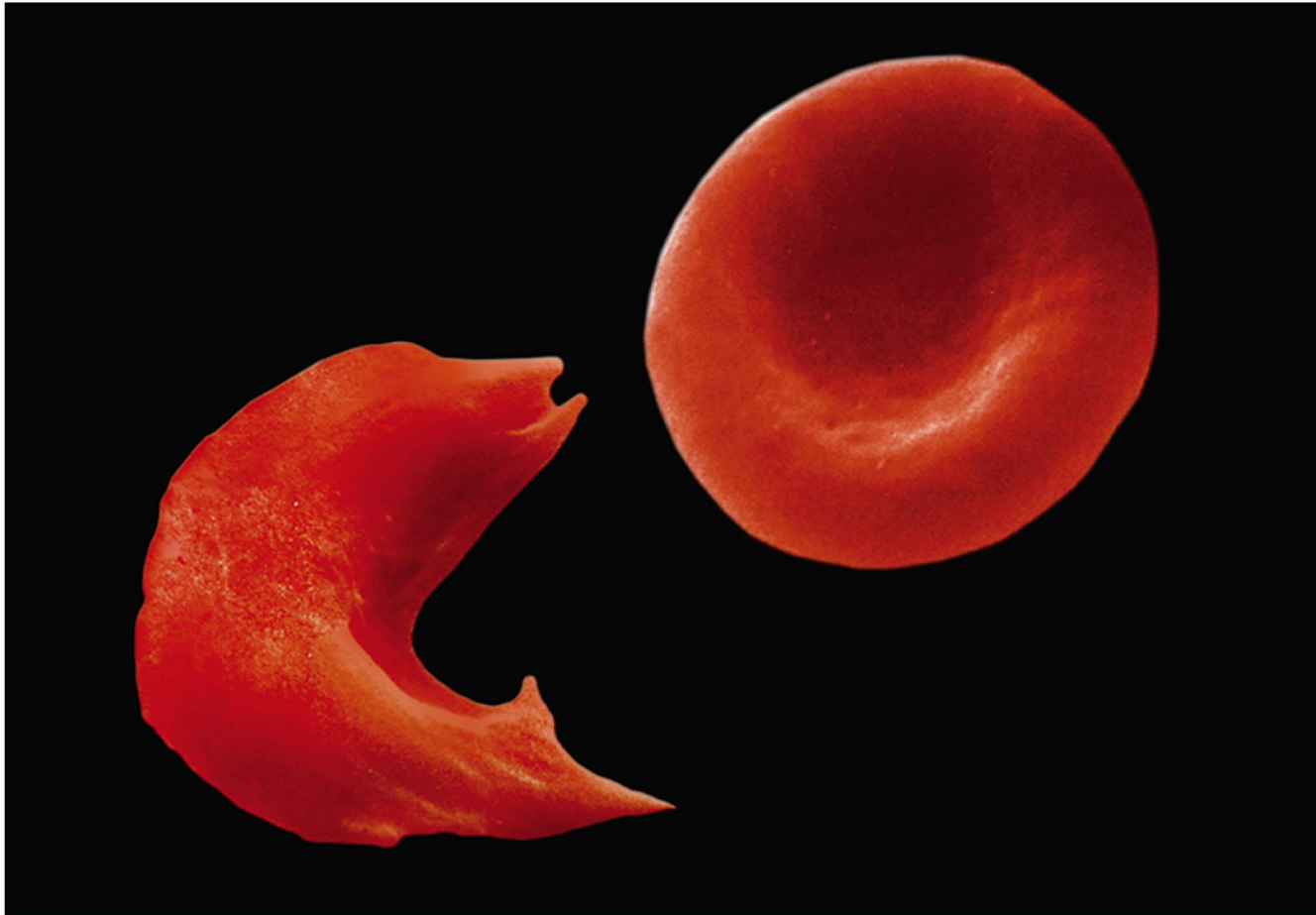
Hemoglobin Structure



Sickle-shaped blood cells

Normal red blood cells

© Dr. Stanley Flegler/Visuals Unlimited



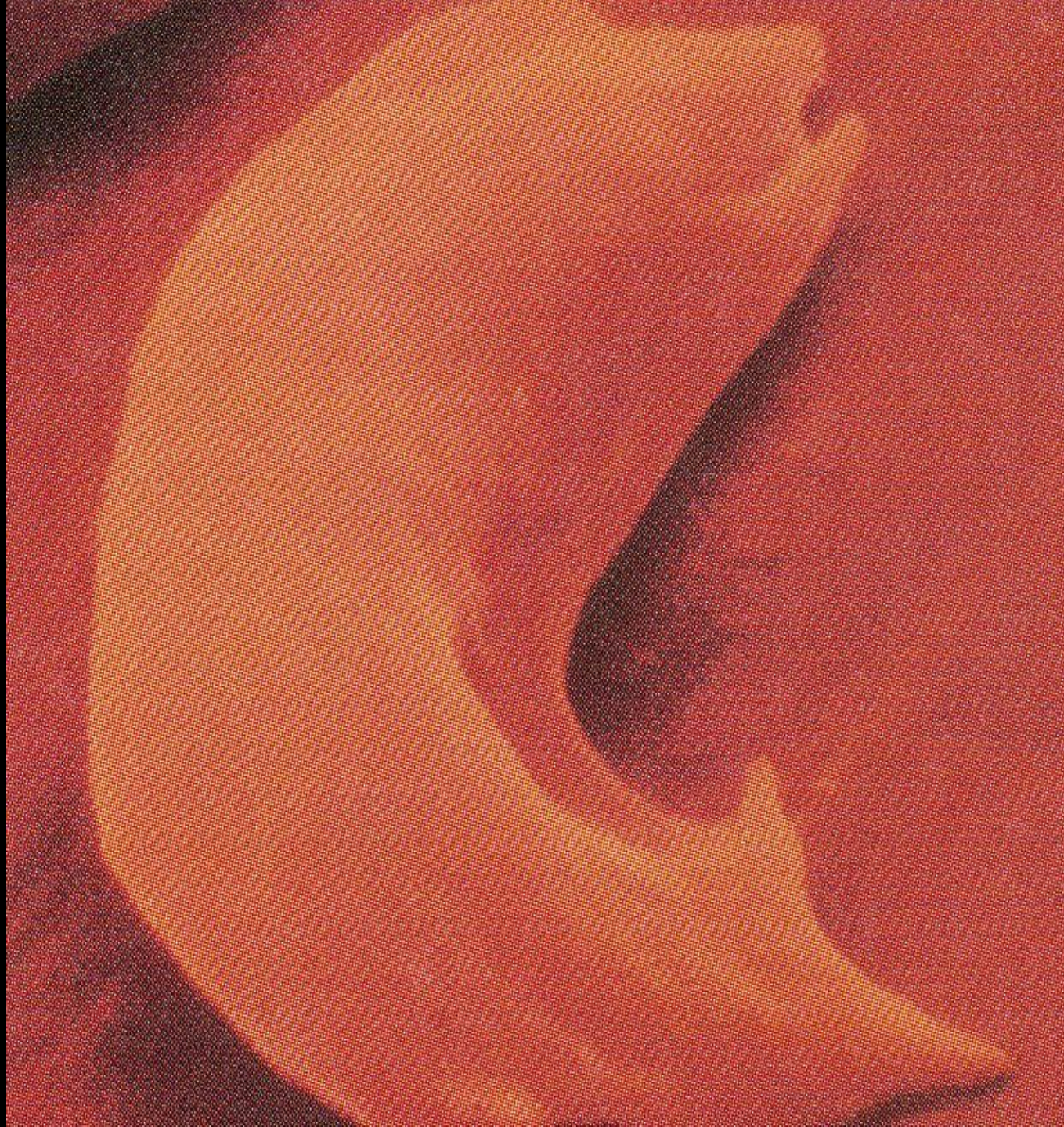
What a difference one amino acid can make!

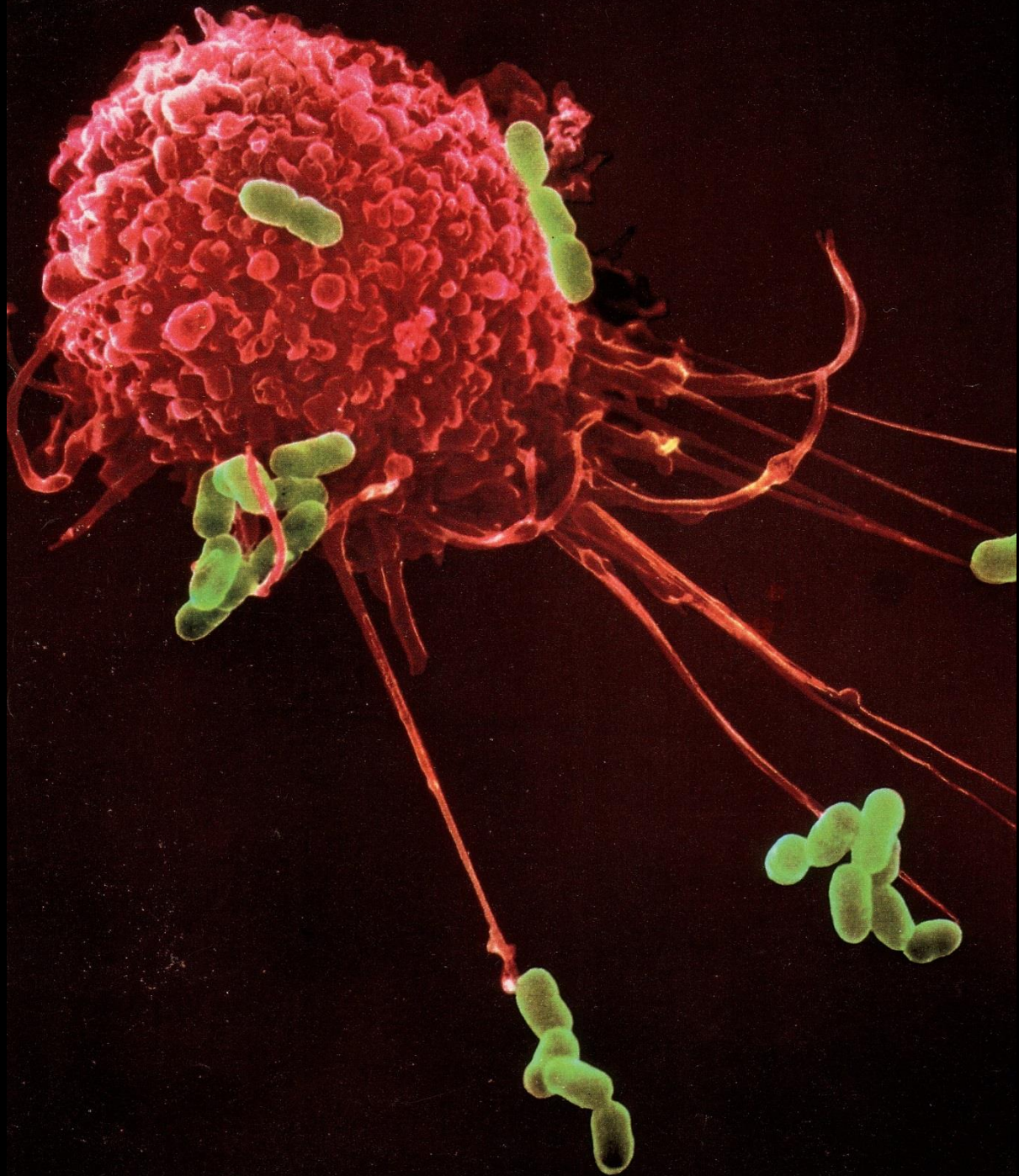
Amino acid sequence of normal hemoglobin:

Val — His — Leu — Thr — Pro — Glu — Glu

Amino acid sequence of sickle-cell hemoglobin:

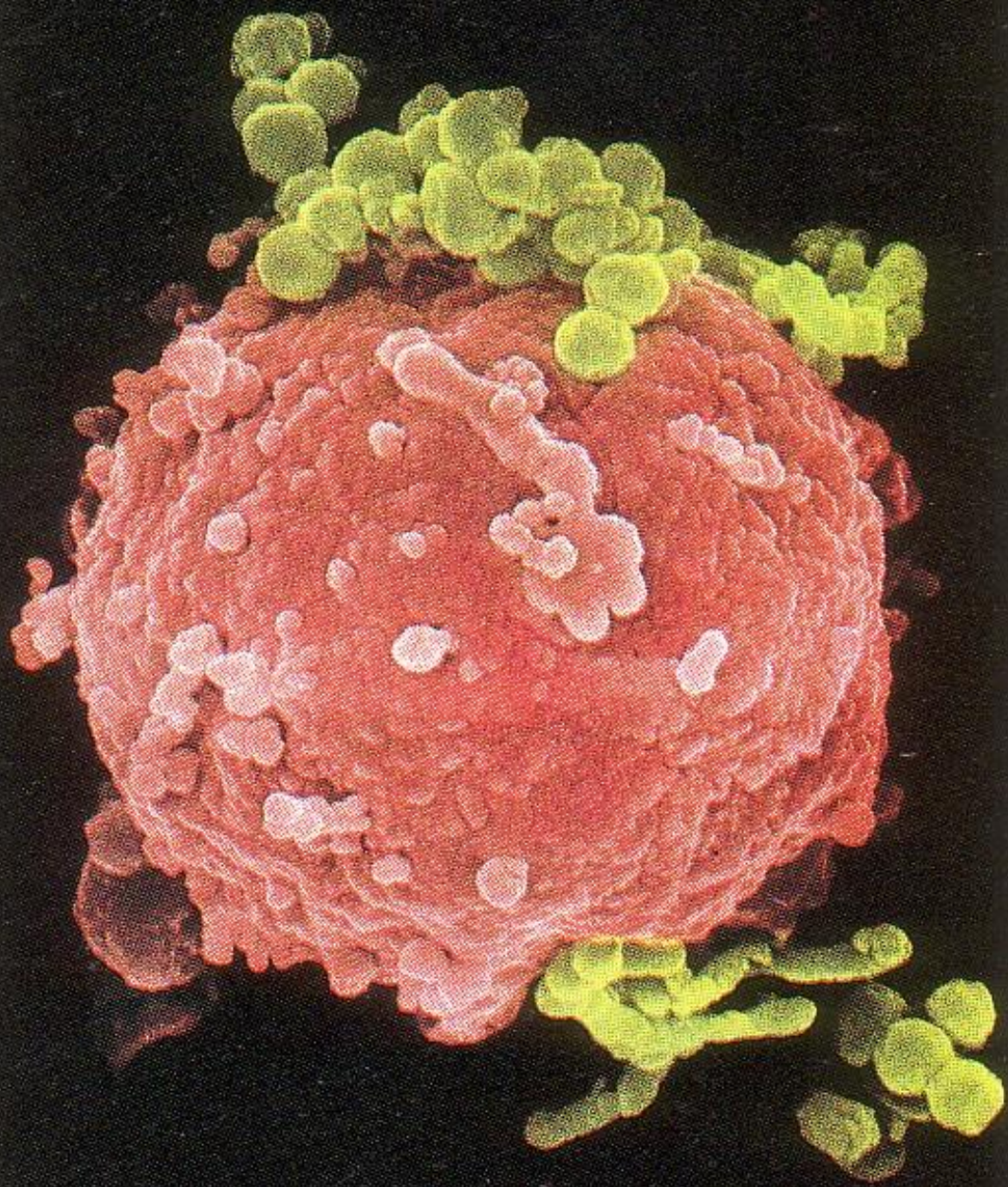
Val — His — Leu — Thr — Pro — Val — Glu

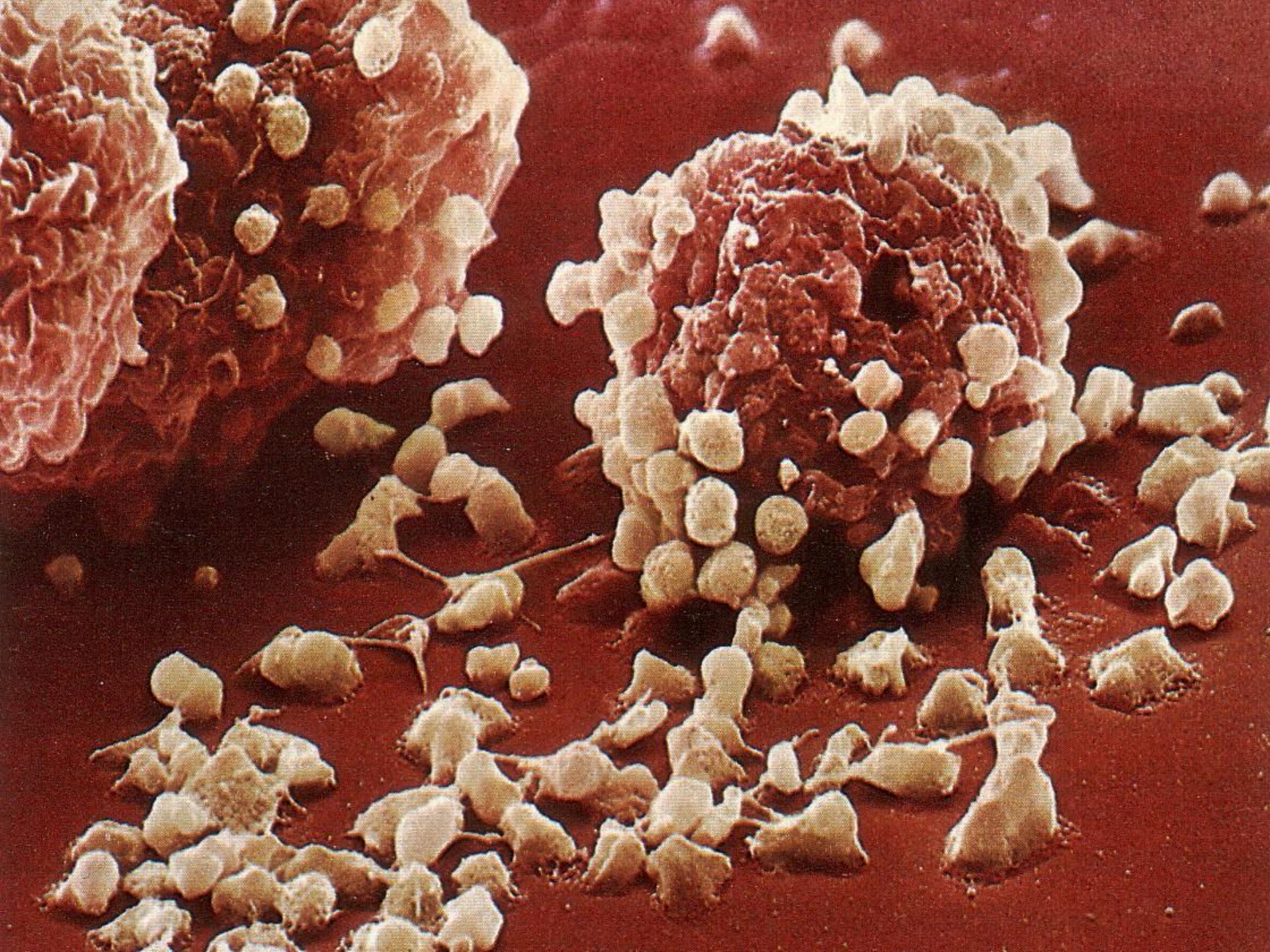


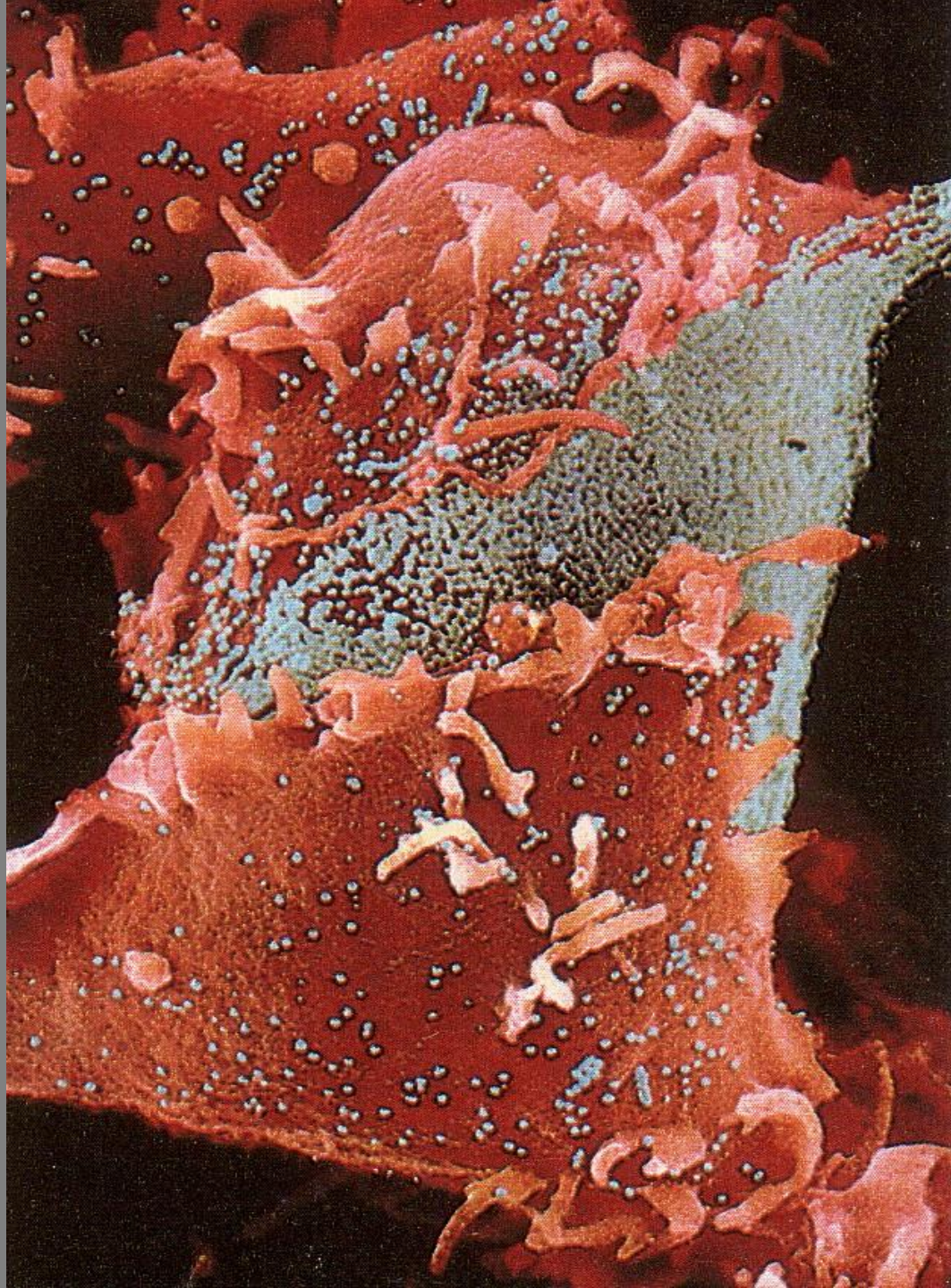




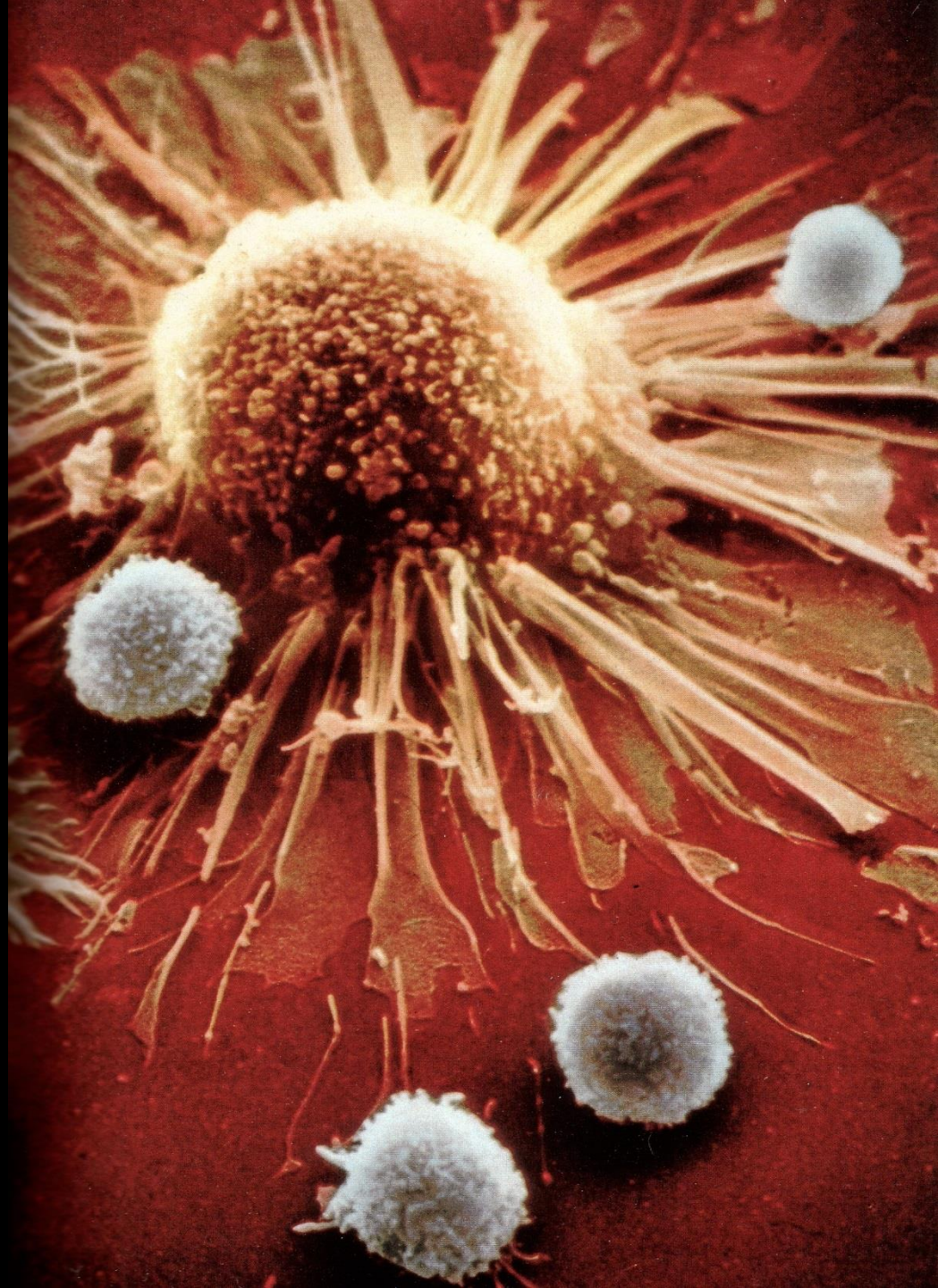
3000 x GMBH
Nat Geog 1986



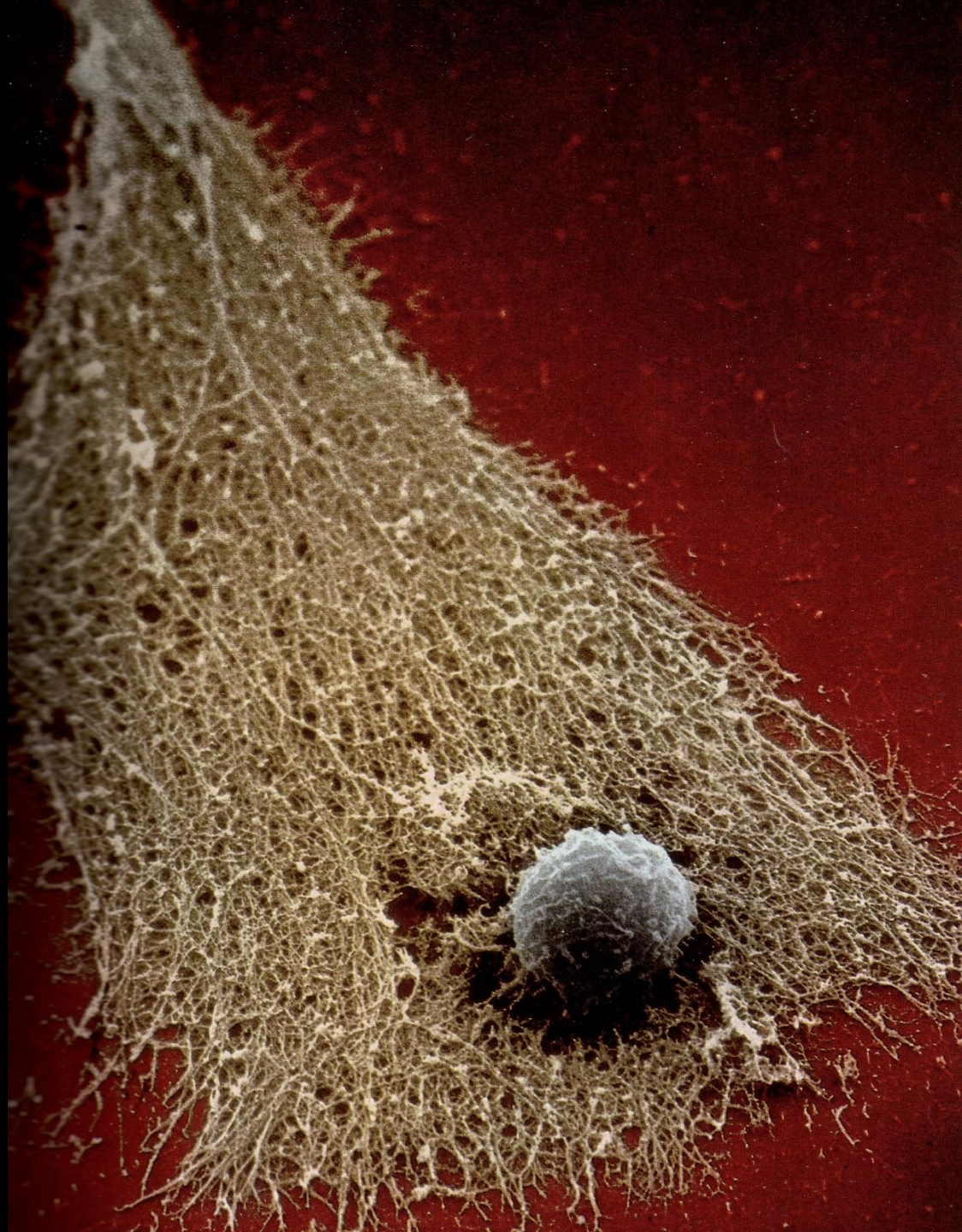


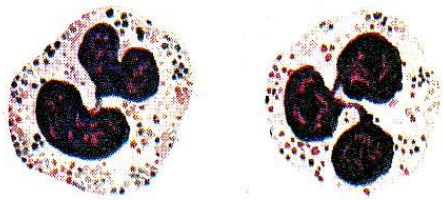




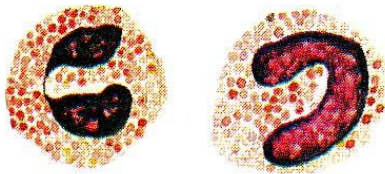




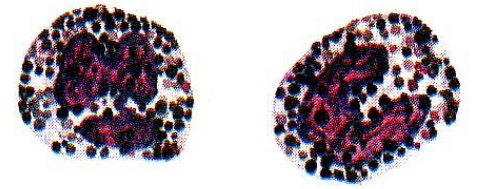




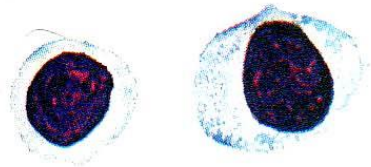
NEUTROPHILS



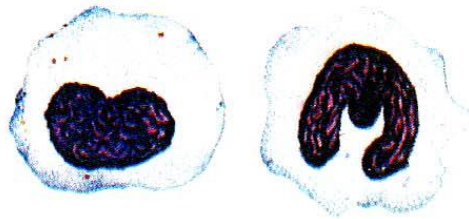
EOSINOPHILS



BASOPHILS



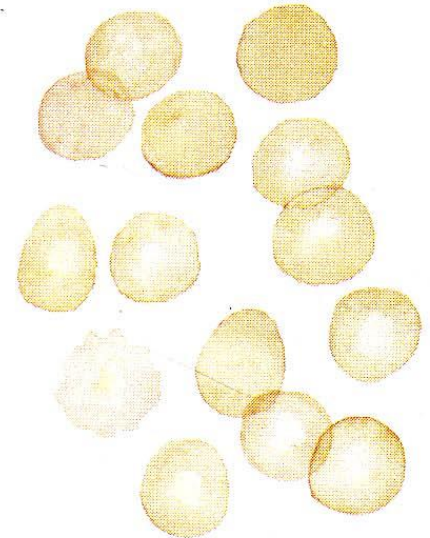
LYMPHOCYTES



MONOCYTES



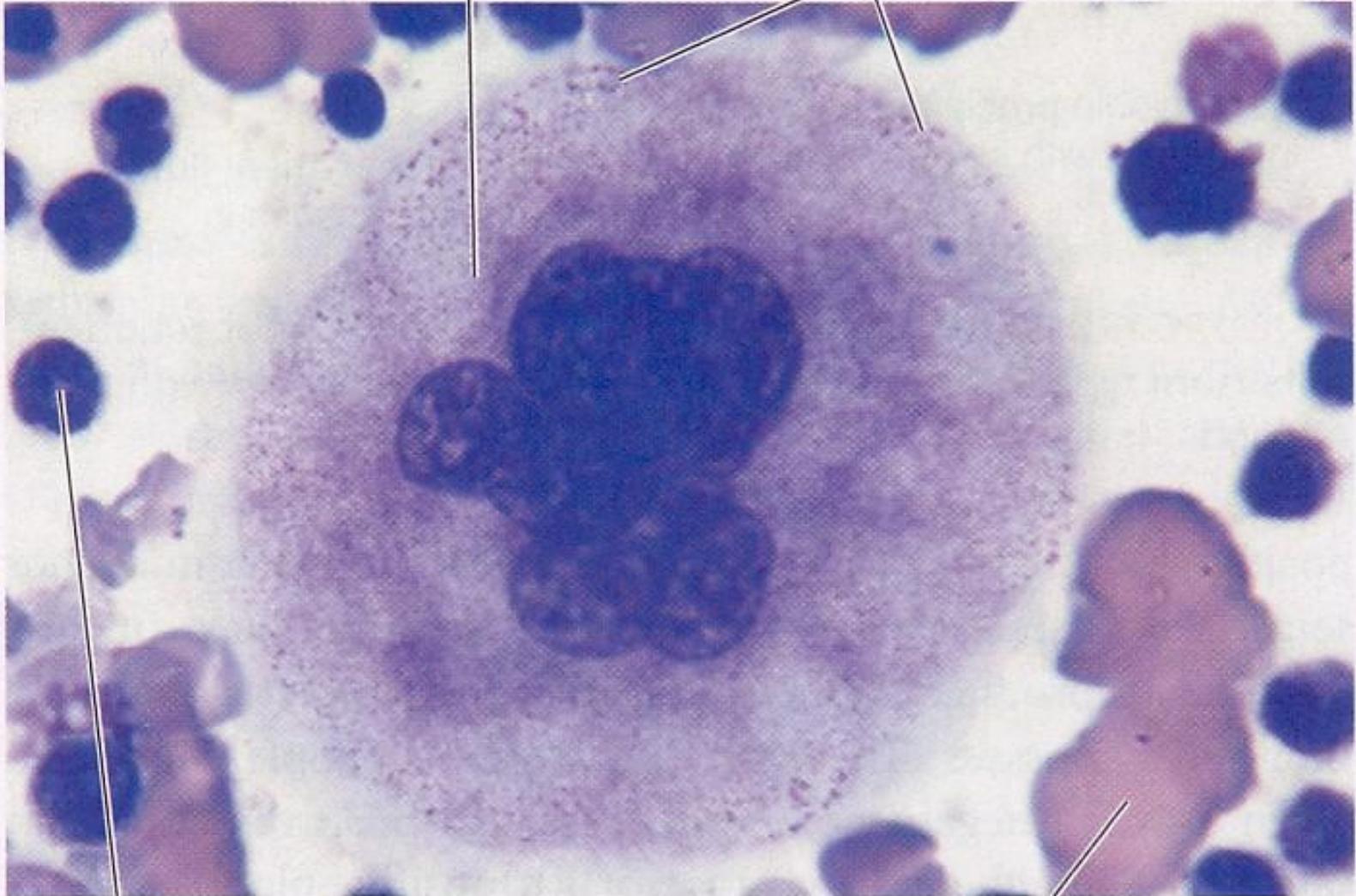
PLATELETS



ERYTHROCYTES

Megakaryocyte

Clusters of platelets
about to shed off

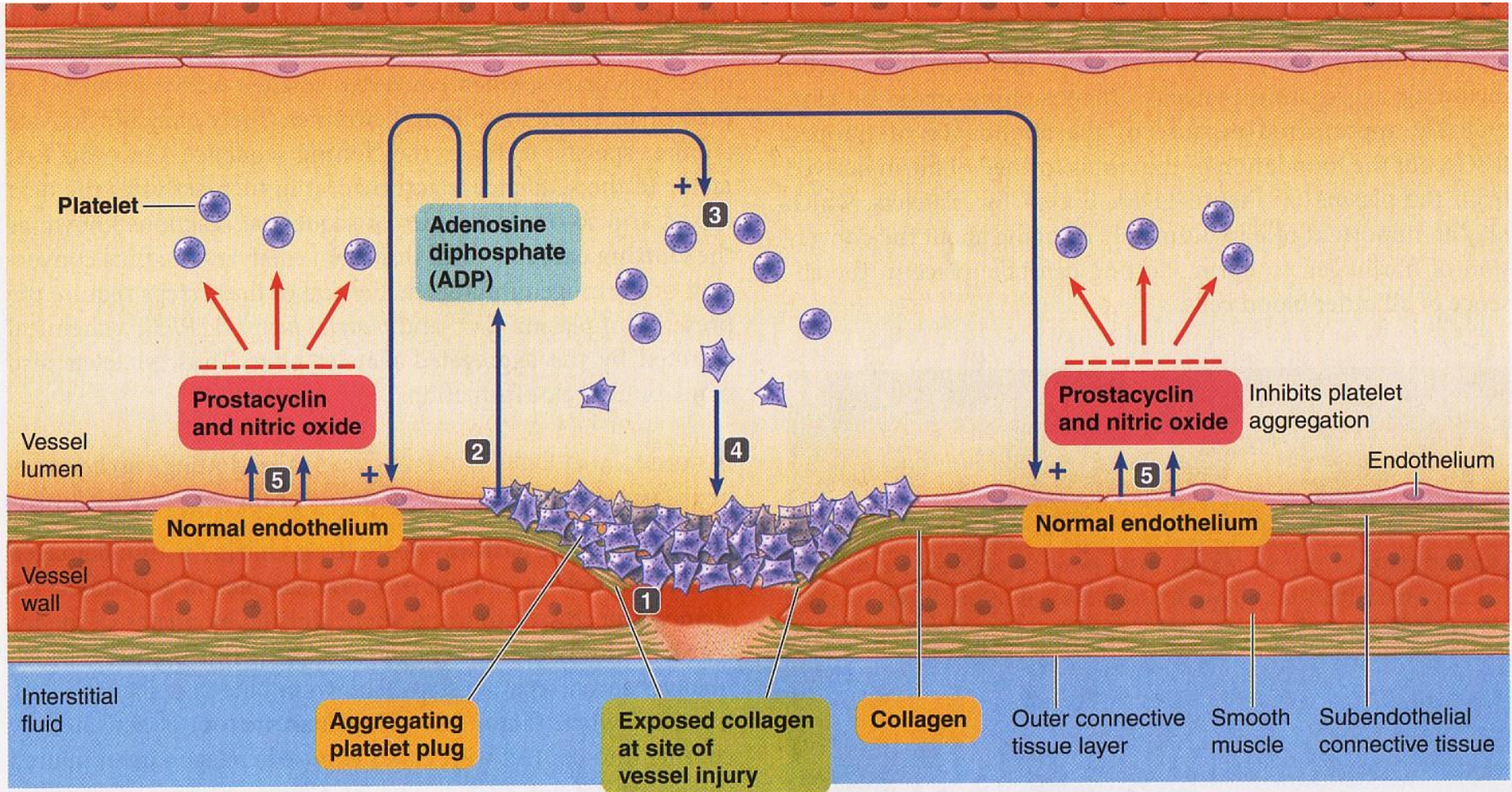


Developing
leukocyte

Cluster of developing
erythrocytes

Carolina Biological/Visuals Unlimited

Formation of the Platelet Plug



1 Platelets adhere to and are activated by exposed collagen at the site of vessel injury.

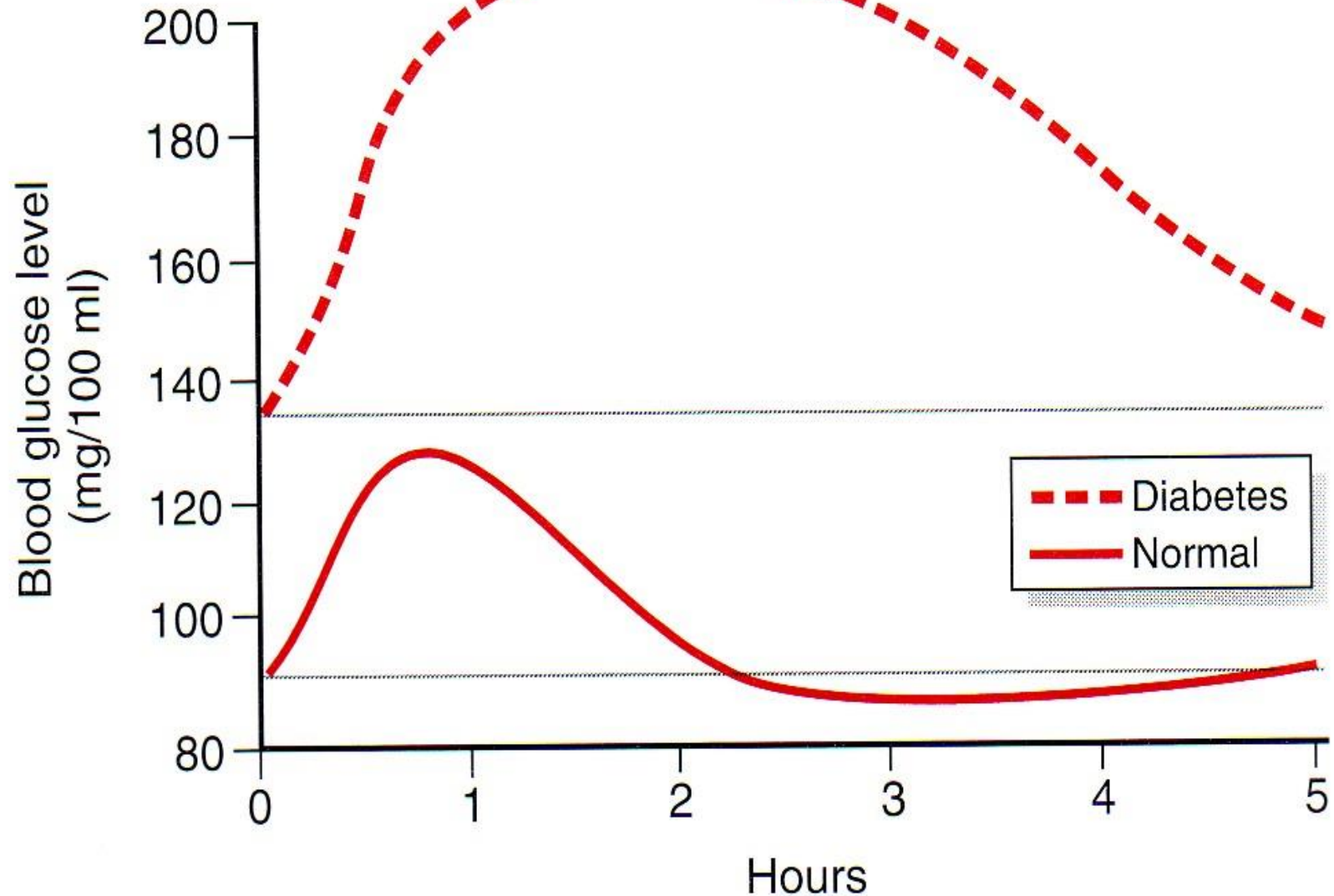
2 Activated platelets release ADP.

3 ADP activates other platelets passing by.

4 Newly activated platelets aggregate onto growing platelet plug and release even more platelet-attracting chemicals.

5 Normal (uninjured) endothelium releases prostacyclin and nitric oxide, which inhibit platelet aggregation, so platelet plug is confined to site of injury.

Diabetic & Normal Response to Glucose Load



Glucose:
Sugar in Blood



Normal: 70-99
Pre-Diabetes: 100-125
Diabetes: ≥ 126 mg/dL

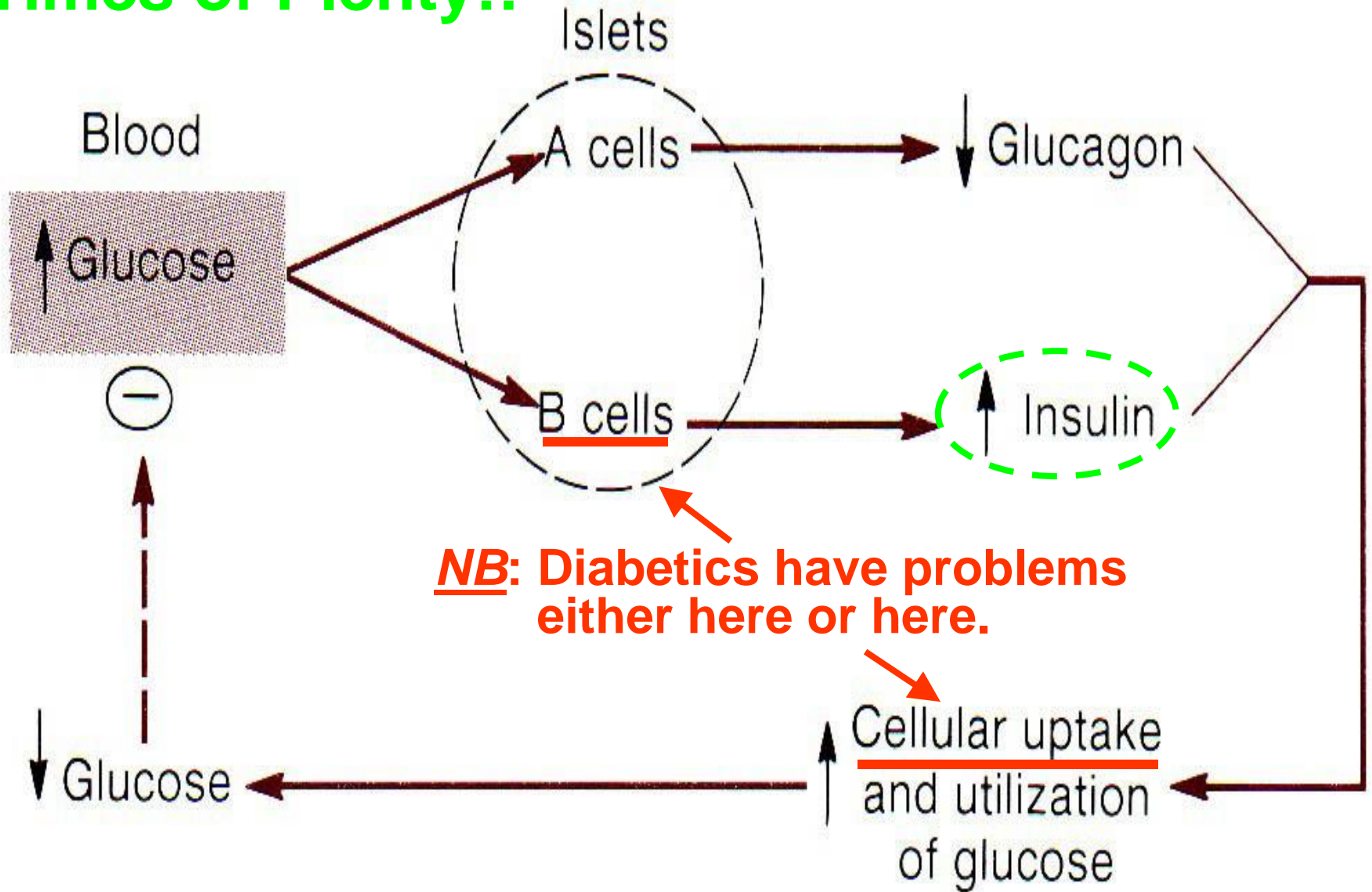
TABLE
4-7

Warning Signs of Diabetes

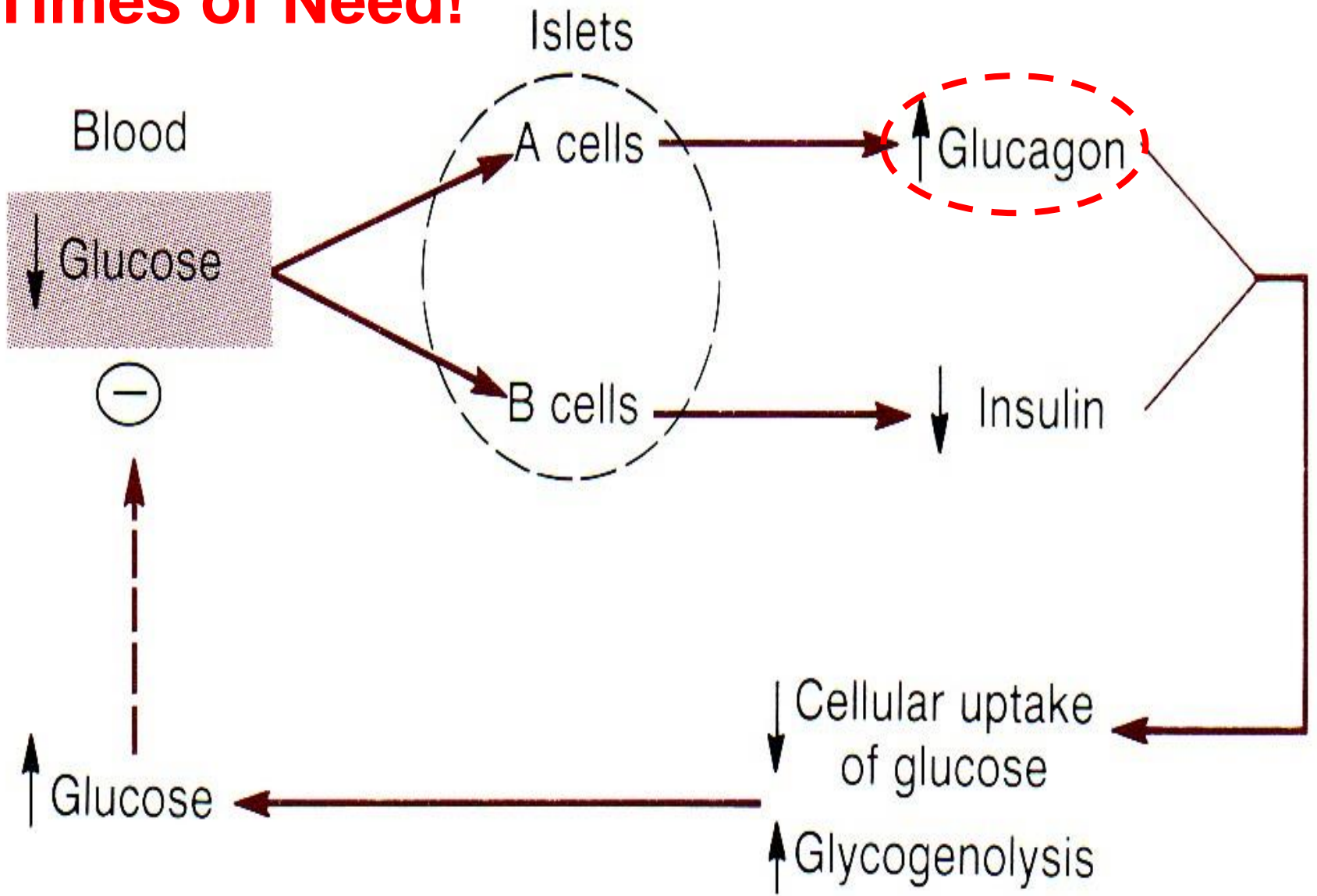
These signs appear reliably in type 1 diabetes and, often, in the later stages of type 2 diabetes.

- Excessive urination and thirst
- Glucose in the urine
- Weight loss with nausea, easy tiring, weakness, or irritability
- Cravings for food, especially for sweets
- Frequent infections of the skin, gums, vagina, or urinary tract
- Vision disturbances; blurred vision
- Pain in the legs, feet, or fingers
- Slow healing of cuts and bruises
- Itching
- Drowsiness
- Abnormally high glucose in the blood

Times of Plenty!!



Times of Need!



Diabetics must constantly juggle diet, exercise & medication to control blood glucose!

Medication



Diet

Exercise

Like others, diabetics benefit from whole grains, vegetables, fruits, legumes & non-/low-fat milk products!

