

BI 121 Lecture 10



...Fun lab week with much personal data!

- 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?
Notebooks returned at the end of lecture today.
- II. CVDs Risk Reduction Connections** LS ch 9-10, DC Module 4
Minimizing risk of CVDs: U of O Smoke-Free! Exercise!!
Can food choices make a difference? What's HAPOC?
- 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!)**

$$X = [\text{Hope for? } 80 - ((0.3 \times \text{MT } 62) + (0.2 \times \text{Lecture } 100) + (0.2 \times \text{Lab } 100))] / 0.3$$

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

$$X = [21.4] / 0.3 = 71.3 \text{ Need this on final for } B^- \text{ for course!}$$



...Fortunately, the lab buffers 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.

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

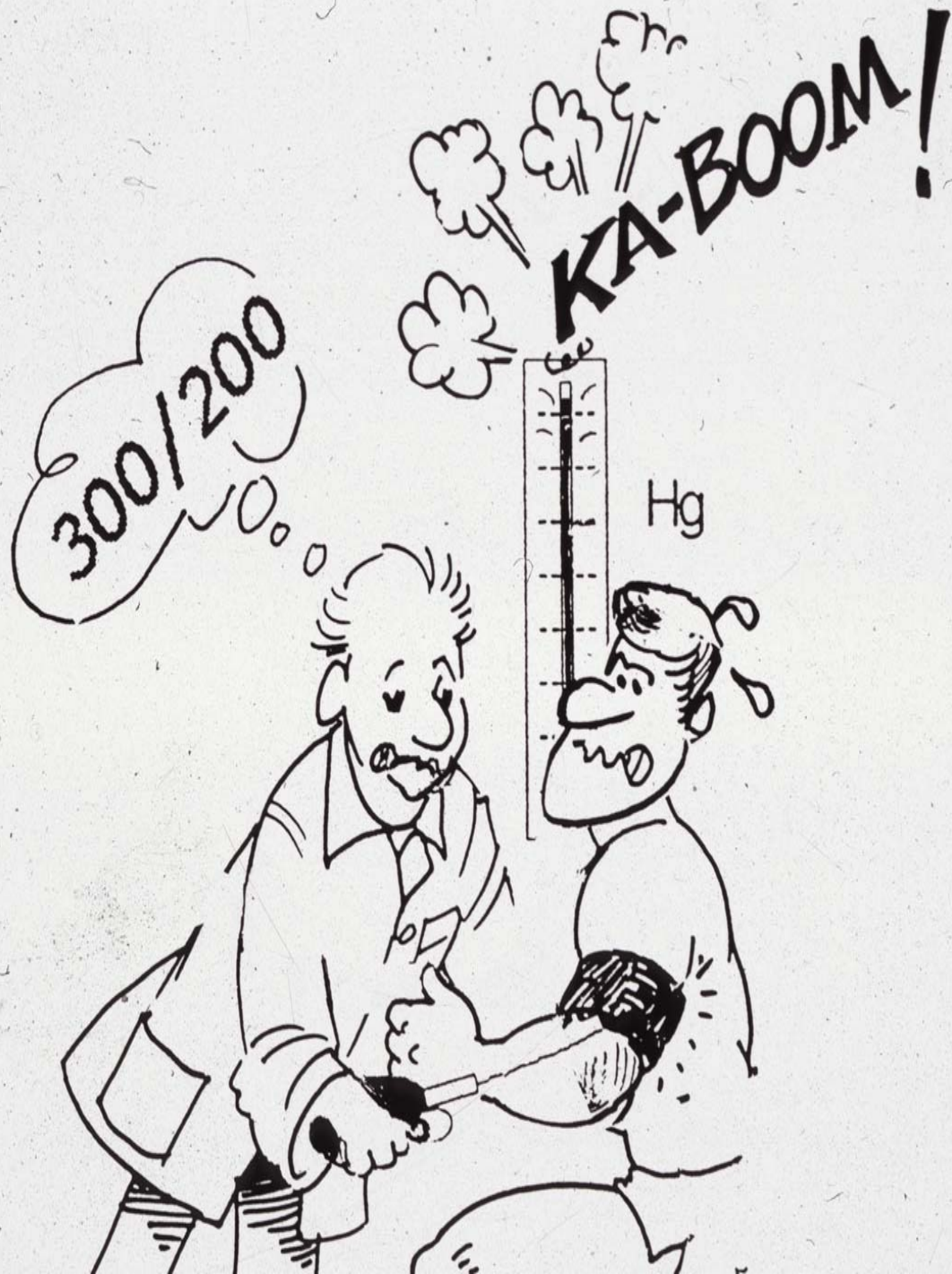


UNIVERSITY OF OREGON

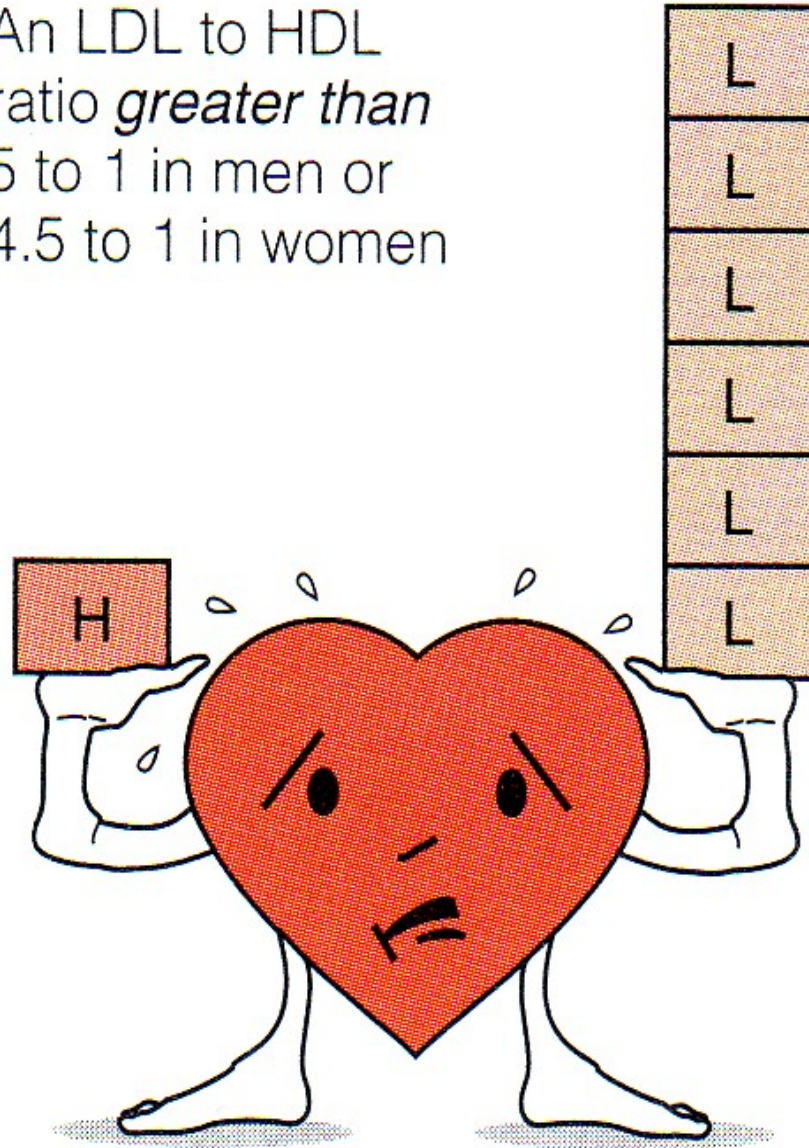
tobaccofree.uoregon.edu



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

Those with *apple type* of obesity predisposed to CVD!



**CAUTION:
HAZARDOUS WAIST**

A hazardous substance is stored nearby. It's the excess fat packed around your middle. Fat that increases your risk of heart disease and other serious illnesses, such as diabetes. Good reason to start a **waist disposal program today.**

Heart Foundation

The poster features a central photograph of a person's large, protruding belly, which is the focus of the 'apple type' obesity mentioned in the text. The text is presented in a clear, bold font, and the overall design uses a caution tape border at the top and bottom.



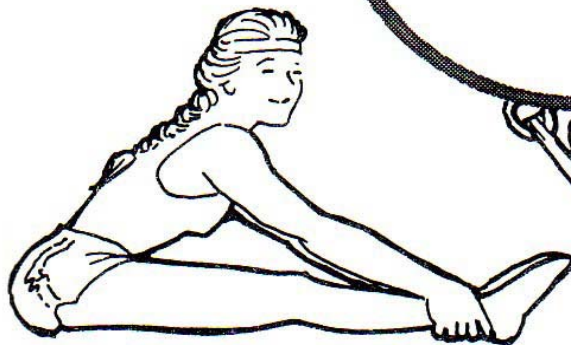
**Cardiorespiratory
Endurance**



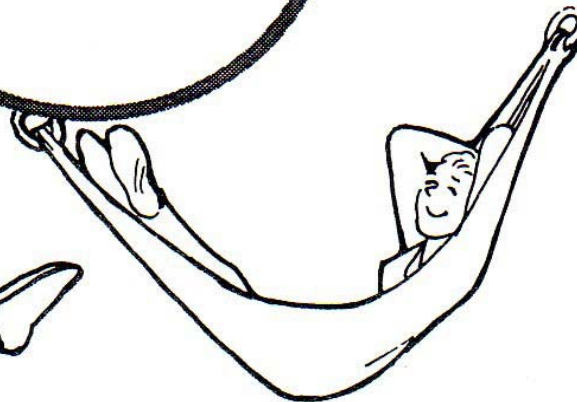
**Muscular
Strength/Endurance**



**HEALTH-RELATED
FITNESS**



Flexibility



Neuromuscular Relaxation

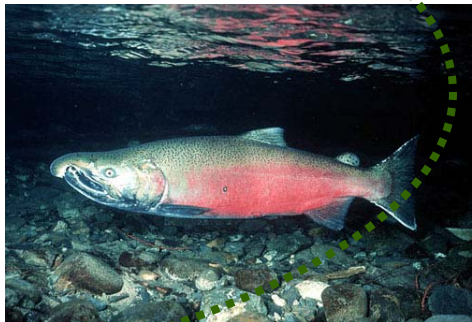


Essential Fatty Acids: Ω -6 Linoleic & Ω -3 Linolenic Acids

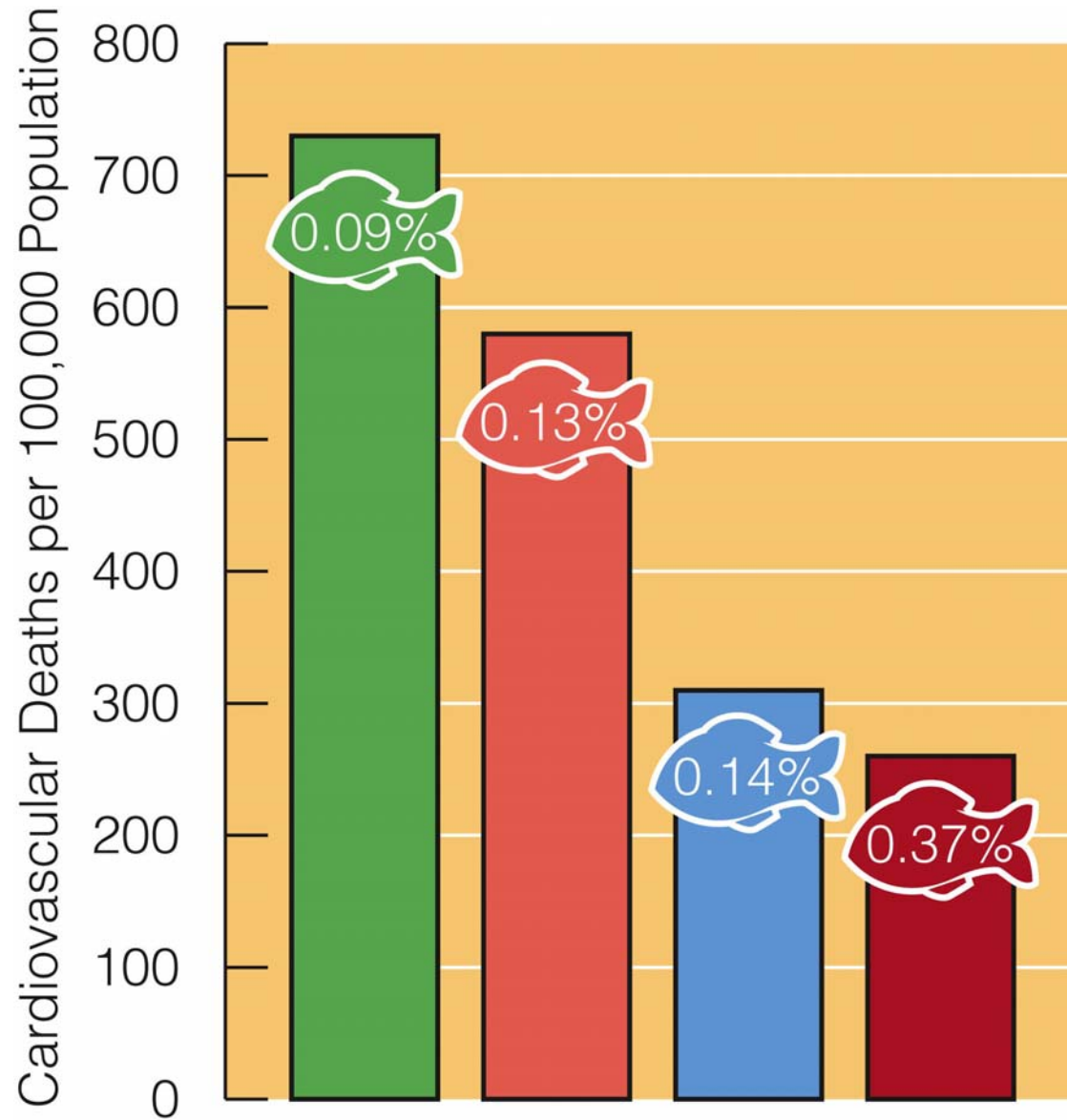


Linoleic \rightarrow Arachadonic Acid \rightarrow Inflammatory Cascade

Linolenic \rightarrow EPA, DHA \rightarrow Anti-inflammatory



Fish Oil Intakes & Cardiovascular Death Rates



Ireland

USA

France

Japan

S&W fig 5-12 p 167

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



♥ *Healthy Oils to Minimize Atherosclerosis*
HAPOC?

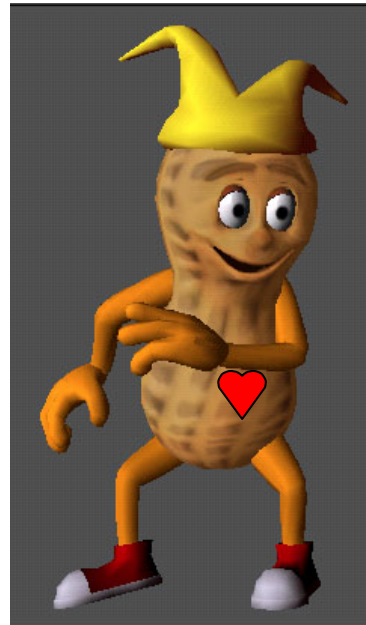
H



A



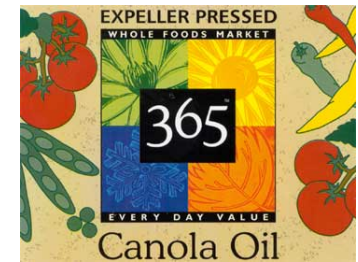
P



O



C

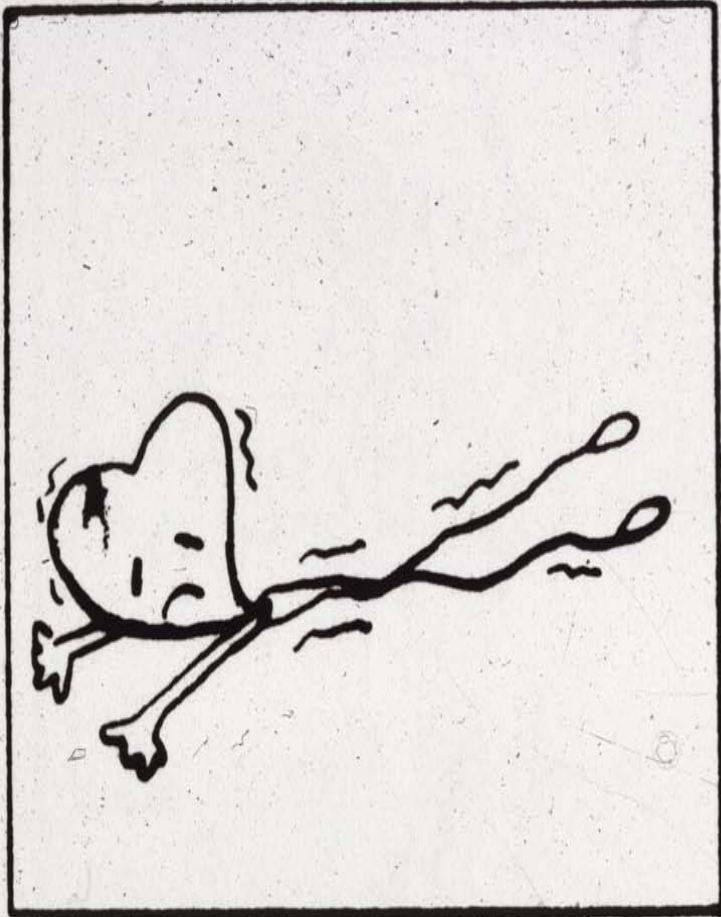


***Olive Oil Loves Olive Oil & has
some heartfelt advise for Popeye!!***

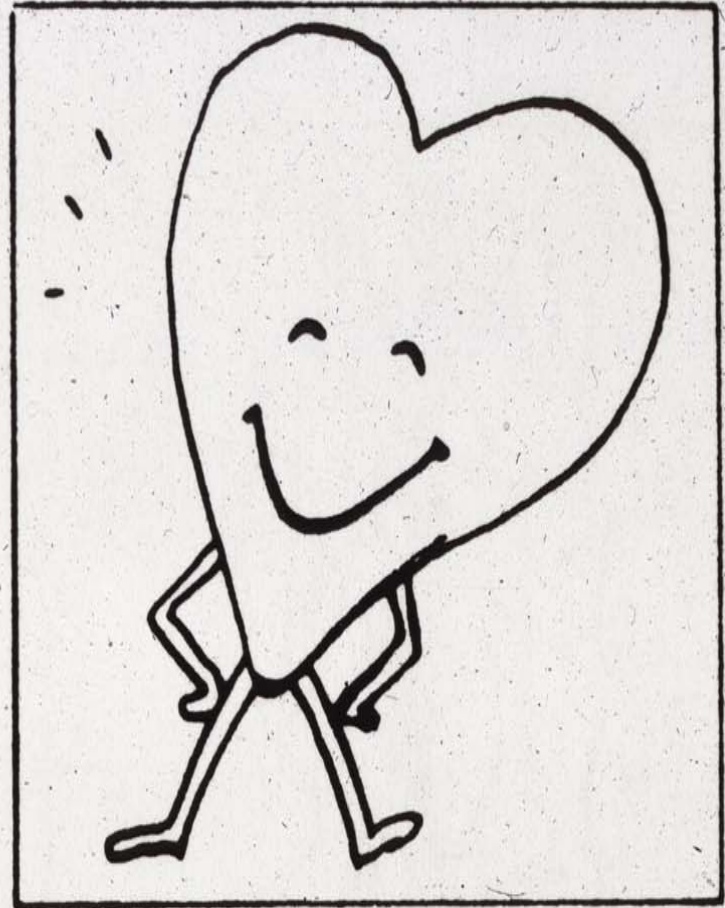


Yes for the
spinach! — but get
rid of the pipe!!



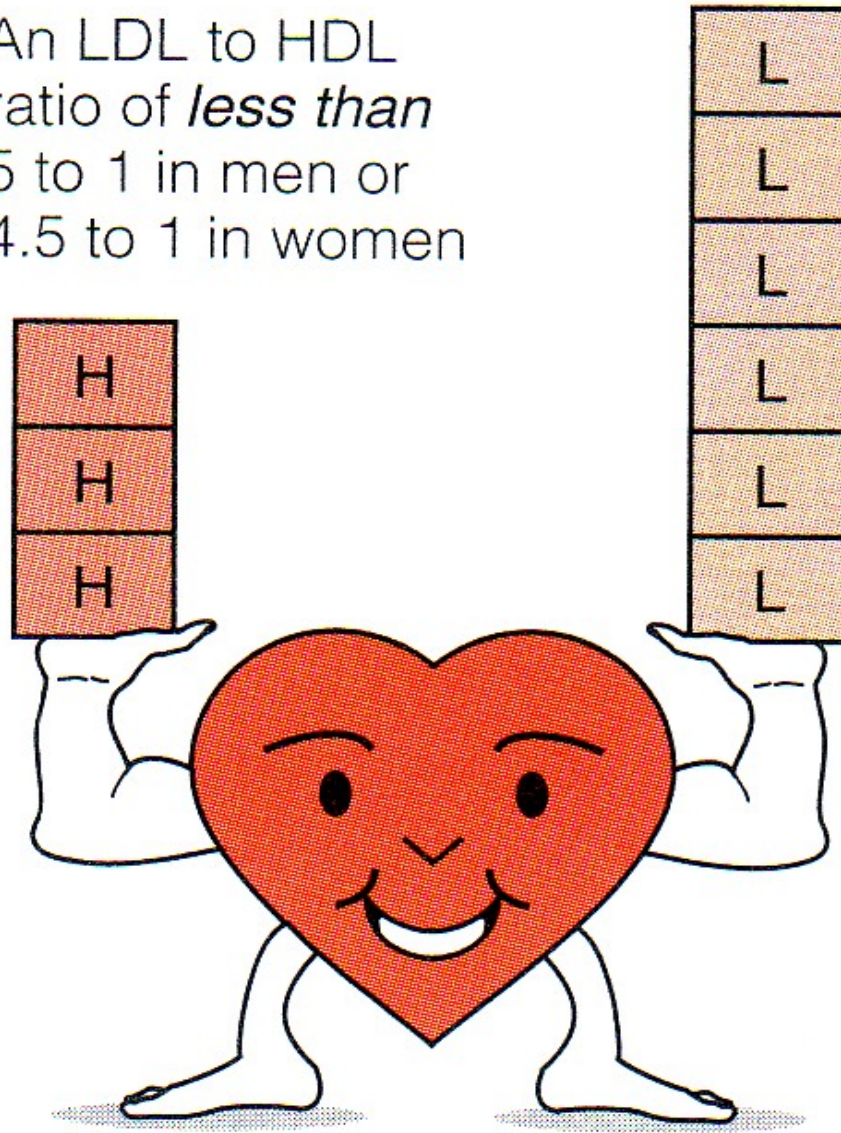


Before



After

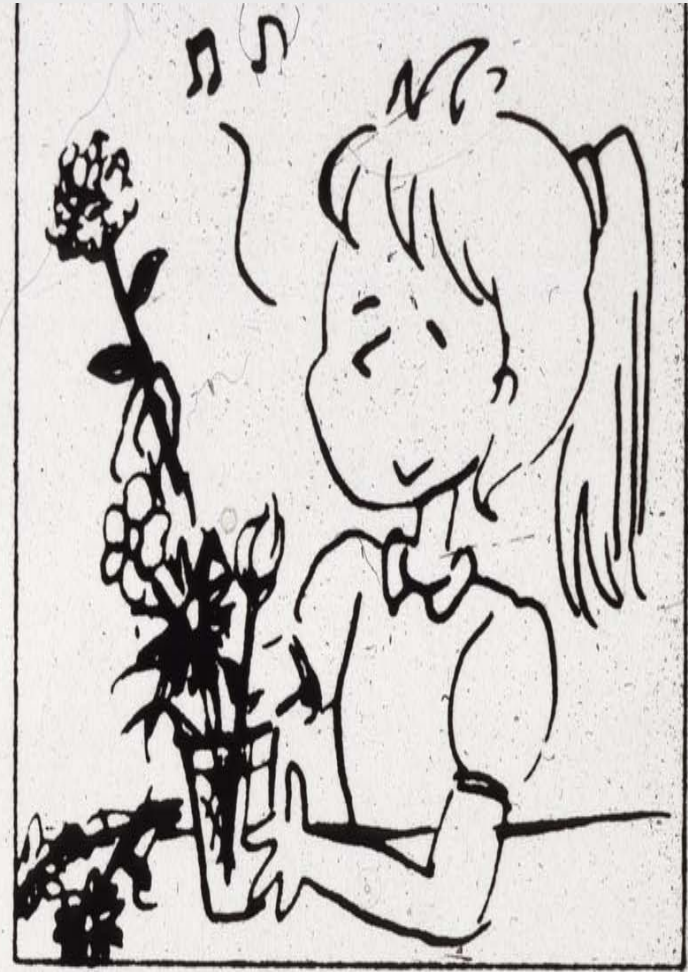
An LDL to HDL
ratio of *less than*
5 to 1 in men or
4.5 to 1 in women



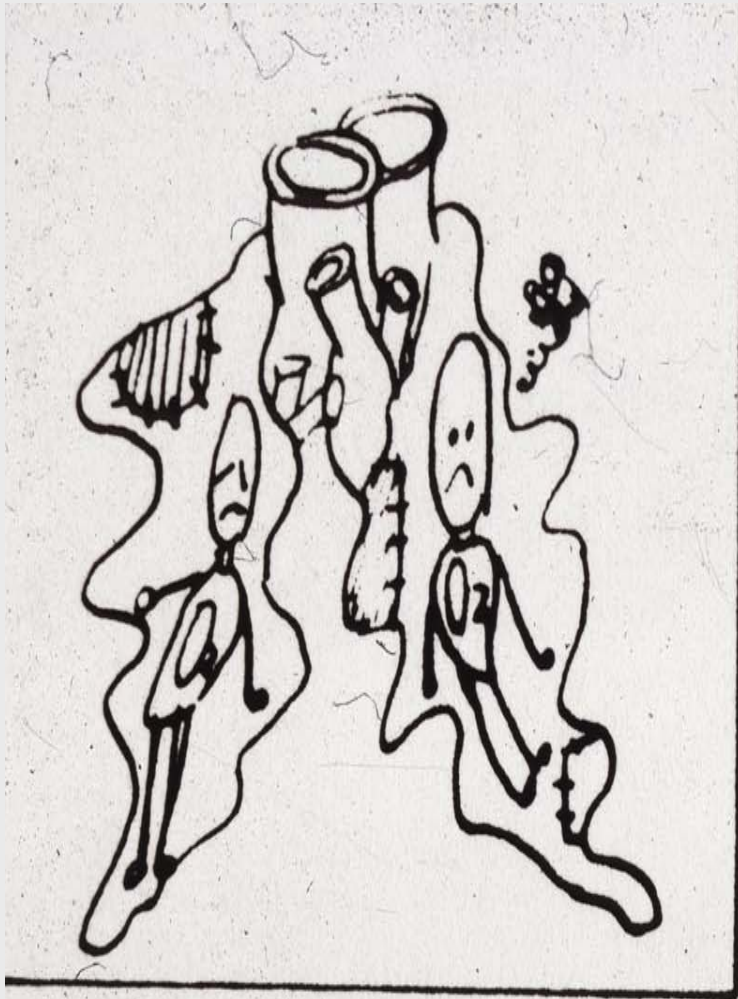
Reduced risk of
heart disease



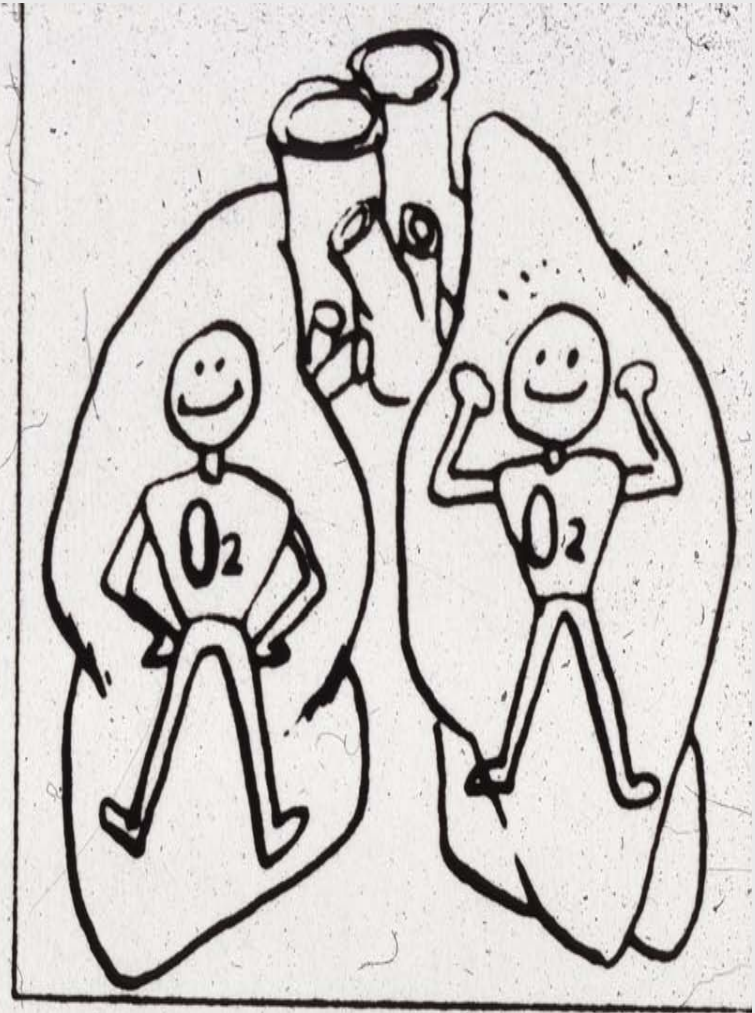
Before



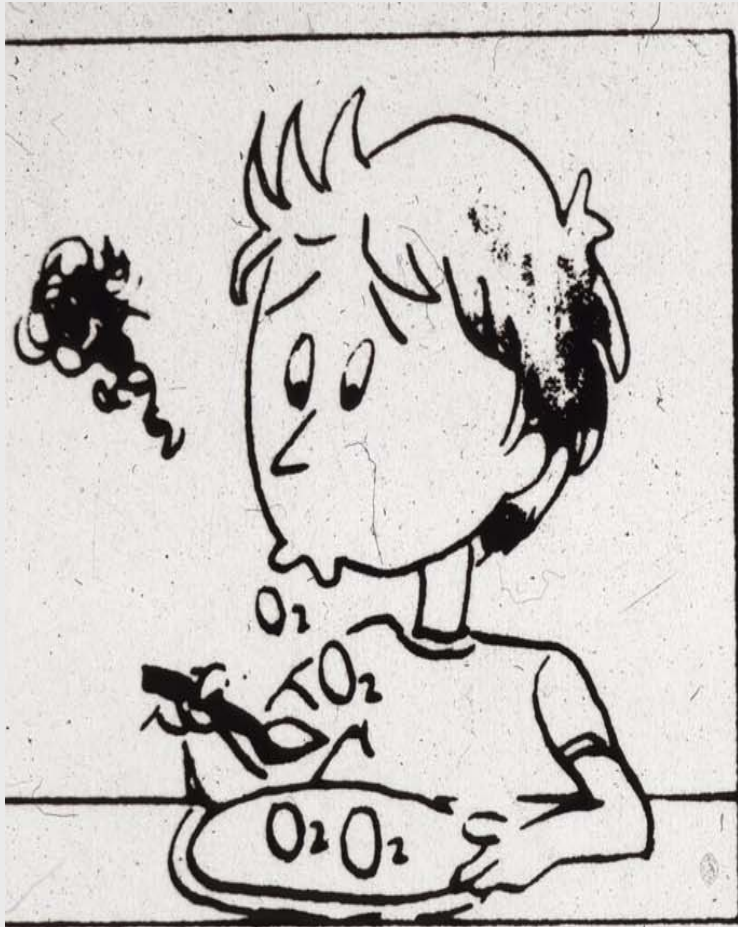
After



Before



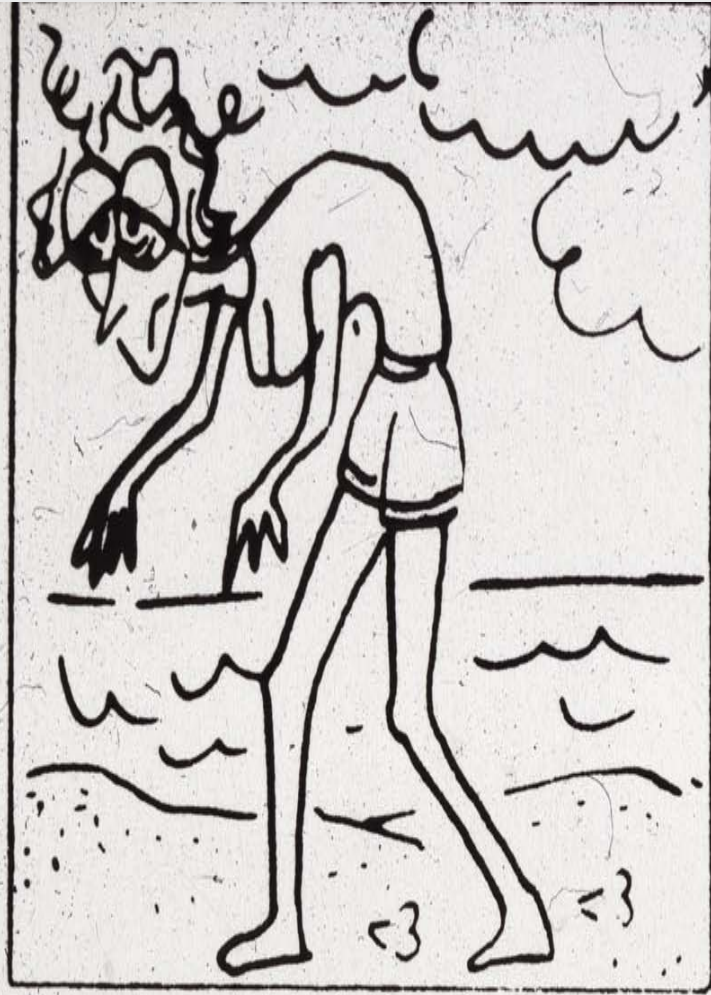
After



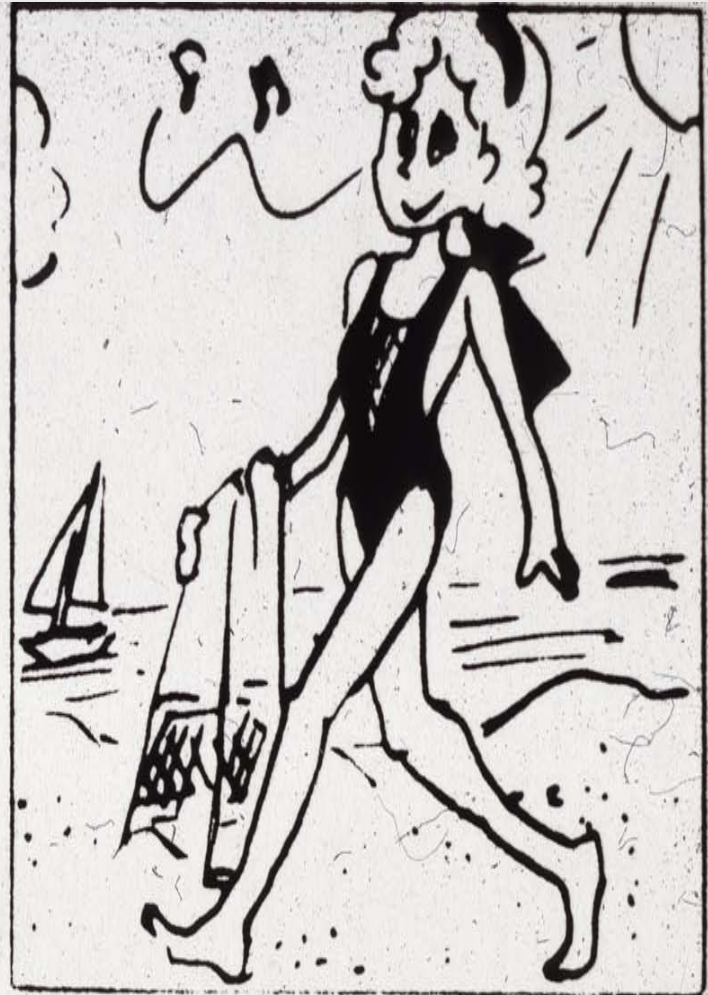
Before



After



Before

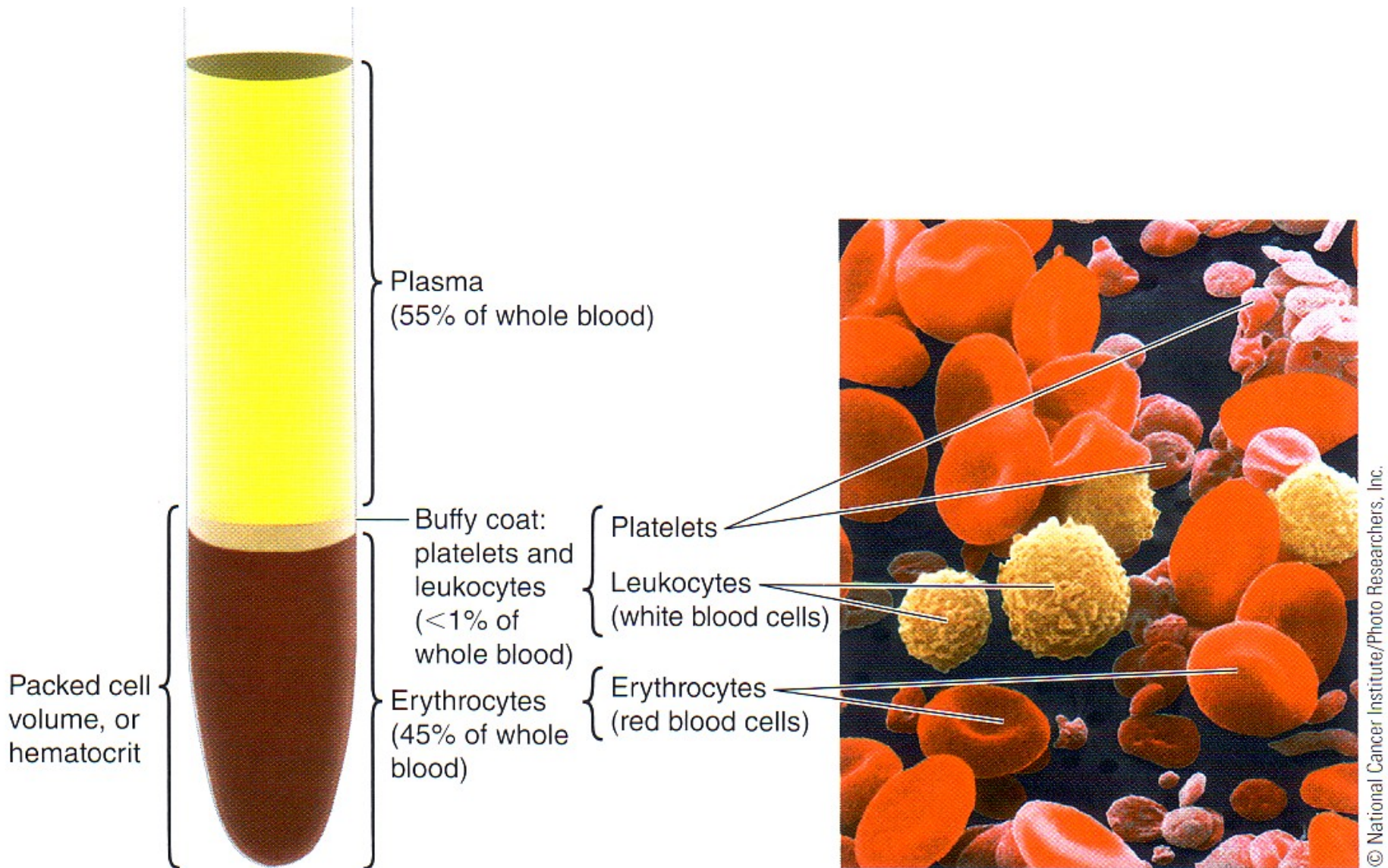


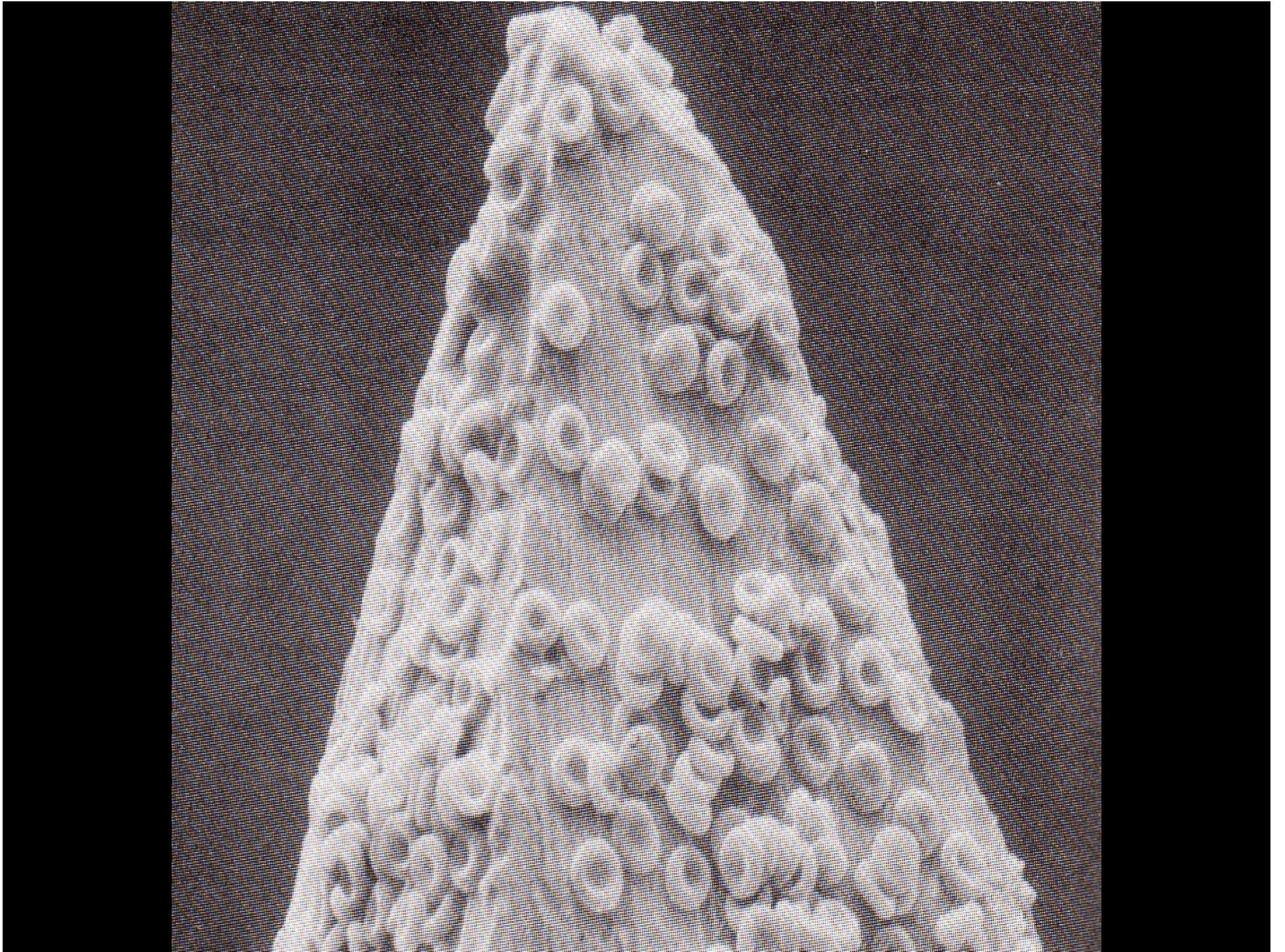
After

Break for discussion/questions!

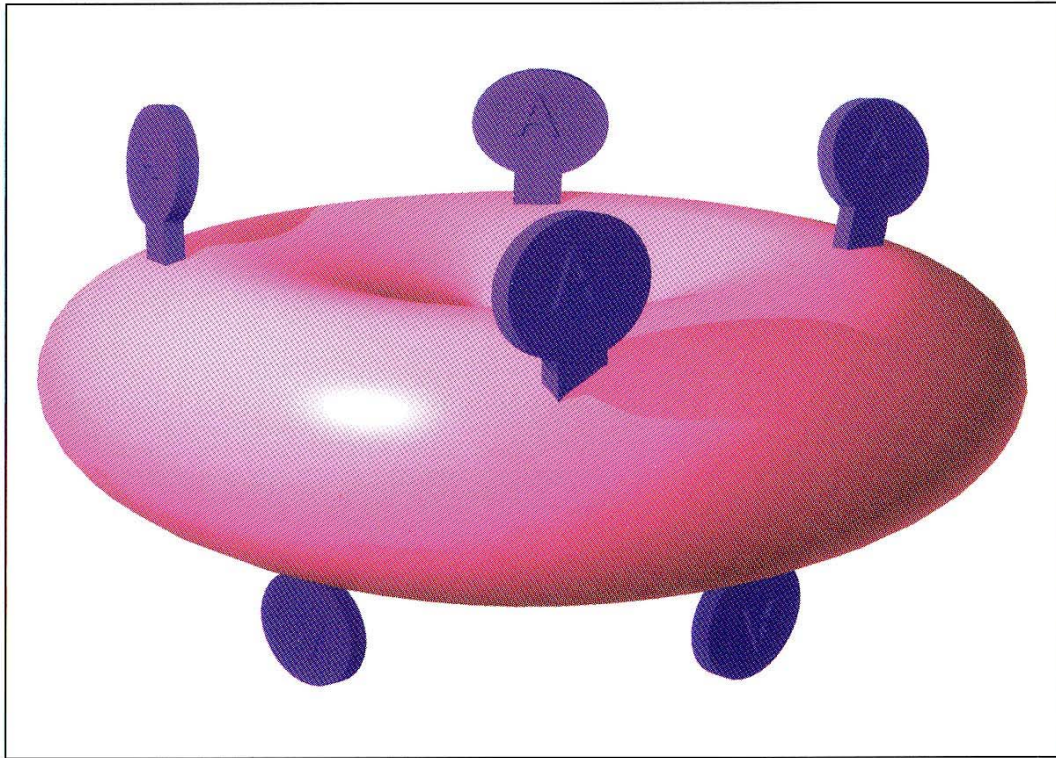


What's in Blood? Plasma & Blood Cells



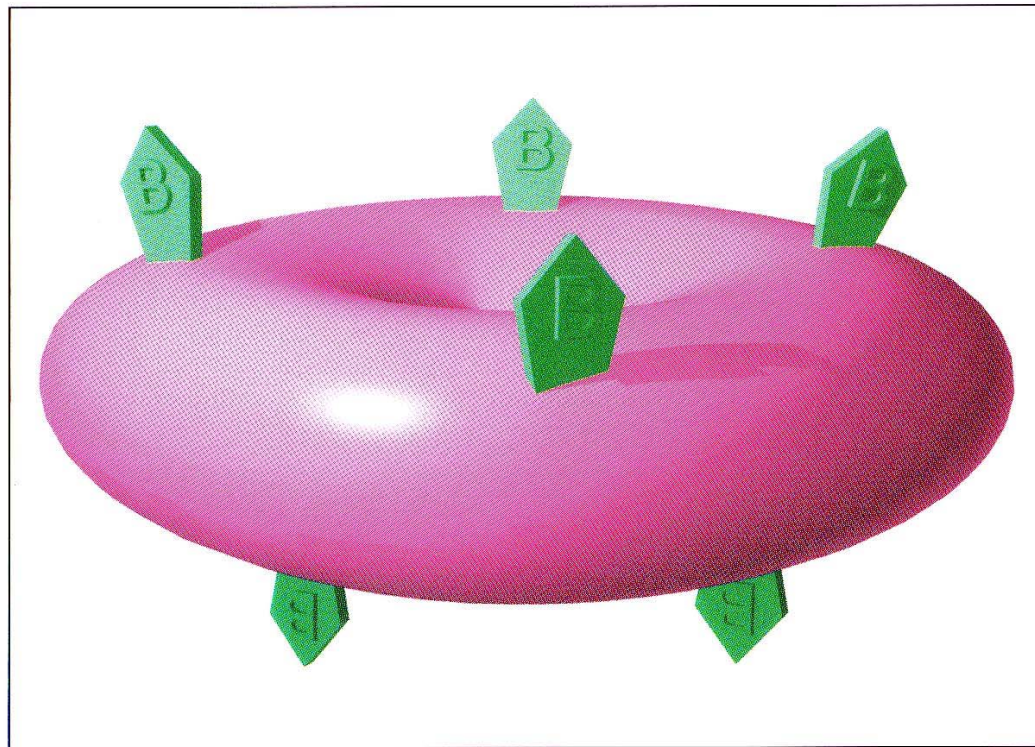


A



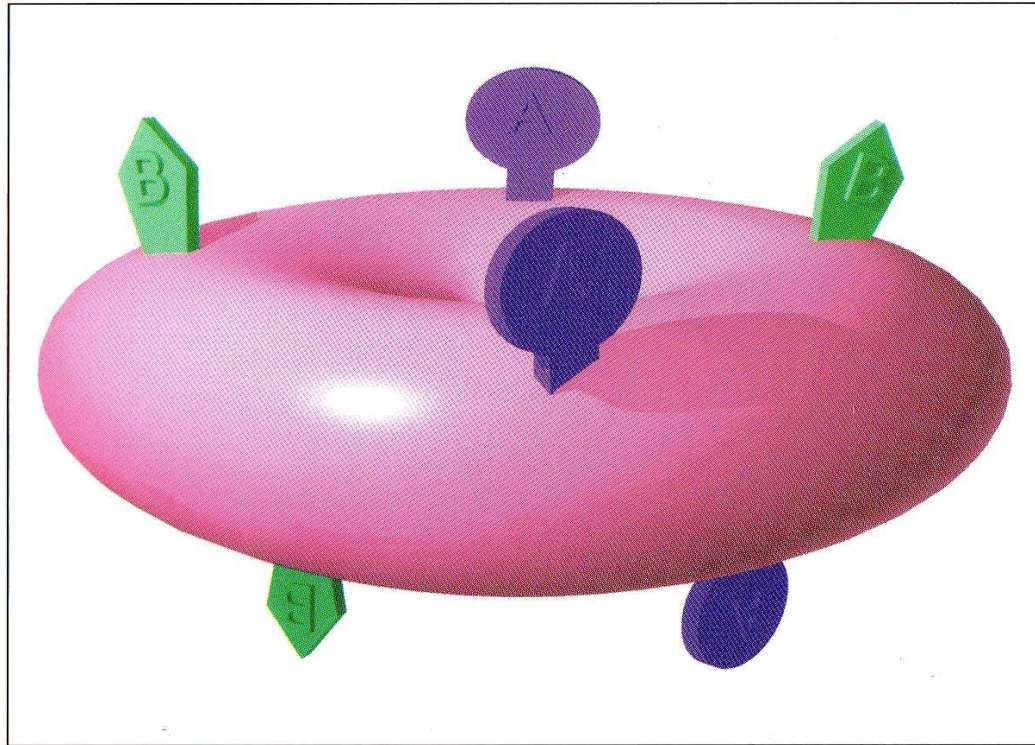
A Antigens
(Agglutinogens)

B

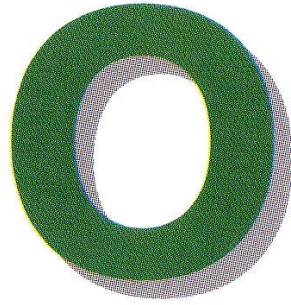


B Antigens
(Agglutinogens)

AB



A & B Antigens
(Agglutinogens)

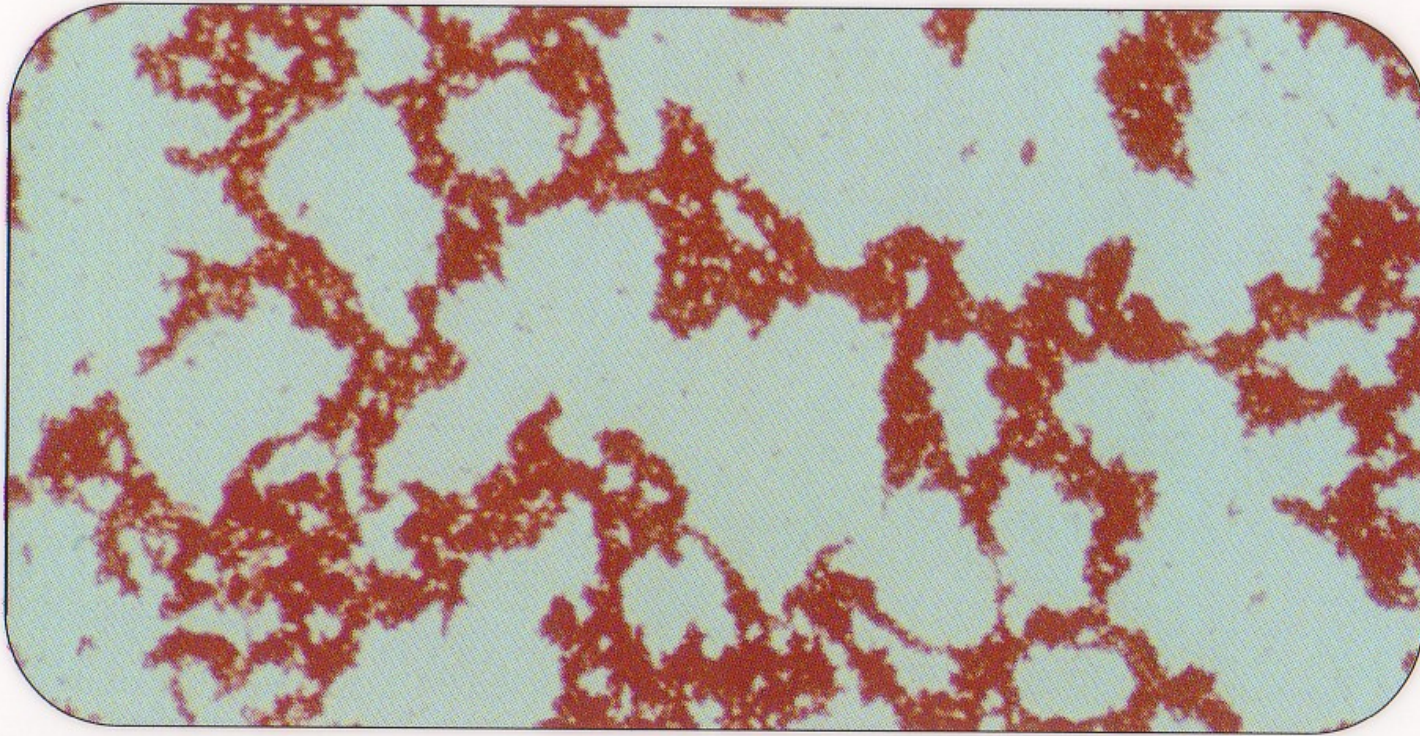


No Antigens
(Agglutinogens)

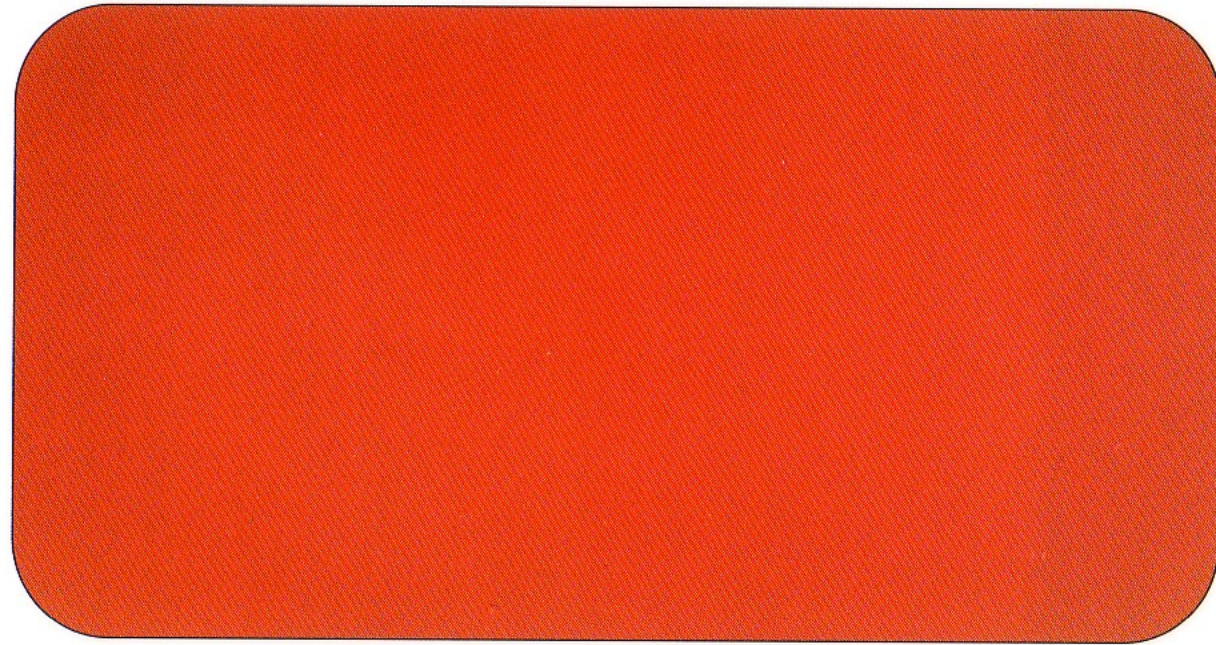


A Antibodies

(Agglutinins)

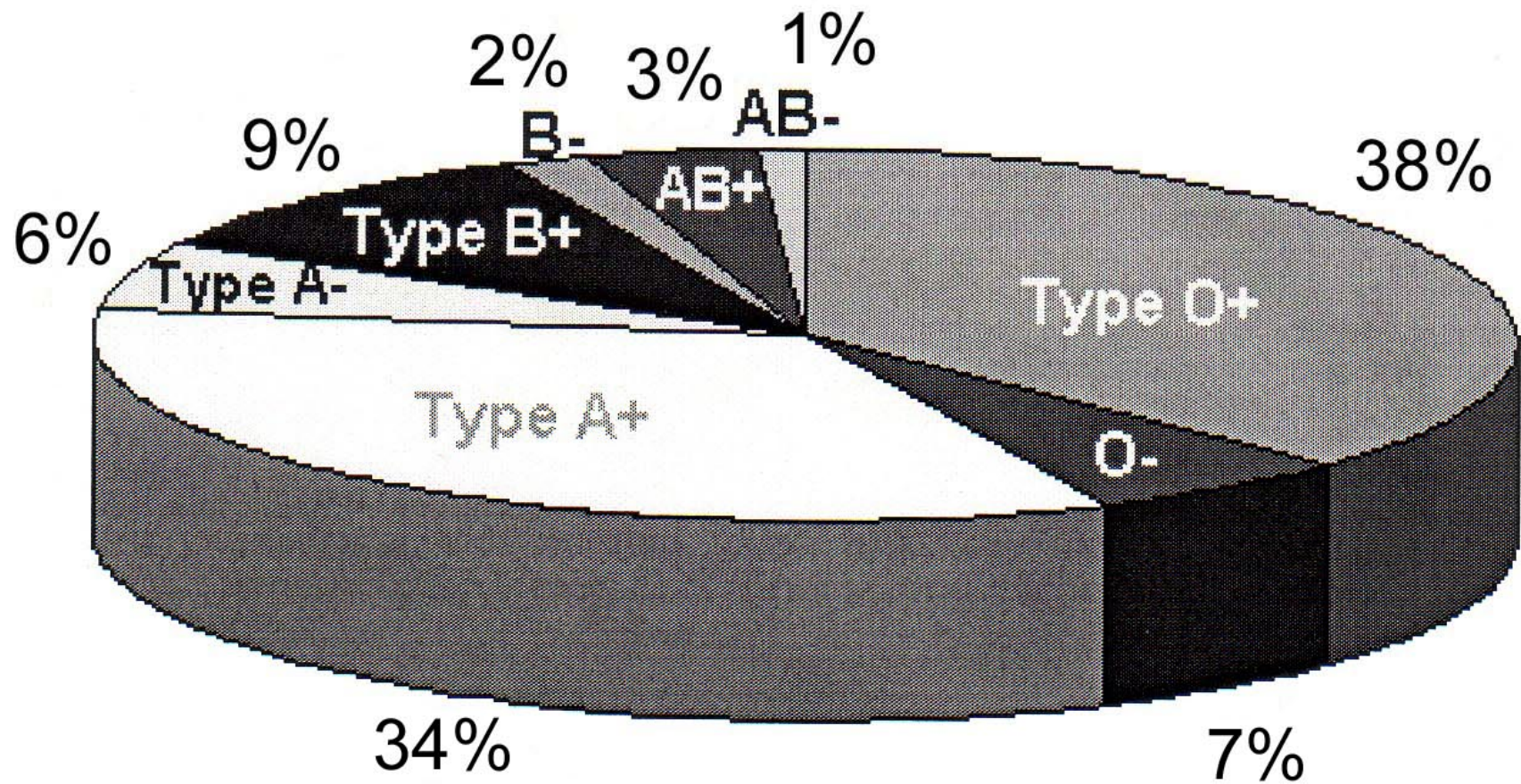


Clumping with
anti-A serum



No Clumping with
anti-A serum

Blood Type Distribution, General Population



Erythroblastosis Fetalis?

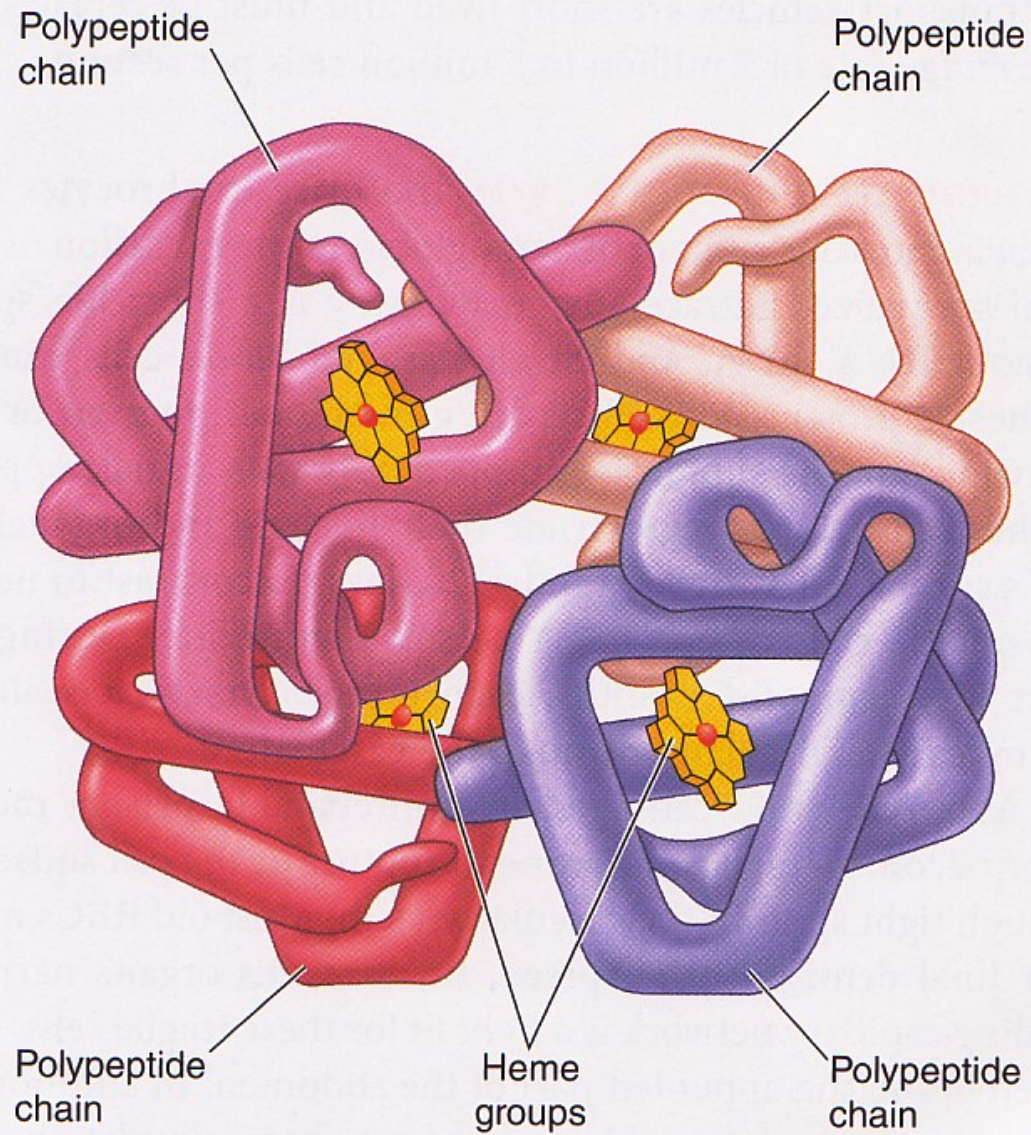
**eg, Rh- mom
Rh+ baby**

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



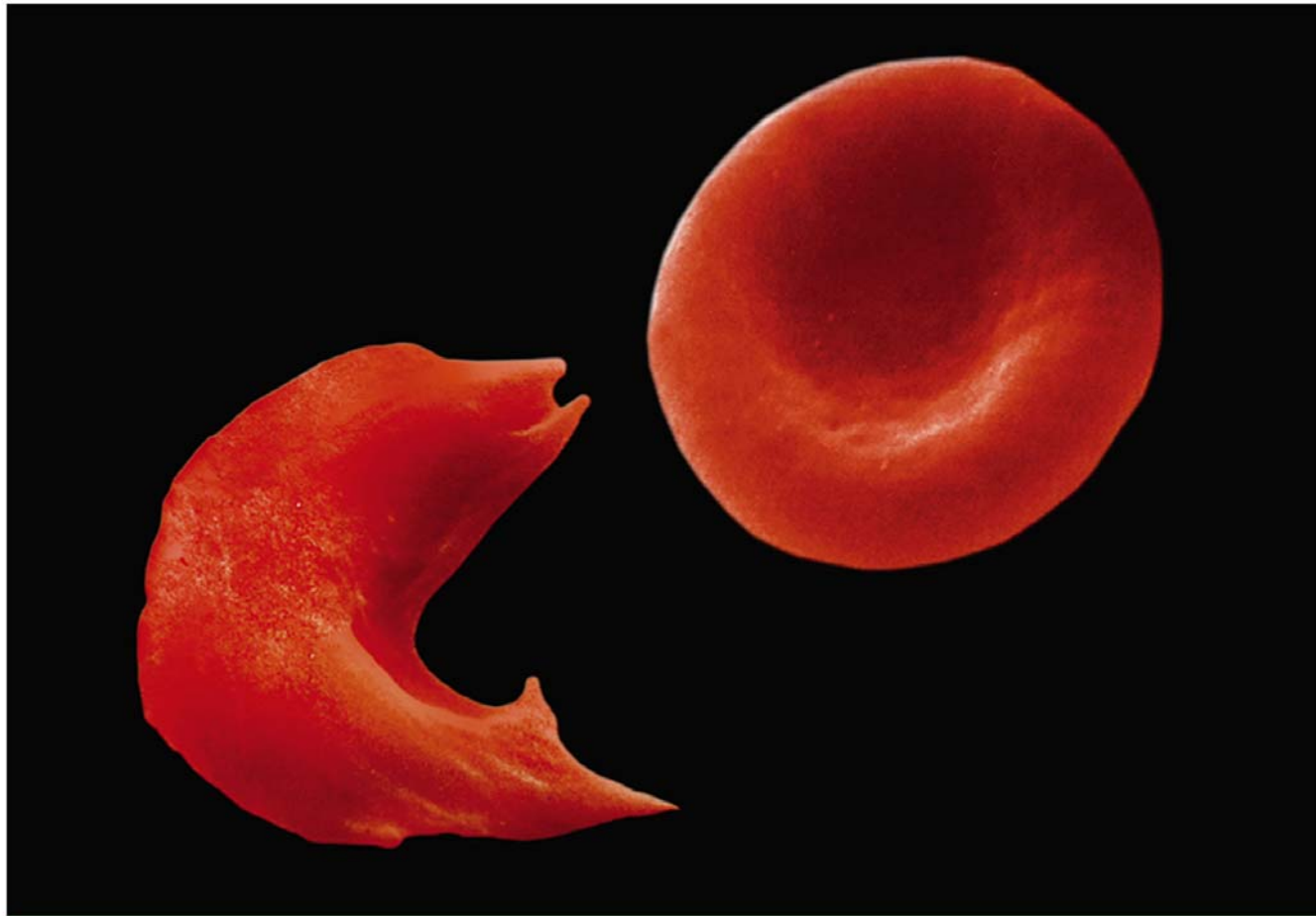
2000 x GMBH,
Nat Geog 1986
Jun p 714

Hemoglobin Structure



Sickle-shaped blood cells

Normal red blood cells



© Dr. Stanley Flegler/Visuals Unlimited

What a difference one amino acid can make!

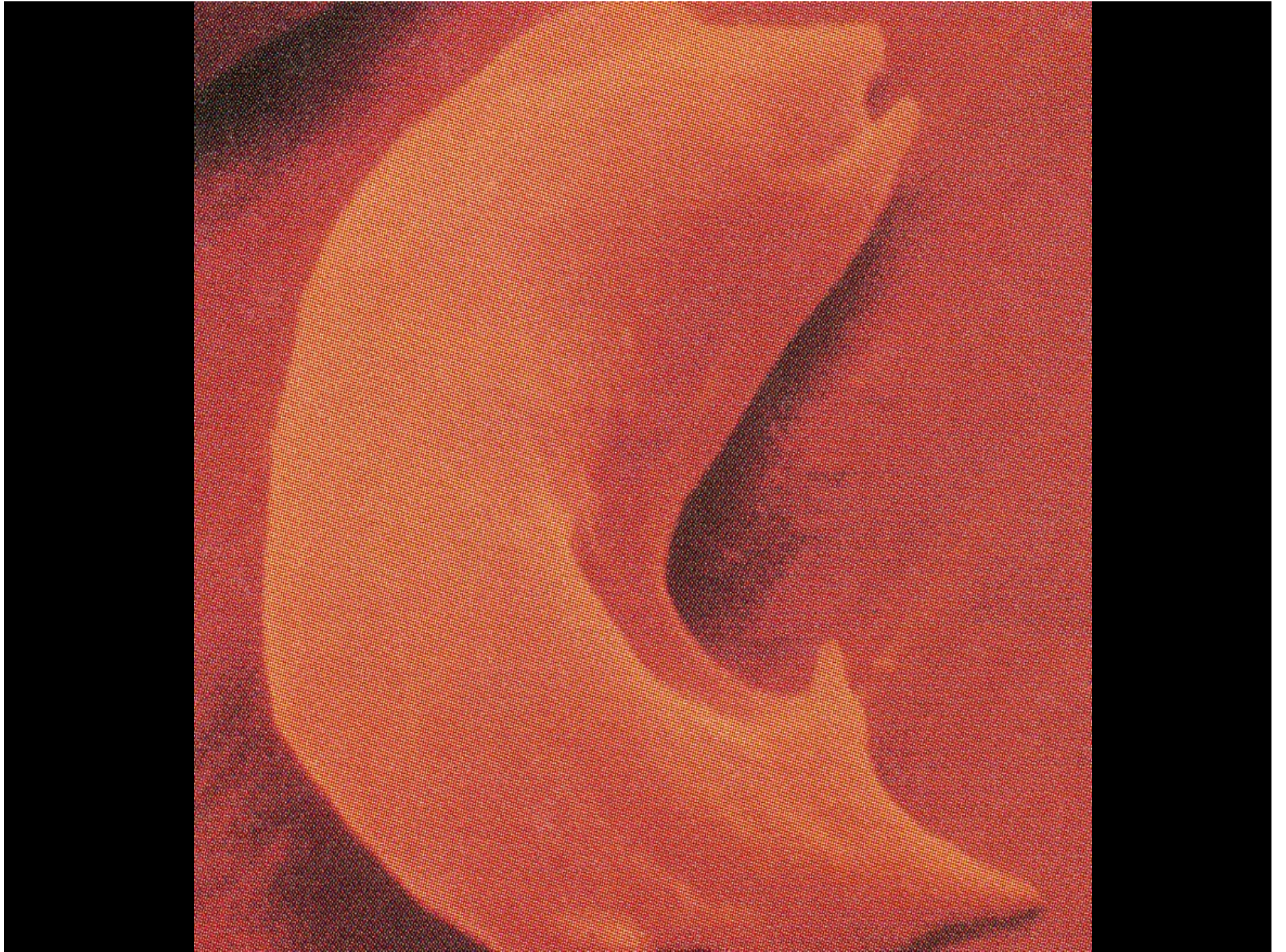
Amino acid sequence of normal hemoglobin:

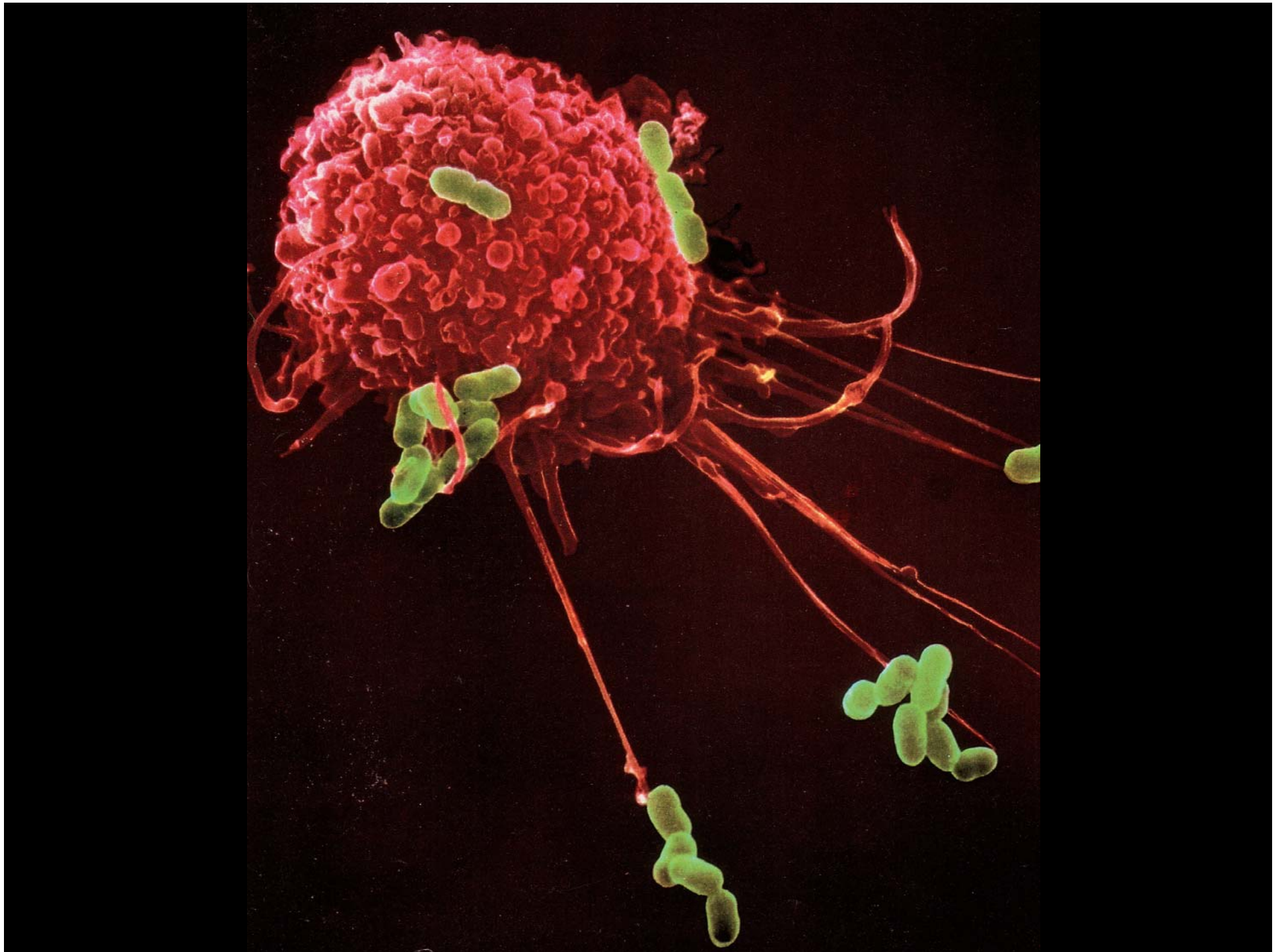
Val — His — Leu — Thr — Pro — Glu — Glu

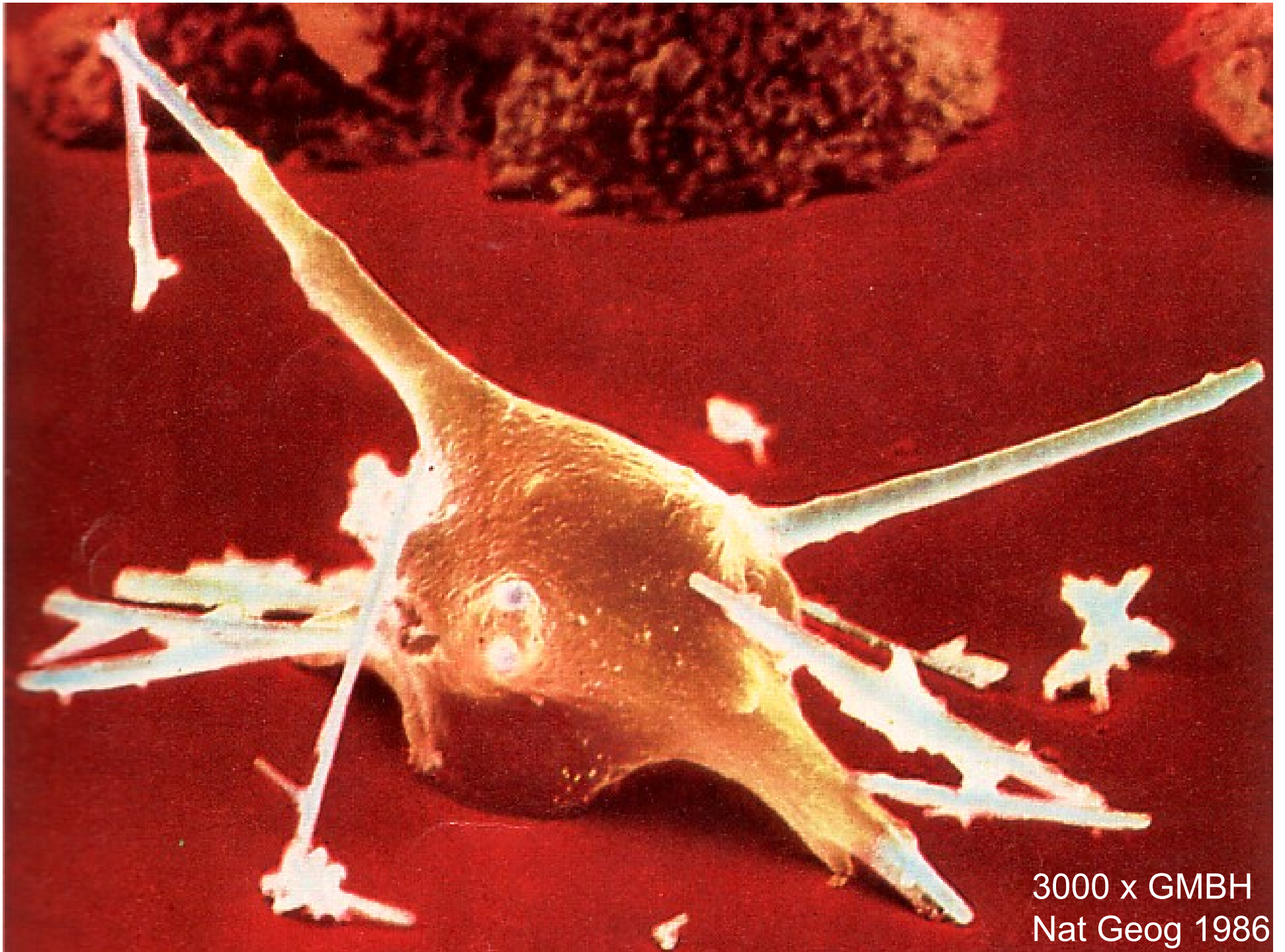
Amino acid sequence of sickle-cell hemoglobin:

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

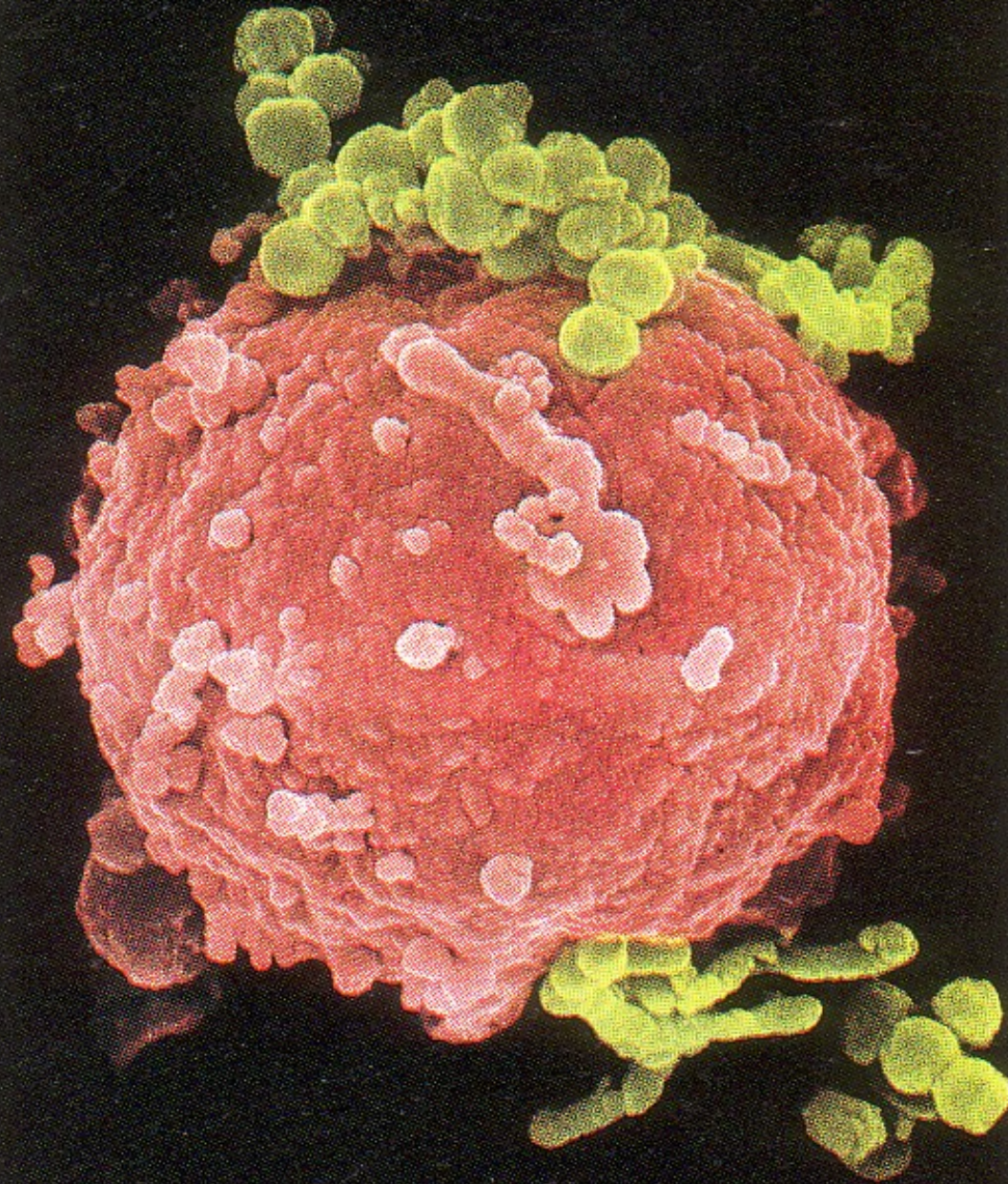
S&W 2011 fig 6-5 p 194

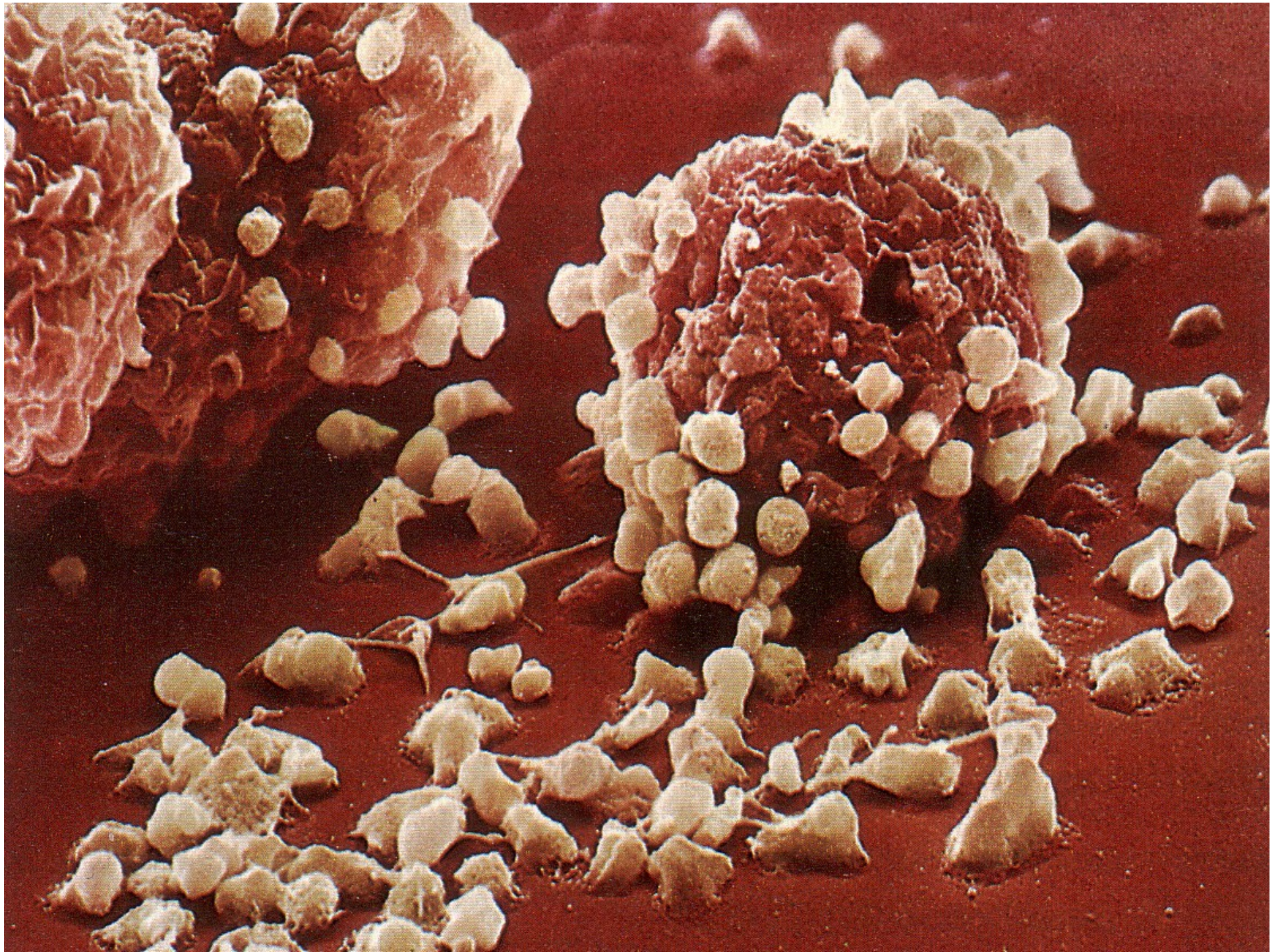


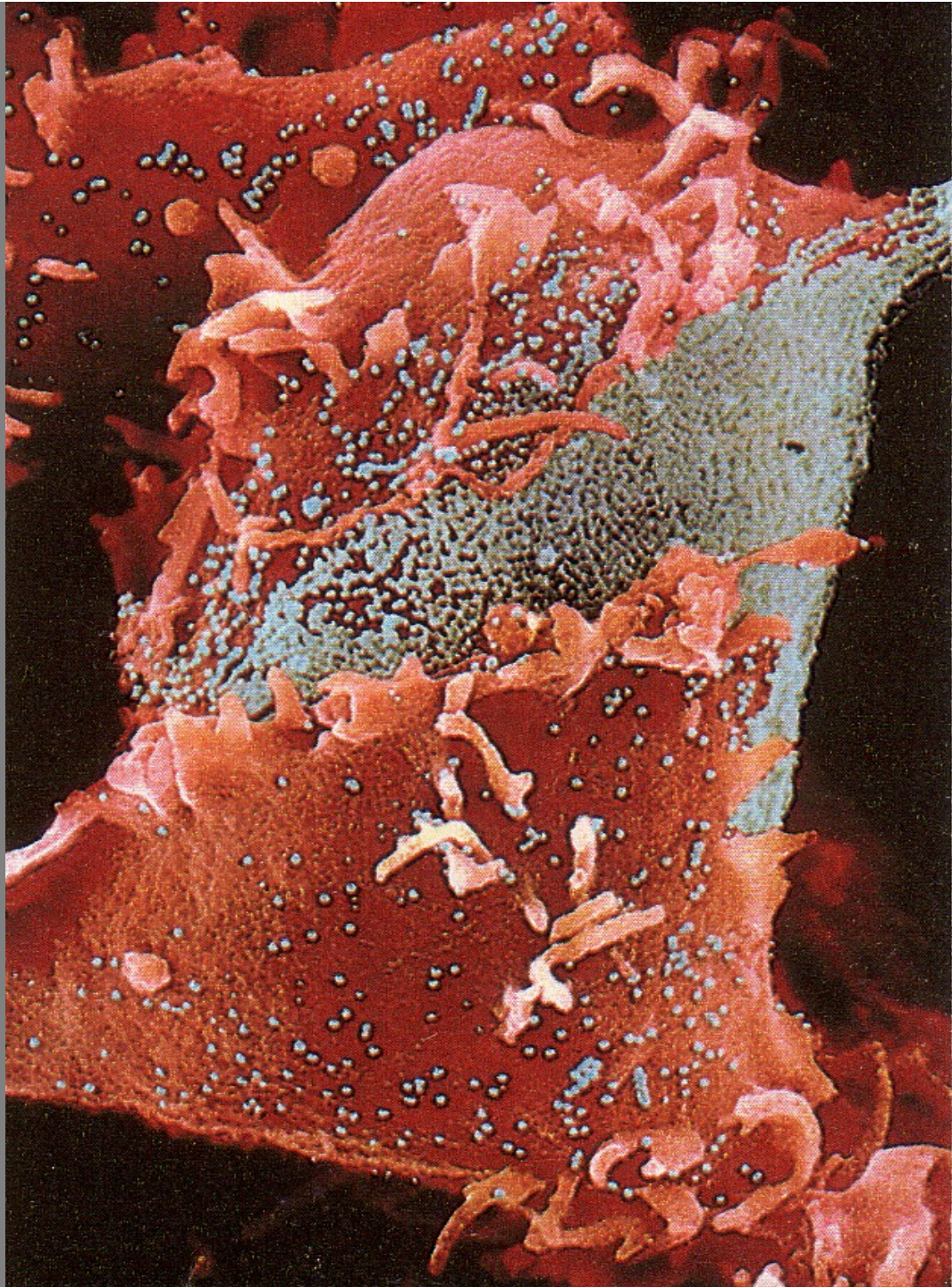




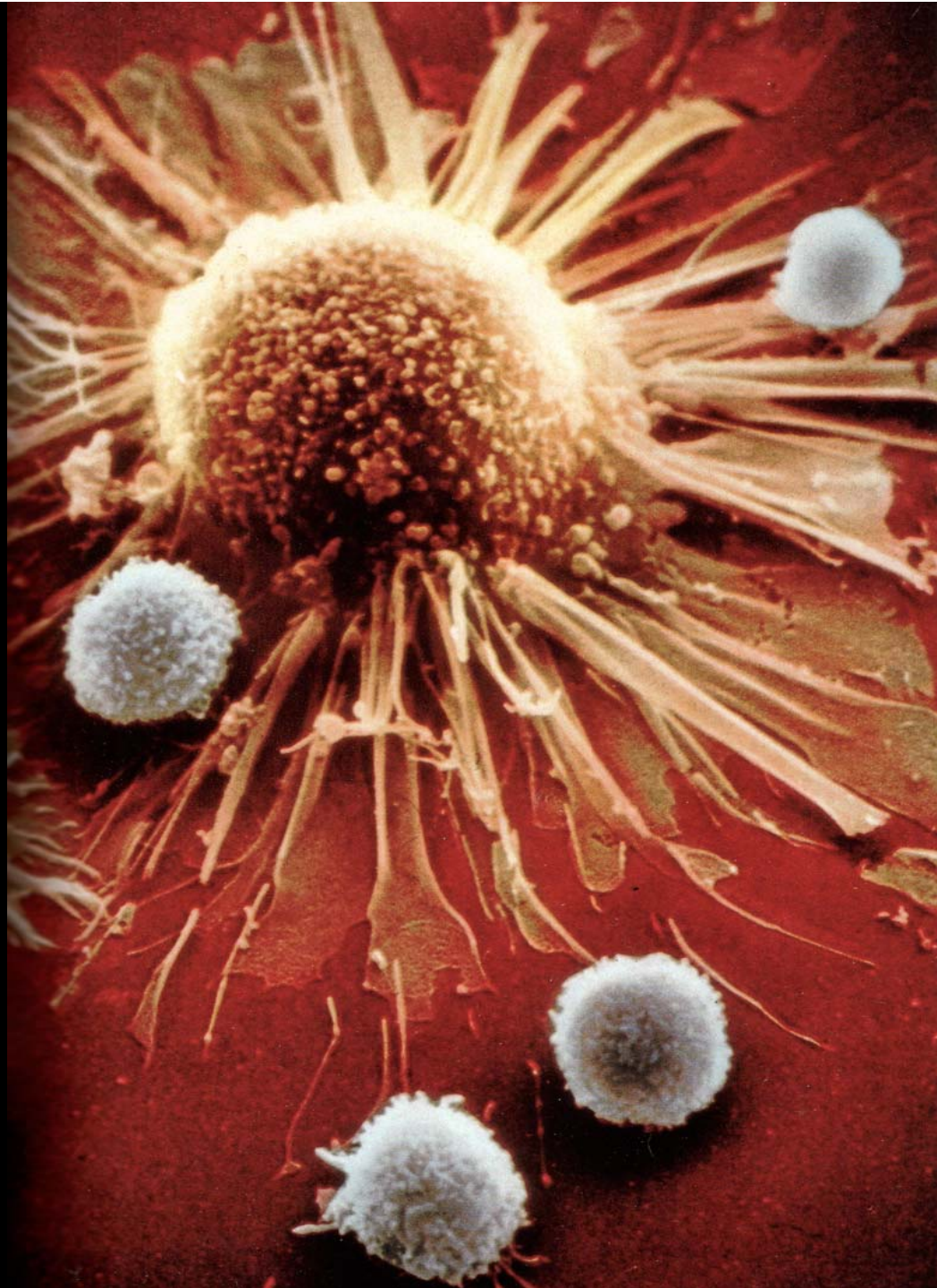
3000 x GMBH
Nat Geog 1986





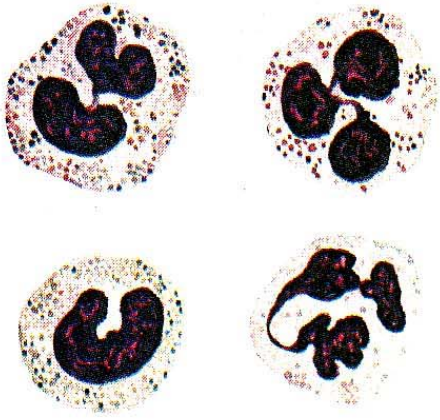




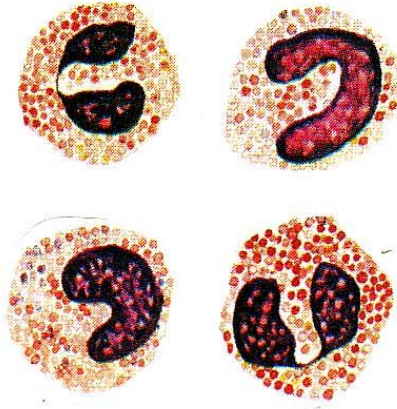




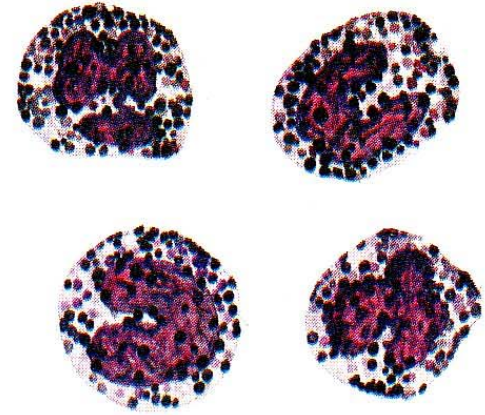




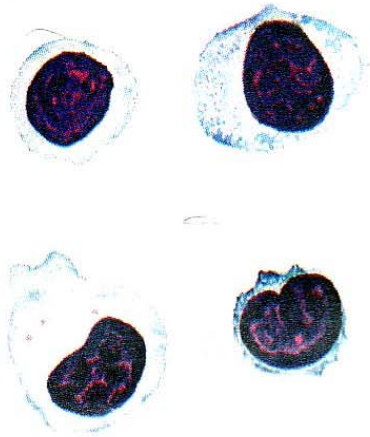
NEUTROPHILS



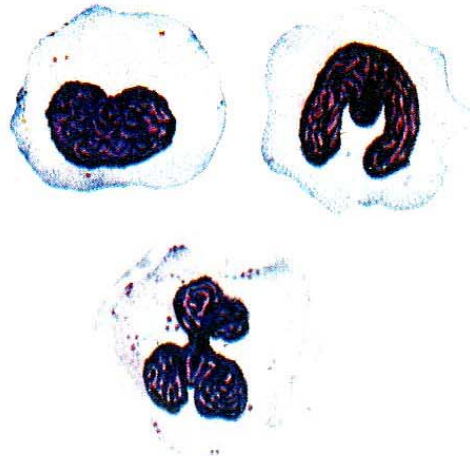
EOSINOPHILS



BASOPHILS



LYMPHOCYTES



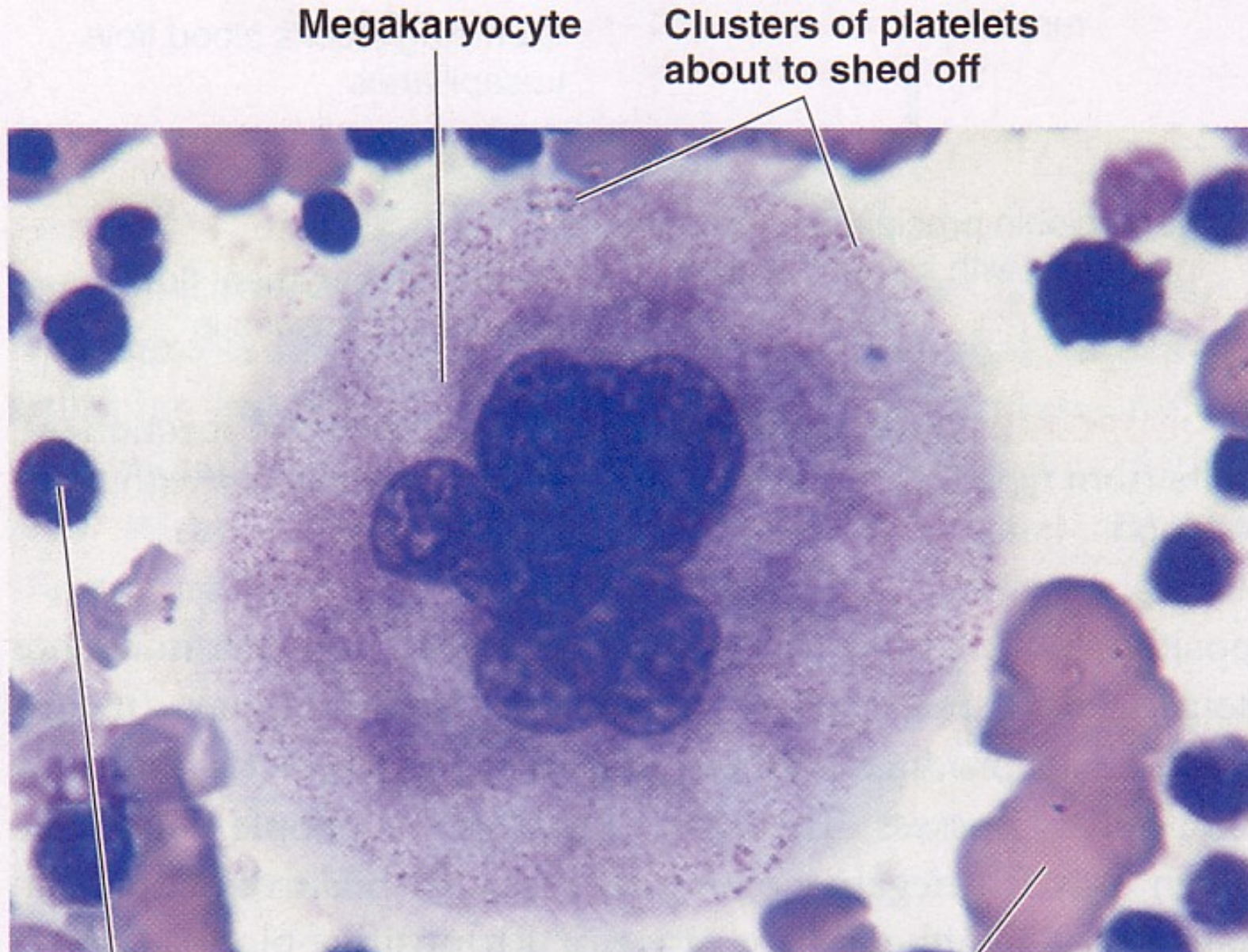
MONOCYTES



PLATELETS



ERYTHROCYTES



Megakaryocyte

Clusters of platelets
about to shed off

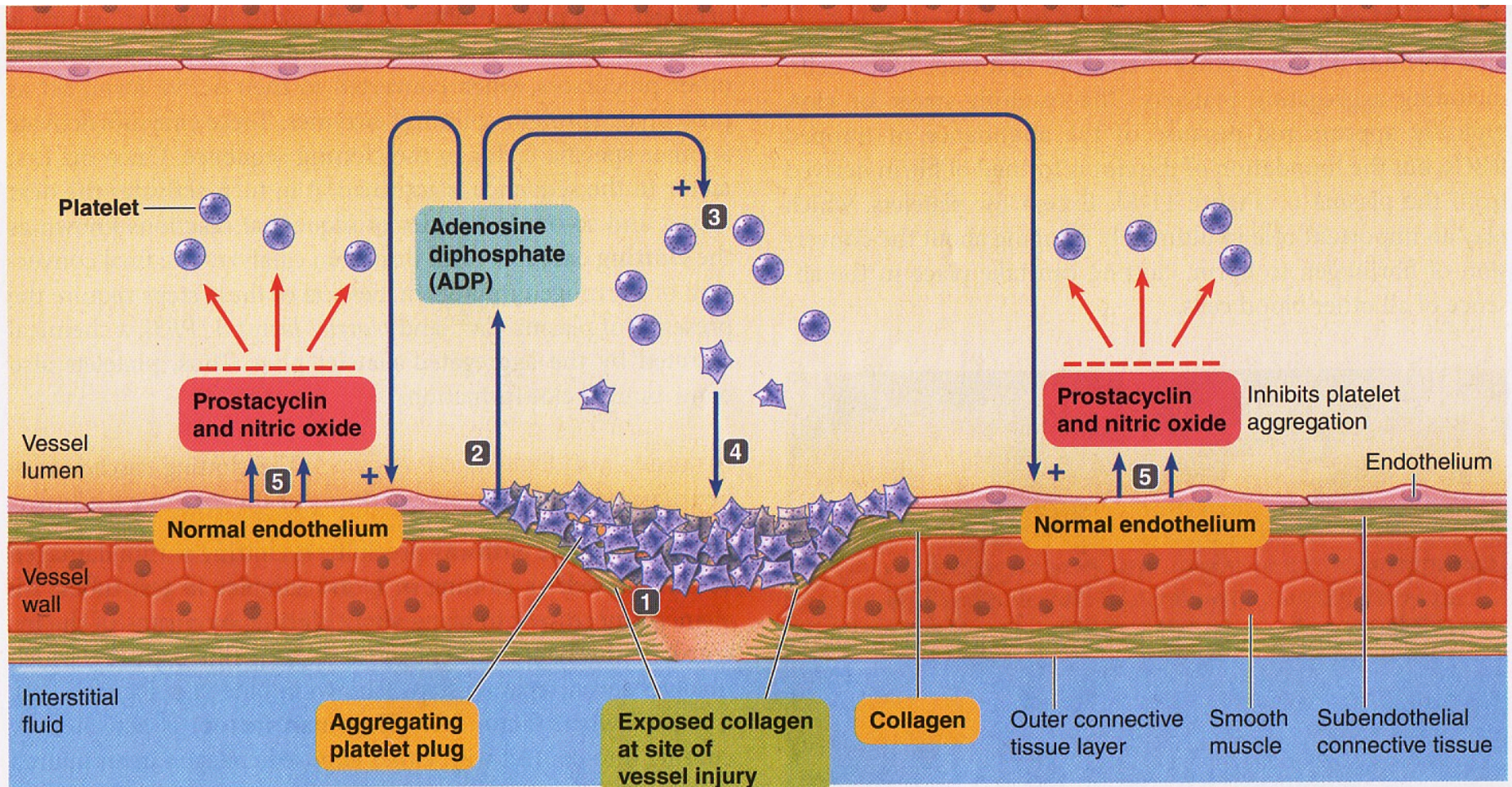
Developing
leukocyte

Cluster of developing
erythrocytes

Carolina Biological/Visuals Unlimited

LS 2012 fig 11-6

Formation of the Platelet Plug



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

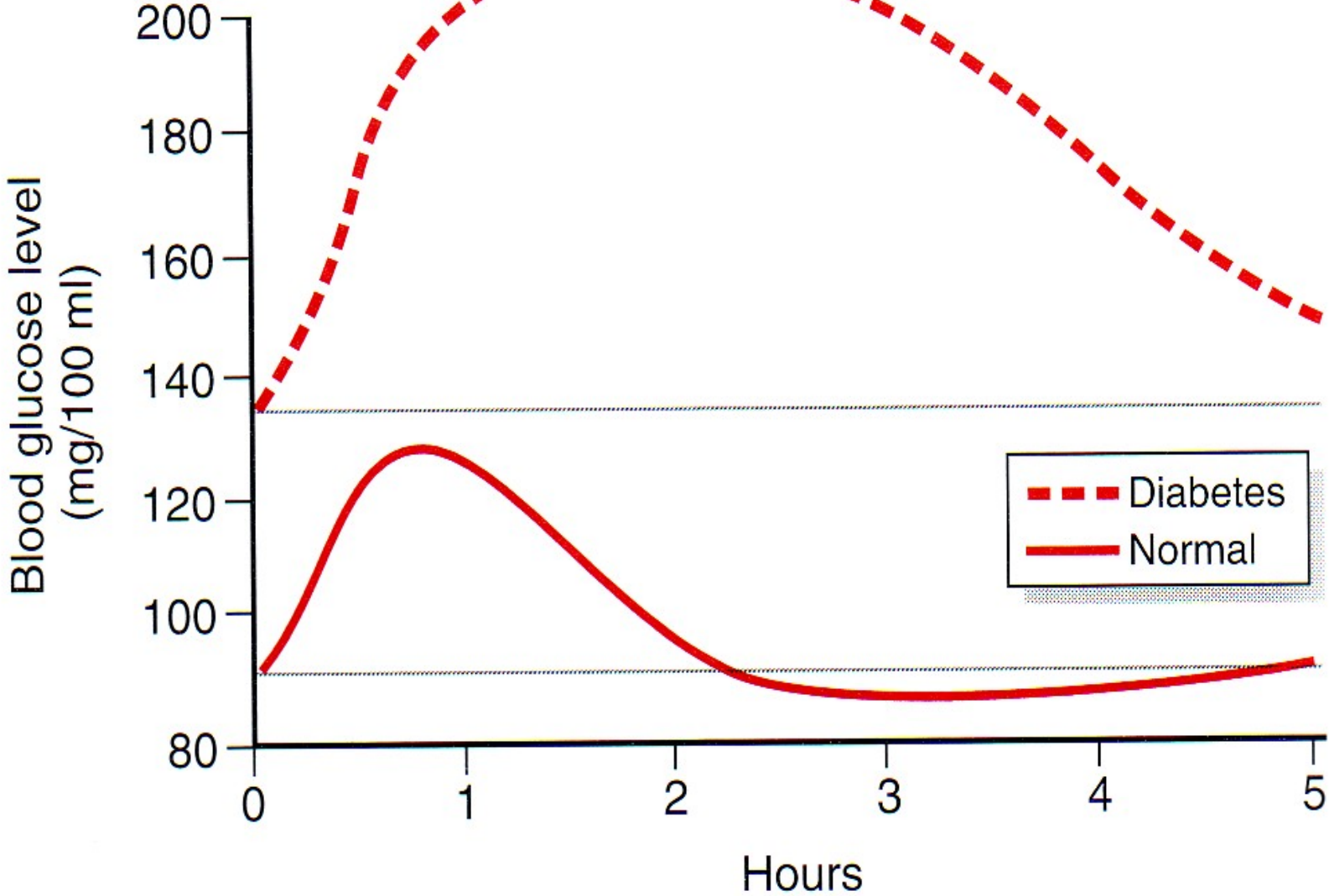
2 Activated platelets release ADP.

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

Proinsulin with C-Connecting Peptide

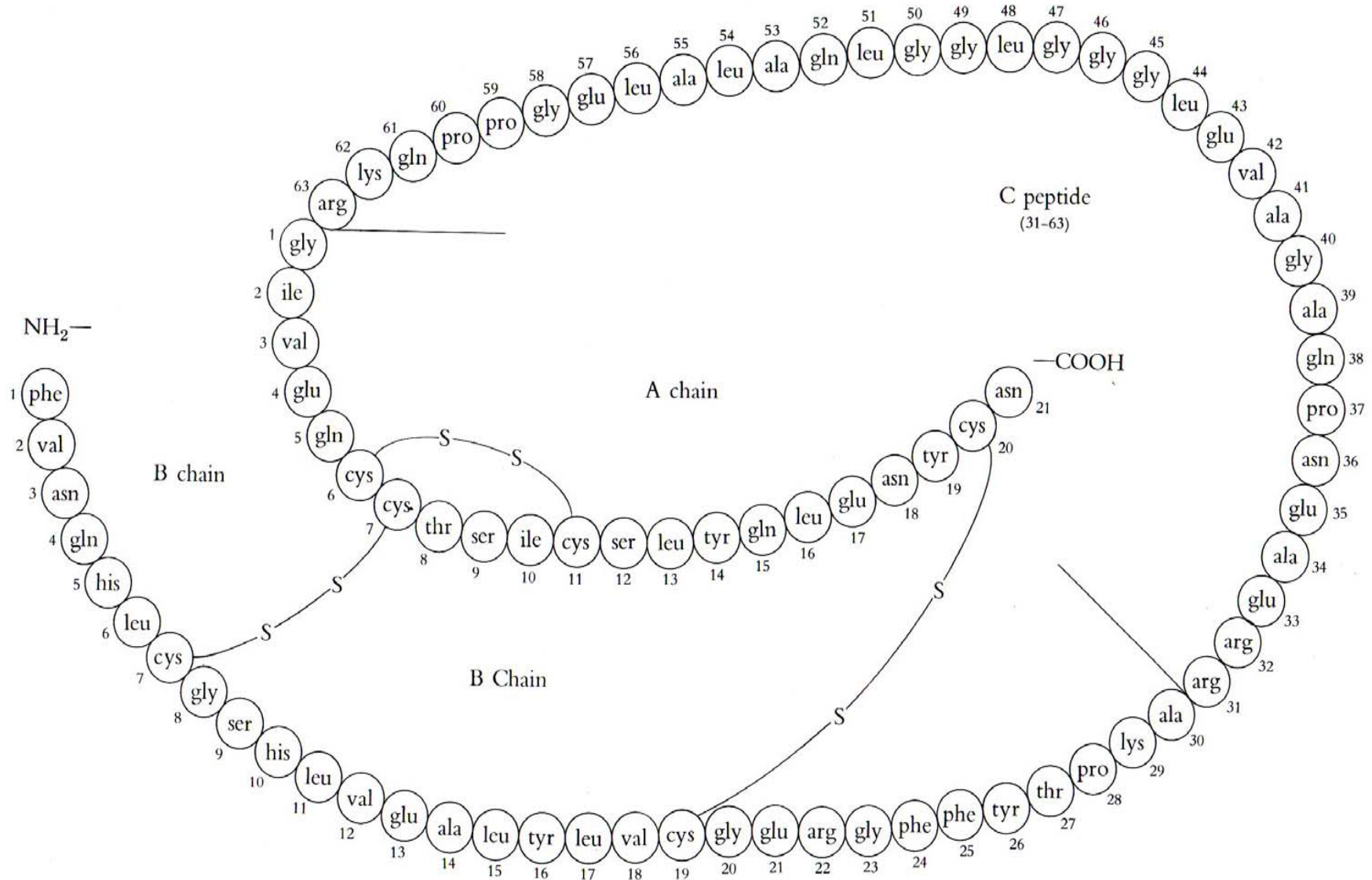


FIG. 10-4. Amino acid sequence of a mammalian proinsulin molecule. Note how the insulin molecule can be formed by cleaving this polypeptide chain at two locations to liberate the C peptide.

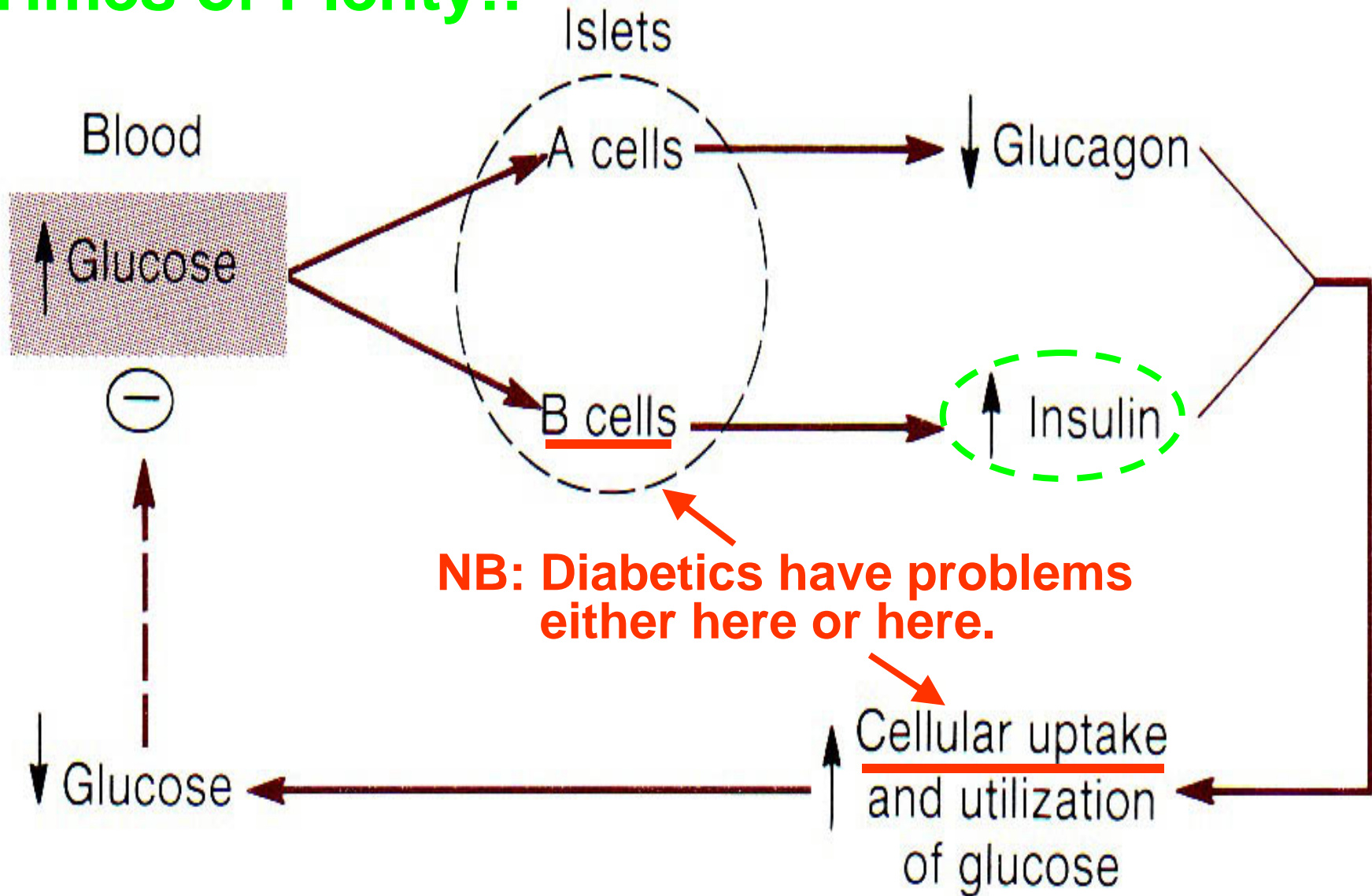
TABLE
4-7

Warning Signs of Diabetes

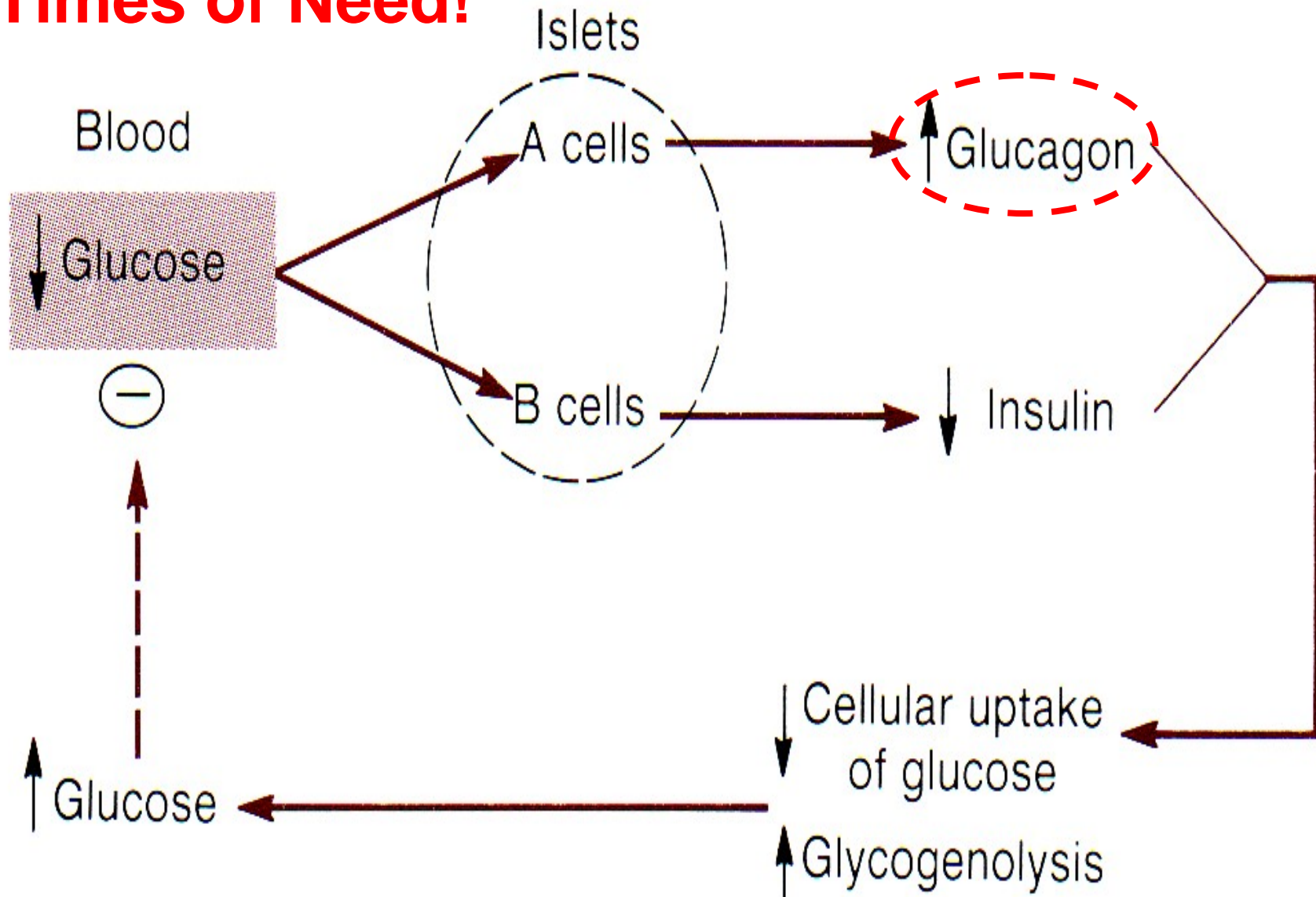
These signs appear reliably in type 1 diabetes and, often, in the later stages of type 2 diabetes.

- 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!



Mobilize!!

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!

