

We survived the exam! Happy Halloween!!
Remember nutrient p & have safe fun!



I. Announcements No lab today! Break for exam week!
Next R Blood Chemistry. Thanks sincerely for helping us optimize safety by reading $\geq 2x$ Lab 5, LM pp 5-1 thru 5-6.

II. Blood Form & Function LS ch 11, DC Module 5 pp 35-9

- A. Formed vs Nonformed/cells vs plasma LS fig + tab 11-1
Cell origin - bone marrow. What's in plasma? LS p 297
- B. Red blood cells/erythrocytes: O_2 carrying LS p 299
Normal flexible vs fragile sickle cell LS p 301
- C. White blood cells/leukocytes: defense/immunity
differential + general functions LS pp 298, 309-12
- D. Platelets/thrombocytes: clotting LS pp 304-6 fig 11-6+7

III. Blood Chemistry Lab: Basics LM + LS ch 11 & 17

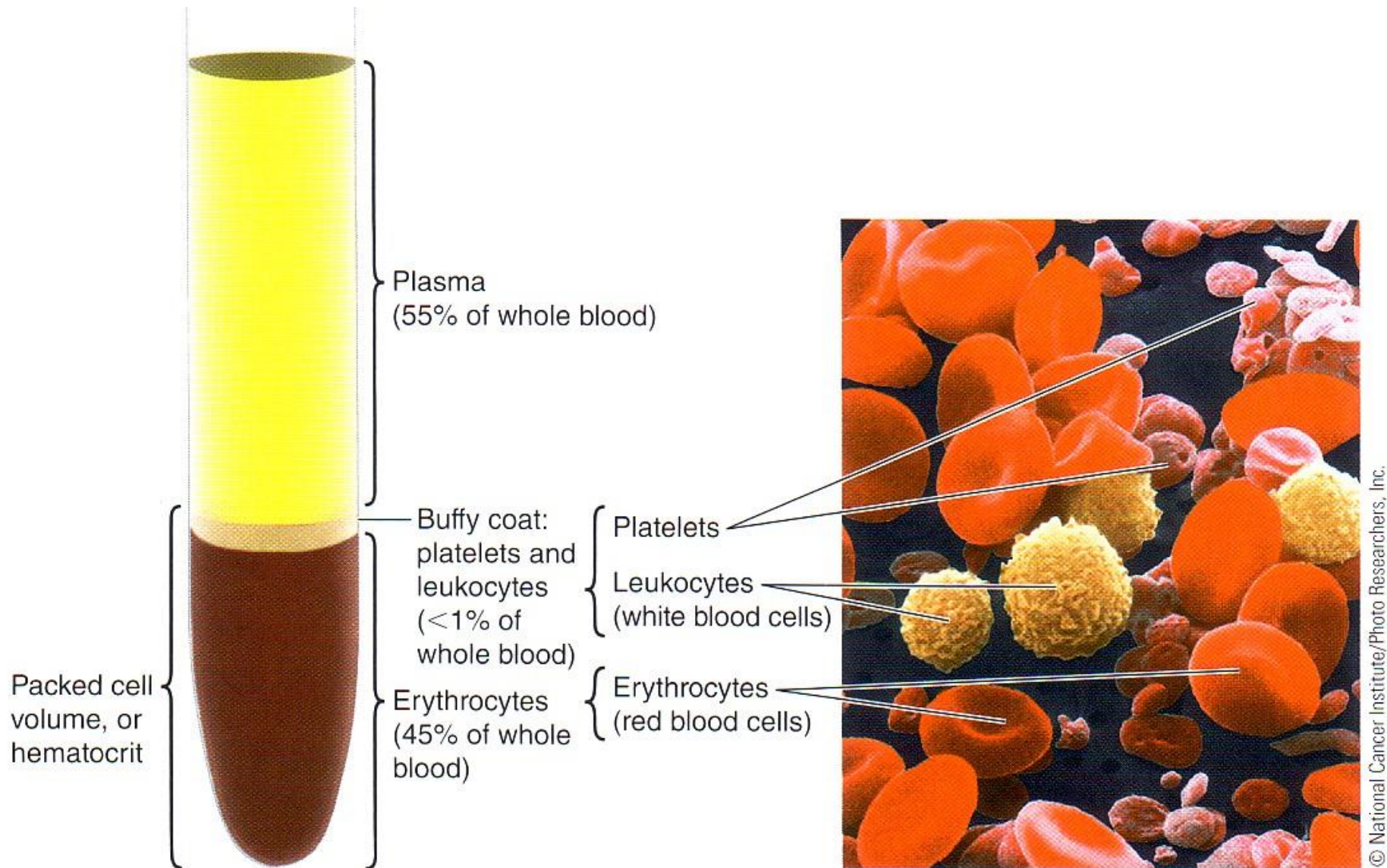
- A. What's blood typing? ABo System LS pp 302- 4
Rhesus factor? Erythroblastosis fetalis? LS p 303-4
- B. What's blood glucose? Clinically healthy range?
- C. Diabetes + Treatment LS ch 17 pp 532-5

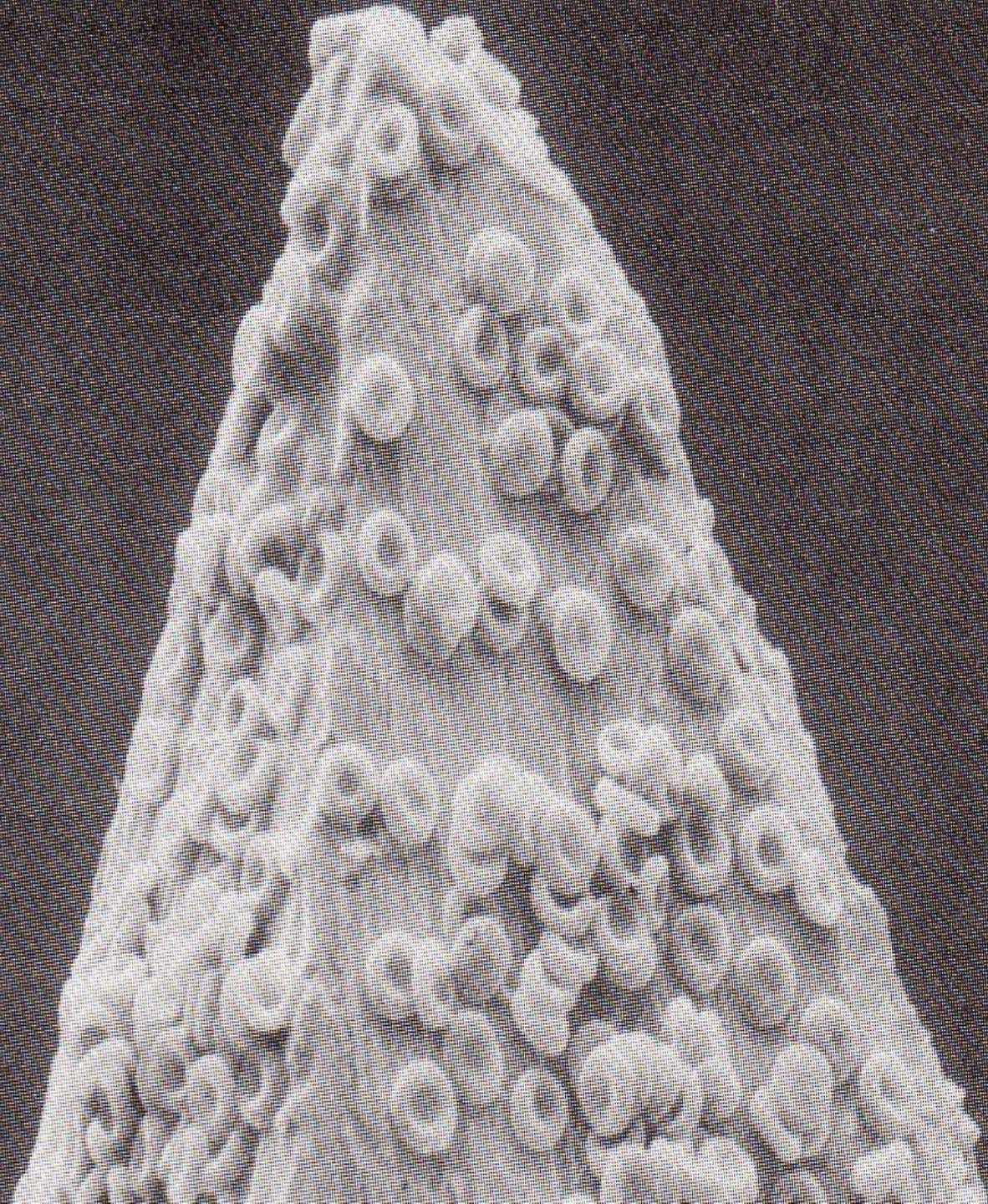
IV. Exam Comments & Return

Ghost, marshmallow
or white blood cell?



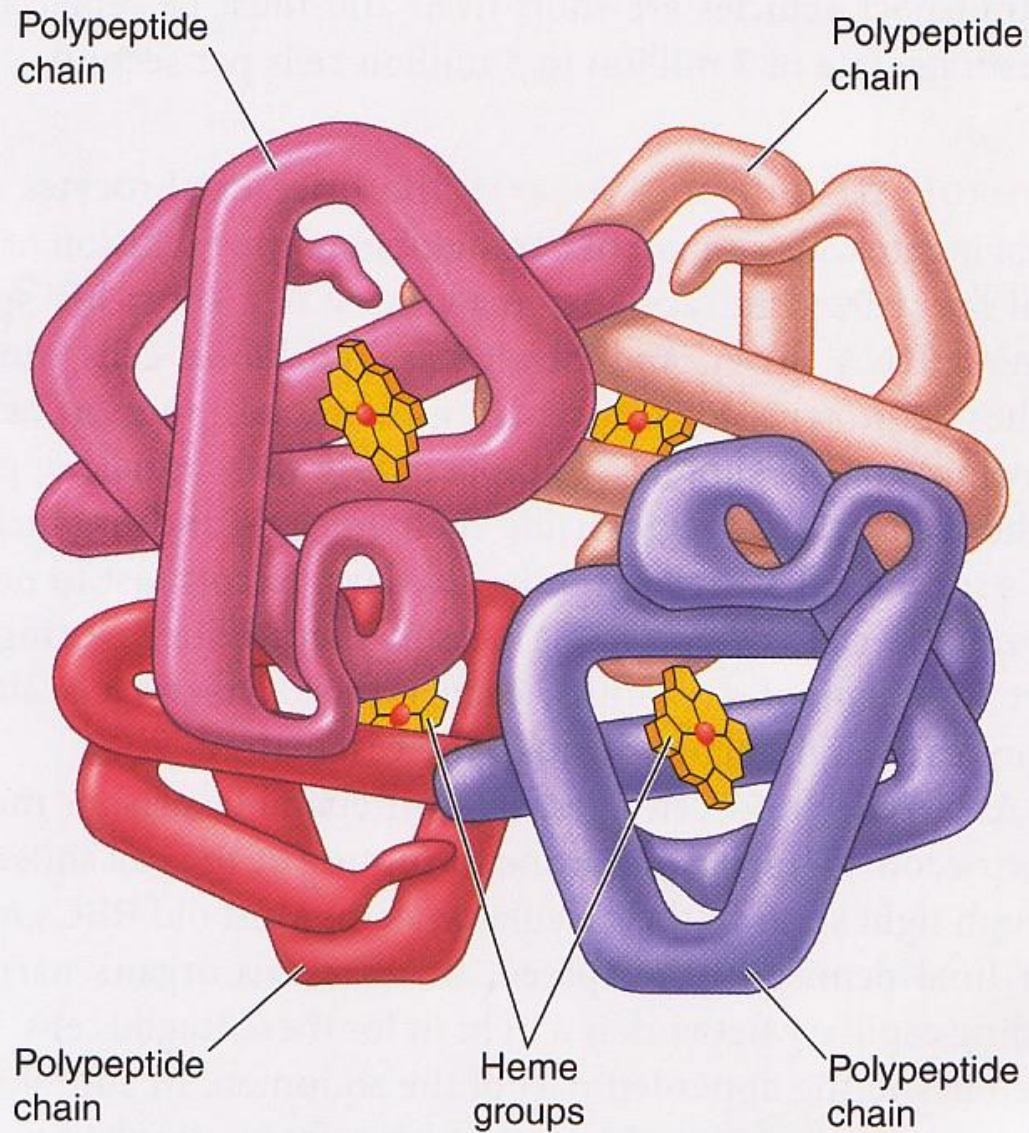
What's in Blood? Plasma & Blood Cells







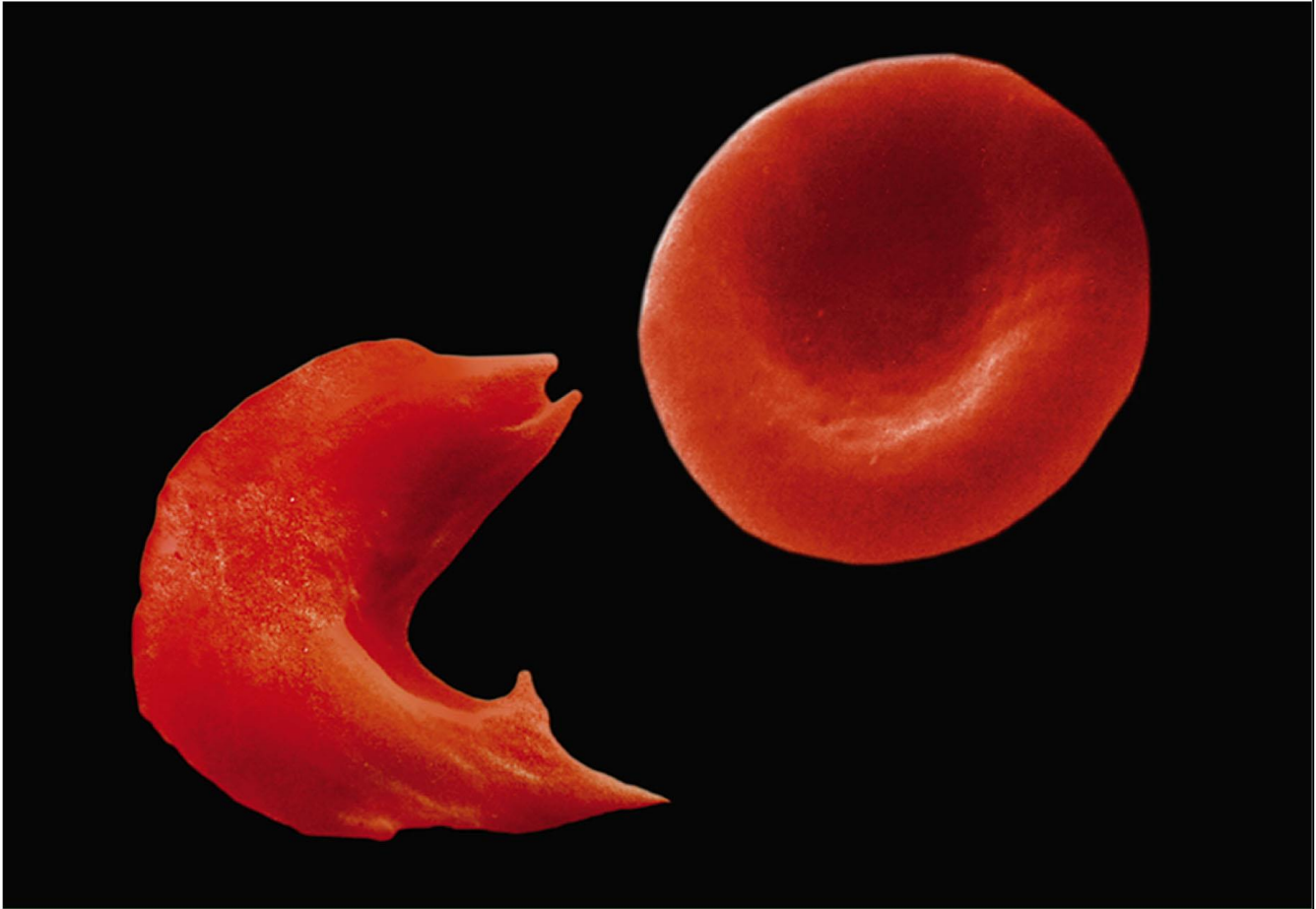
Hemoglobin Structure



Sickle-shaped blood cells

Normal red blood cells

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What a difference one amino acid can make!

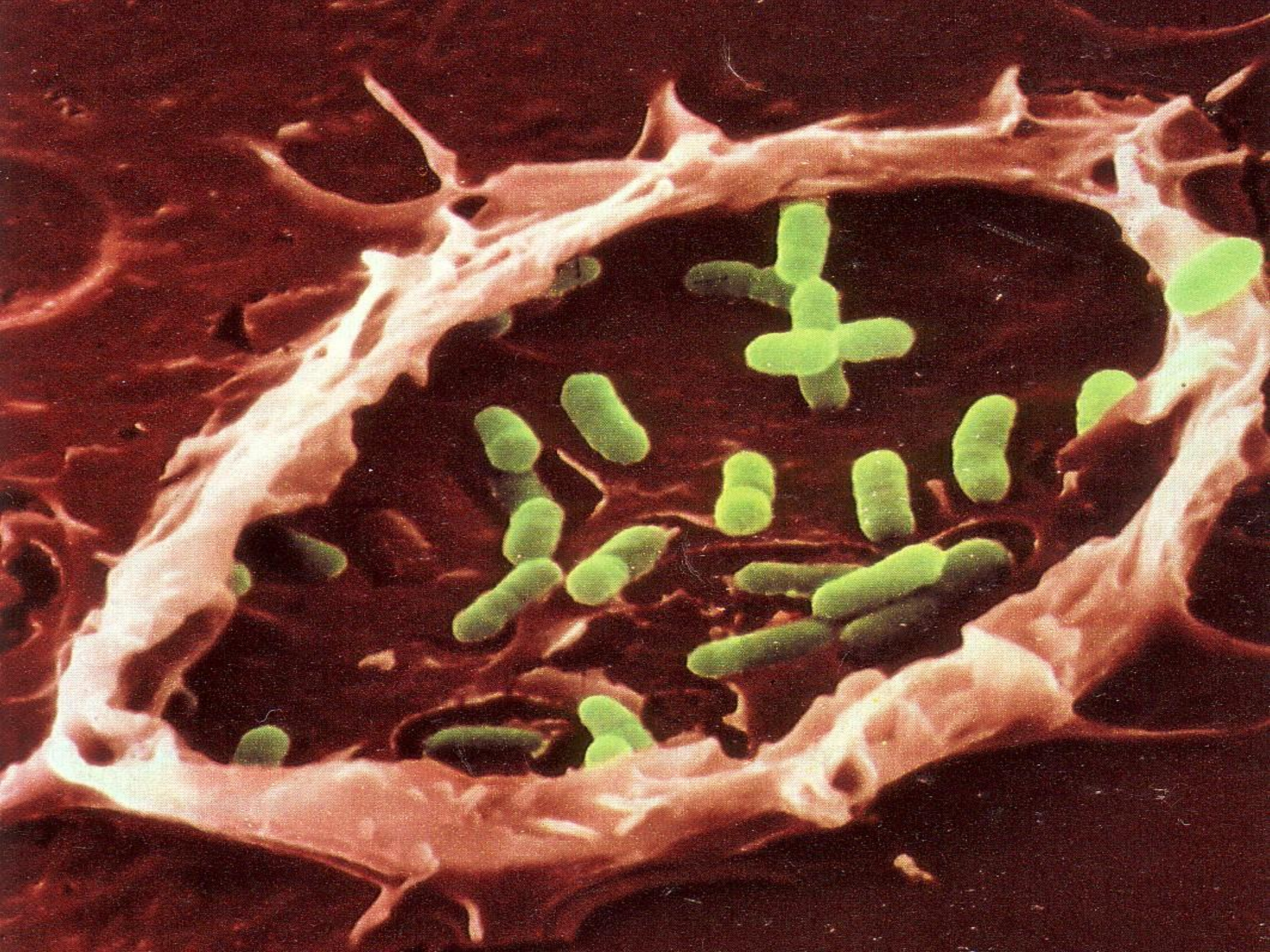
Amino acid sequence of normal hemoglobin:

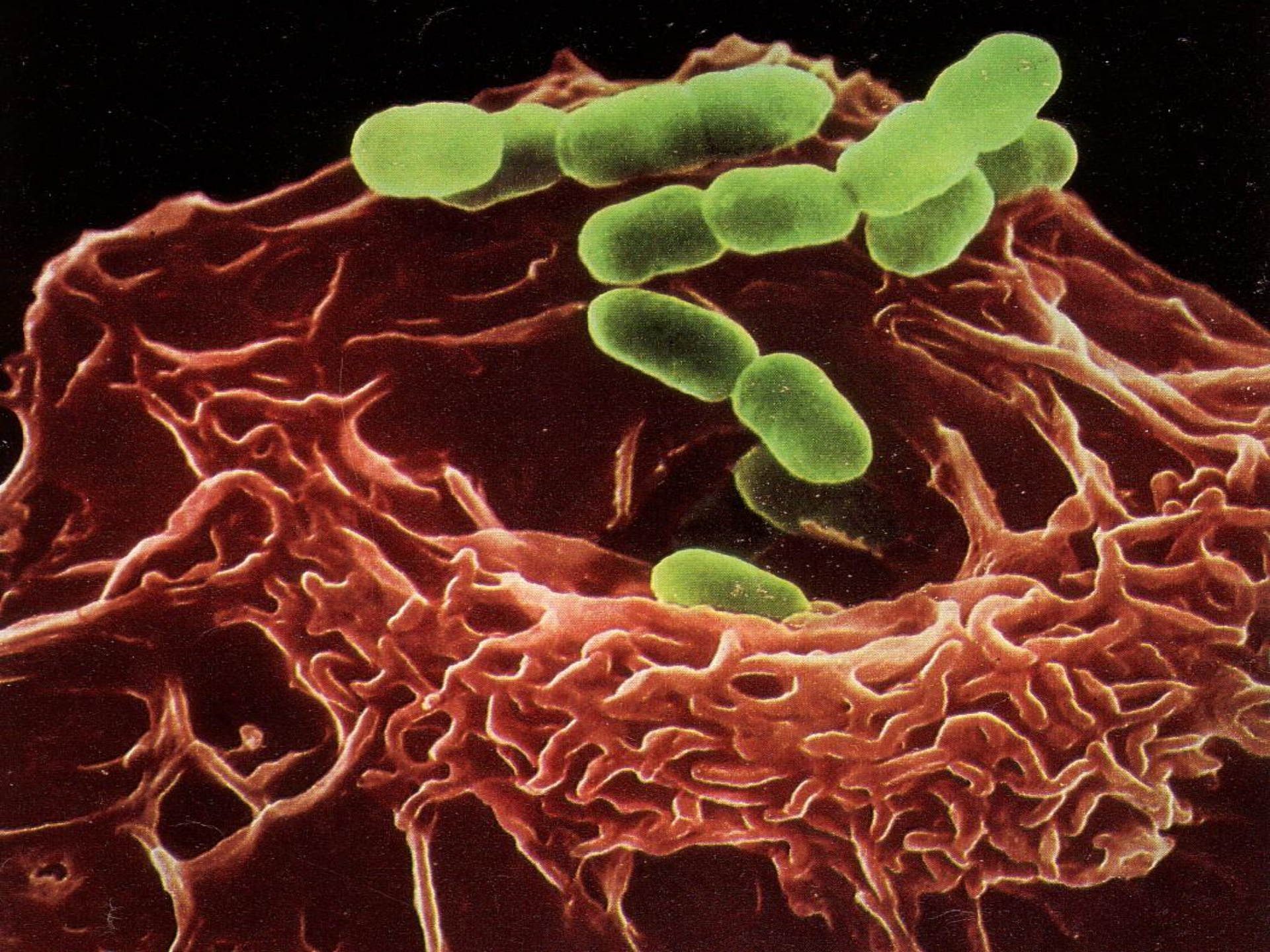


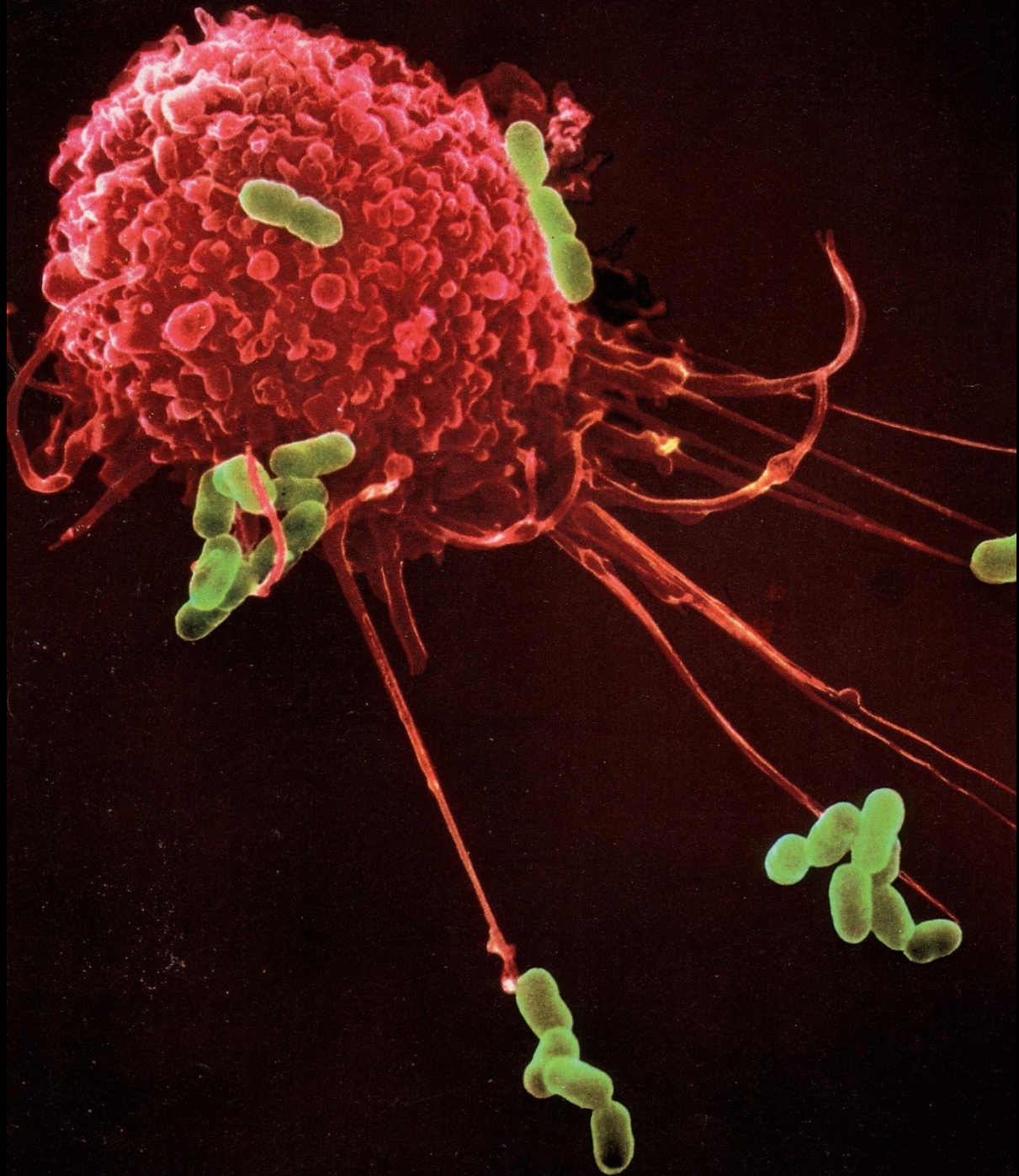
Amino acid sequence of sickle-cell hemoglobin:

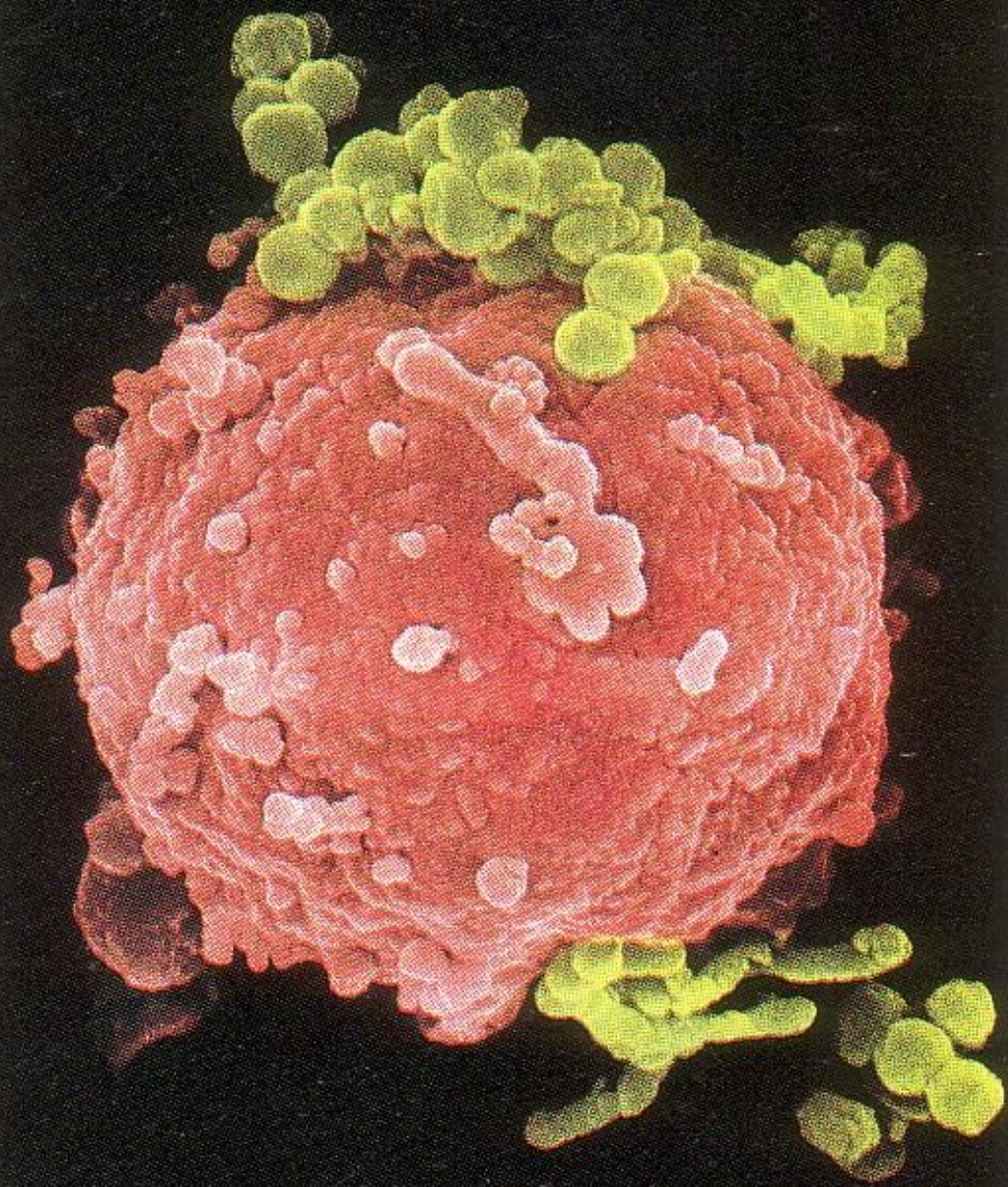


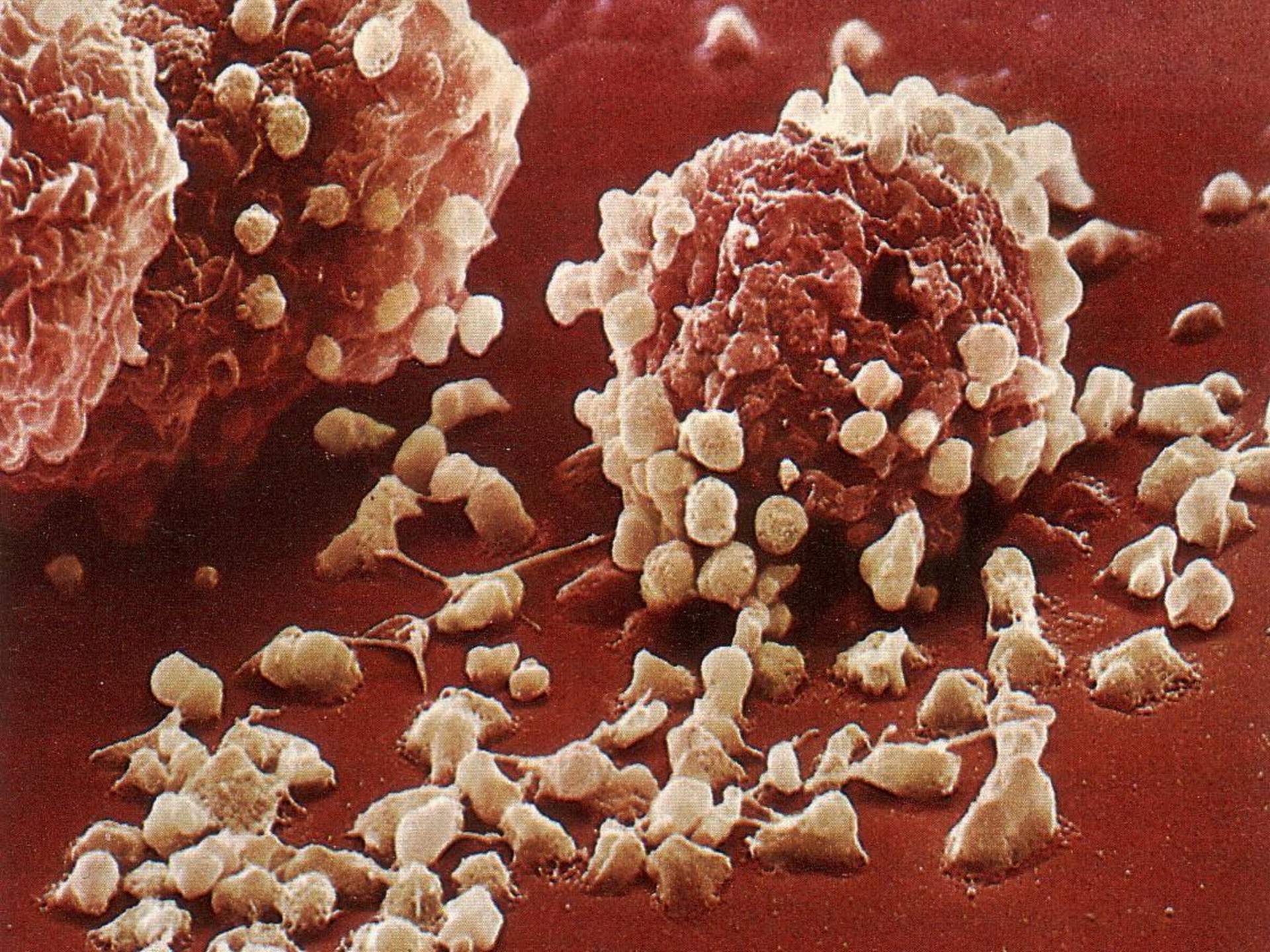


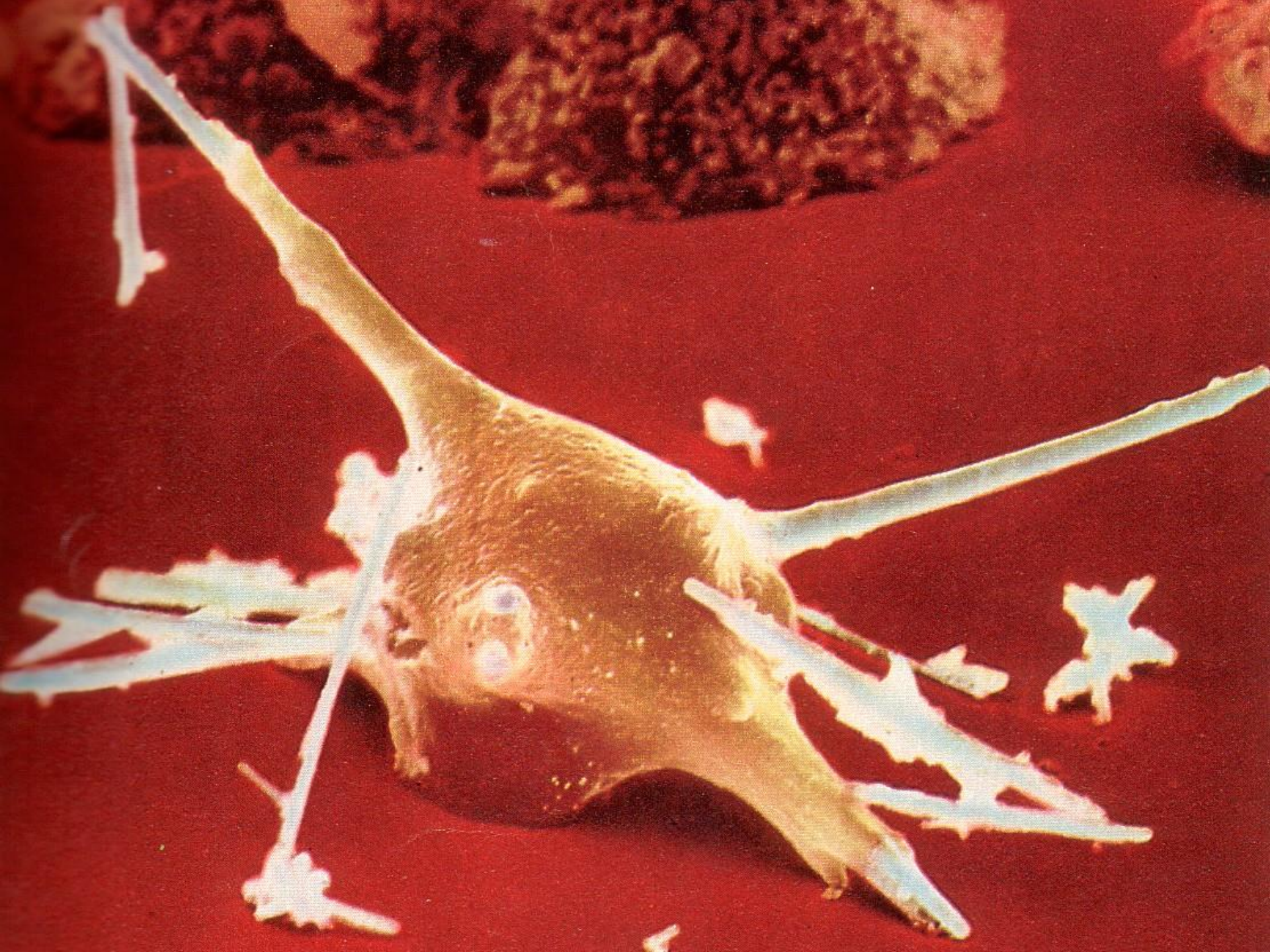


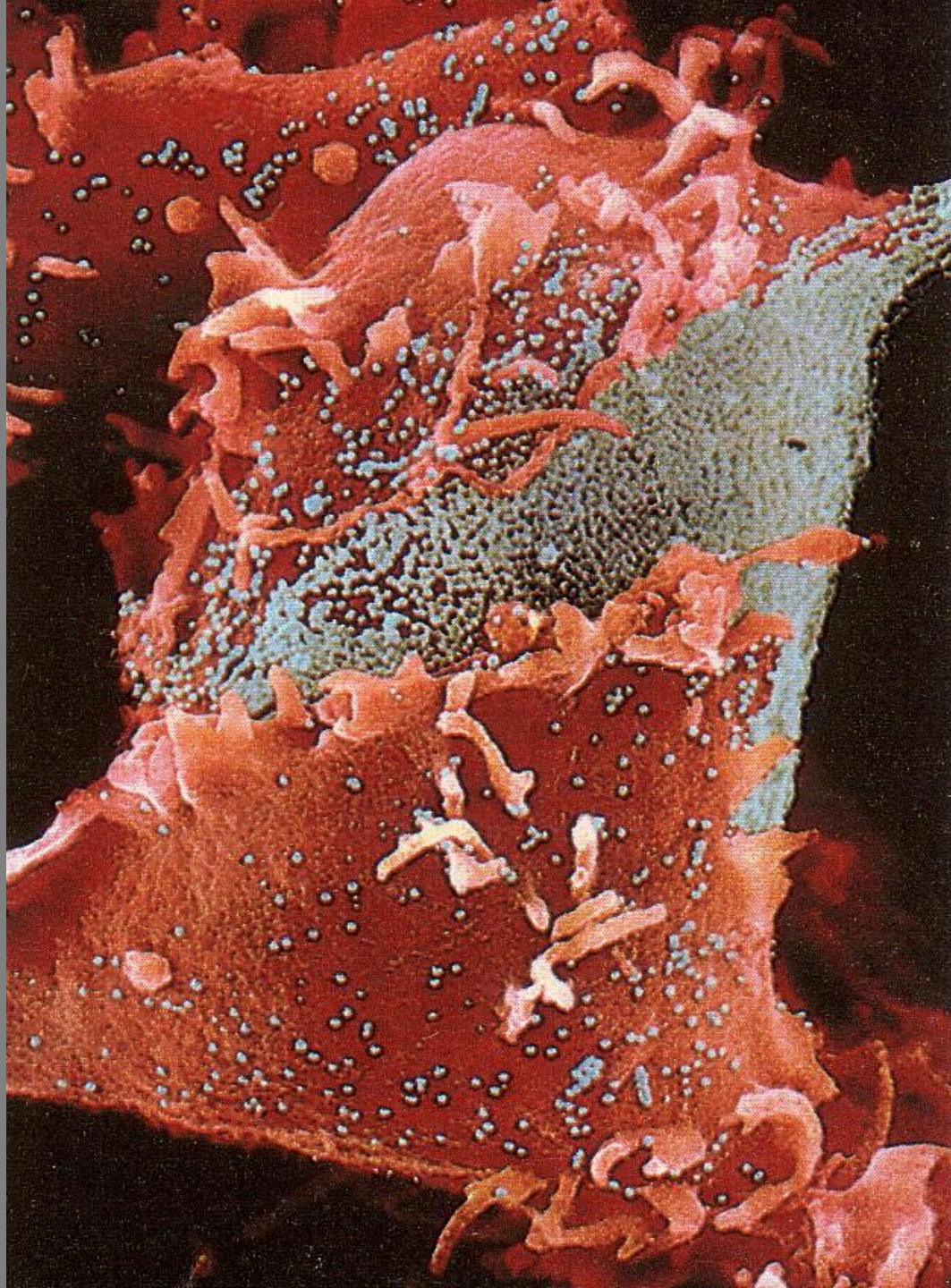




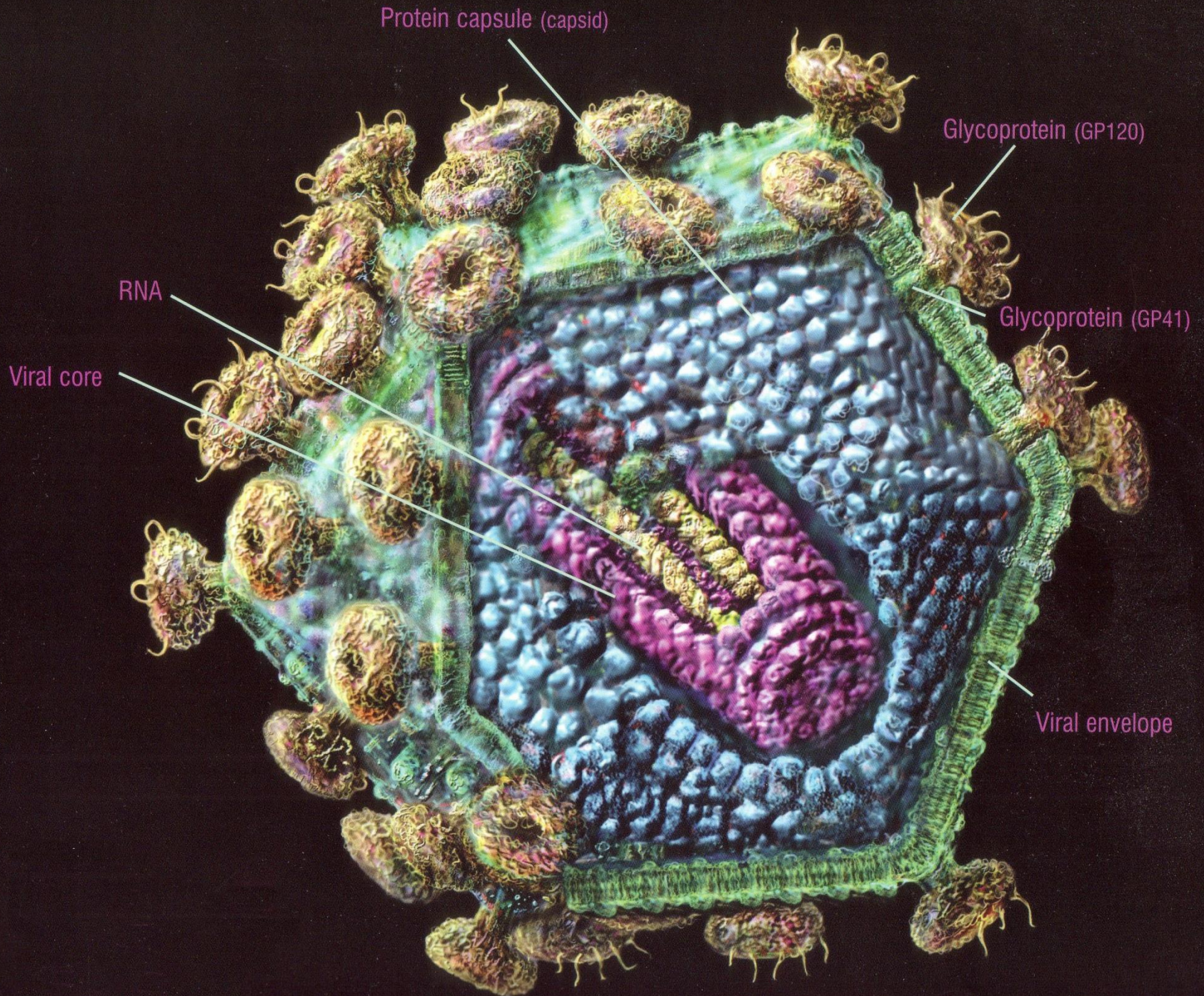


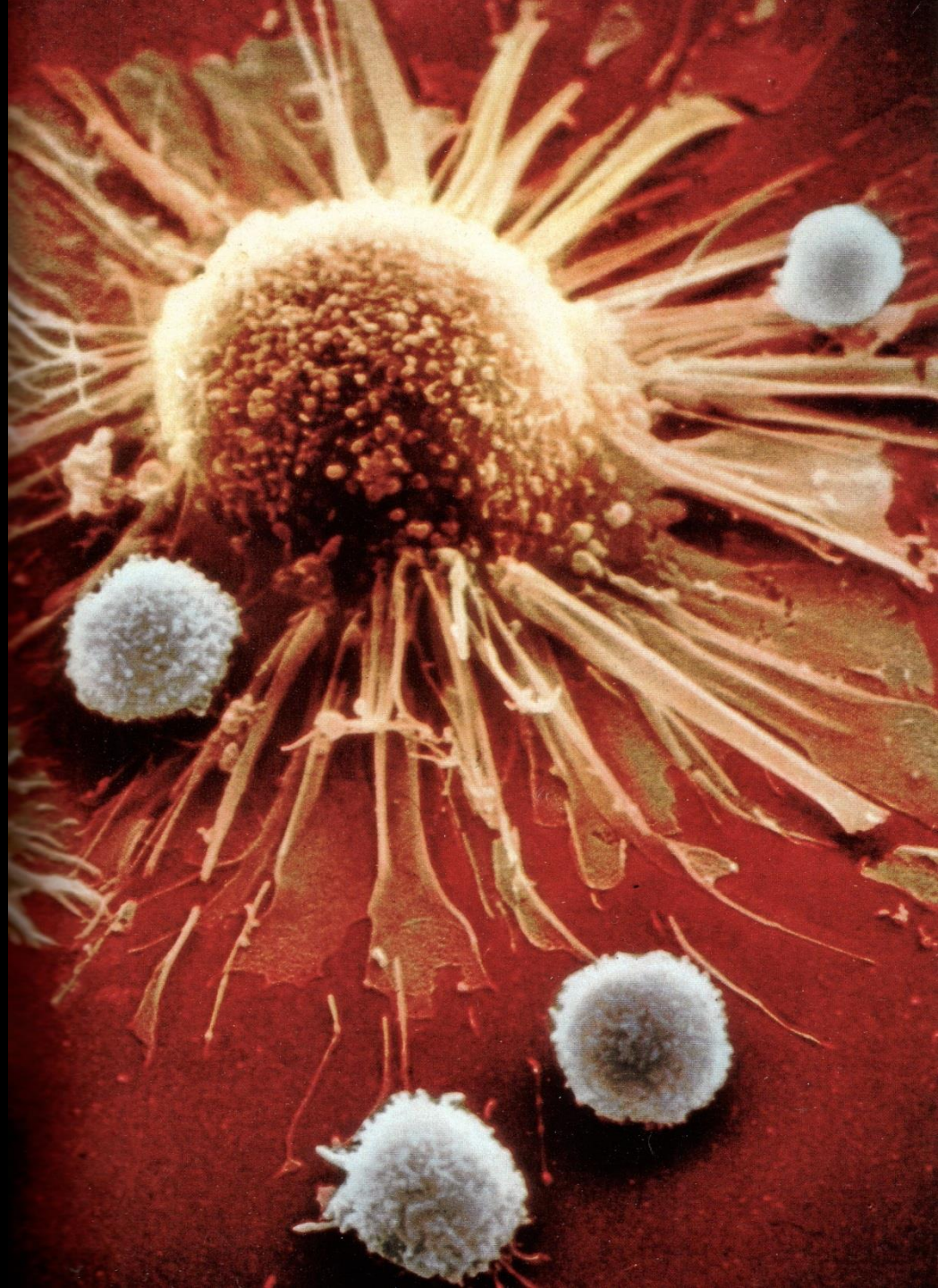




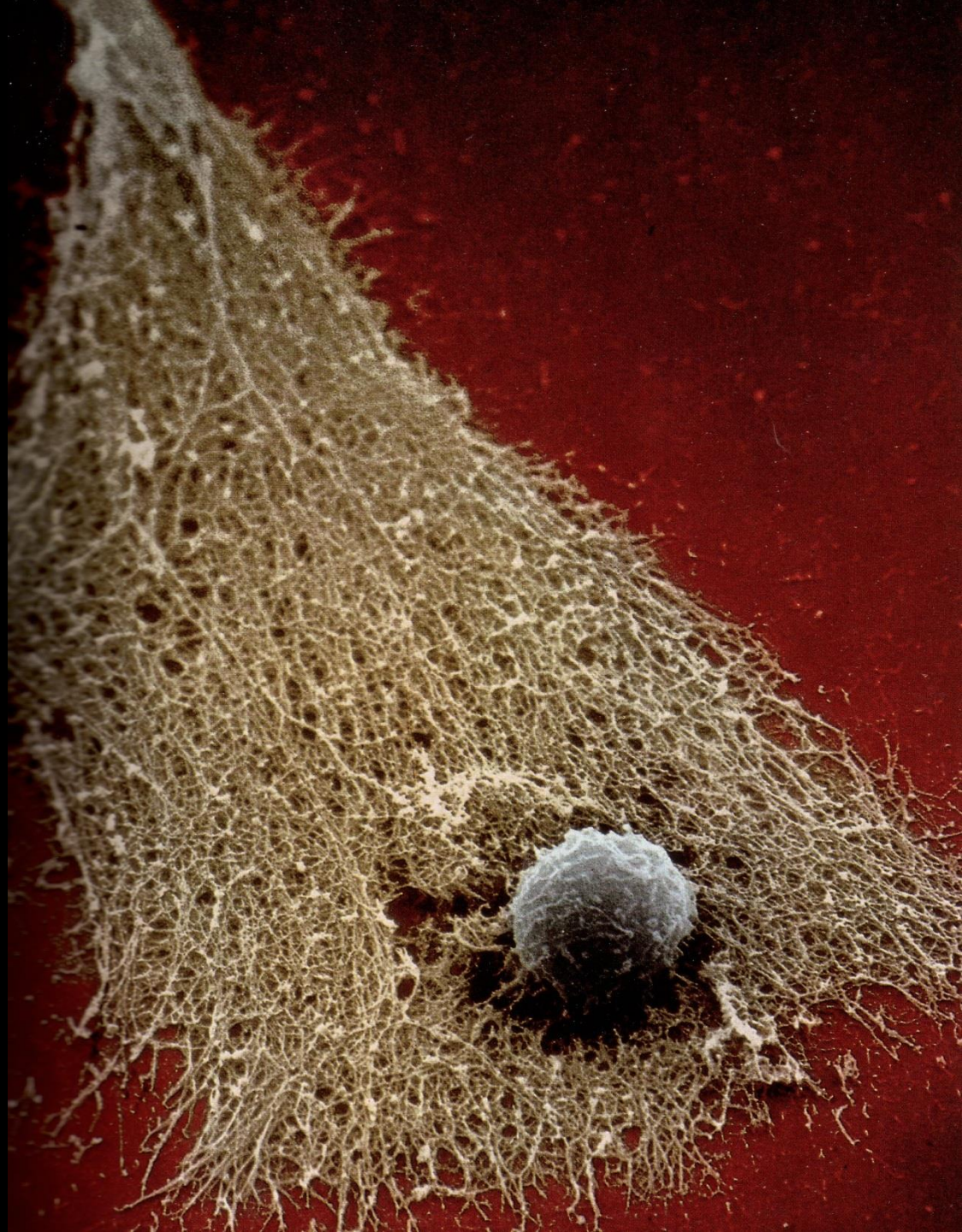


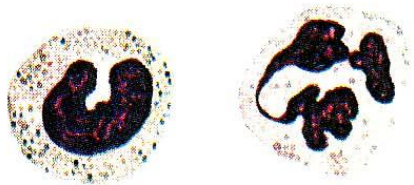
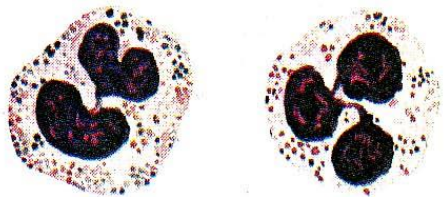




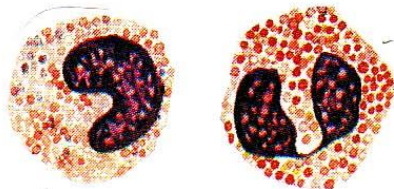
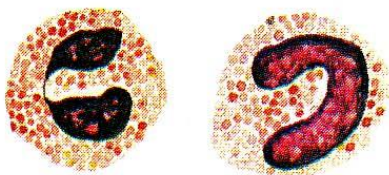




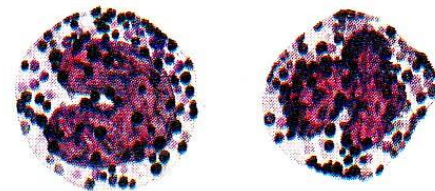
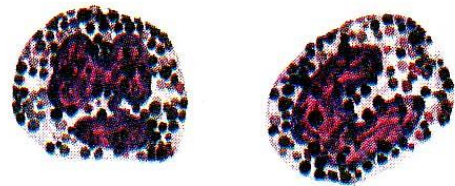




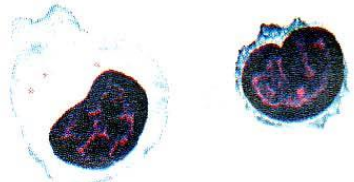
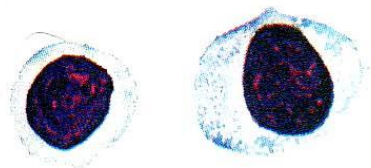
NEUTROPHILS



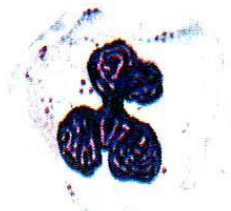
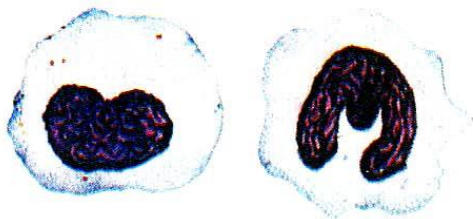
EOSINOPHILS



BASOPHILS



LYMPHOCYTES



MONOCYTES



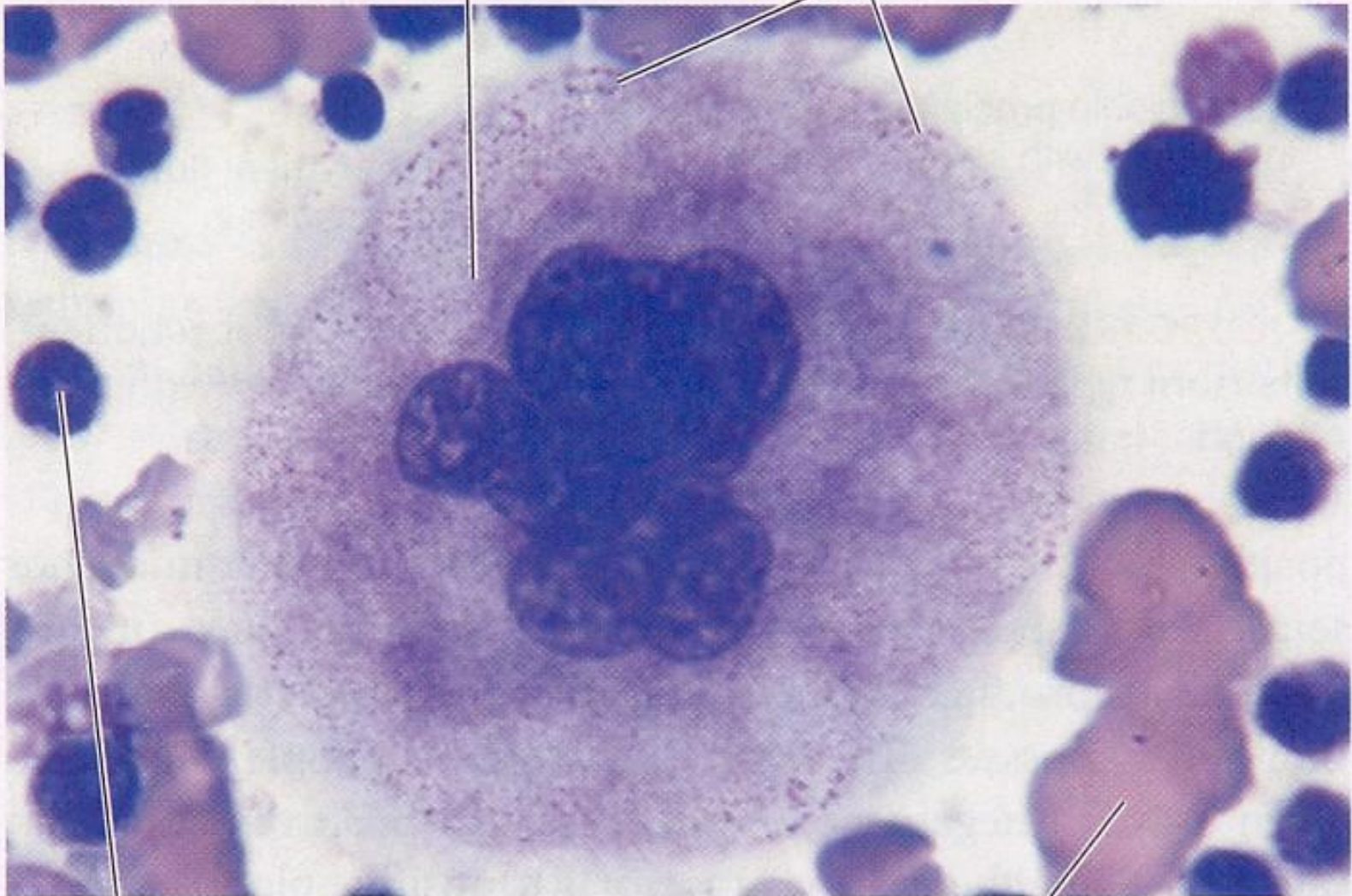
PLATELETS



ERYTHROCYTES

Megakaryocyte

Clusters of platelets
about to shed off

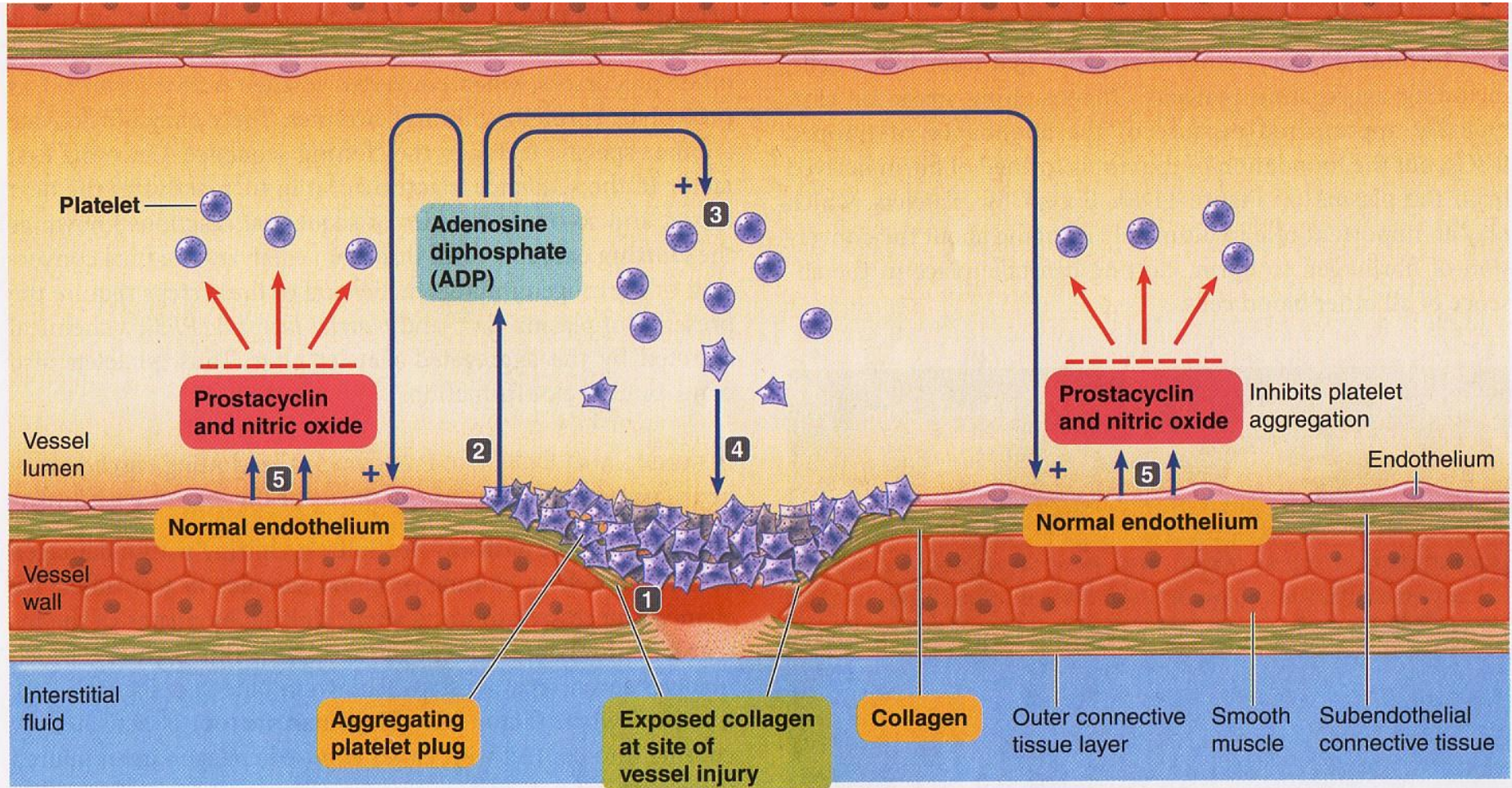


Carolina Biological/Visuals Unlimited

Developing
leukocyte

Cluster of developing
erythrocytes

Platelet Plug Formation



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.

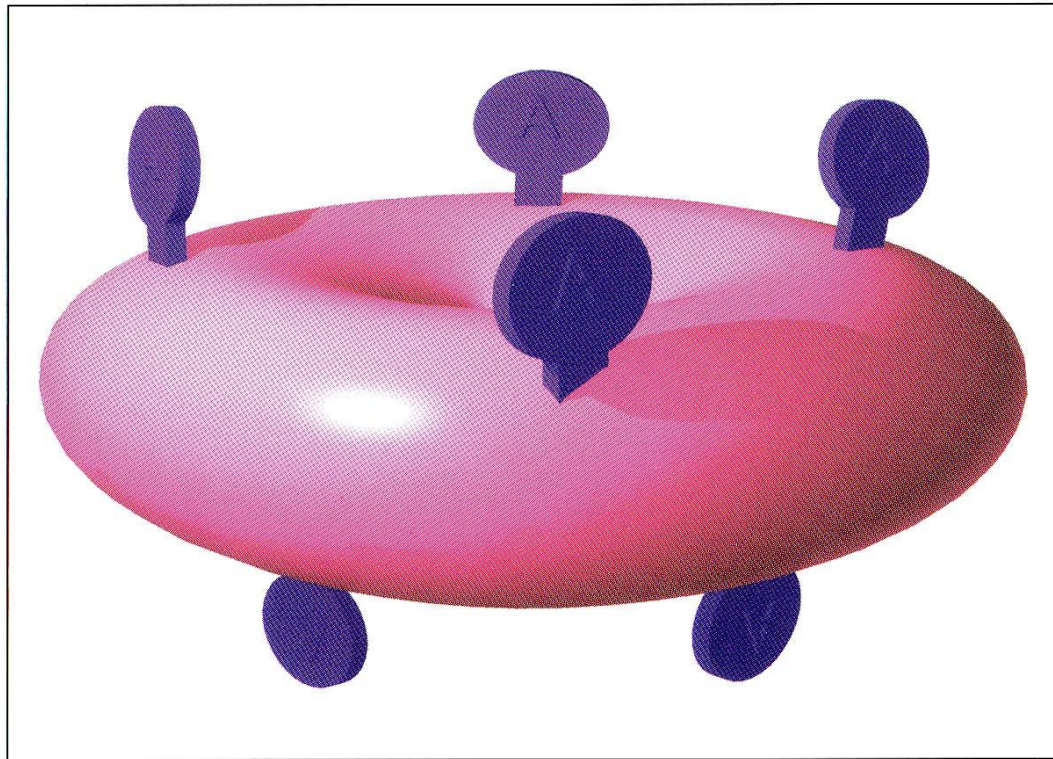
4 Newly activated platelets aggregate onto growing platelet plug and release even more platelet-attracting chemicals.

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

Break for discussion/questions!

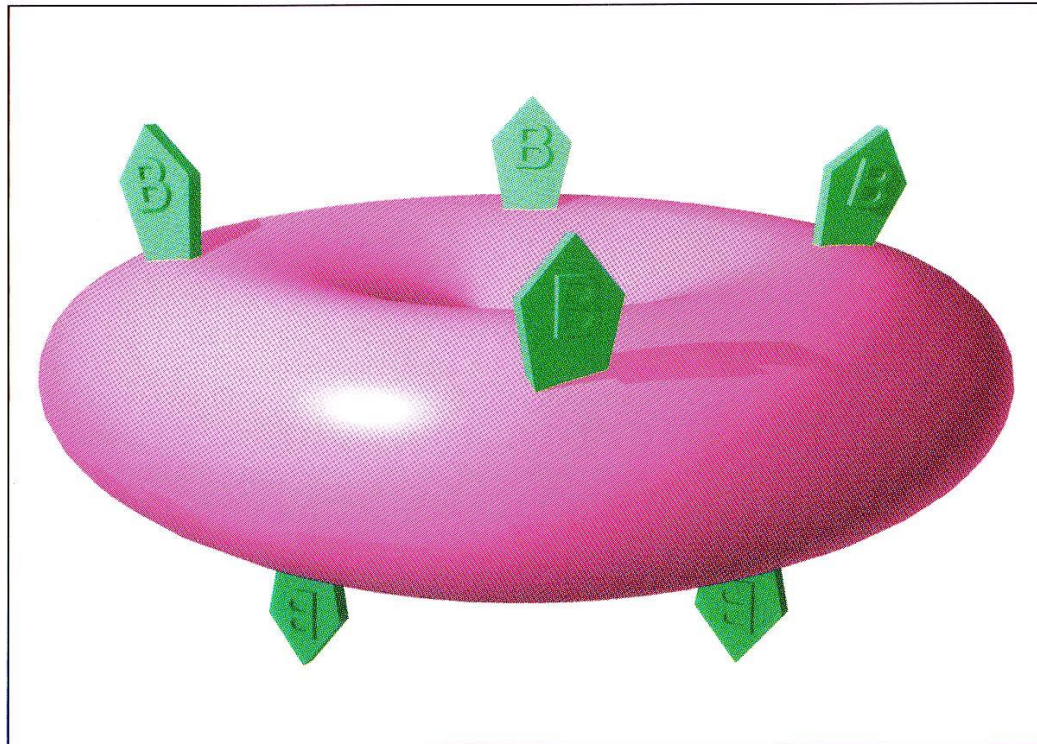


A



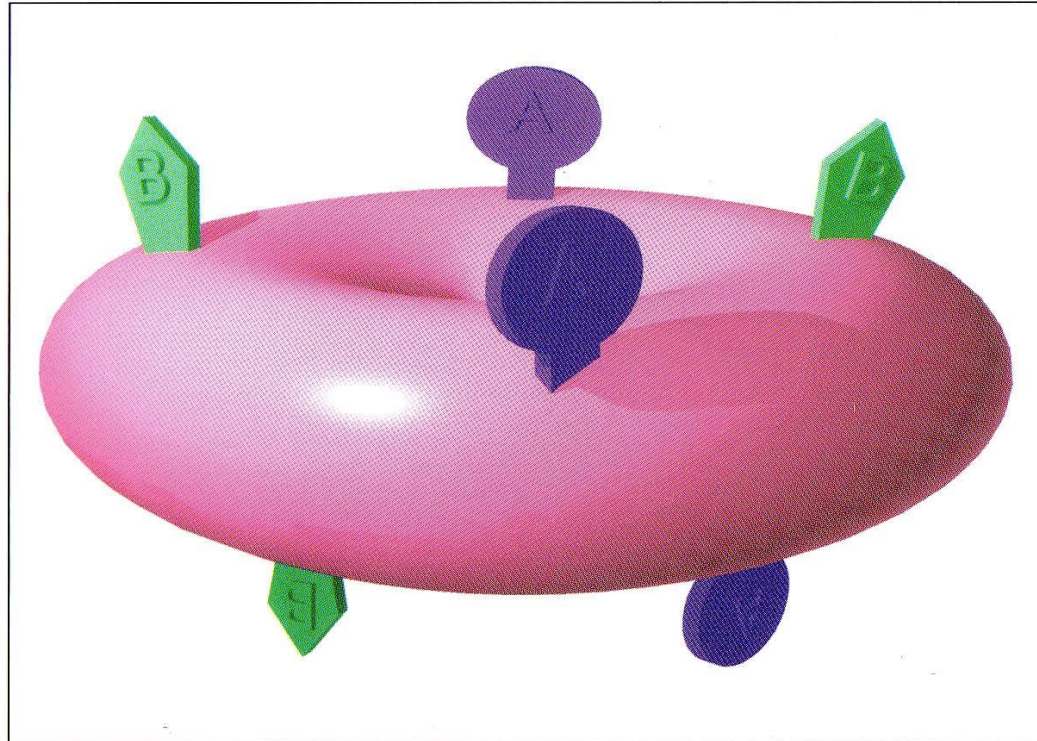
A Antigens
(Agglutinogens)

B

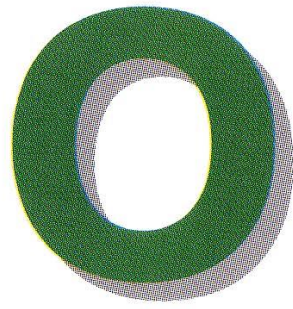


B Antigens
(Agglutinogens)

AB



A & B Antigens
(Agglutinogens)

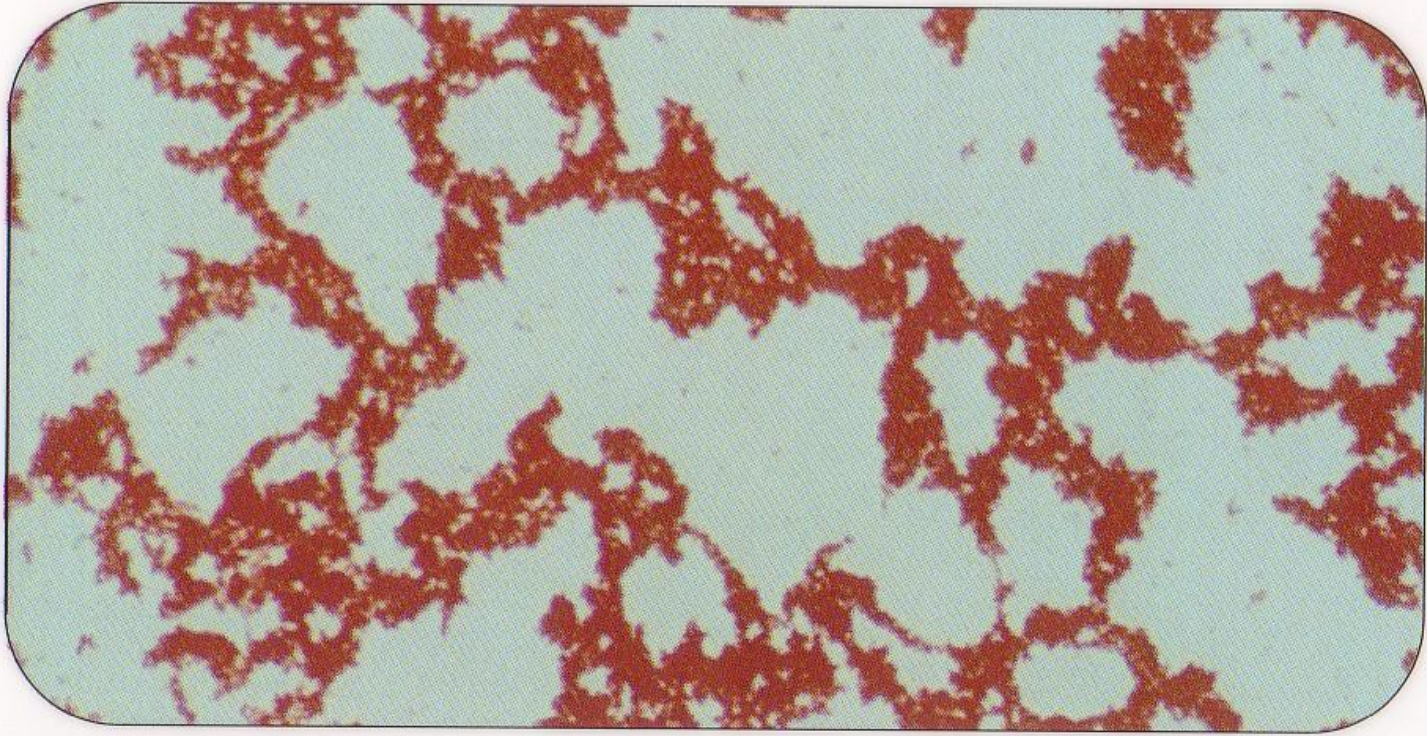


No Antigens
(Agglutinogens)

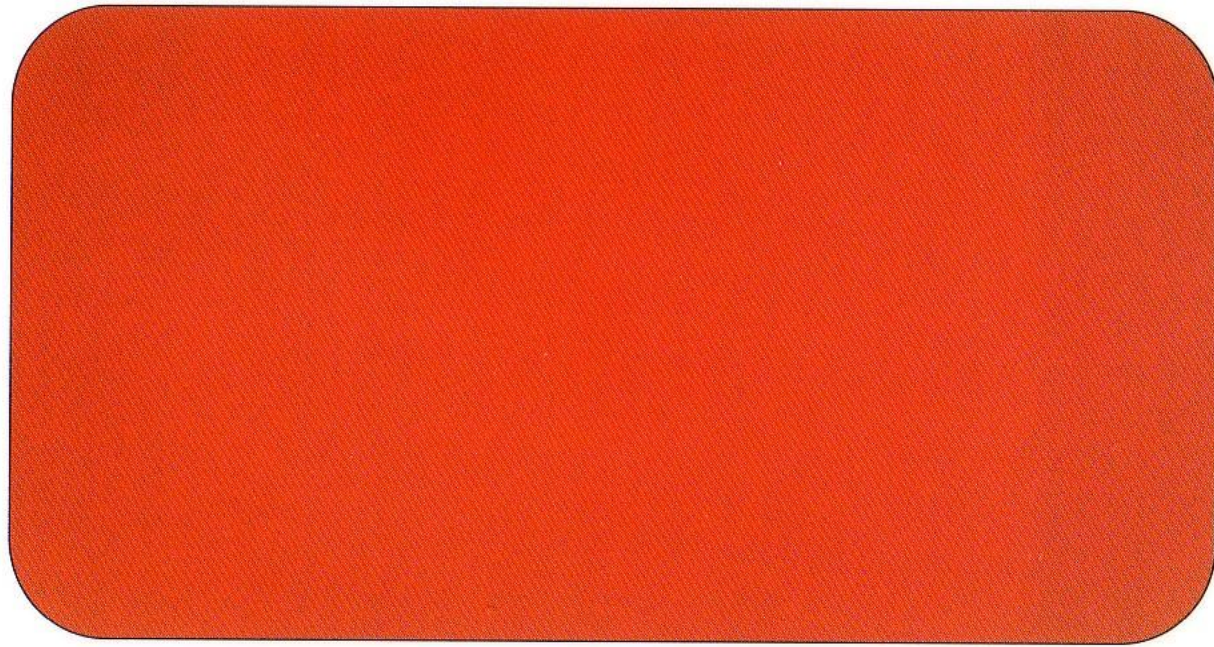


A Antibodies

(Agglutinins)

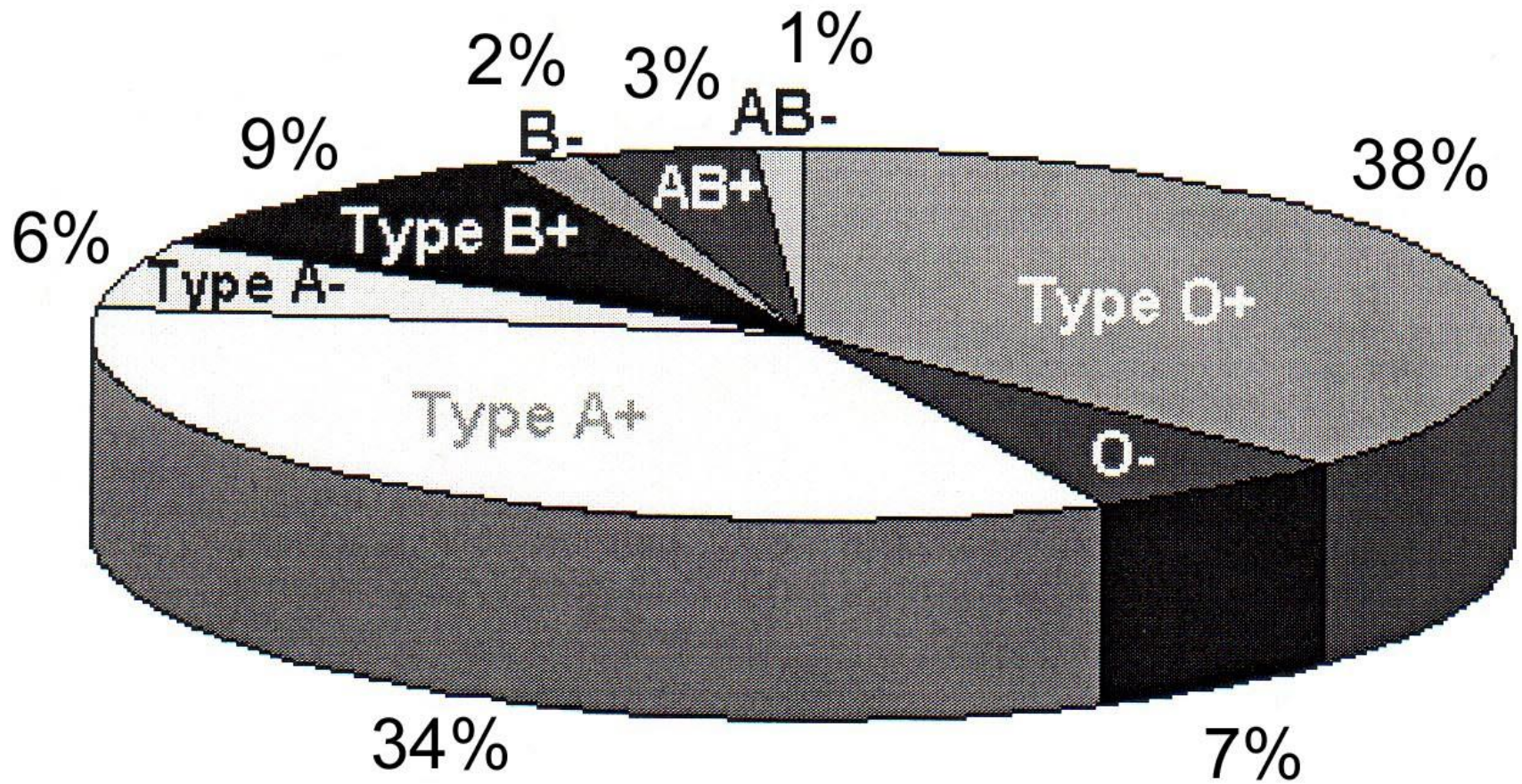


Clumping with
anti-A serum



No Clumping with
anti-A serum

Blood Type Distribution, General Population

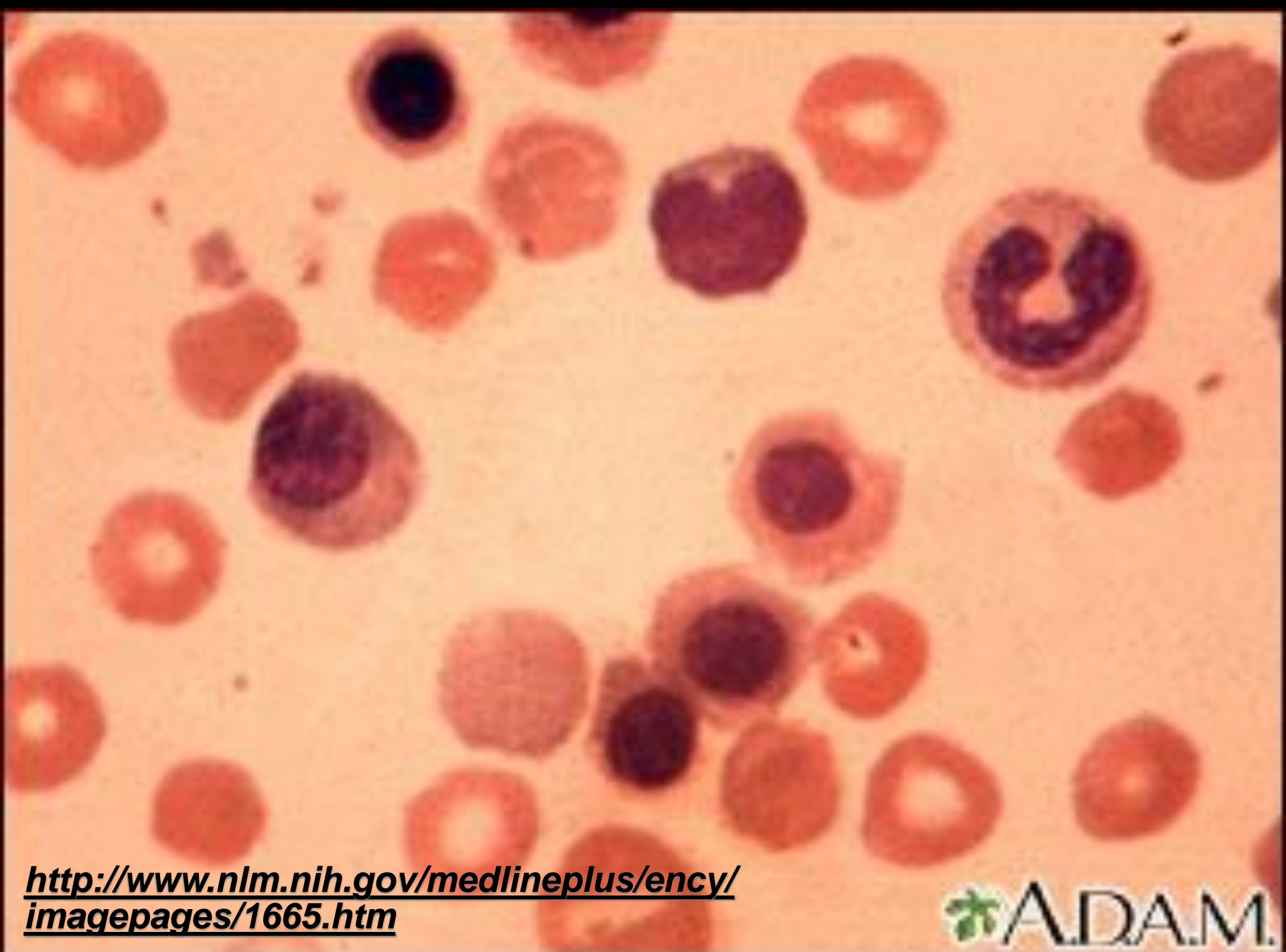


Erythroblastosis Fetalis?

eg, *Rh-* mom
Rh+ baby

<https://www.nlm.nih.gov/medlineplus/rhincompatibility.html>

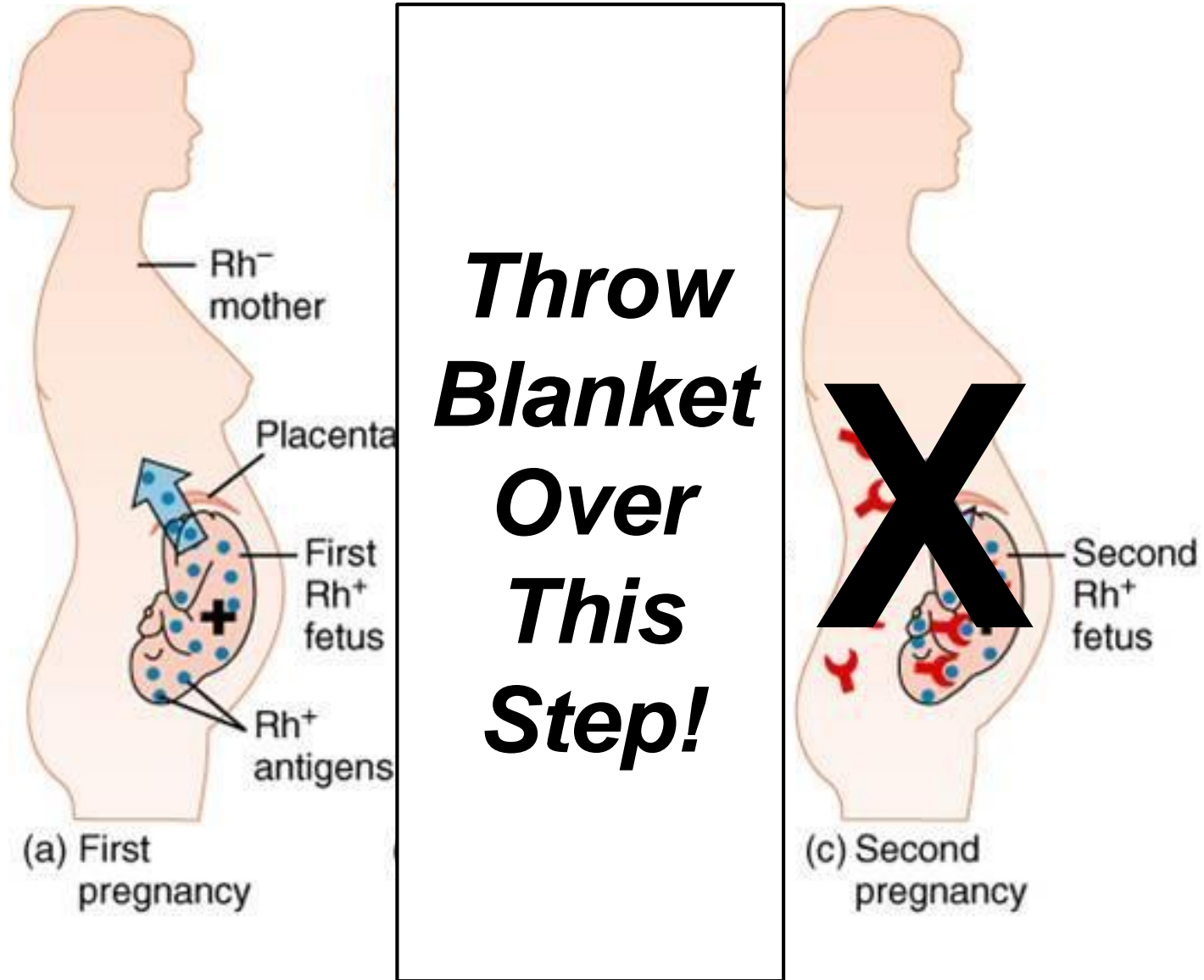
[http://www.nlm.nih.gov/MEDLINEPLUS/ency/article/001298
.htm#Alternative%20Names](http://www.nlm.nih.gov/MEDLINEPLUS/ency/article/001298.htm#Alternative%20Names)



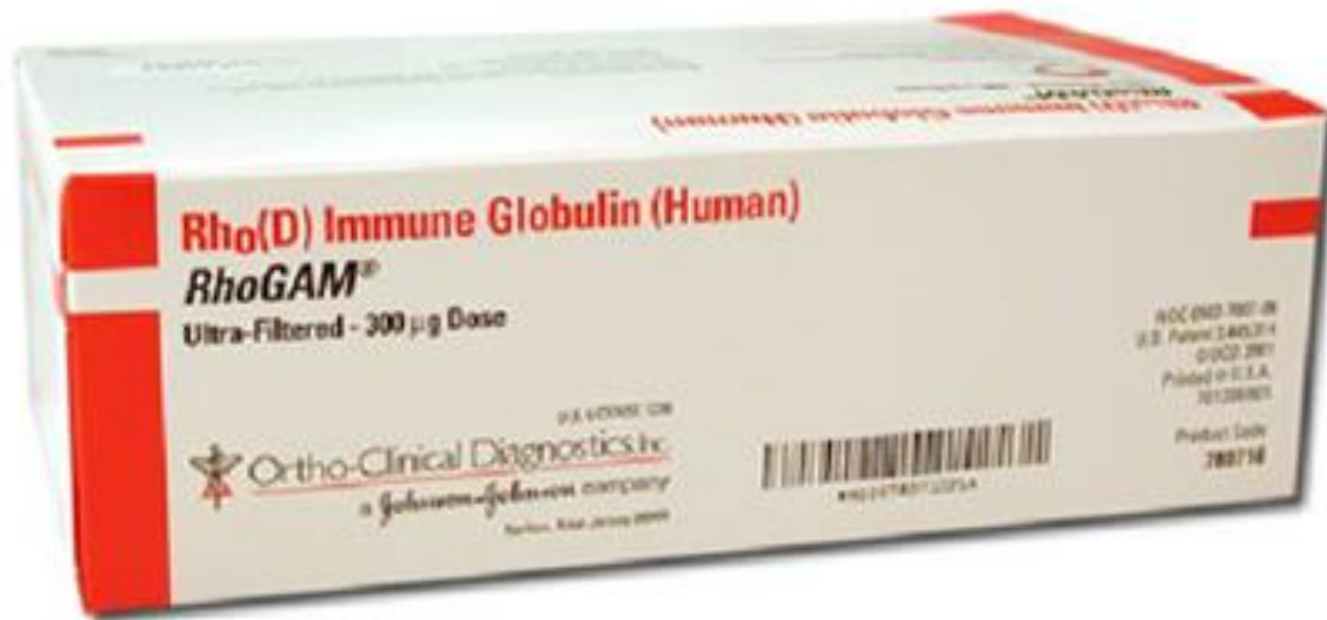
<http://www.nlm.nih.gov/medlineplus/ency/imagepages/1665.htm>

 ADAM

Erythroblastosis Fetalis or Hemolytic Disease of the Unborn/Newborn

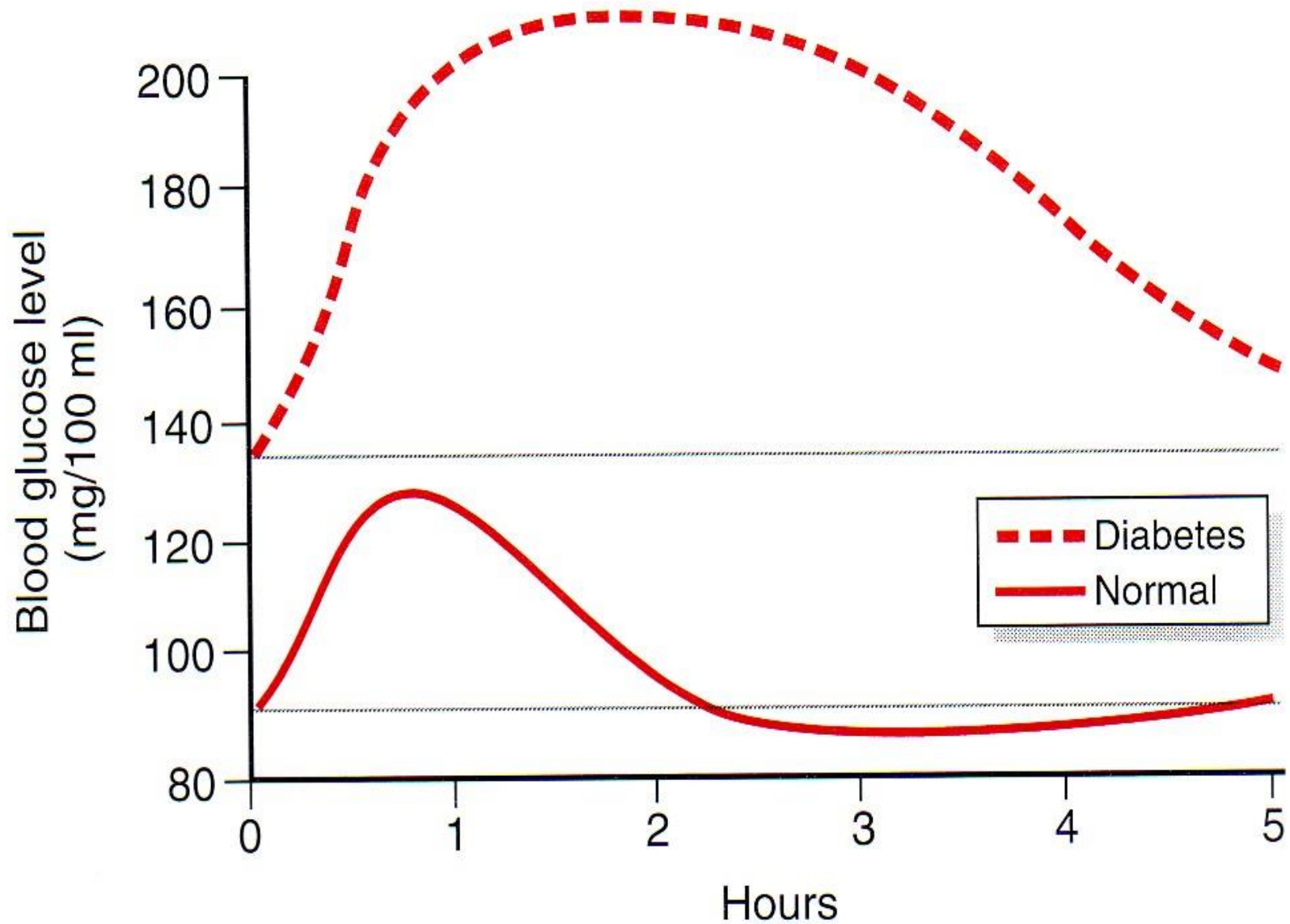


**Inject Mom with RhoGam \leq 48-72 hr
> each Rh+ Pregnancy**



**The Blanket is RhoGam → Masks
the Mom's Immune System!**

Diabetic & Normal Response to Glucose Load

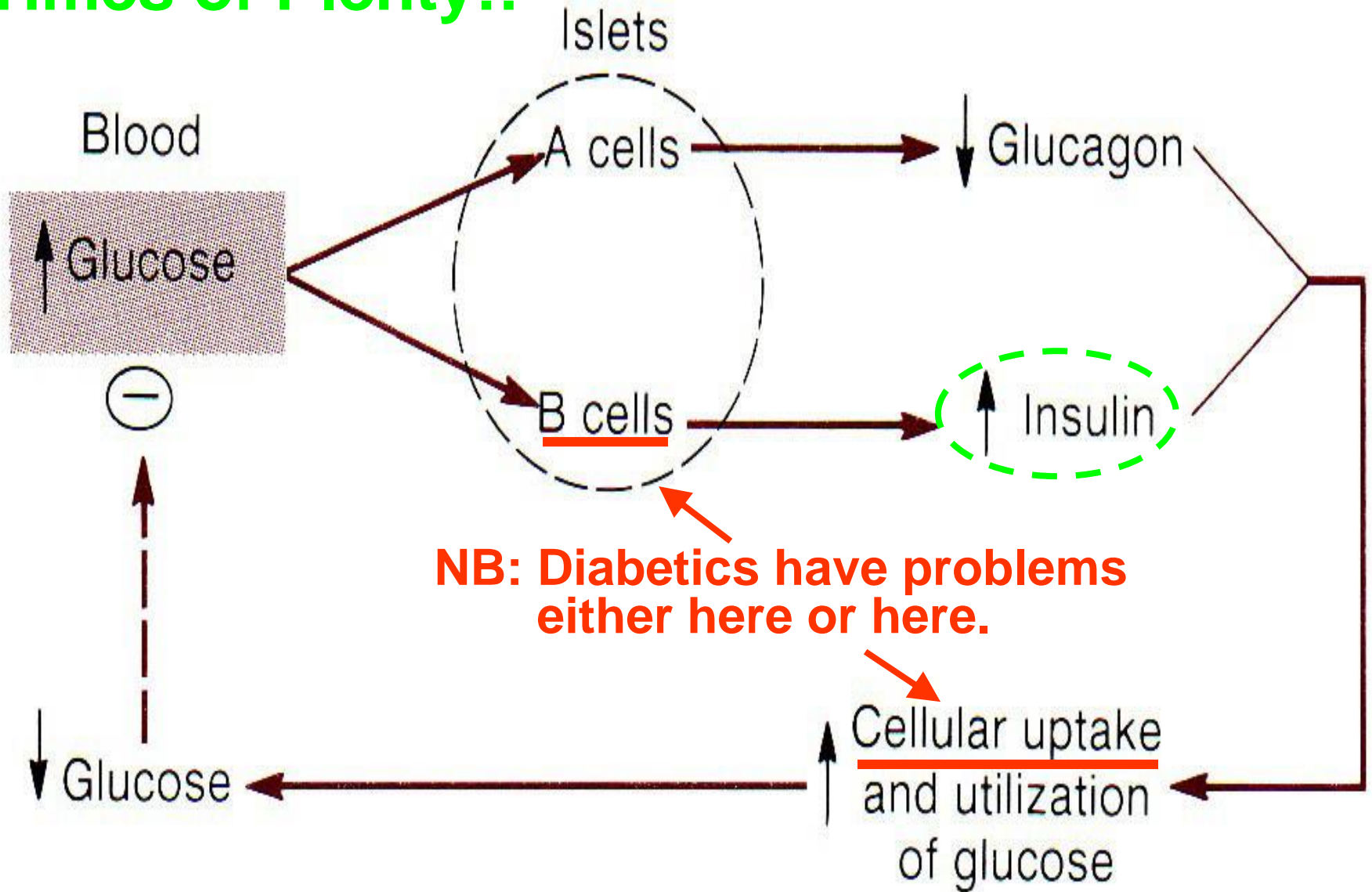


Glucose:
Sugar in Blood

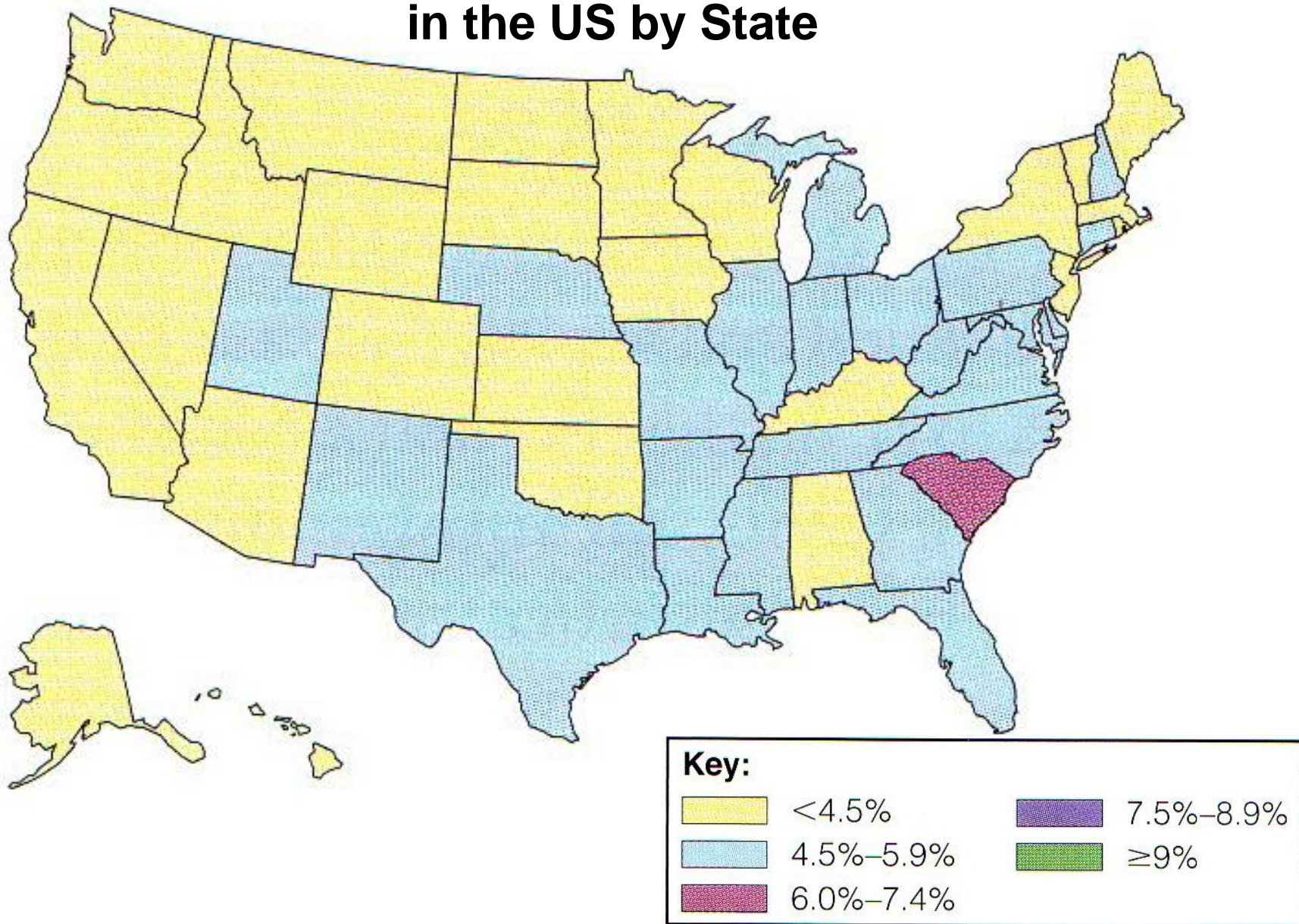


Normal: 70-99
Pre-Diabetes: 100-125
Diabetes: ≥ 126 mg/dL

Times of Plenty!!

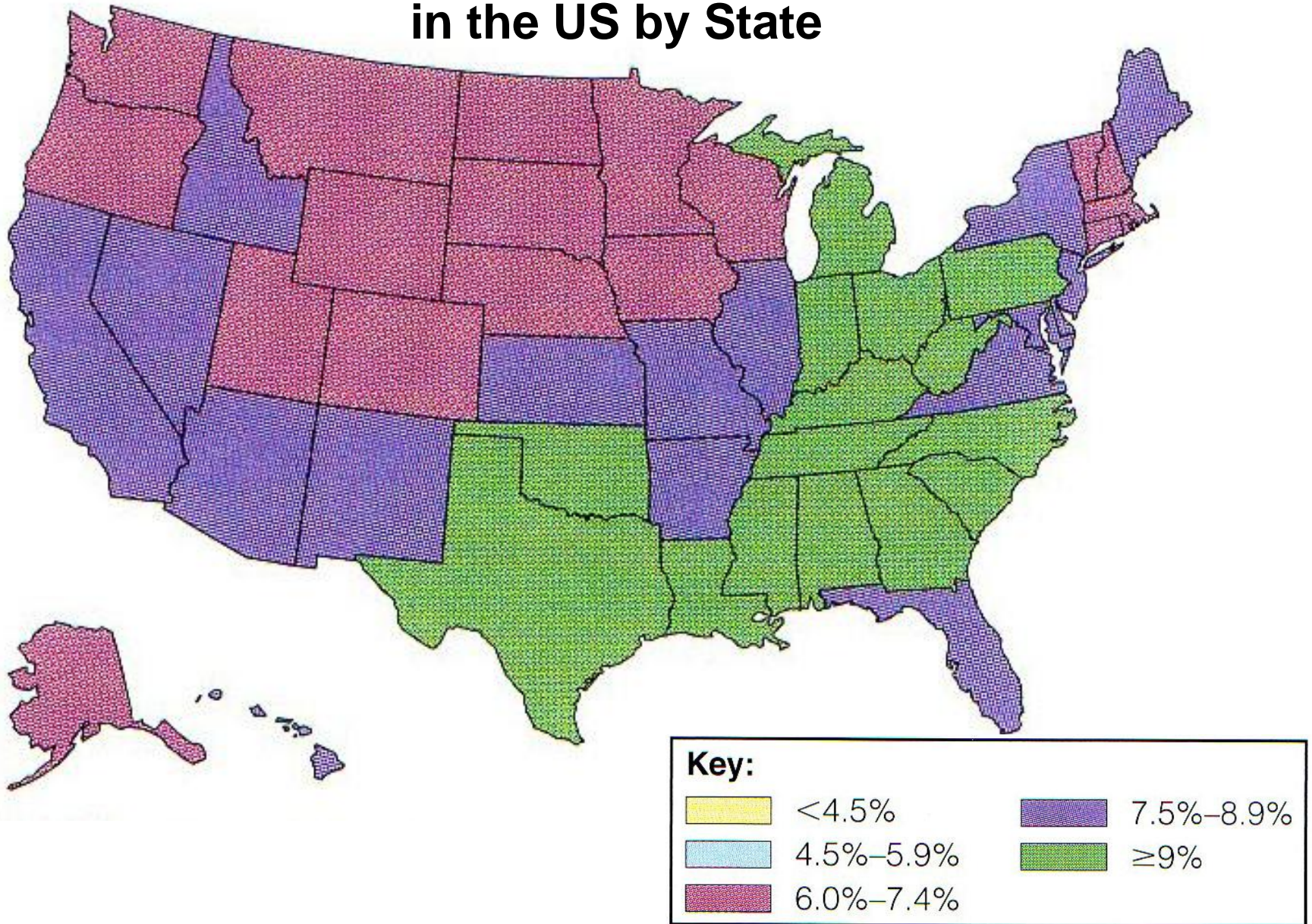


1994 Diabetes Prevalence in the US by State



Source: Centers for Disease Control, Division of Diabetes Translation,
<http://www.cdc.gov/diabetes/statistics>, S&W 2014 fig 4-15 p139A.

2010 Diabetes Prevalence in the US by State



Source: Centers for Disease Control, Division of Diabetes Translation,
<http://www.cdc.gov/diabetes/statistics>, S&W 2014 fig 4-15 p139B.

Type 1 and Type 2 Diabetes Compared

	Type 1	Type 2
Percentage of cases	5–10%	90–95%
Age of onset	<30 years	>40 years ^a
Associated characteristics	Autoimmune diseases, viral infections, inherited factors	Obesity, aging, inherited factors
Primary problems	Destruction of pancreatic beta cells; insulin deficiency	Insulin resistance, insulin deficiency (relative to needs)
Insulin secretion	Little or none	Varies; may be normal, increased, or decreased
Requires insulin	Always	Sometimes
Older names	Juvenile-onset diabetes Insulin-dependent diabetes mellitus (IDDM)	Adult-onset diabetes Noninsulin-dependent diabetes mellitus (NIDDM)

Table 4-9

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

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

Medication



Exercise

Diet

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



***Exercise is a must based on
its insulin-like effect!***

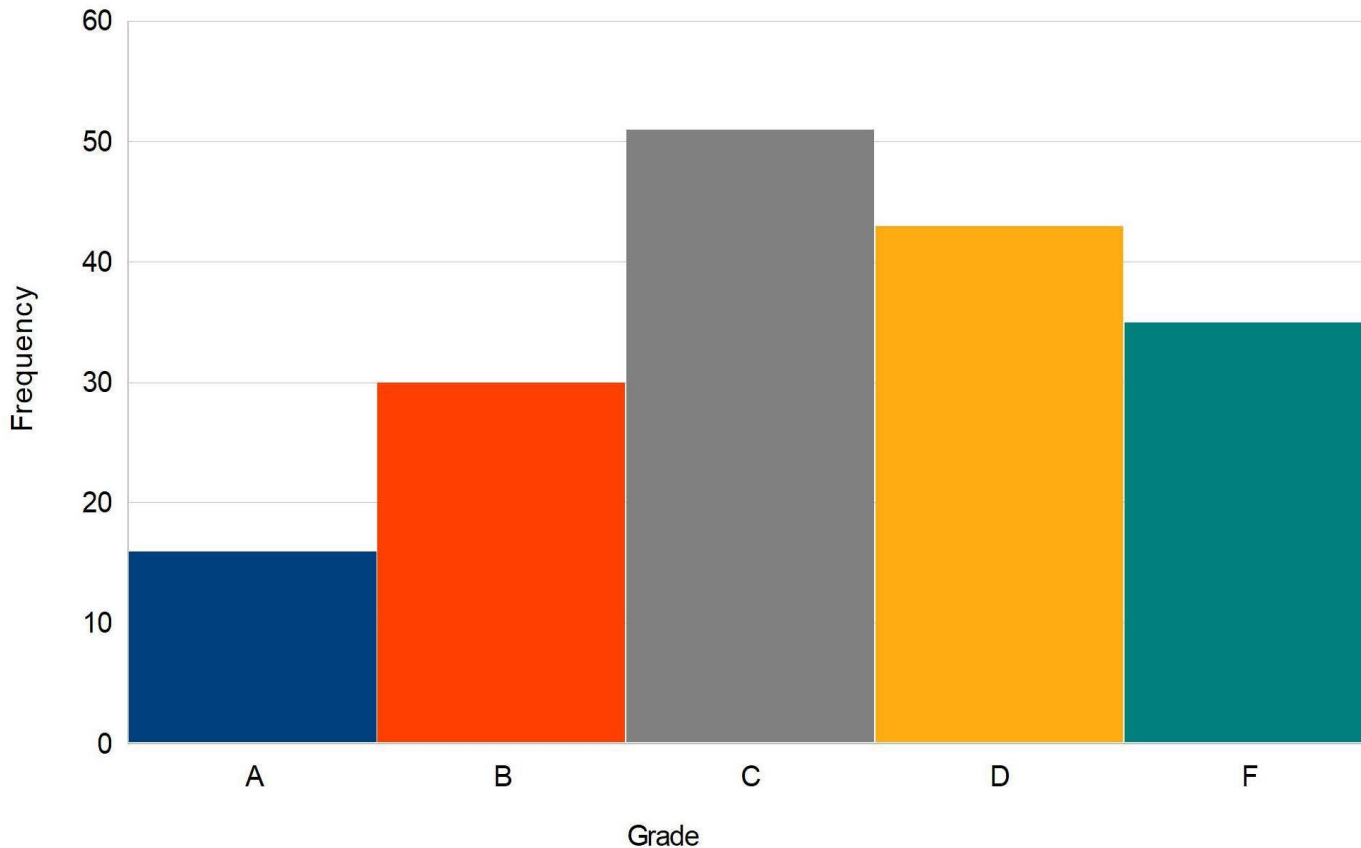


Class Frequency Distribution Report for BI 121 Exam I F18, Multiple Choice, Part II

Overall

Mean Score: 69.76%

Grade	Percent Score	Raw Score	Frequency	Percent
A	90.00 - 100.00	36.00 - 40.00	16	9.14
B	80.00 - 89.99	32.00 - 35.99	30	17.14
C	70.00 - 79.99	28.00 - 31.99	51	29.14
D	60.00 - 69.99	24.00 - 27.99	43	24.57
F	0.00 - 59.99	0.00 - 23.99	35	20.00



WOW!



SUPER



~ TOP 5-10!

EXCELLENT!!



~ TOP 15!

GREAT EFFORT



~ TOP 20-25!