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 Follow-up or Q?**
Exercise, dietary modifications anti-inflammatory oils?

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: \(O_2\)-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 ≥ B- (assume ≥ 80)

Assume 100% for lecture (20% of grade)
+ lab attendance & participation (20% of grade!)

Hope for? Exam I Lecture Lab

X = \[80 - ((0.3 \times 62) + (0.2 \times 100) + (0.2 \times 100))]/0.3

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

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

Need this on Exam II for B- for course!

…Fortunately, lecture & lab attendance buffer the grade!
What's in Blood? Plasma & Blood Cells

- Plasma (55% of whole blood)
- Buffy coat: platelets and leukocytes (<1% of whole blood)
- Erythrocytes (45% of whole blood)
- Platelets
- Leukocytes (white blood cells)
- Erythrocytes (red blood cells)
A Antigens
(Agglutinogens)
B Antigens
(Agglutinogens)
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

- Type O+: 38%
- Type A+: 34%
- Type B+: 9%
- Type A-: 6%
- Type B-: 2%
- Type AB+: 3%
- Type AB-: 1%
Erythroblastosis Fetalis?

eg, Rh- mom Rh+ baby

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
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

Blood glucose level (mg/100 ml)

Hours

Guyton & Hall 2000
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
NB: Diabetics have problems either here or here.
Times of Need!

Mobilize!!

Glucose

Blood

A cells

Glucagon

B cells

Insulin

Cellular uptake of glucose

Glycogenolysis

Fox 1987
Diabetics must constantly juggle diet, exercise & medication to control blood glucose!
Like others, diabetics benefit from whole grains, vegetables, fruits, legumes & non-/low-fat milk products!