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. **CVD & Oil Connections** Anti-inflammatory vs. inflammatory? 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**: 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

...Fun lab week with much personal data!
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?

MT       Lecture       Lab

\[ X = \frac{[80 - (0.3 \times 62) + (0.2 \times 100) + (0.2 \times 100)]}{0.3} \]

\[ X = \frac{[80 - (18.6 + 20 + 20)]}{0.3} \]

\[ X = \frac{21.4}{0.3} = 71.3 \]

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.

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

Linoleic → Arachadonic Acid → Inflammatory Cascade

Linolenic → EPA, DHA → Anti-inflammatory
Deep cold water fish are fabulous sources of $\Omega$-3 fatty acids!
Break for discussion/questions!
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)

Packed cell volume, or hematocrit

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
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
Megakaryocyte

Clusters of platelets about to shed off

Developing leukocyte

Cluster of developing erythrocytes
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**

![Diagram of Proinsulin molecule]

**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.

DO Norris 1980
**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!!

**NB**: Diabetics have problems either here or here.

Fox 1987
Times of Need!

Blood

Glucose

Mobilize!!

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!