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:** 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 \( \geq B- \) (assume \( \geq 80 \))

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!
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.

Treatment Triad

**NB:** Last blasted resort!!

- Exercise
- Dietary Modification
- Drugs/Surgery
Figure 37-1  Devices for percutaneous transluminal coronary interventions. A, Coronary balloon. B, Rotational atherectomy burr (Rotablator). C, Coronary stent.
CABG
The diagram illustrates the cardiovascular mortality rates (average annual incidence per 1,000) associated with smoking. The x-axis represents the number of cigarettes smoked per day, categorized as:

- None
- Less than 20
- 20
- More than 20
- Quit One Year

The y-axis shows the mortality rates:

- None: 7
- Less than 20: 8.4
- 20: 10.2
- More than 20: 12.4
- Quit One Year: 7
Tobacco-free Campus
For better health, smoking and use of tobacco products are prohibited everywhere on our property.

September 1, 2012
For a healthier community and cleaner environment, the University of Oregon will be smoke and tobacco-free.

UO's Josh Buehler
U.S. Surgeon General
Regina Benjamin

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!
HEALTH-RELATED FITNESS

Cardiorespiratory Endurance

Muscular Strength/Endurance

Flexibility

Neuromuscular Relaxation
Pick an abundance of whole grains, legumes, nuts, vegetables & fruits!
Healthy Oils to Minimize Atherosclerosis

HAPOC?
Olive Oil Loves Olive Oil & has some heartfelt advise for Popeye!!
Yes for the spinach! — but get rid of the pipe!!
Essential Fatty Acids: \( \Omega-6 \) Linoleic & \( \Omega-3 \) 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
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)

Packed cell
volume, or
hematocrit

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
Erythroblastosis Fetalis?

eg, Rh- mom
Rh+ baby

Hemoglobin Structure

L Sherwood 2011 fig 11-2
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
NEUTROPHILS

EOSINOPHILS

BASOPHILS

LYMPHOCYTES

MONOCYTES

PLATELETS

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

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
Times of Plenty!!

NB: Diabetics have problems either here or here.

Fox 1987
Times of Need!

Blood → Glucose

Glucose ↓ Glucose

- Glucose uptake

Islets

A cells → Glucagon

B cells → Insulin

Cellular uptake of glucose

Glycogenolysis

Fox 1987

Mobilize!!
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!