I. **Announcements** Lab notebook due today! Lab 4 HR & BP.
 Thursday, Lab 5 Blood Chemistry. Read 2x pp 5-1 thru 5-6. Q?

II. **Overview of Labs** HR & BP. ♥Cycle. Blood chem lab review

III. **Cardiovascular Connections** LS 2012 ch 9
   A. Normal vs abnormal blood flow!
   B. ♥‘s electrical highway + Pacemaker activity
      LS fig 9-7 p 235, tab 9-1 p 236, fig 9-8 p 237

IV. **CV Physiology in the News**  Randy Foye, NBA player with
    Situs Inversus? 1:10,000! NHLBI & AHA websites
    Nicole Kidman & exercise? ACSM, AHA, CDC guidelines

V. **CV Pathophysiology & Risk Reduction** LS ch 9, 10 +…
   A. AMI, CVA, CVD, PVD, TIA, HTN? + surgical treatments
   B. Atherosclerosis? LS fig 9-27, 9-25, 9-26 pp 266-8
   C. How to minimize risk of CVDs? Treatment triad:
      Exercise, Diet, Drugs + Surgery
   D. Food choices make a difference? What’s HAPOC?
Wow! Super 😊

~ Top 5-10.

Excellent!!

~ Top 15.

Great effort

~ Top 20-25.
### Class Frequency Distribution Report

**BI 121 MT U16, Part II, Multiple Choice**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percent Score</th>
<th>Raw Score</th>
<th>Frequency</th>
<th>Percent</th>
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<tbody>
<tr>
<td>A</td>
<td>90.00 - 100.00</td>
<td>36.00 - 40.00</td>
<td>2</td>
<td>14.29</td>
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<tr>
<td>B</td>
<td>80.00 - 89.99</td>
<td>32.00 - 35.99</td>
<td>6</td>
<td>42.86</td>
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<tr>
<td>C</td>
<td>70.00 - 79.99</td>
<td>28.00 - 31.99</td>
<td>3</td>
<td>21.43</td>
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<tr>
<td>D</td>
<td>60.00 - 69.99</td>
<td>24.00 - 27.99</td>
<td>3</td>
<td>21.43</td>
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<tr>
<td>F</td>
<td>0.00 - 59.99</td>
<td>0.00 - 23.99</td>
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<td>0.00</td>
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</tbody>
</table>

Mean Score: 78.93%

**Overall $\bar{X} \pm SD = 76.3 \pm 10.2$**

$\Rightarrow 2/3$ of scores $\sim 66 - 86$
Heart-Blood Pressure Lab Today!

Lub-dup!

I'm cool!
Cardiac Cycle

Systole
Contract & Empty

Diastole
Relax & Fill
Blood Chemistry on Thursday! No food, drink or gum in lab!

Thanks sincerely!
PREPARATION

1. WASH & DRY

2. ALCOHOL
OBTAIN μSAMPLE

BLOOD GLUCOSE

BLOOD TYPING
BLOOD GLUCOSE

READ & RECORD!!
BLOOD TYPING

ADD ANTISERA

MIX W/TOOTHPICKS

READ & RECORD!!
CLEAN-UP!

1. FOLD DIAPER

2. BLOOD PRODUCTS

3. REWASH!!
Veins ➔ Atria ➔ Ventricles ➔ Arteries

http://www.nhlbi.nih.gov/health/health-topics/topics/hhw/contraction.html
Patent or still open!
(Automatically) Shock the Heart then it Contracts!
EKG/ECG Origin
Heart's Electrical Highway!

- Interatrial pathway
- Sinoatrial (SA) node
- Right atrium
- Internodal pathway
- Atrioventricular (AV) node
- Left atrium
- Left branch of bundle of His
- Right ventricle
- Left ventricle
- Right branch of bundle of His
- Purkinje fibers

LS 2012 fig 9-7a p 235
(a) Normal pacemaker activity: Whole train will go \textbf{70 mph} (heart rate set by SA node, the fastest autorhythmic tissue).

(b) Takeover of pacemaker activity by AV node when the SA node is nonfunctional: Train will go \textbf{50 mph} (the next fastest autorhythmic tissue, the AV node, will set the heart rate).

(c) Takeover of ventricular rate by the slower ventricular autorhythmic tissue in complete heart block: First part of train will go \textbf{70 mph}; last part will go \textbf{30 mph} (atria will be driven by SA node; ventricles will assume own, much slower rhythm).

Ectopic focus
Normal (A) vs Situs Inversus (B): 1:10,000 live births!

Randy Foye, NBA Player & Situs Inversus!

http://www.pbs.org/program/nine-months-that-made-you/
American Heart Association (AHA) &
National Heart, Lung & Blood Institute

http://www.my.americanheart.org

http://www.nhlbi.nih.gov/

Department of Health and Human Services · National Institutes of Health

National Heart Lung and Blood Institute

People Science Health
We all have multimillion-dollar bodies!!

Can you believe that's Nicole?
Hollywood glamour queen Nicole Kidman likes to swim to keep that multimillion-dollar body in shape. But the down-to-earth superstar doesn't need a fancy spa — she does her laps at the local YMCA! Nice goggles, Nic!
How much aerobic?

Continuous exercise
- ≥ 50% muscle mass
- ≥ Conversational pace
- 20-60 min/session
- 3-5 days/wk

Guidelines: Healthy Adults < 65 yr

Do moderately intense aerobic exercise
30 min/d, 5 d/wk

OR

Do vigorously intense aerobic exercise
20 min/d, 3 d/wk

AND

Do 8-10 strength-training exercises
8-12 repetitions/each exercise, 2 d/wk
How much strength?

- 2-3 days/wk
- 8-10 exercises for major muscle groups
- ≥ 1 set/exercise
- 8-12 (most) or 10-15 (frail/ > 50-60 yr) repetitions/set
Federal exercise guidelines include strength training for all:

- **Adults**: Moderate to Vigorous Exercise
  - ≥ 30 min, 5 d/wk

- **Children**: Moderate to Vigorous Exercise
  - ≥ 60 min, 5 d/wk

Questions + Discussion
Did you know?

- Every year ~785,000 Americans have a first heart attack. Another 470,000 who've had ≥ 1 have another attack.

- In 2008, > 616,000 people died of heart disease. Heart disease caused almost 25% of deaths in the US.

- In 2010, coronary heart disease US costs ~$108.9 billion including health care, medications & lost productivity.

*SOURCE:* Heart Disease Facts, Centers for Disease Control, 2012
Heart Disease Death Rates, 2000-2006
Adults Ages 35+, by County

AK low, too!

MN is lowest!

Jackson, MS

Eugene, OR

http://www.cdc.gov/heartDisease/statistics.htm

Ages-Adjusted
Average Annual
Deaths per 100,000

Number of
Counties

195 - 382
532

383 - 430
649

431 - 473
629

474 - 522
624

523 - 747
606

Insufficient Data
2

Rates are spatially smoothed to enhance the stability of rates in counties with small populations.

ICD-10 codes for heart disease: I00-I08, I11, I13, I20-I51

Data Source: National Vital Statistics System and the U.S. Census Bureau

http://www.cdc.gov/heartDisease/statistics.htm
Supraorbital branch of ophthalmic artery
Superficial temporal artery
Occipital artery
Maxillary artery
Posterior auricular artery
Internal carotid artery
External carotid artery
Common carotid artery
Inferior alveolar artery
Facial artery
Lingual artery
Superior thyroid artery

Source: Francis & Martin, 1975, p 291.
Coronary Circulation ≡ Crowns the Heart!
Area of cardiac muscle deprived of blood supply if coronary vessel is blocked at point A:

Right coronary artery
Right ventricle

Area of cardiac muscle deprived of blood supply if coronary vessel is blocked at point B:

Left coronary artery
Left ventricle

**FIGURE 9-35**

Extent of myocardial damage as a function of the size of the occluded vessel
59 yr HTN ♂
Treatment Triad

- Exercise
- Drugs/Surgery
- Dietary Modification

NB: Last blasted resort!!
Figure 37-1 Devices for percutaneous transluminal coronary interventions. A, Coronary balloon. B, Rotational atherectomy burr (Rotablator). C, Coronary stent.
CABG
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
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!!
Fish Oil Intakes & Cardiovascular Death Rates

Cardiovascular Deaths per 100,000 Population

- Ireland: 0.09%
- USA: 0.13%
- France: 0.14%
- Japan: 0.37%

S&W 2011
fig 5-12 p 167
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**