BI 121 Lecture 9

I. **Announcements**  Lab notebook due today! Lab 4 HR & BP. Thursday, Lab 5 Blood Chemistry. Read pp 5-1 thru 5-6 x2. Q?

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

III. **Cardiovascular Connections**  LS 2012 ch 9
    A. Cardiac cycle? Contract-relax!
    B. ♥‘s electrical highway + Pacemaker activity
       LS fig 9-7 p 235, tab 9-1 p 236, fig 9-8 p 237
    C. NHLBI & AHA websites

IV. **CV Physiology in the News**  NHLBI & AHA websites
    Exercise & Nic? Exercise guidelines: ACSM, AHA, CDC

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?
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
SAMPLE+TESTS

1

OBTAIN μSAMPLE

2

BLOOD GLUCOSE

3

BLOOD TYPING
BLOOD GLUCOSE

READ & RECORD!!

MEM
93
3:24 PM 11/4
BLOOD TYPING

ADD ANTISERA

MIX W/TOOTHPICKS

READ & RECORD!!
CLEAN-UP!

1. FOLD DIAPER
2. BLOOD PRODUCTS
3. REWASH!!
Discussion
+
Brief Break
(Automatically) Shock the Heart then it Contracts!
EKG/ECG Origin

- SA node
- AV node

Diagram showing heart and ECG waveforms with labels P, Q, R, S, T.
Heart's Electrical Highway!

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

LS 2012 fig 9-7a p 235
(a) Normal pacemaker activity: Whole train will go 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 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 70 mph; last part will go 30 mph (atria will be driven by SA node; ventricles will assume own, much slower rhythm).
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!
Aerobic exercise requirements:

- Continuous exercise
- Greater than 50% muscle mass
- Greater than conversational pace
- 20-60 minutes per session
- 3-5 days per week

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

[link](http://www.health.gov/paguidelines/guidelines/default.aspx)

**Adults**: Moderate to Vigorous Exercise

- ≥ 30 min, 5 d/wk

**Children**: Moderate to Vigorous Exercise

- ≥ 60 min, 5 d/wk
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

Eugene, OR
MN is lowest!

AK low, too!

Jackson, MS

http://www.cdc.gov/heartDisease/statistics.htm
Source: Francis & Martin, 1975, p 291.
Coronary Circulation ≡ Crowns the Heart!
FIGURE 9-35
Extent of myocardial damage as a function of the size of the occluded vessel
59 yr HTN ♀
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 (Rotabrator). C, Coronary stent.
CABG
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For better health, smoking and use of tobacco products are prohibited everywhere on our property.

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.

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September 1, 2012

Ready to Quit Tobacco?
300/200
KA-BOOM!
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 advice 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
Before

After
Before

After