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
OBTAIN _μ_ SAMPLE

BLOOD GLUCOSE

BLOOD TYPING
BLOOD GLUCOSE

READ & RECORD!!

[Image of a blood glucose meter reading 93 mg/dL]
BLOOD TYPING

1. ADD ANTISERA

2. MIX W/TOOTHPICKS

3. 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

Torstar Books 1984
Heart's Electrical Highway!

- Interatrial pathway
- Sinoatrial (SA) node
- Right atrium
- Internodal pathway
- Left atrium
- Left branch of bundle of His
- Right ventricle
- Left ventricle
- Right branch of bundle of His
- Purkinje fibers
(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!
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
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
DISEASED CAROTID ARTERY

HEALTHY CAROTID ARTERY

Source: Lifeline Screening, 2007
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:

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

Right coronary artery

Left coronary artery

Right ventricle

Left ventricle

**FIGURE 9.35**

Extent of myocardial damage as a function of the size of the occluded vessel
Treatment Triad

**NB:** Last blasted resort!!

- **Drugs/Surgery**
- **Exercise**
- **Dietary Modification**
**Figure 37-1** Devices for percutaneous transluminal coronary interventions. **A**, Coronary balloon. **B**, Rotational atherectomy burr (Rotablator). **C**, Coronary stent.
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
300/200

 KA-BOOM! 

Hg
An LDL to HDL ratio greater than 5 to 1 in men or 4.5 to 1 in women increases the 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

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