I. **Announcements** Exam I next time: 10 & 11 am lab sections go directly to 5 KLA & 129 HUE. All others (except AEC) here, 100 WIL! Review: Sun, 6 pm 100 WIL! Lab Manuals. Q?

II. **Cardiovascular Connections** DC Module 4, LS ch 9, Torstar+…

III. **CV Physiology in News** AHA + ACSM exercise guidelines!

IV. **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


D. Food choices make a difference? Plant-based diet! What’s HAPOC?
10 am lab section takes Exam in 5 Klamath (KLA)
11 am lab section takes Exam in 129 Huestis (HUE)
All others (-AEC) here in 100 WIL!
All on Tuesday, 8:30 start time!

Study & blast the exam!
Heart-Blood Pressure Lab Today!

Lub-dup!

I'm cool!
Cardiac Cycle

**Systole**
Contract & Empty

**Diastole**
Relax & Fill
Heart Protection & Layers

- **EPI**
- **MYO**
- **ENDO**
- **PERI**

Diagram showing layers of the heart with annotations:
- Aorta
- Superior vena cava
- Right atrium
- Right ventricle
- Inferior vena cava
- Pericardial cavity
- Fibrous pericardium
- Parietal pericardium

Source: Torstar 1984 p 34
Human ♥️ = 4-chambered box?
2 separate pumps?

Upper = Atria
Lower = Ventricles
Pulmonary Systemic

RA LV
RV LA

Primer Pumps
Power Pumps

R L
(a) Location of the heart valves in a longitudinal section of the heart

- Aorta
- Superior vena cava
- Pulmonary valve
- Pulmonary arteries
- Pulmonary veins
- Left atrium
- Left AV valve
- Aortic valve
- Chordae tendineae
- Papillary muscle
- Left ventricle
- Septum
- Right ventricle
- Inferior vena cava

LS 2012 fig 9-4a p 233
Heart Valves Ensure Unidirectional Blood Flow!

Mom's valve!

Right AV valve
Left AV valve
Aortic or pulmonary valve

(b) Heart valves in closed position, viewed from above

Right atrium
Right AV valve
Chordae tendineae
Direction of backflow of blood
Septum
Right ventricle
Papillary muscle

(c) Prevention of eversion of AV valves

● FIGURE 9-4 Heart valves.
Human $\heartsuit = 4$ unique valves?

2 valve sets?

Semilunar = Half-moon shaped

1. Pulmonic/Pulmonary
2. Aortic

AV = Atrioventricular

3. $\textcircled{R}$ AV = Tricuspid
4. $\textcircled{L}$ AV = Mitral/Bicuspid
Heart Valve Orientation & Scaffolding

- Pulmonary ring
- Aortic ring
- Mitral ring
- Tricuspid ring
- Muscle fiber
**Figure 9-6**
Mitral and aortic valves.
Veins ➔ Atria ➔ Ventricles ➔ Arteries

https://www.nhlbi.nih.gov/health-topics/how-heart-works
https://www.youtube.com/watch?v=zJXAlh9VDDU
Patent or still open!
Foramen ovale!
Patent or still open! Ductus arteriosus!
Heart Murmurs? An unusual or extra heart sound lub-dup, lub-dup vs lub-gurgle-dup, lub-swish-dup...

S1 = lub  S2 = dup

https://www.thinklabs.com/heart-sounds
How much aerobic?

Continuous exercise

≥ 50% muscle mass

≥ Conversational pace

20-60 min/session

3-5 days/wk


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
Did you know?

- Every 40 seconds, someone has a heart attack in the US!

- ~630,000 Americans die of heart disease each yr – that’s 1 in every 4 deaths. Heart disease is the leading cause of death for both men and women.

- Heart disease costs the US ~ $200 billion per yr in health care, medications & lost productivity. By 2035, CVD costs are projected to top $1 trillion annually.

_SOURCE: Heart Disease Facts & Statistics, Centers for Disease Control, Aug 23, 2017._
Heart Disease Death Rates, 2014-2016
Adults, Ages 35+, by County

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

Data Source: National Vital Statistics System National Center for Health Statistics

https://www.cdc.gov/dhdsp/data_statistics/fact_sheets/fs_heart_disease.htm
Coronary Circulation ≡ Crowns the Heart!
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
CABG

Coronary Artery Bypass Graft
Tobacco-free Campus

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

SMOKE AND TOBACCO-FREE UNIVERSITY

September 1, 2012

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

Ready to Quit Tobacco?
Visit tobaccofree.oregon.edu for free and low cost resources.
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!

CAUTION: HAZARDOUS WAIST

Eat more apples...

to help prevent the apple type of obesity!
Pick an abundance of whole grains, legumes, nuts, vegetables & fruits!
Fish Oil Intakes & Cardiovascular Death Rates

Cardiovascular Deaths per 100,000 Population

<table>
<thead>
<tr>
<th>Country</th>
<th>Death Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ireland</td>
<td>0.09%</td>
</tr>
<tr>
<td>USA</td>
<td>0.13%</td>
</tr>
<tr>
<td>France</td>
<td>0.14%</td>
</tr>
<tr>
<td>Japan</td>
<td>0.37%</td>
</tr>
</tbody>
</table>

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