

Fun heart rate & BP lab today! Hooray!!...



## BI 121 Lecture 8

**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

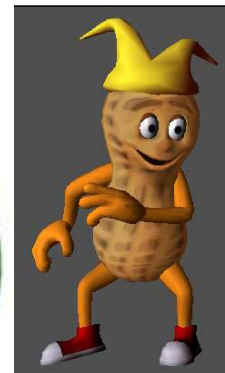
C. How to minimize risk of CVDs? Treatment triad:

1. Exercise, 2. Diet, 3. Drugs+Surgery

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!**



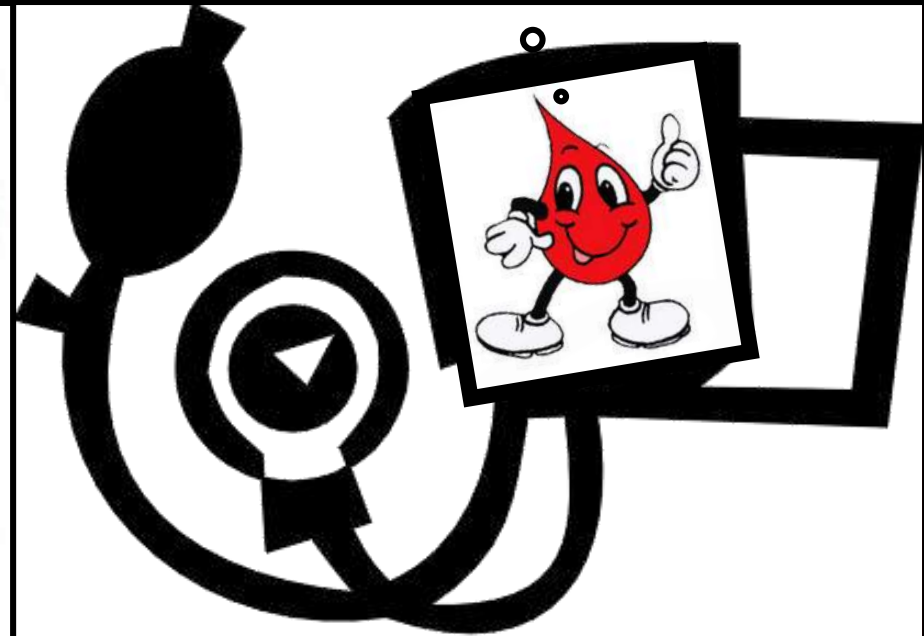
**Study & blast  
the exam!**

# *Heart-Blood Pressure Lab Today!*

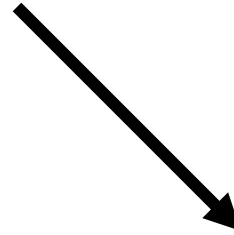
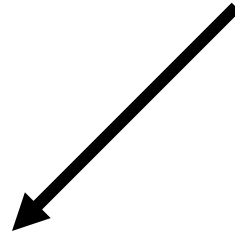
Lub-dup!



I'm cool!



# Cardiac Cycle

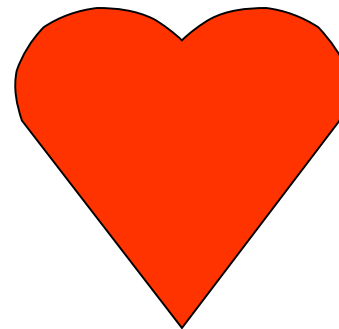
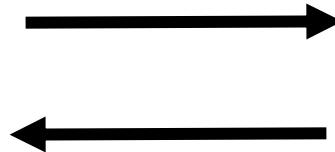
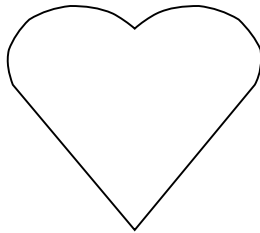


***Systole***

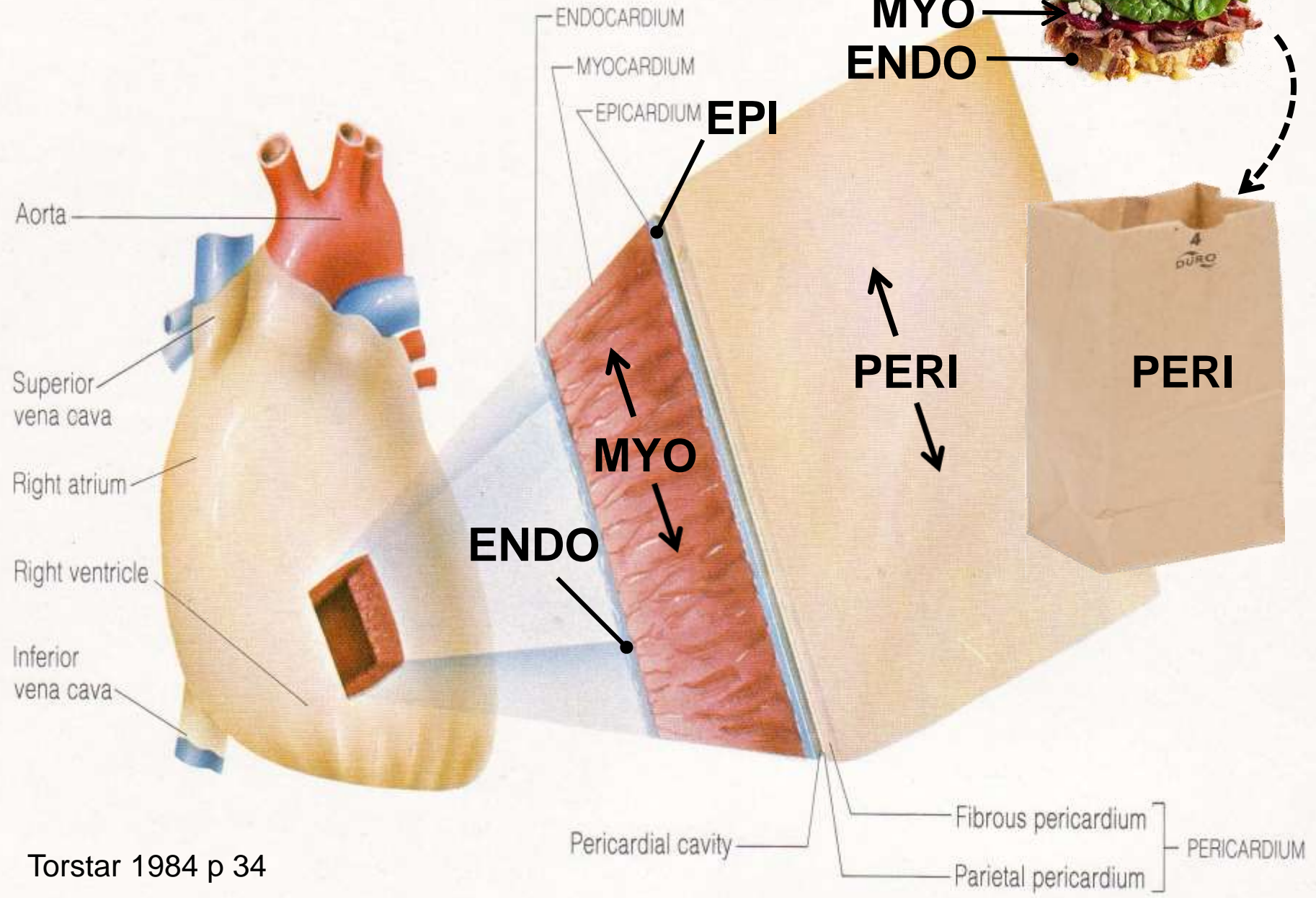
Contract  
& Empty

***Diastole***

Relax  
& Fill

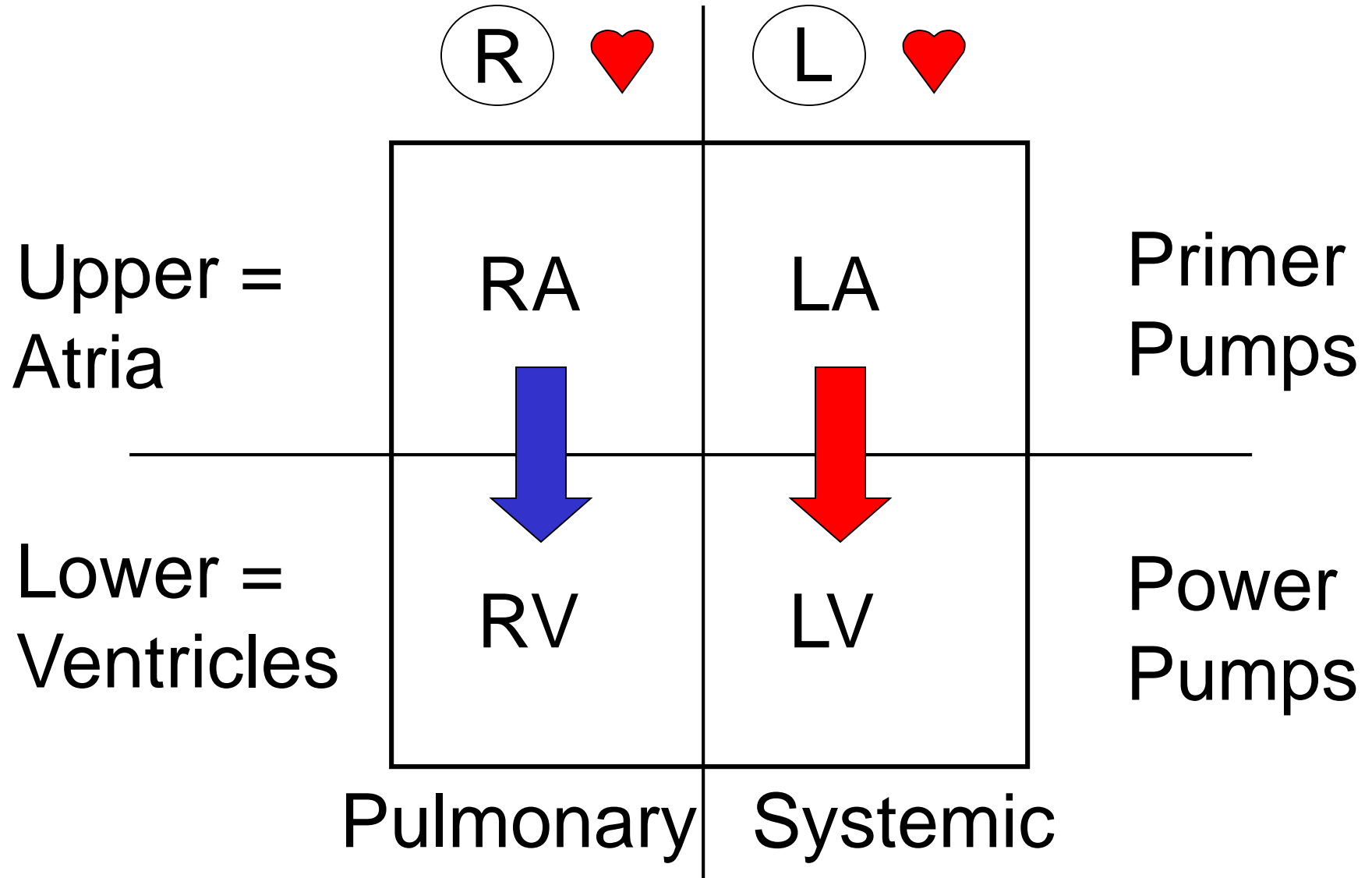


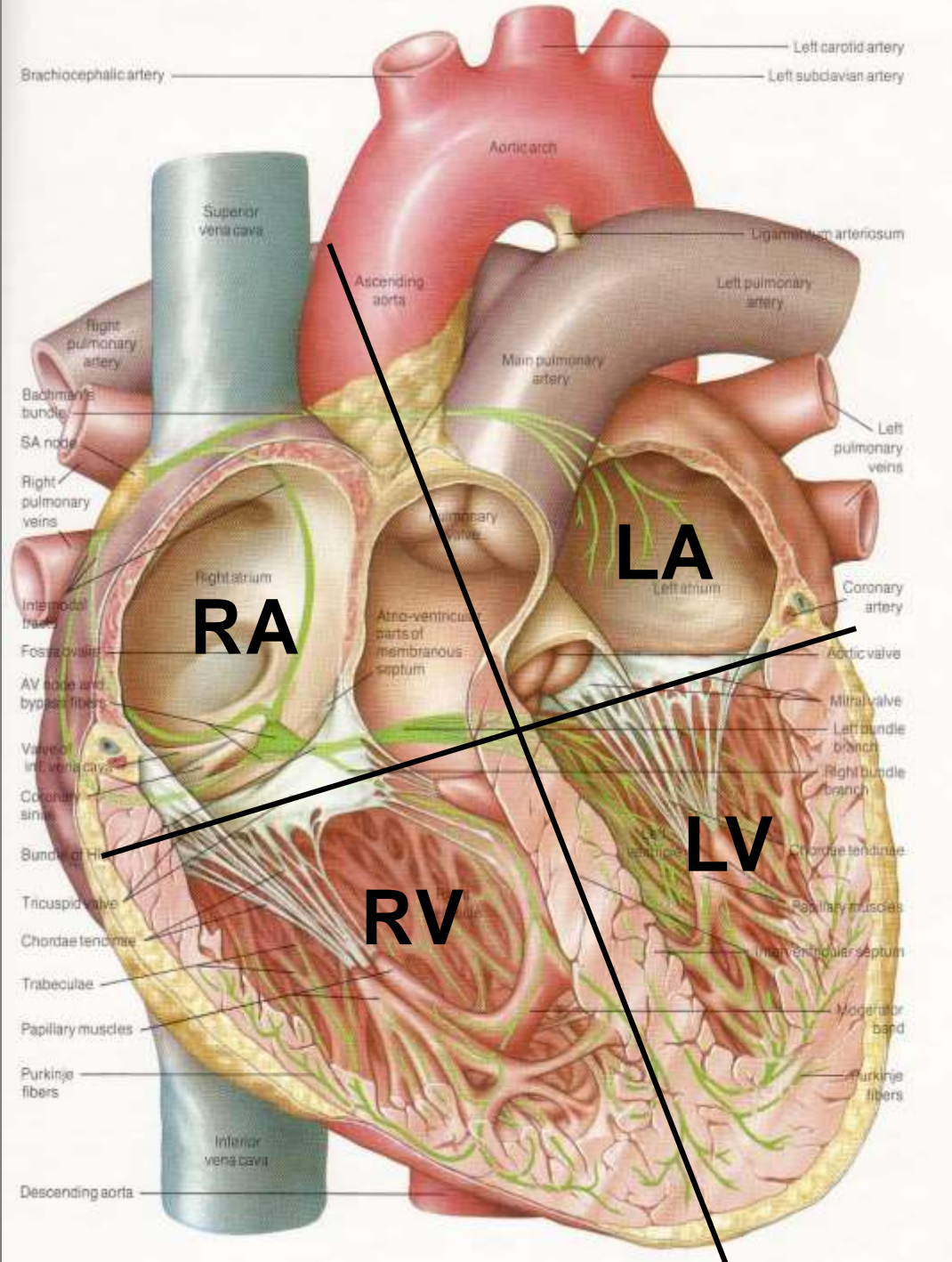
# Heart Protection & Layers

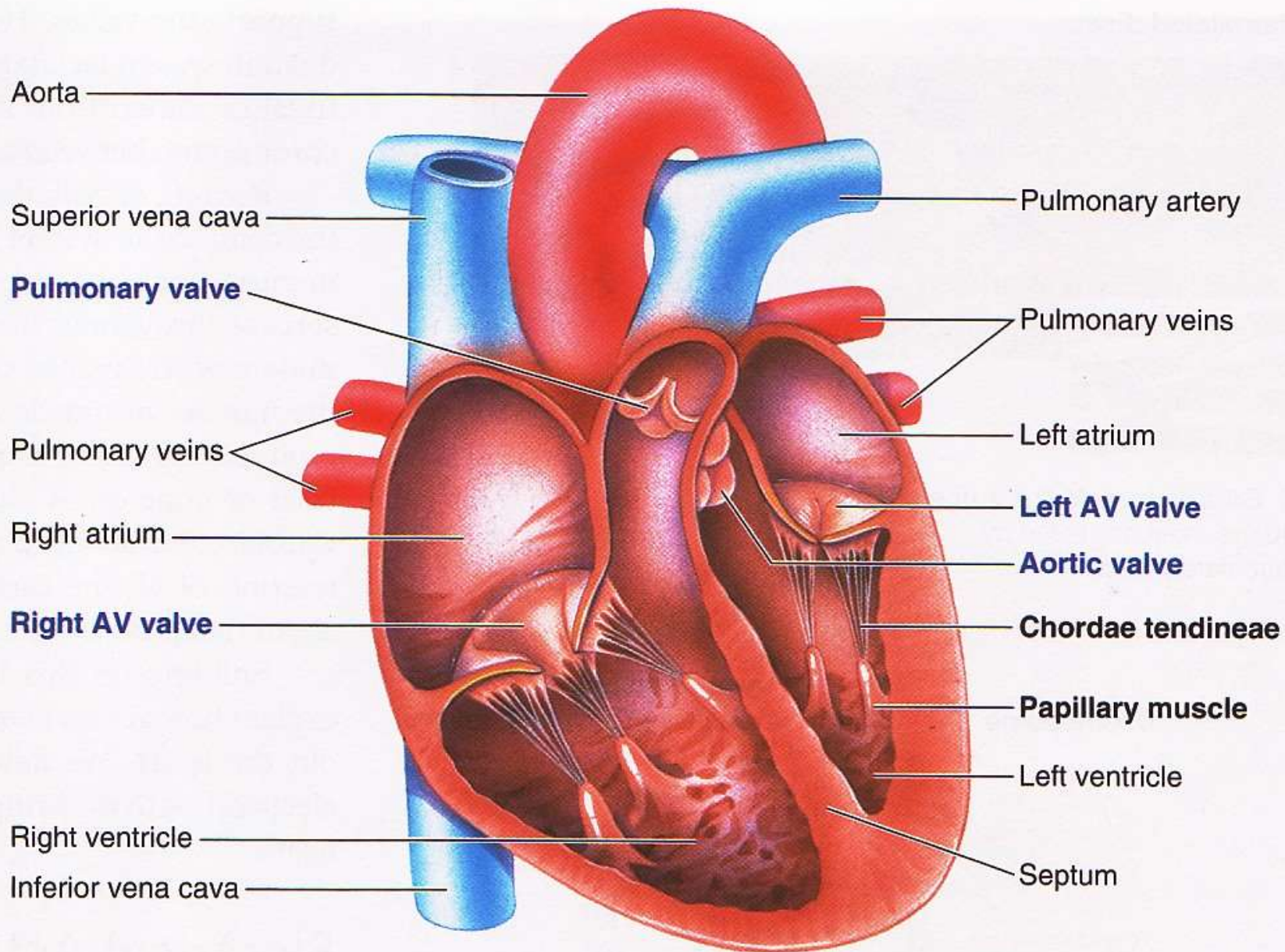


Torstar 1984 p 34

Human  = 4-chambered box?  
2 separate pumps?







**(a)** Location of the heart valves in a longitudinal section of the heart



# Heart Valves Ensure Unidirectional Blood Flow!



Right AV valve



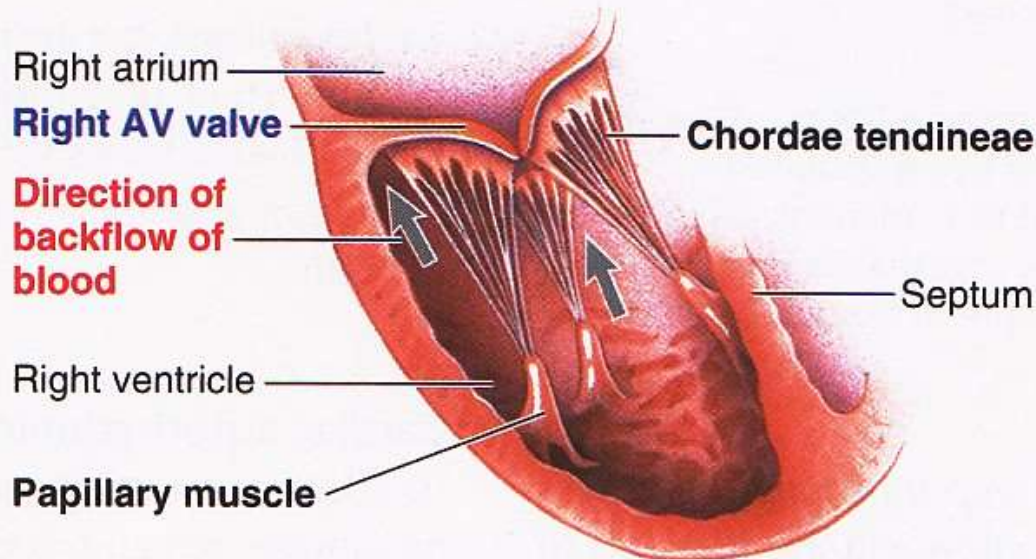
Left AV valve

Mom's valve!



Aortic or pulmonary valve

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



(c) Prevention of eversion of AV valves

Valves must be normal & healthy to work well!



Human ♥ = 4 unique valves?  
2 valve sets?

Semilunar = Half-moon shaped

More  
rigid

1. Pulmonic/Pulmonary
2. Aortic



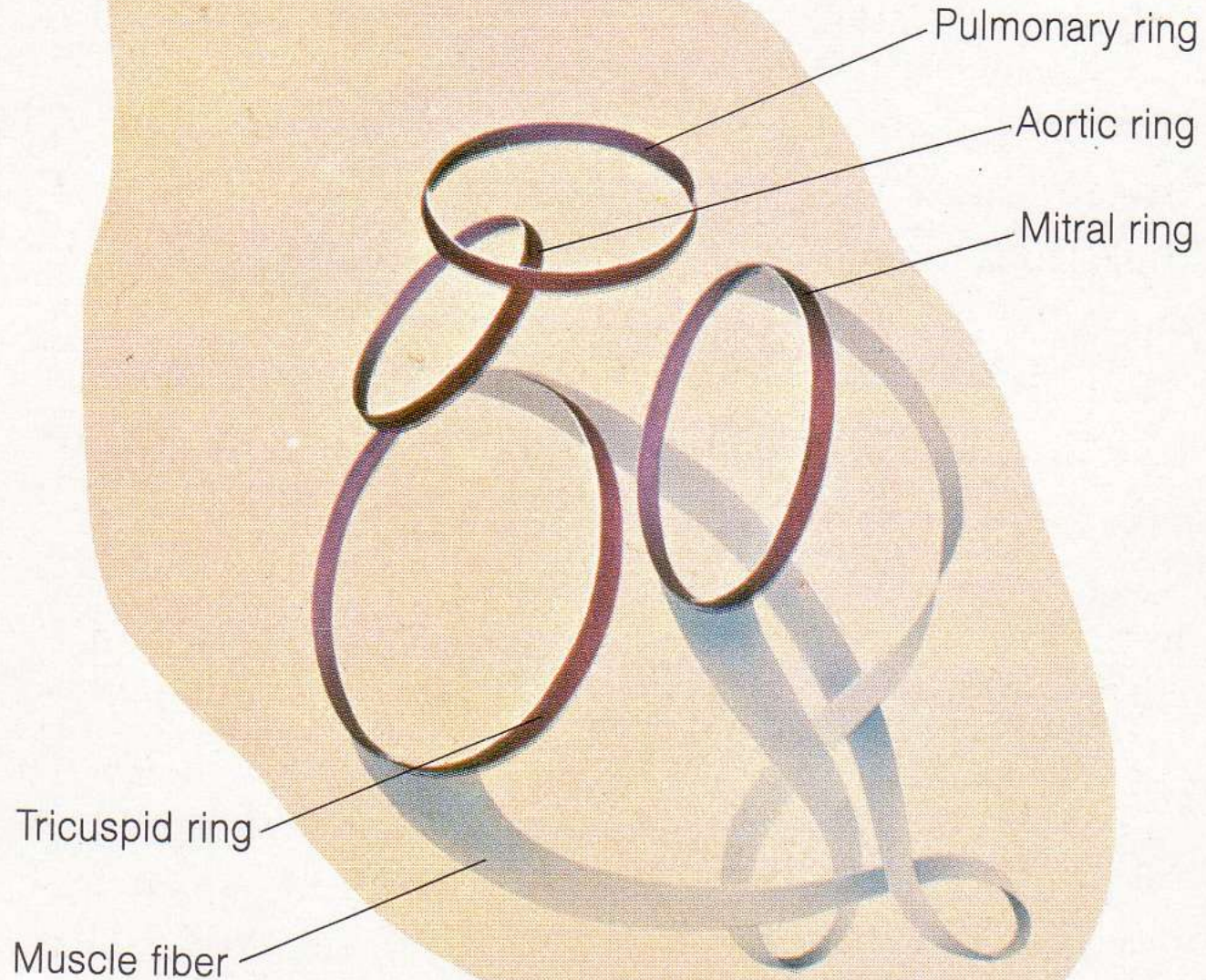
AV = Atrioventricular

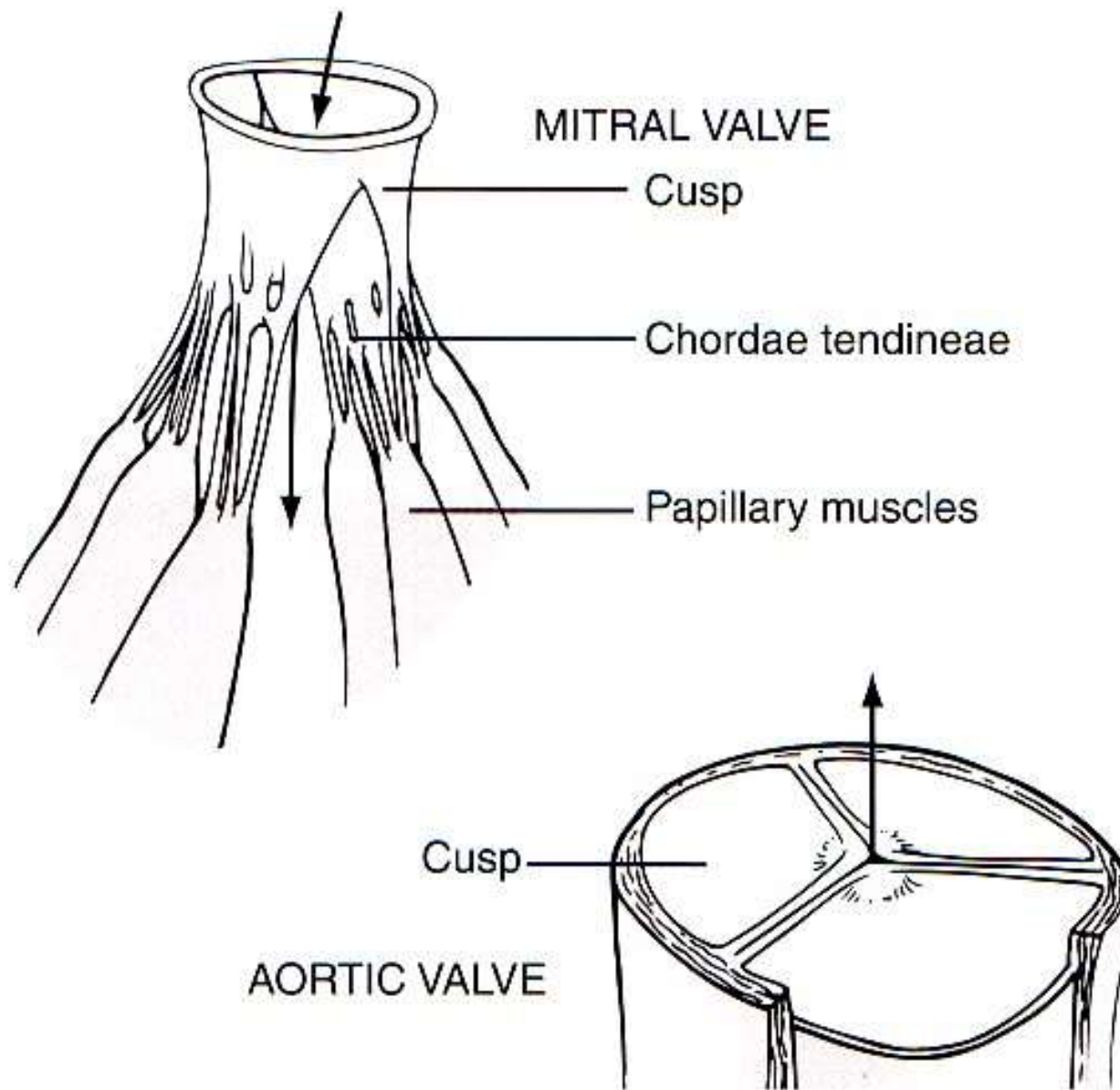
More  
flimsy

3. (R) AV = Tricuspid
4. (L) AV = Mitral/Bicuspid



# Heart Valve Orientation & Scaffolding

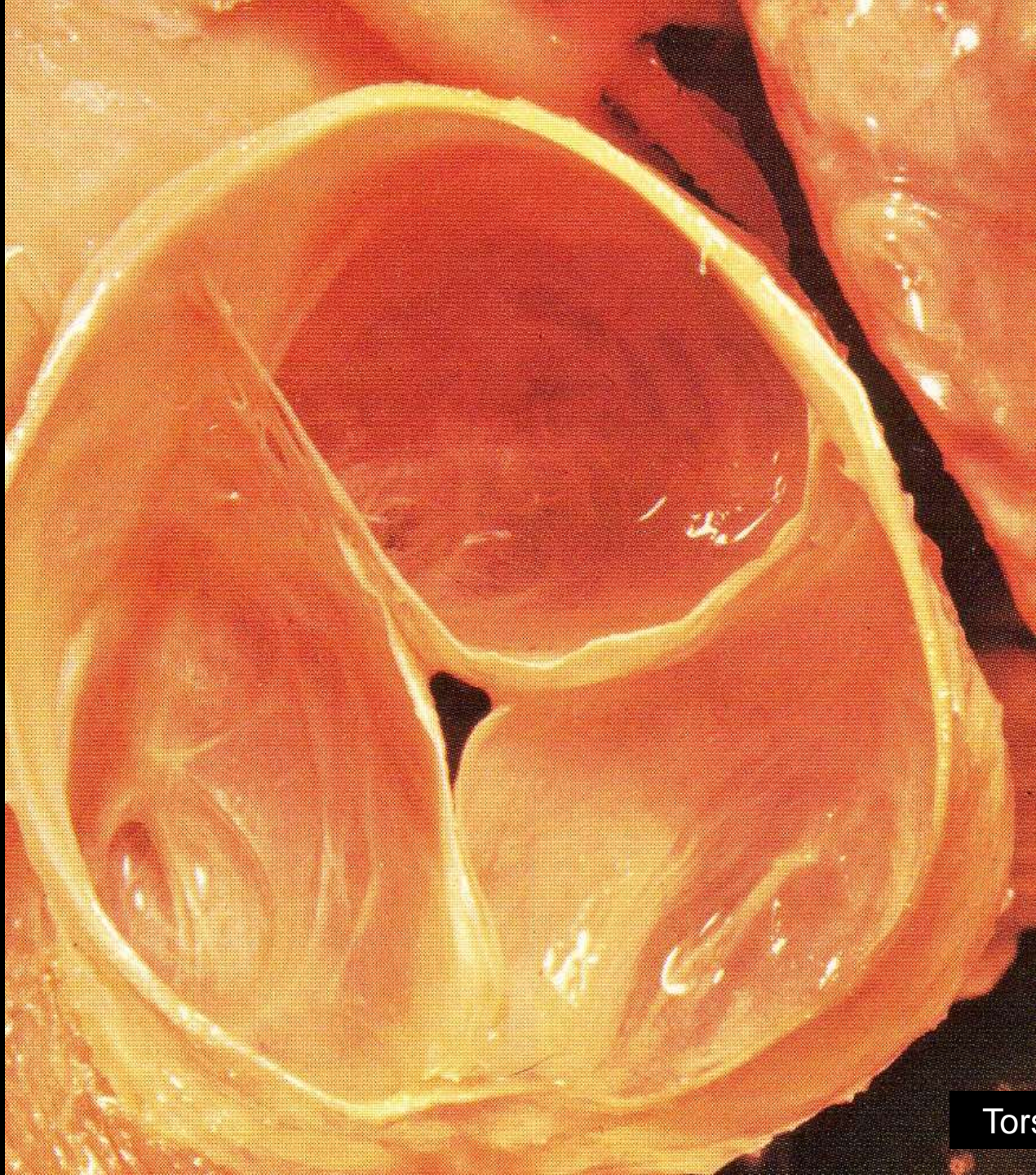




**FIGURE 9-6**

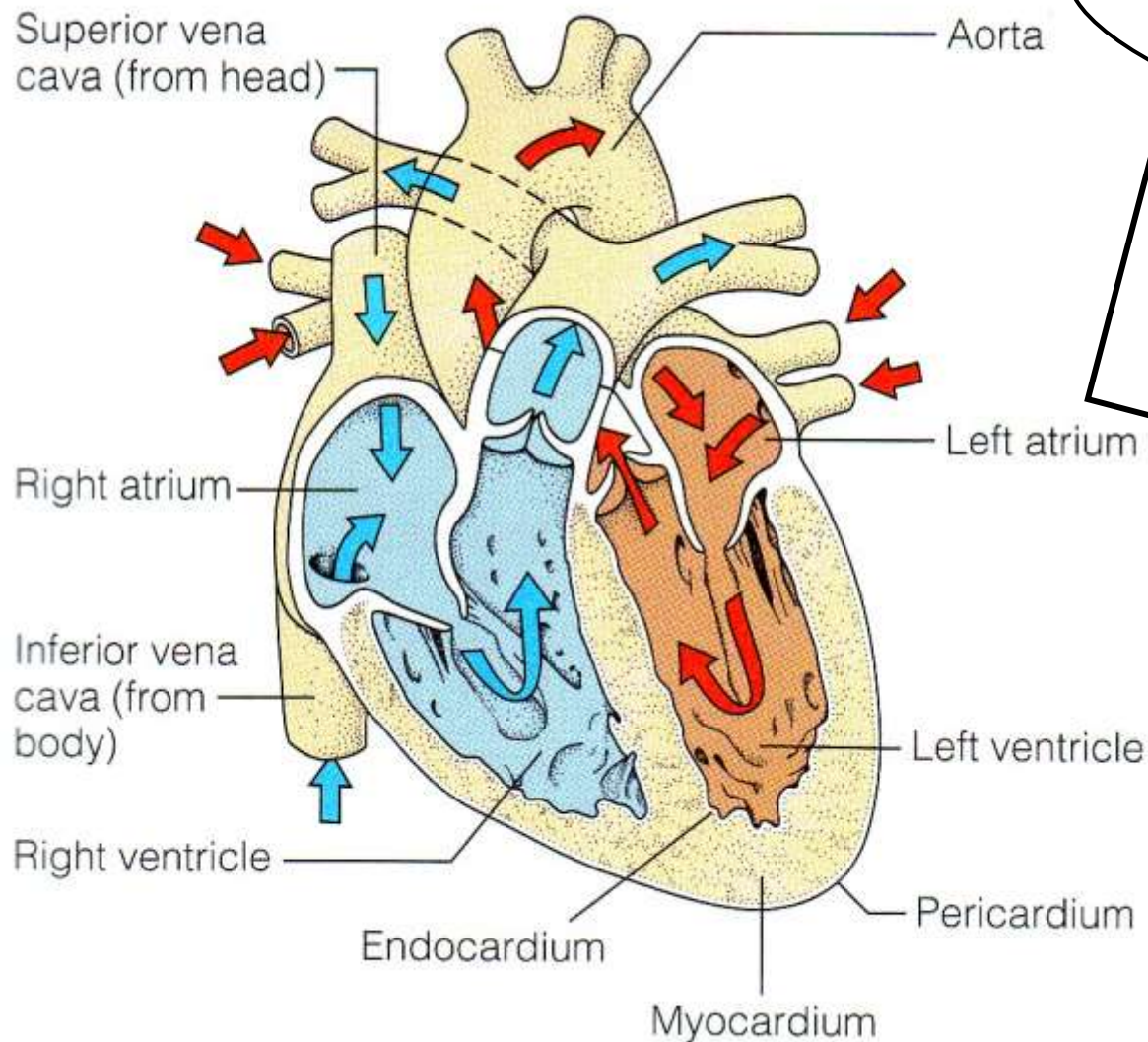
Mitral and aortic valves.



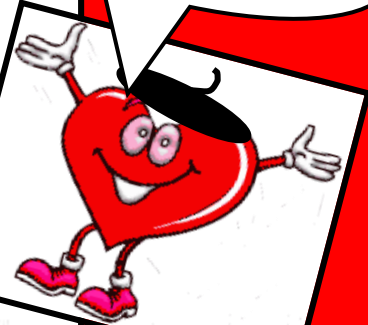




# Veins → Atria → Ventricles → Arteries



VAVA!

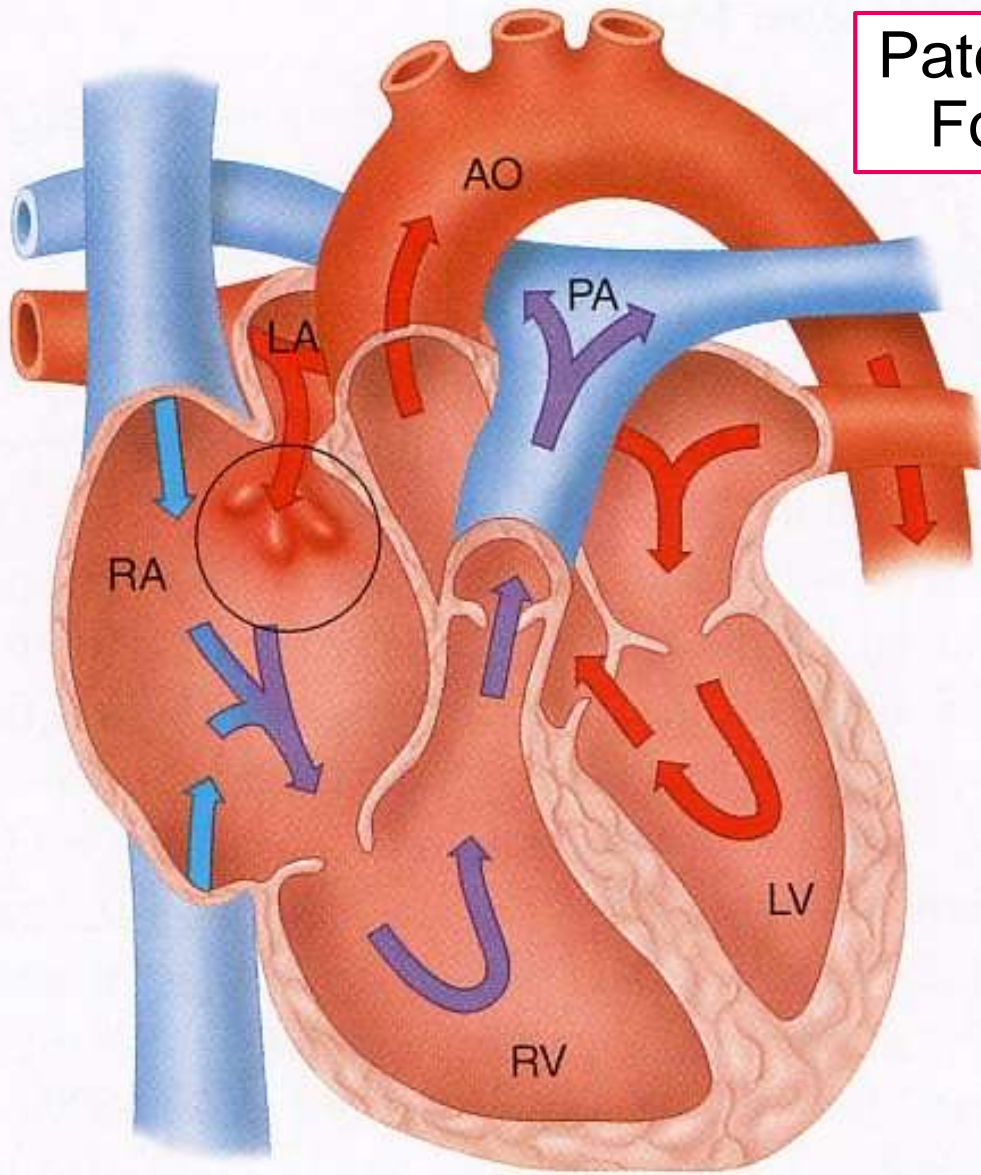


LS2007

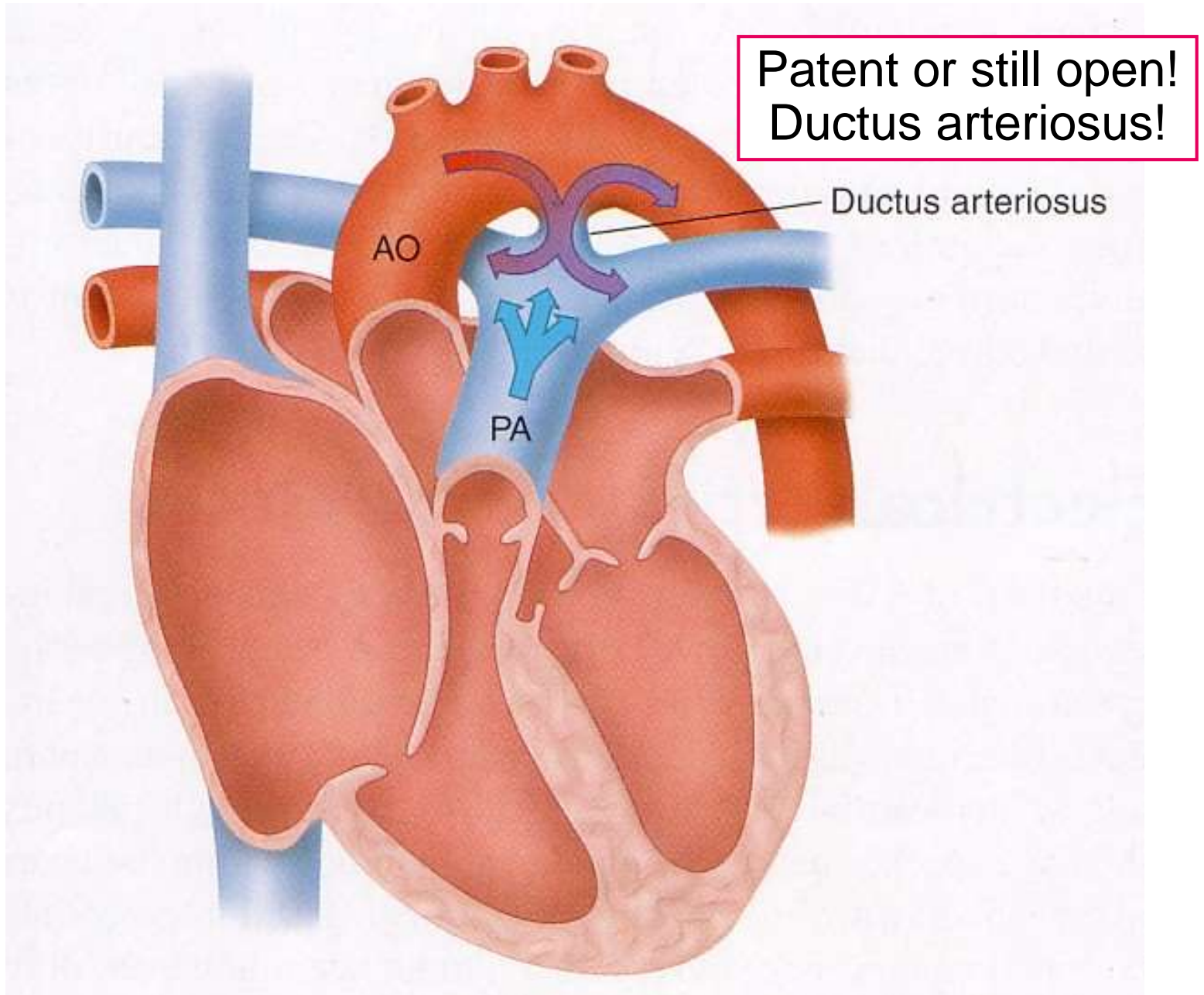
<https://www.nhlbi.nih.gov/health-topics/how-heart-works>  
<https://www.youtube.com/watch?v=zJXAIh9VDDU>



Patent or still open!  
Foramen ovale!



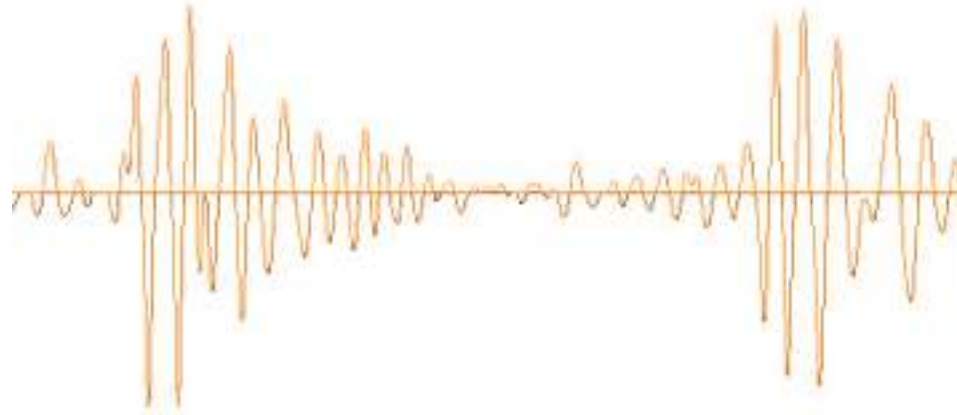
Septal defect  
in atria



***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**



<https://www.acsm.org/acsm-positions-policy/official-positions/ACSM-position-stands>  
<https://www.ncbi.nlm.nih.gov/pubmed/21694556>



**AMERICAN COLLEGE**  
of **SPORTS MEDICINE**



## **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
- ✓  $\geq 1$  set/exercise
- ✓ 8-12 (most) or 10-15 (frail/ $> 50-60$  yr) repetitions/set



# CVDs

AMI

CVA



TIA

HTN

PVD

# 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.**



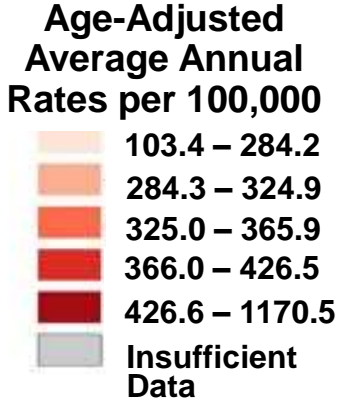
# Heart Disease Death Rates, 2014-2016 Adults, Ages 35+, by County

Eugene, OR

MN is low!

Jackson, MS

HI is low!

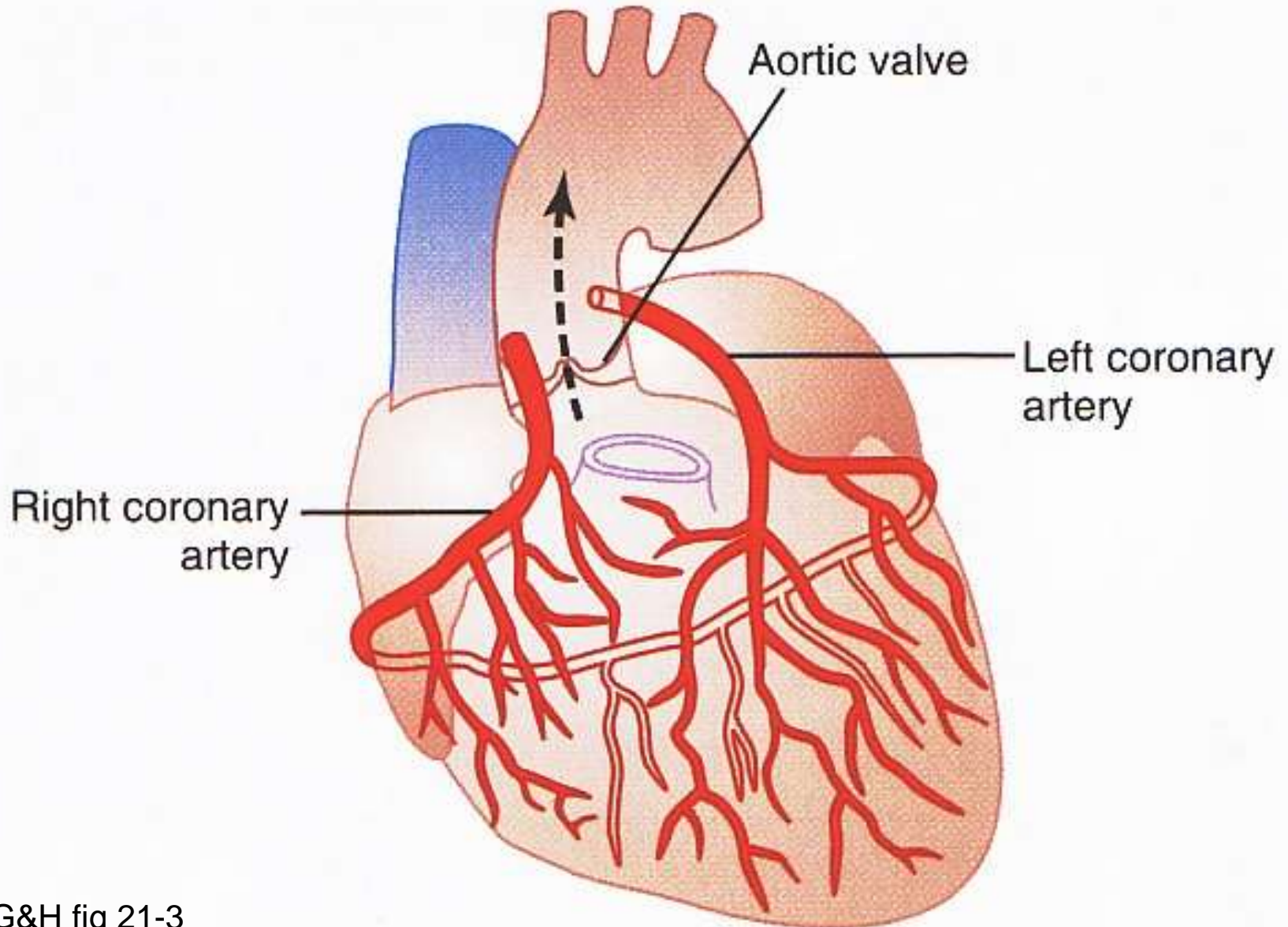


Rates are spatially smoothed to enhance the stability of rates in counties with small populations.

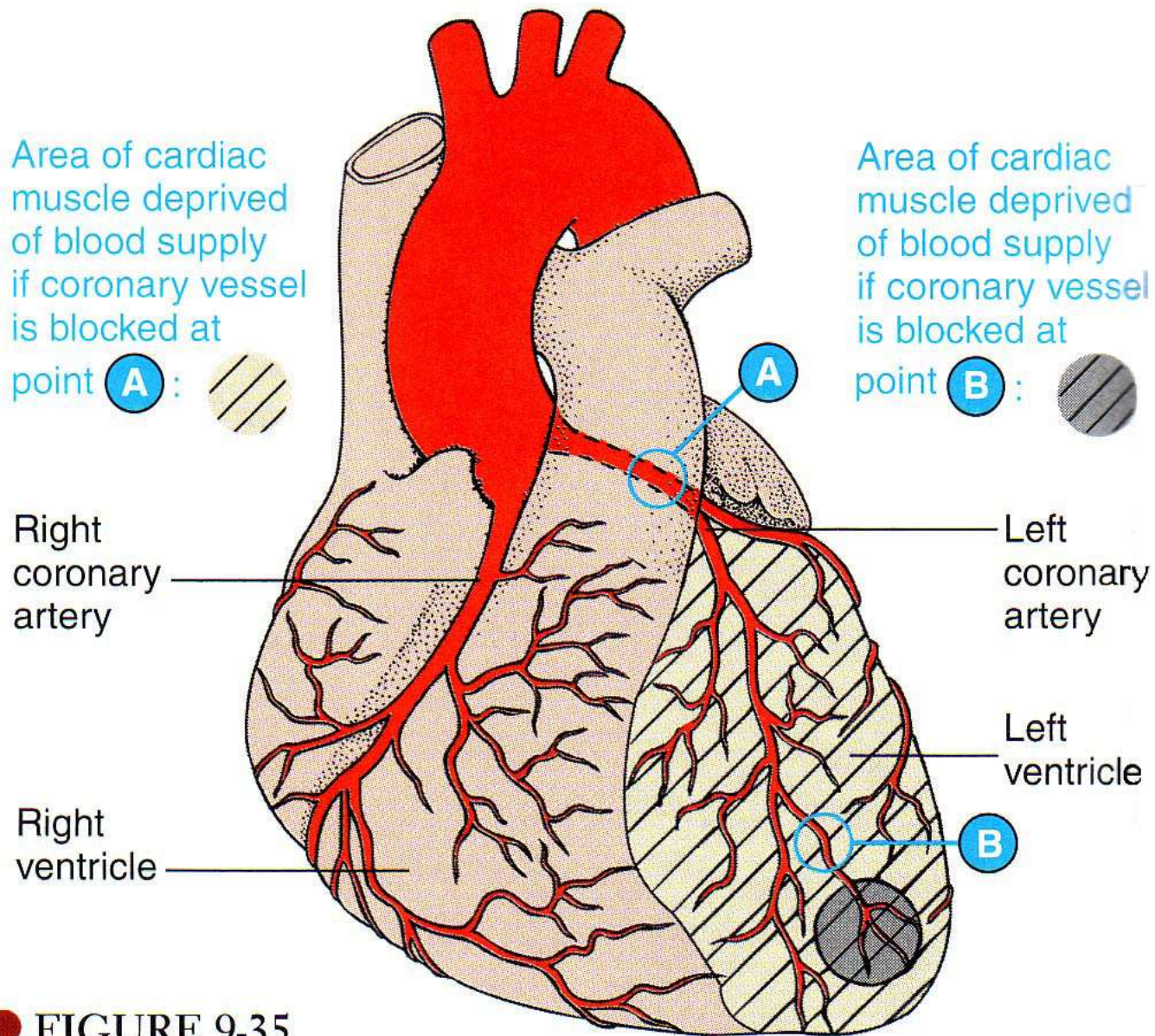
Data Source: National Vital Statistics System  
National Center for Health Statistics



# ***Coronary Circulation ≡ Crowns the Heart!***

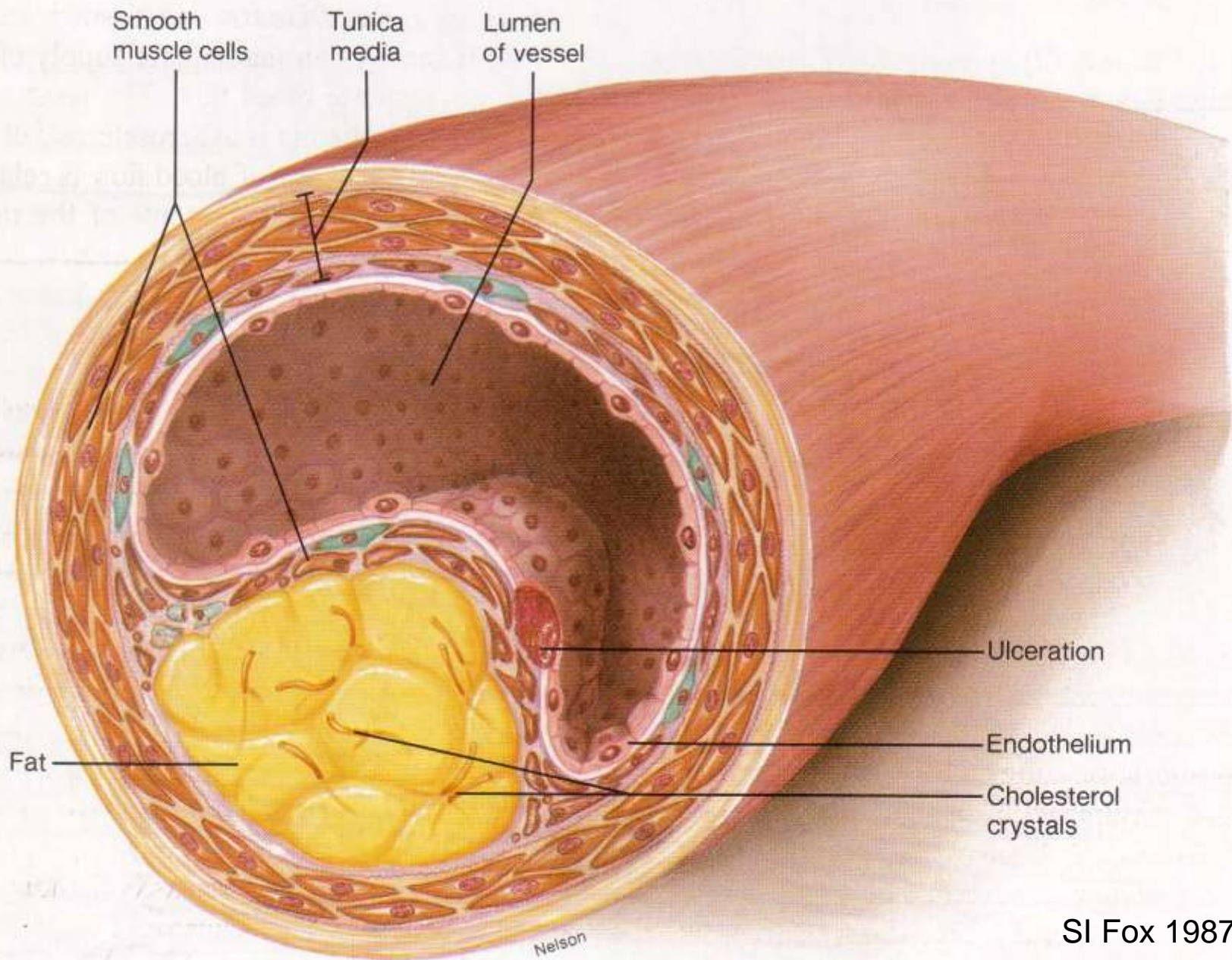






● **FIGURE 9-35**

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



100 yr ♀





59 yr HTN ♀



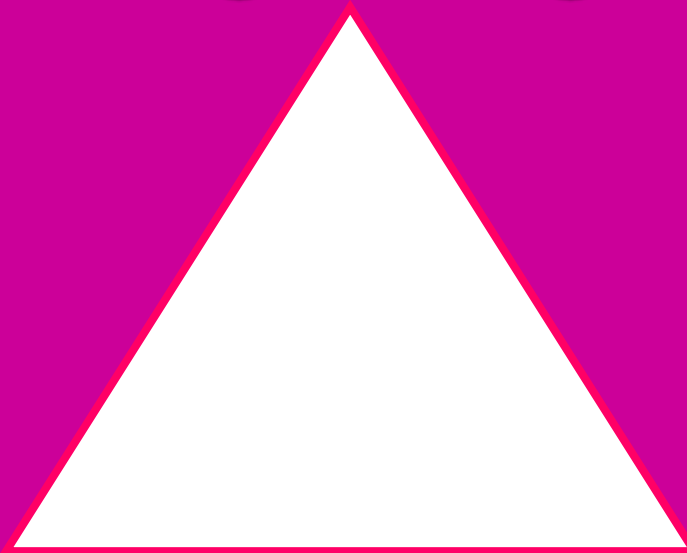


# *Treatment Triad*

NB: Last blasted resort!!

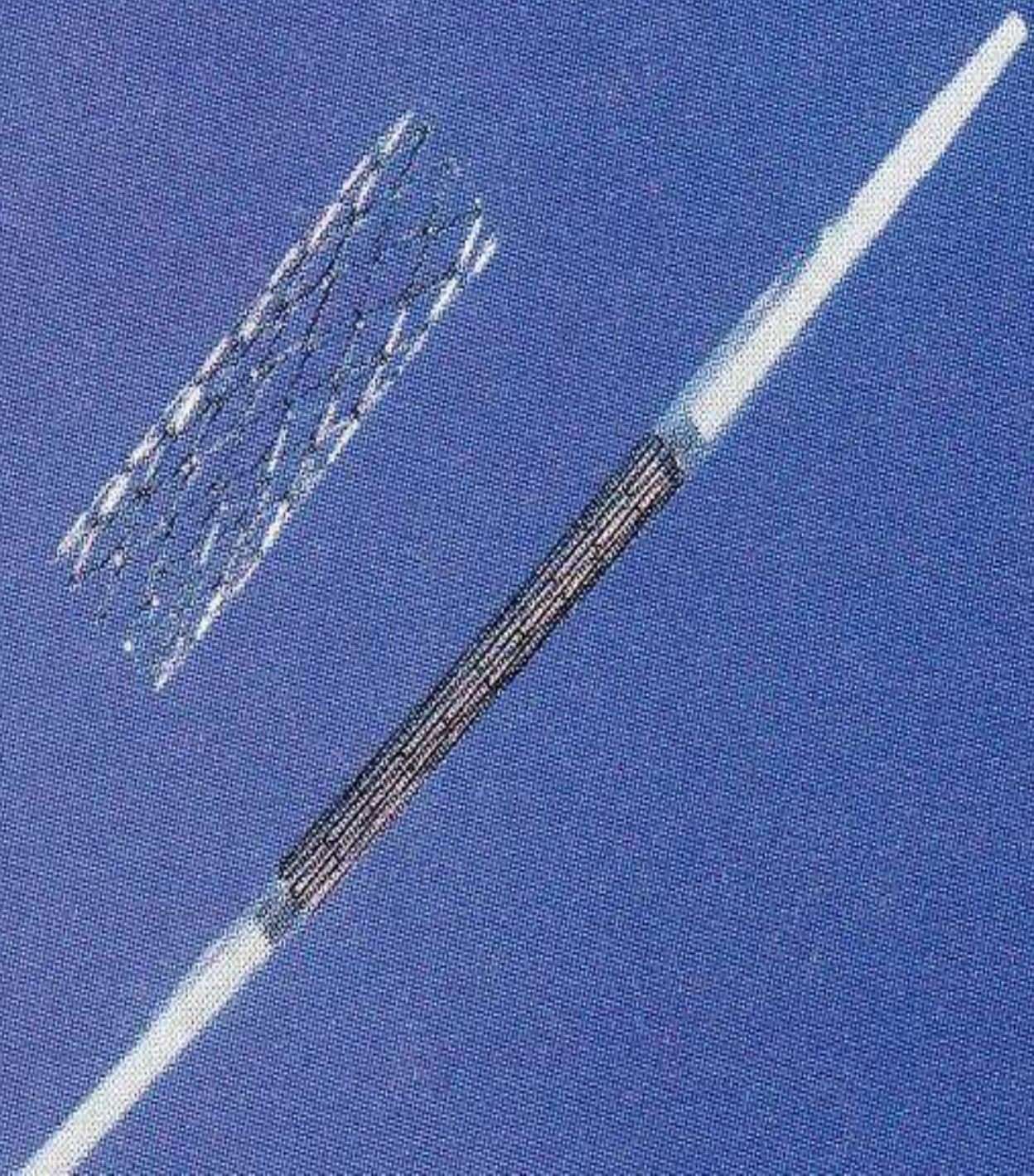


*Drugs/Surgery*



*Exercise*

*Dietary  
Modification*



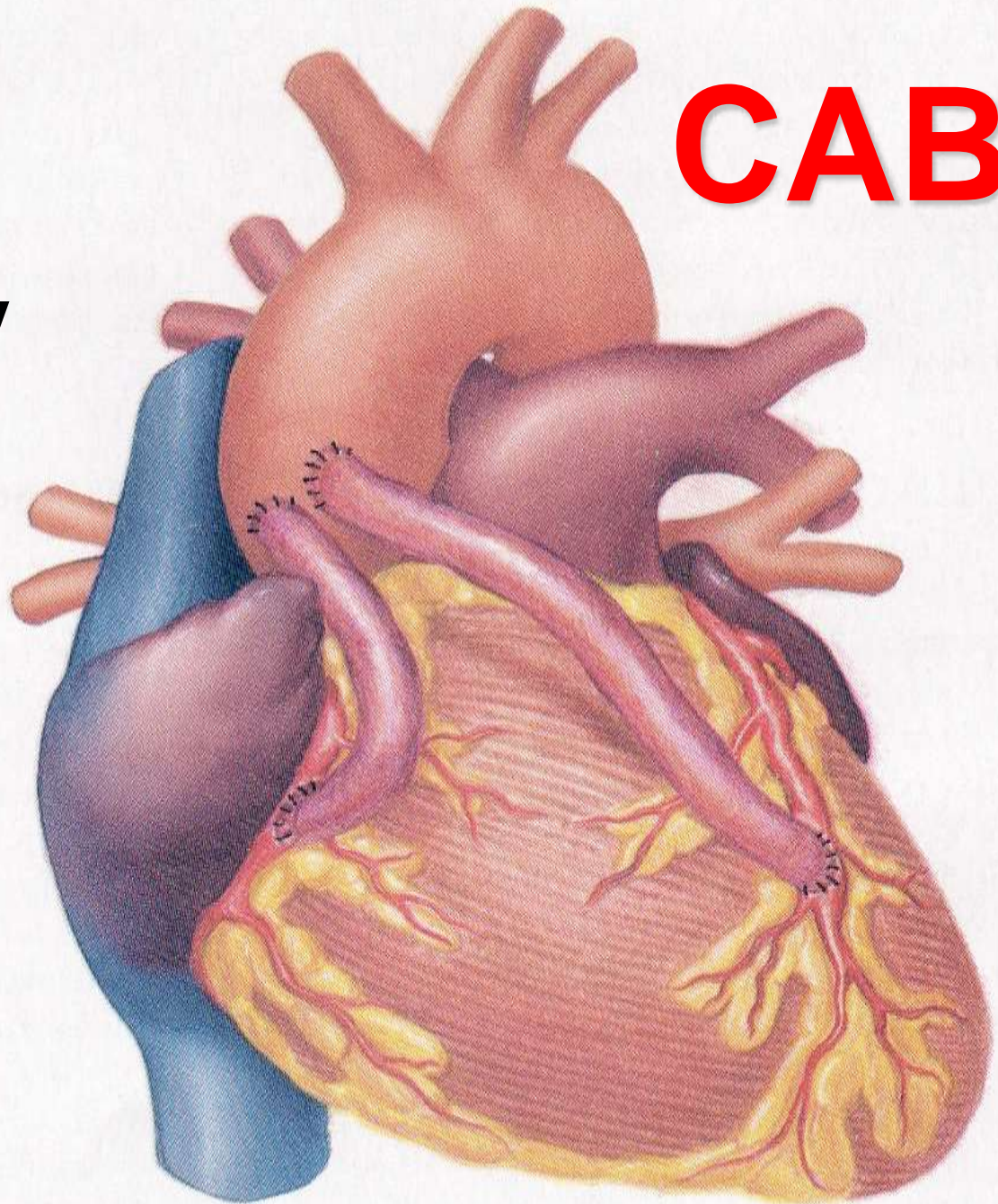
# CABG

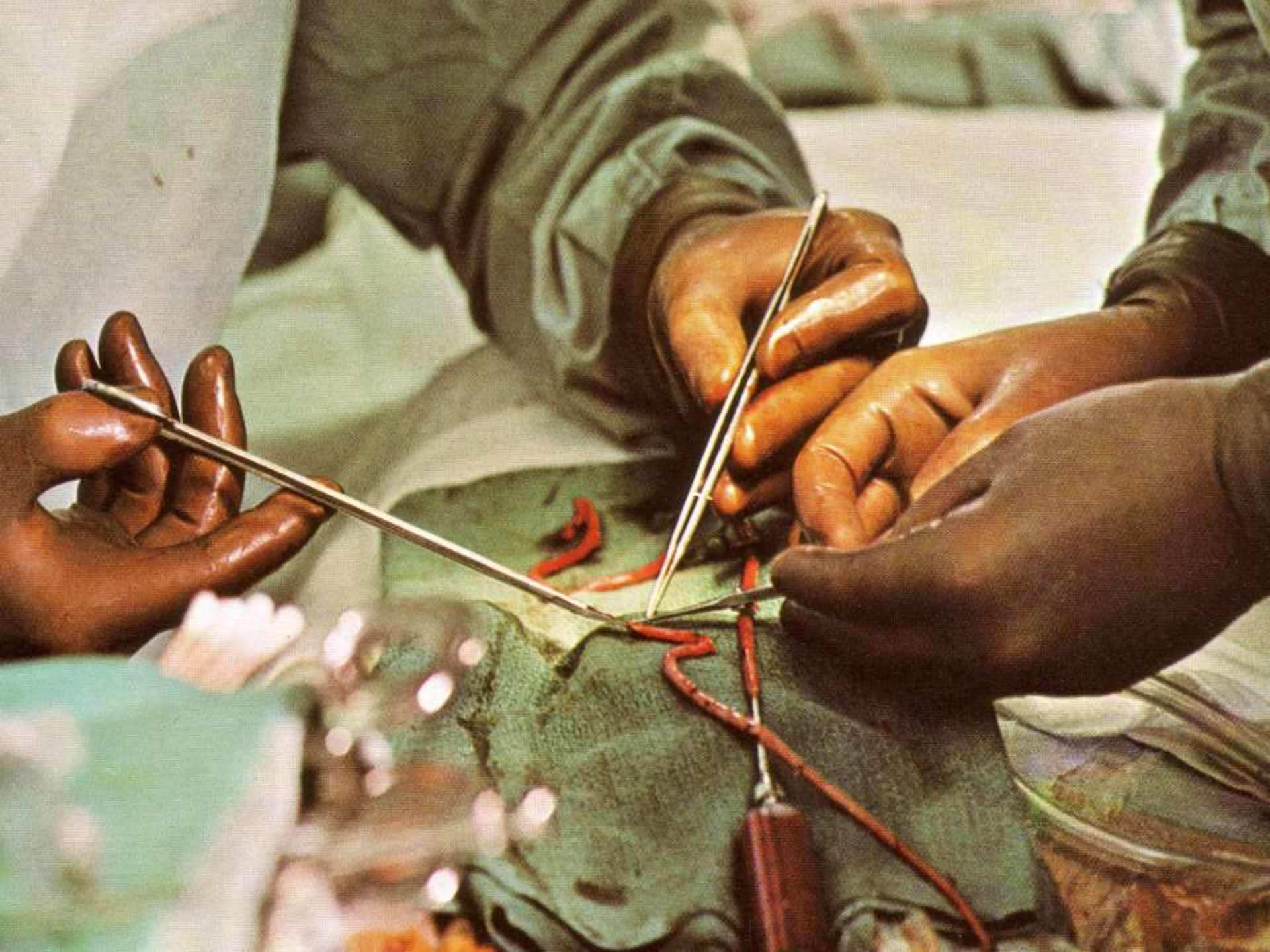
**C**oronary

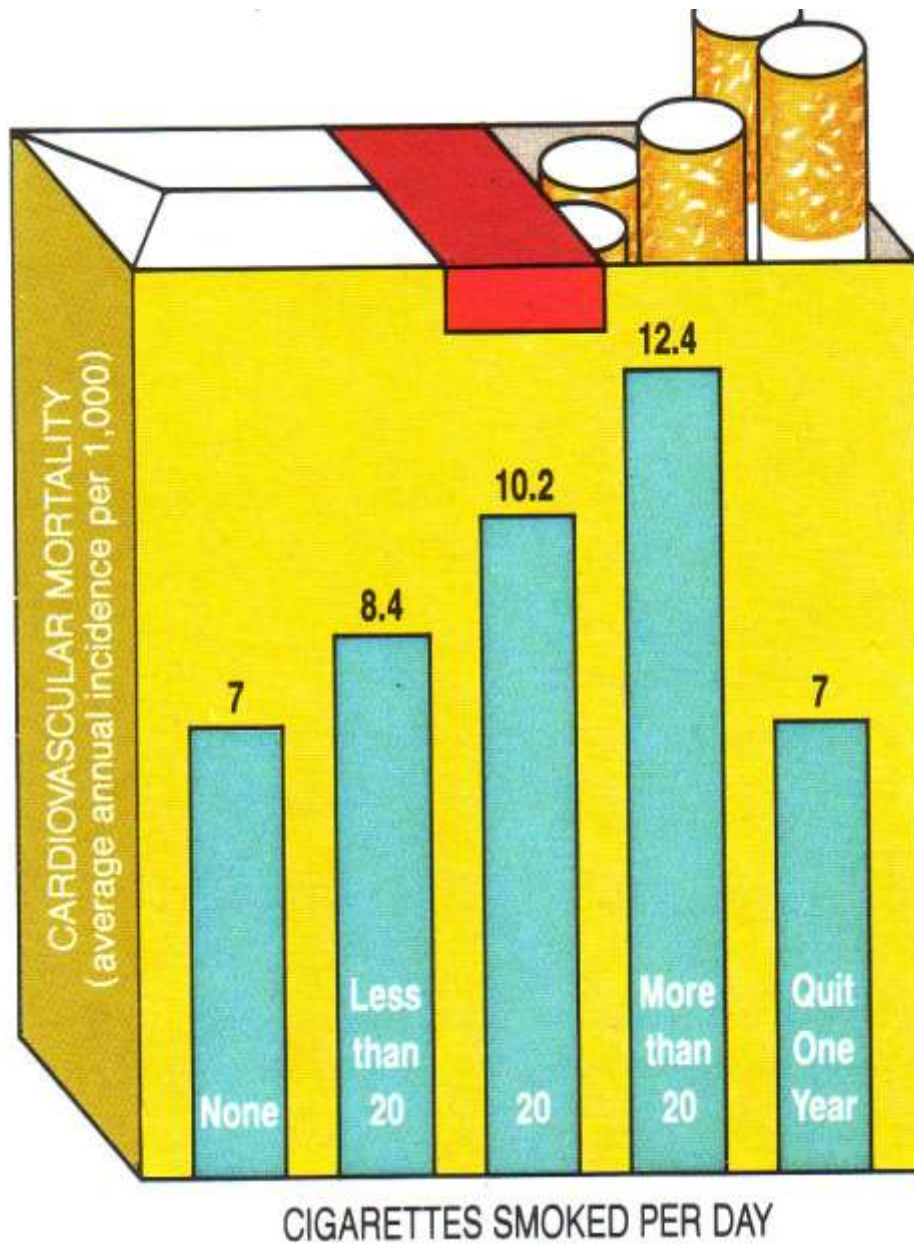
**A**rtery

**B**y-pass

**G**raft







# 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.uoregon.edu](http://tobaccofree.uoregon.edu) for free and low cost resources

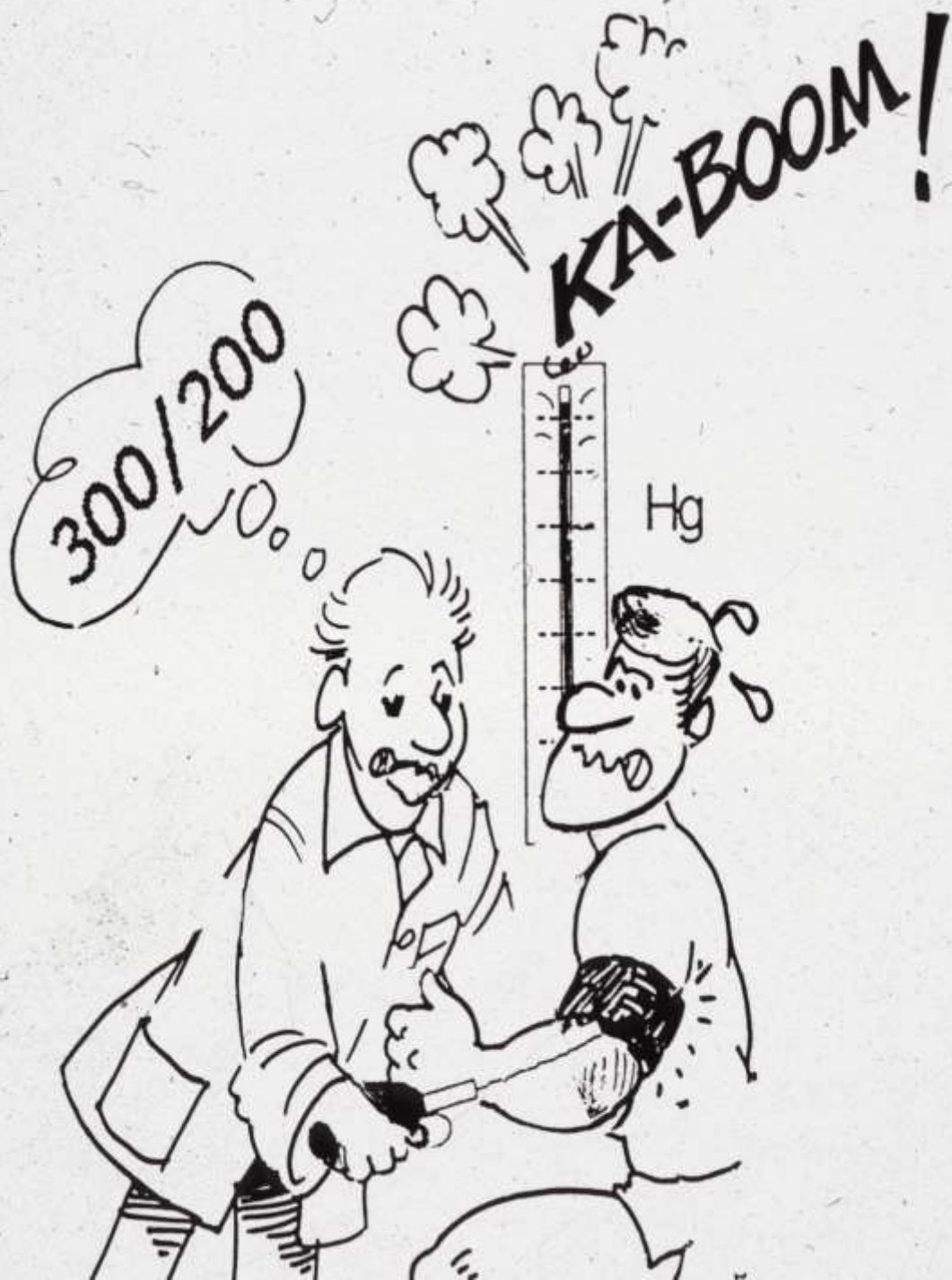


UNIVERSITY OF OREGON

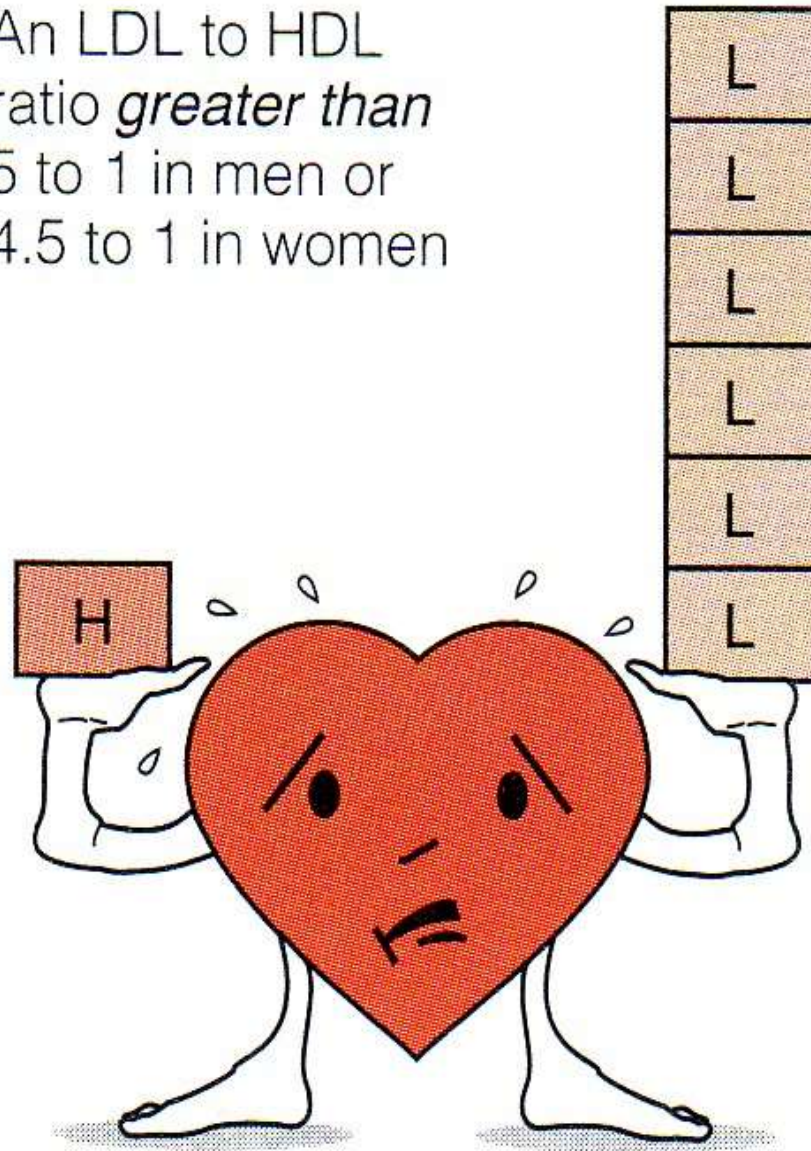
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An LDL to HDL  
ratio *greater than*  
5 to 1 in men or  
4.5 to 1 in women



Increased risk of  
heart disease

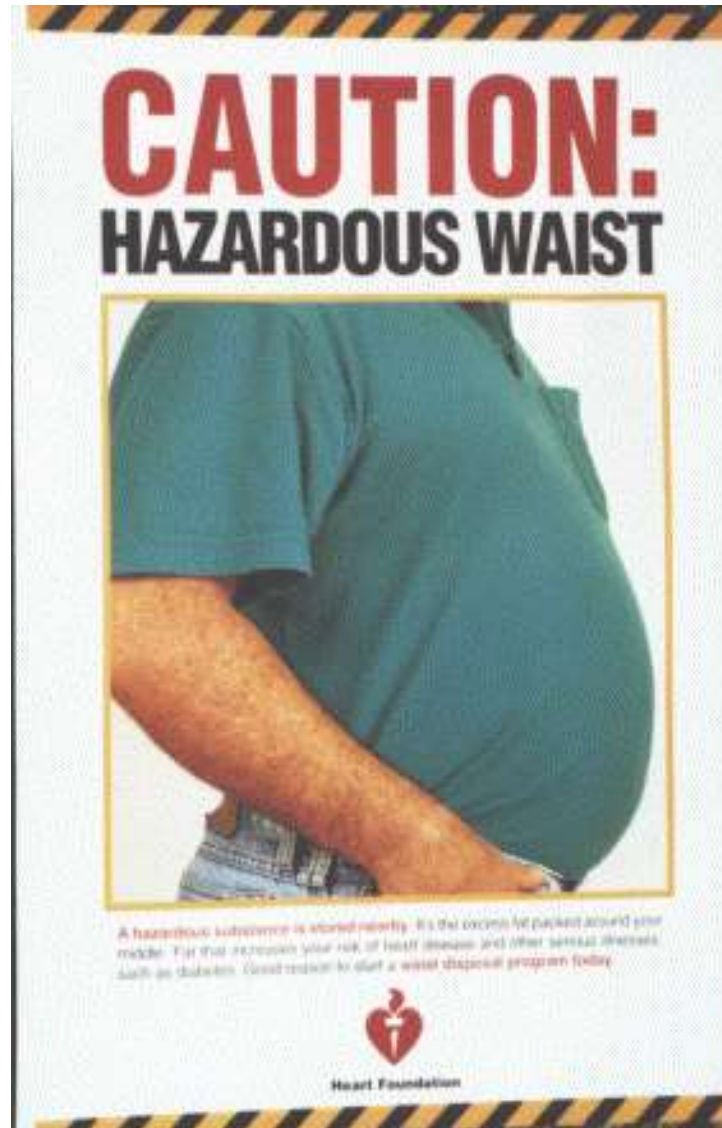


# Apple type of obesity predisposed to CVD!

Pear type of fat pattern...



implies lower disease risk!



Eat more apples...



to help prevent the apple type of obesity!



**Cardiorespiratory  
Endurance**



**Muscular  
Strength/Endurance**

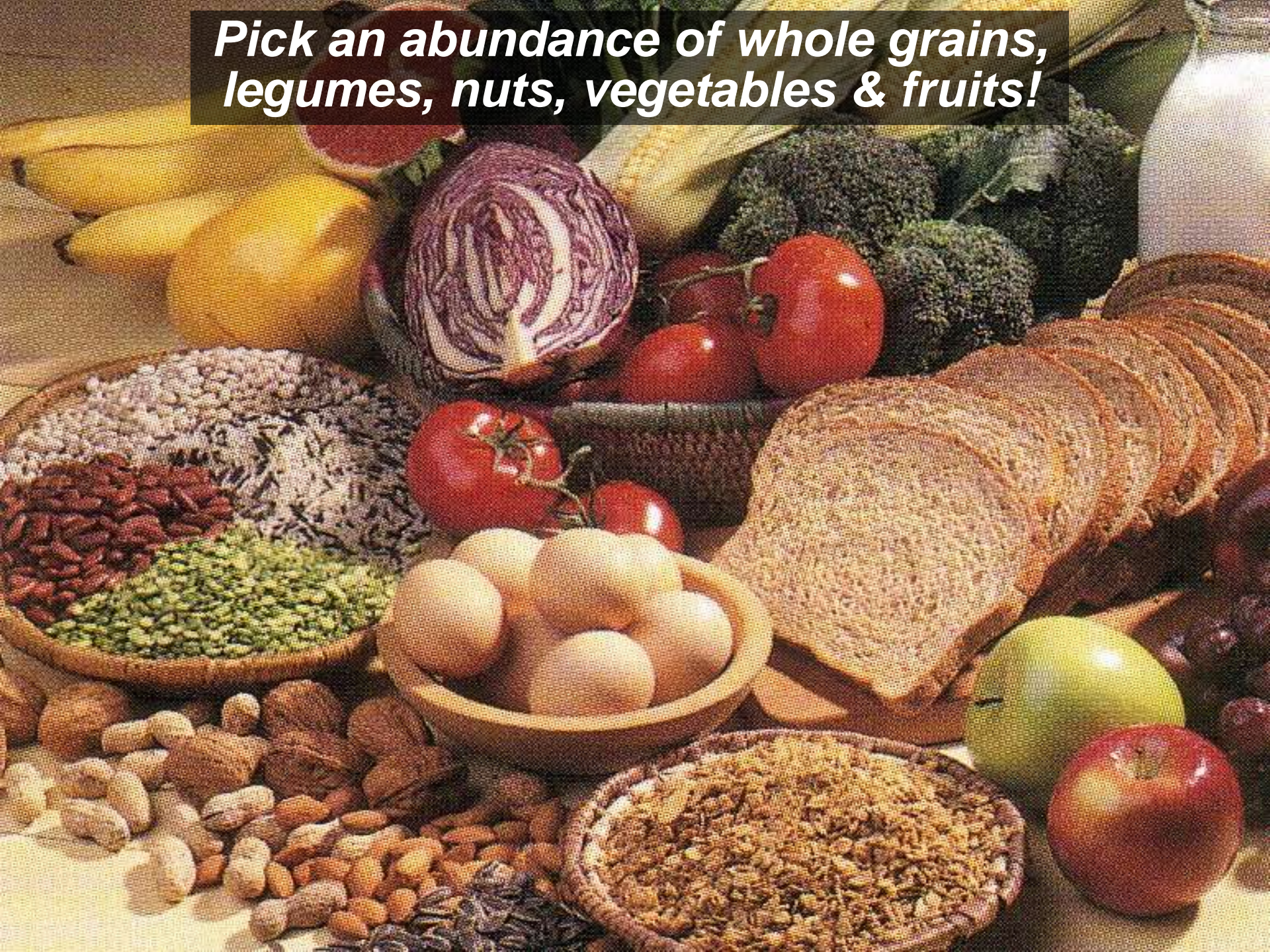


**Flexibility**

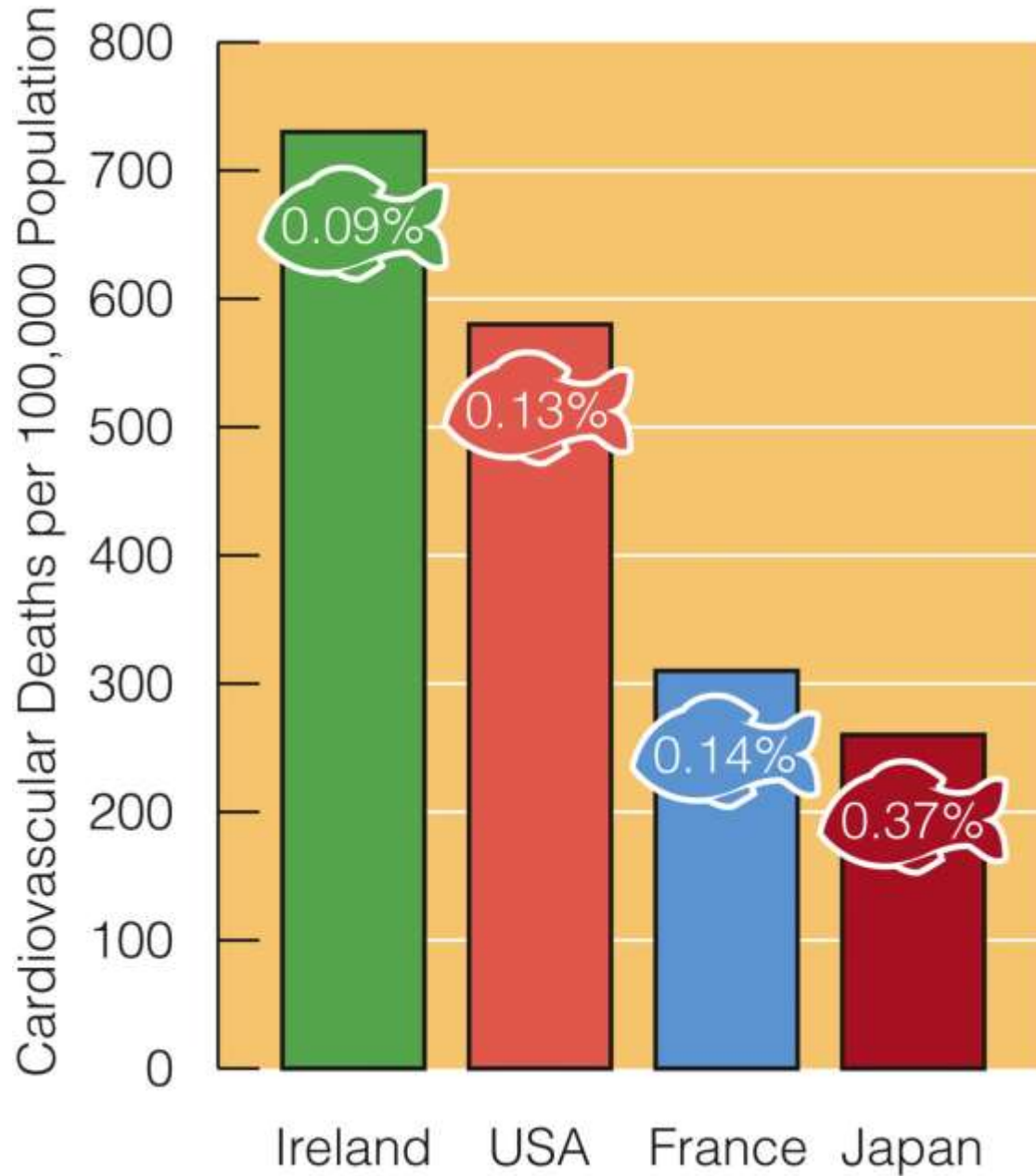


**Neuromuscular Relaxation**

***Pick an abundance of whole grains, legumes, nuts, vegetables & fruits!***



# *Fish Oil Intakes & Cardiovascular Death Rates*





# Healthy Oils to Minimize Atherosclerosis HAPOC?

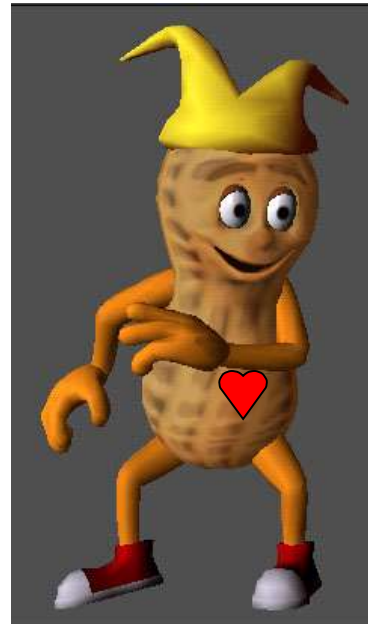
# H

# A

# P

# O

# C

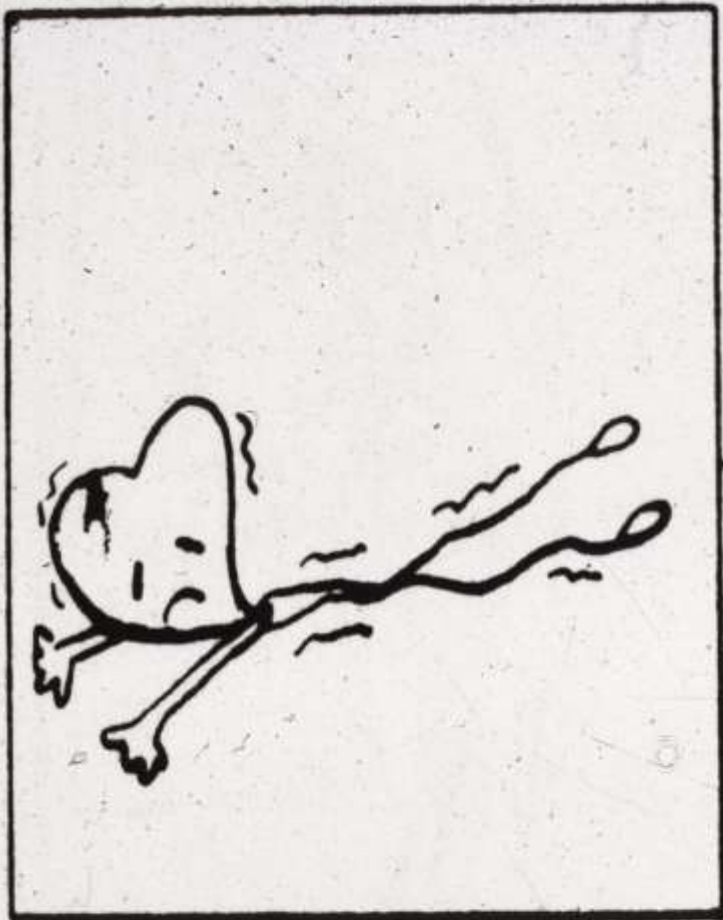


# *Olive Oil Loves Olive Oil & has some heartfelt advise for Popeye!!*

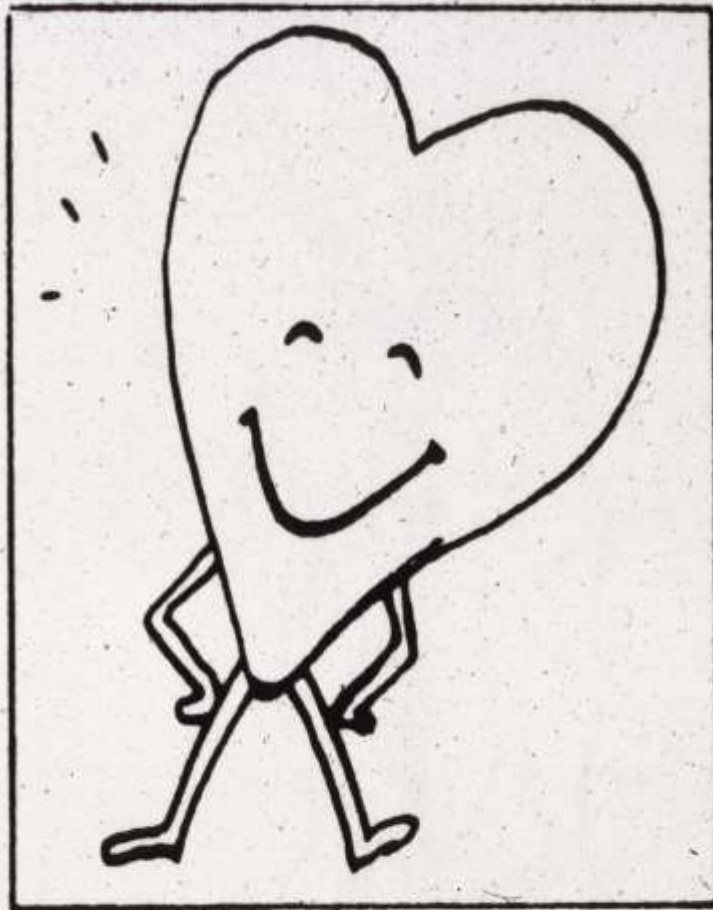


Yes for the  
spinach! — but get  
rid of the pipe!!





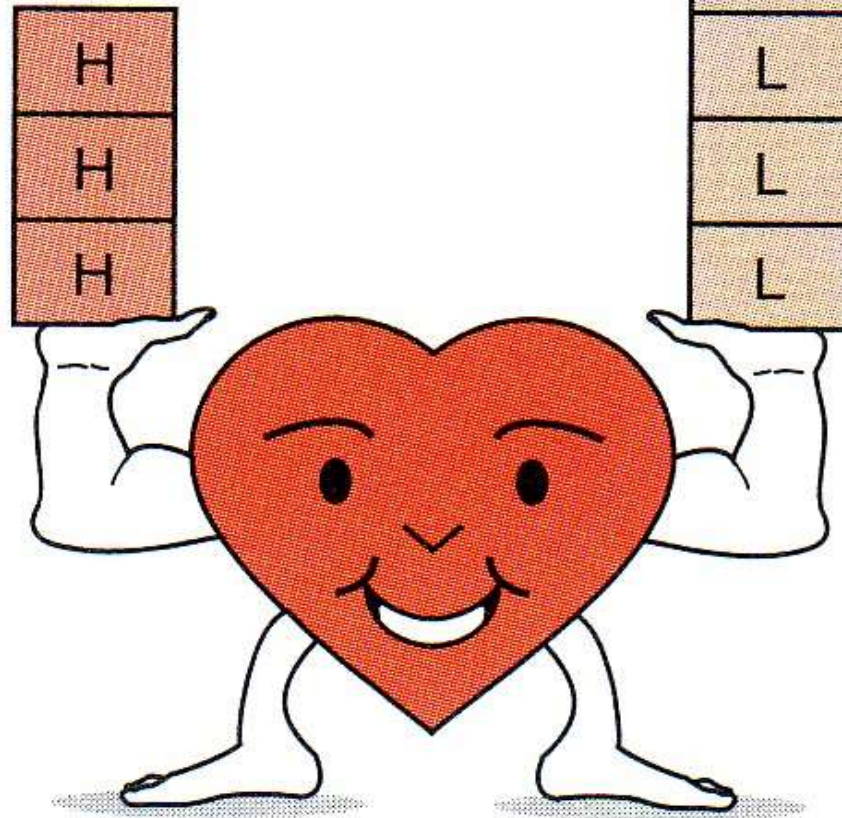
**Before**



**After**



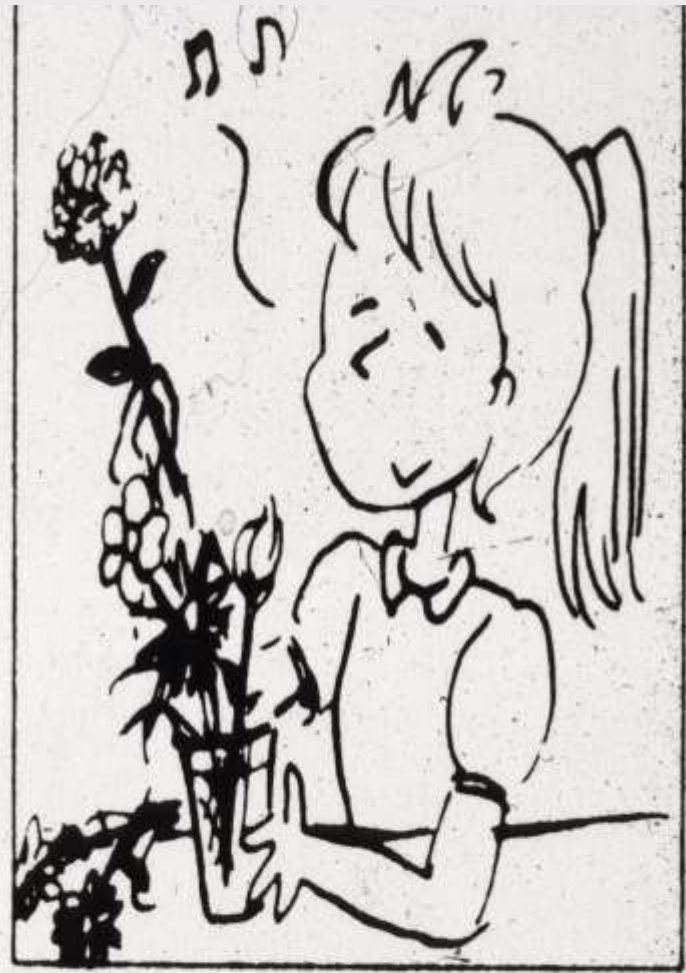
An LDL to HDL  
ratio of *less than*  
5 to 1 in men or  
4.5 to 1 in women



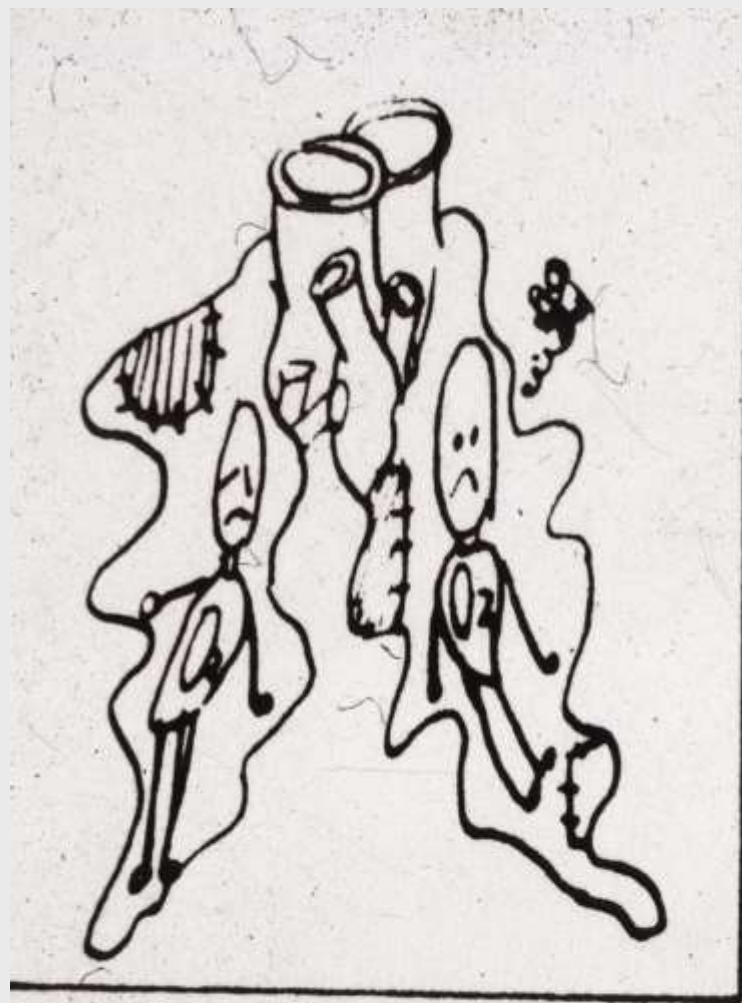
Reduced risk of  
heart disease



Before



After



**Before**



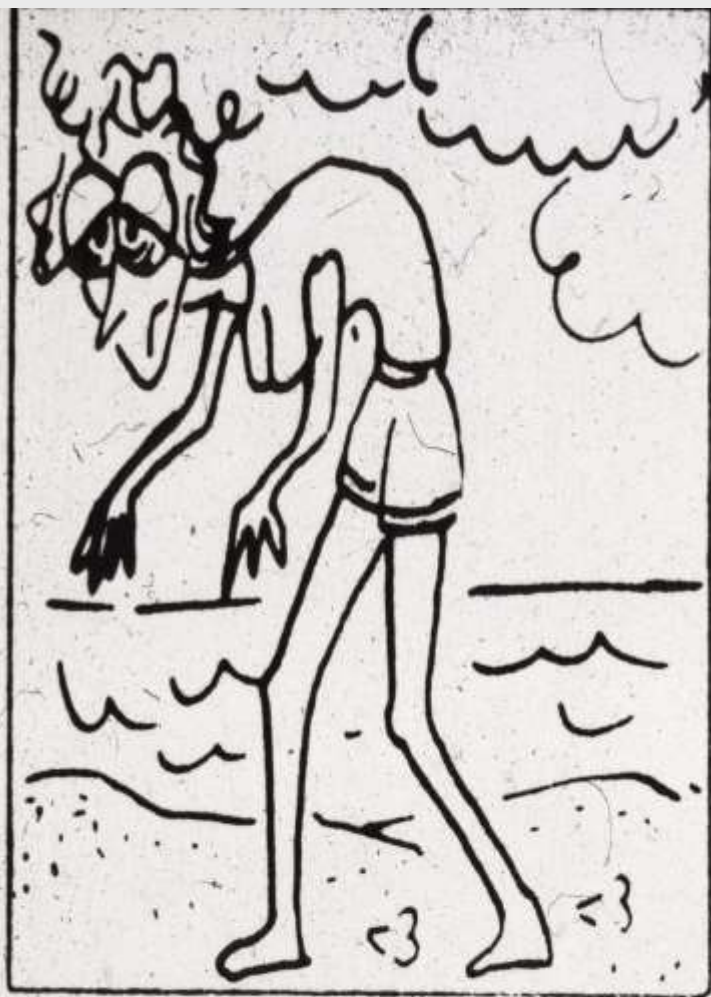
**After**



Before



After



**Before**



**After**