

What about Exam I scores?...



## BI 121 Lecture 9

**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

Normal vs abnormal blood flow! Q?

**IV. CV Physiology in the News** 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



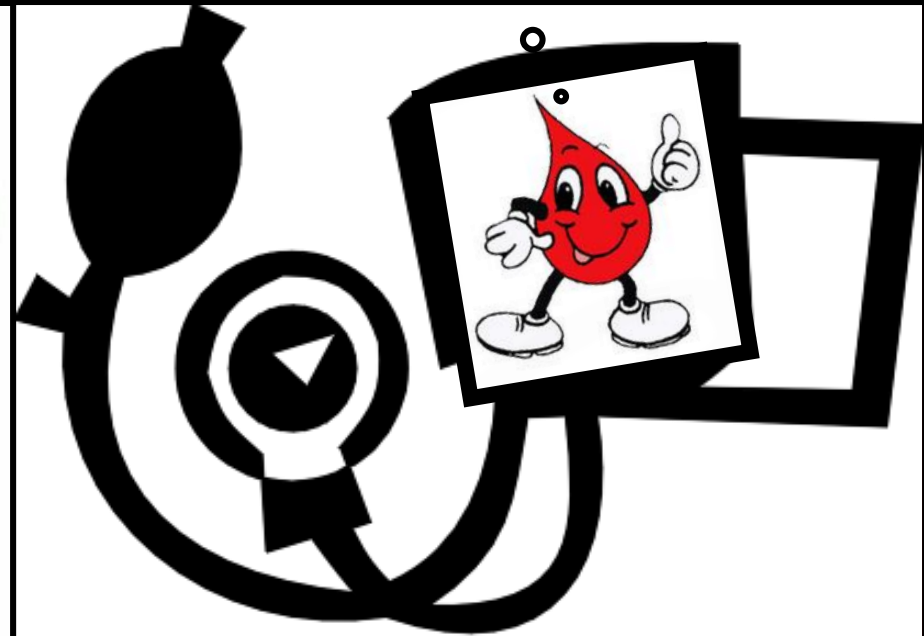
~ TOP 20-25!

# *Heart-Blood Pressure Lab Today!*

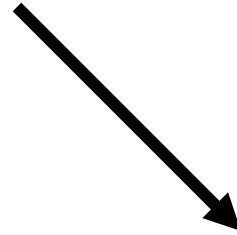
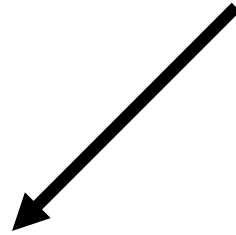
Lub-dup!



I'm cool!



# Cardiac Cycle

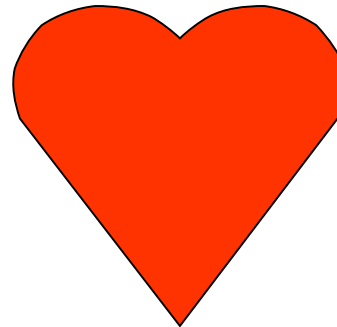
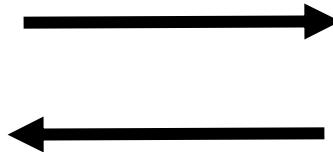
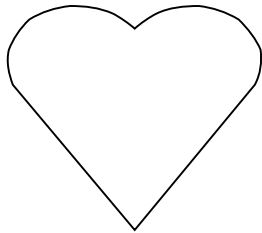


***Systole***

Contract  
& Empty

***Diastole***

Relax  
& Fill





# ***Blood Chemistry on Thursday! No food, drink or gum in lab!***



***Thanks sincerely!***

# PREPARATION



WASH & DRY



ALCOHOL



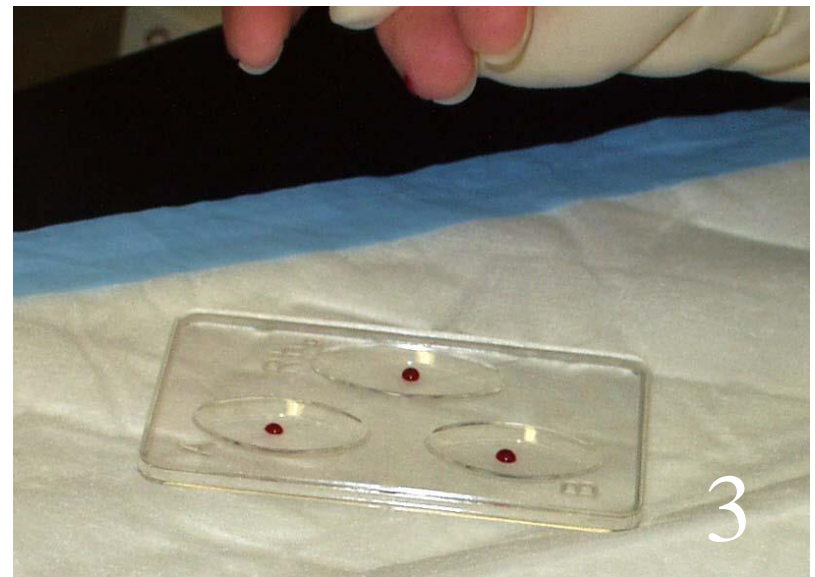
# SAMPLE+TESTS



OBTAIN  $\mu$ SAMPLE



BLOOD GLUCOSE



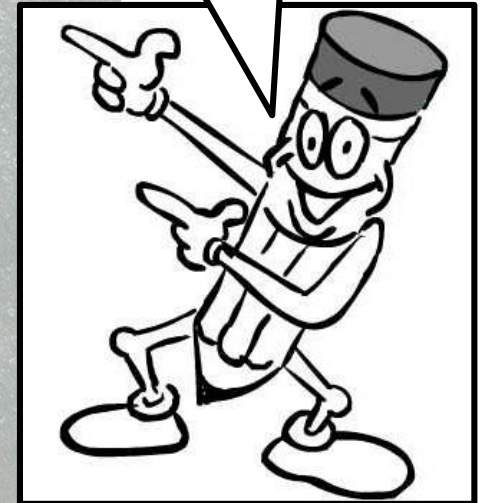
BLOOD TYPING



Glucose:  
Sugar in Blood

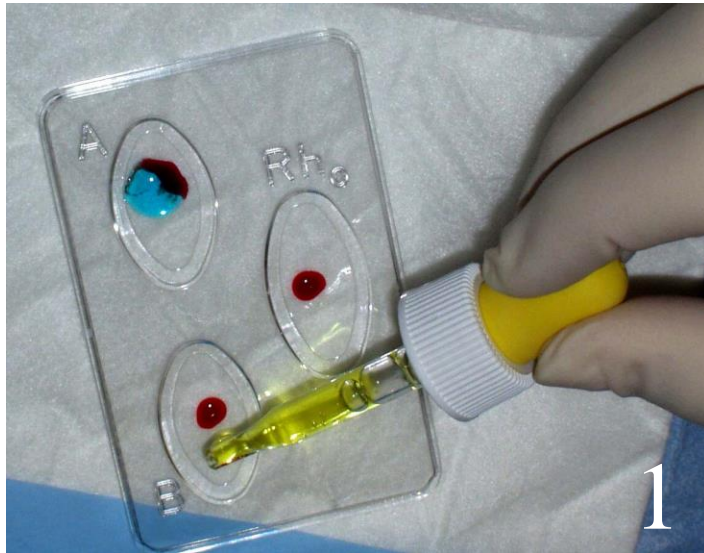


**NB: Read  
& Record!**

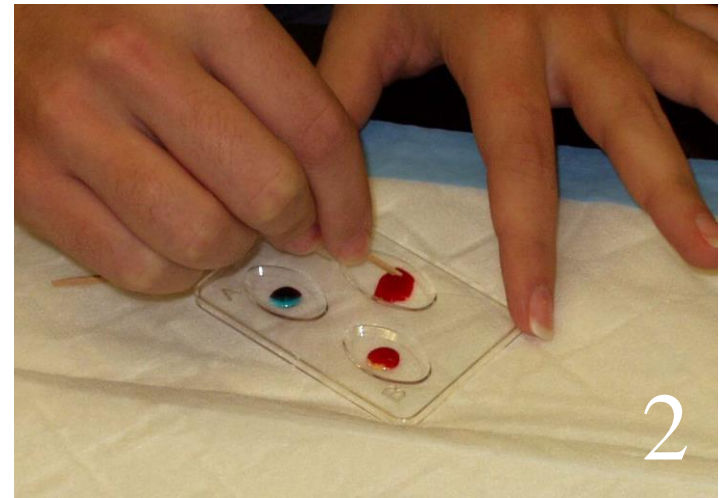


*Normal: 70-99*  
*Pre-Diabetes: 100-125*  
*Diabetes:  $\geq$  126 mg/dL*

# BLOOD TYPING



ADD ANTISERA



MIX W/TOOTHPICKS



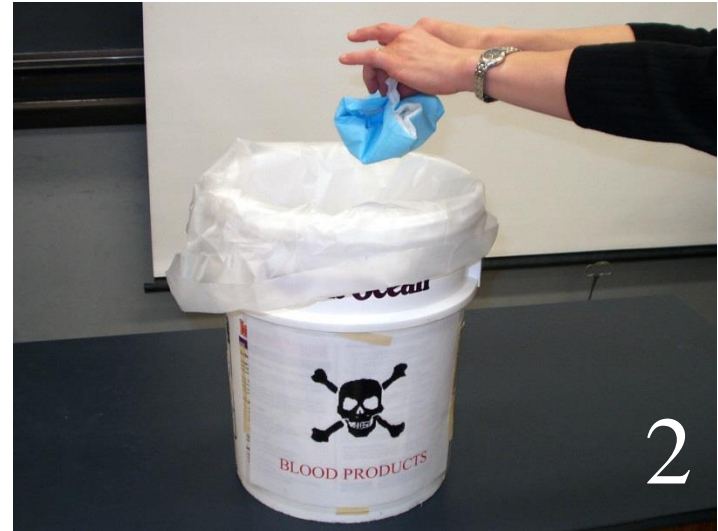
READ & RECORD!!

# CLEAN-UP!



1

FOLD DIAPER



2

BLOOD PRODUCTS

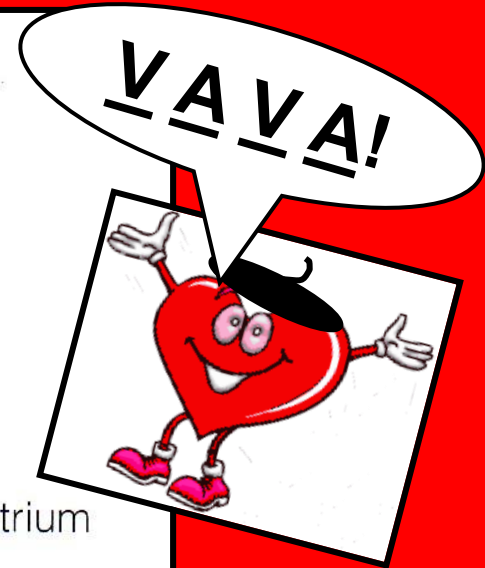
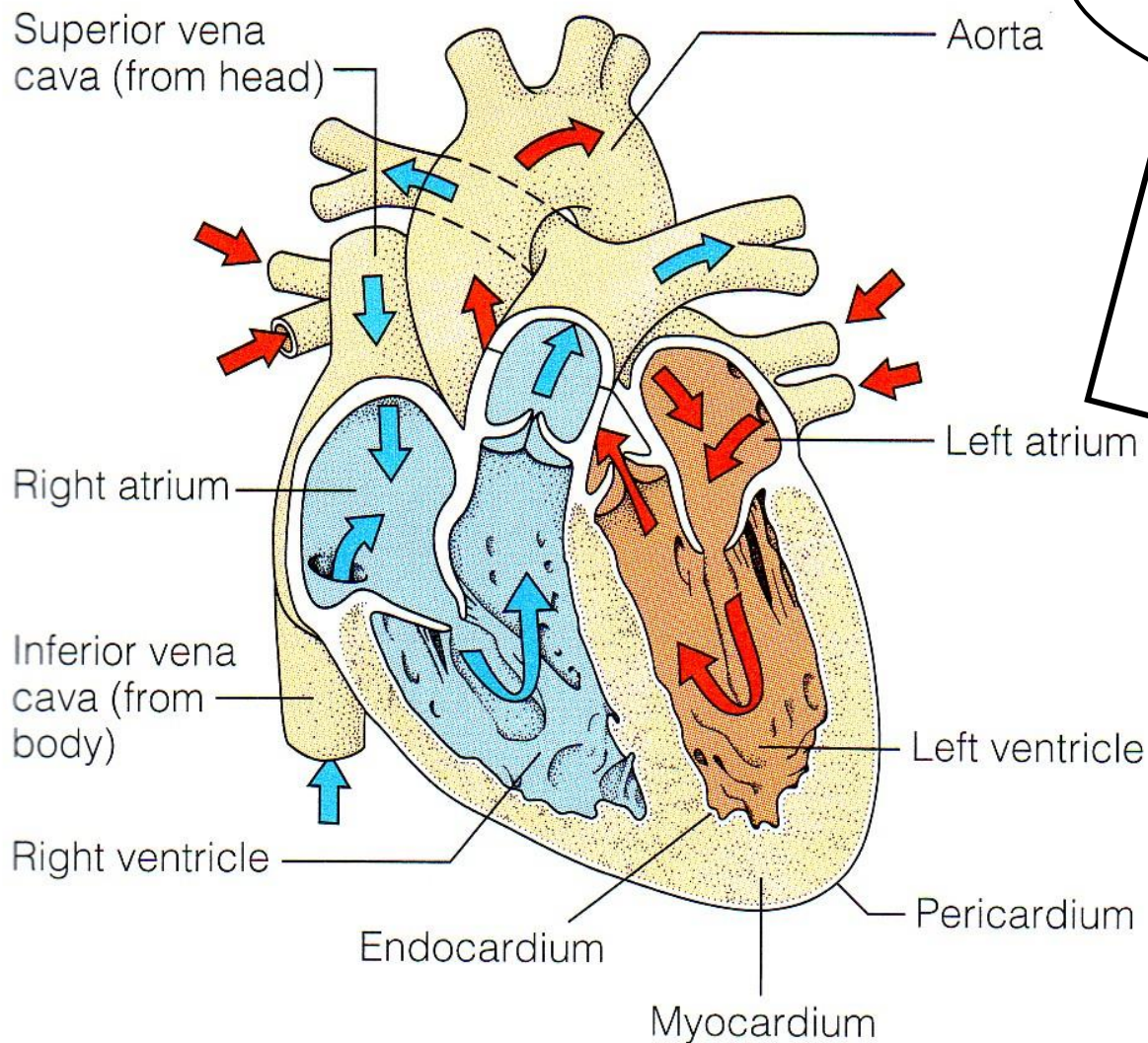


3

REWASH!!



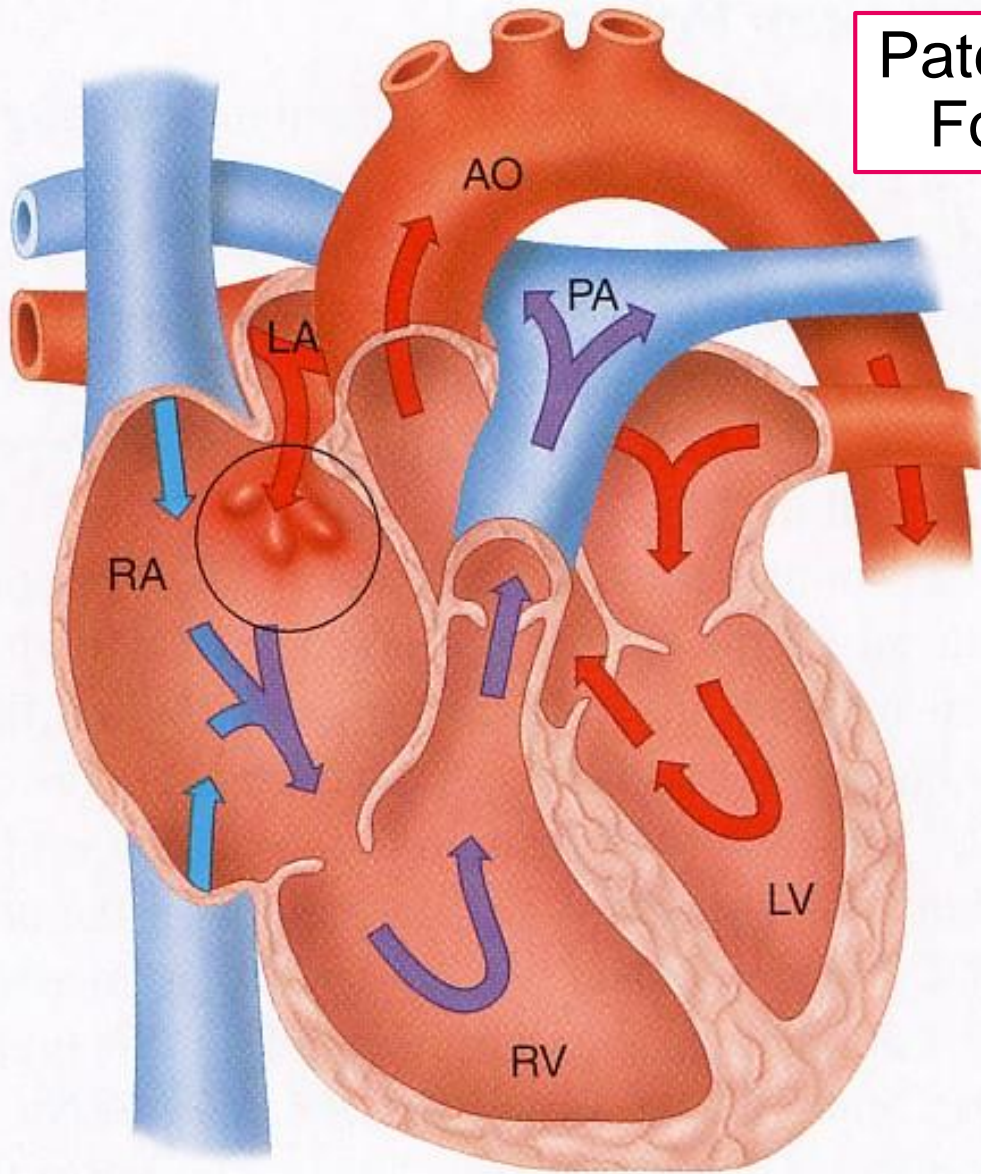
# Veins → Atria → Ventricles → Arteries



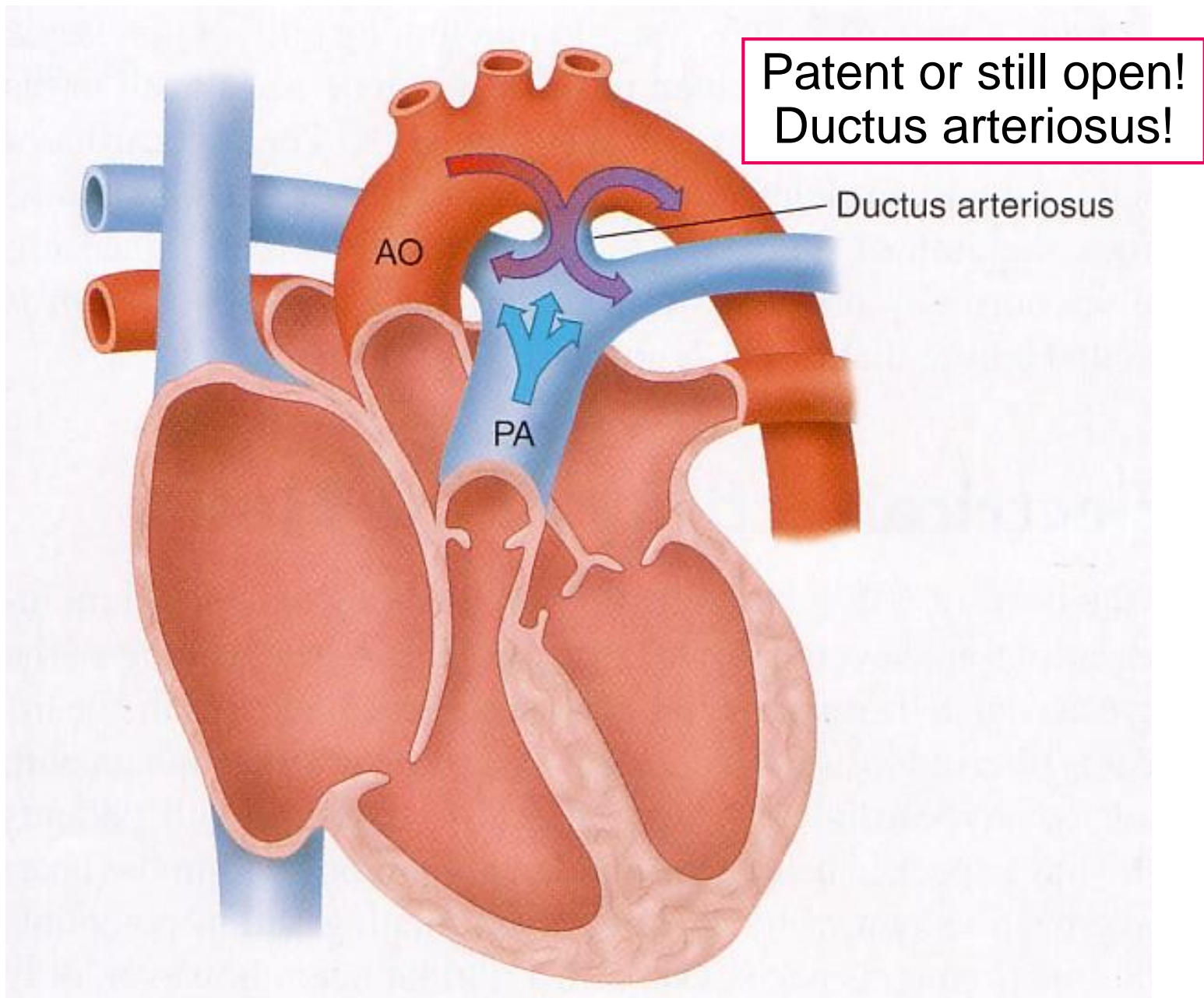
LS2007

<https://www.nhlbi.nih.gov/health-topics/how-heart-works>  
<https://www.youtube.com/watch?v=zJXA1h9VDDU>

Patent or still open!  
Foramen ovale!



Septal defect  
in atria

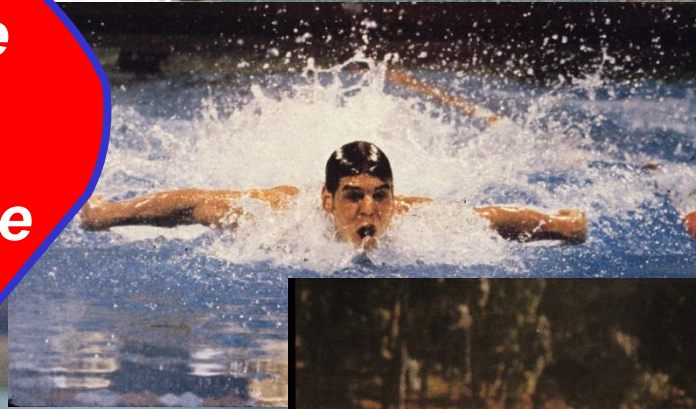




# How much aerobic?



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



<http://www.acsm.org/about-acsm/media-room/news-releases/2011/08/01/acsm-issues-new-recommendations-on-quantity-and-quality-of-exercise>



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

## **Guidelines: Healthy Adults < 65 yr**

American Heart  
Association®   
*Learn and Live™*

**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

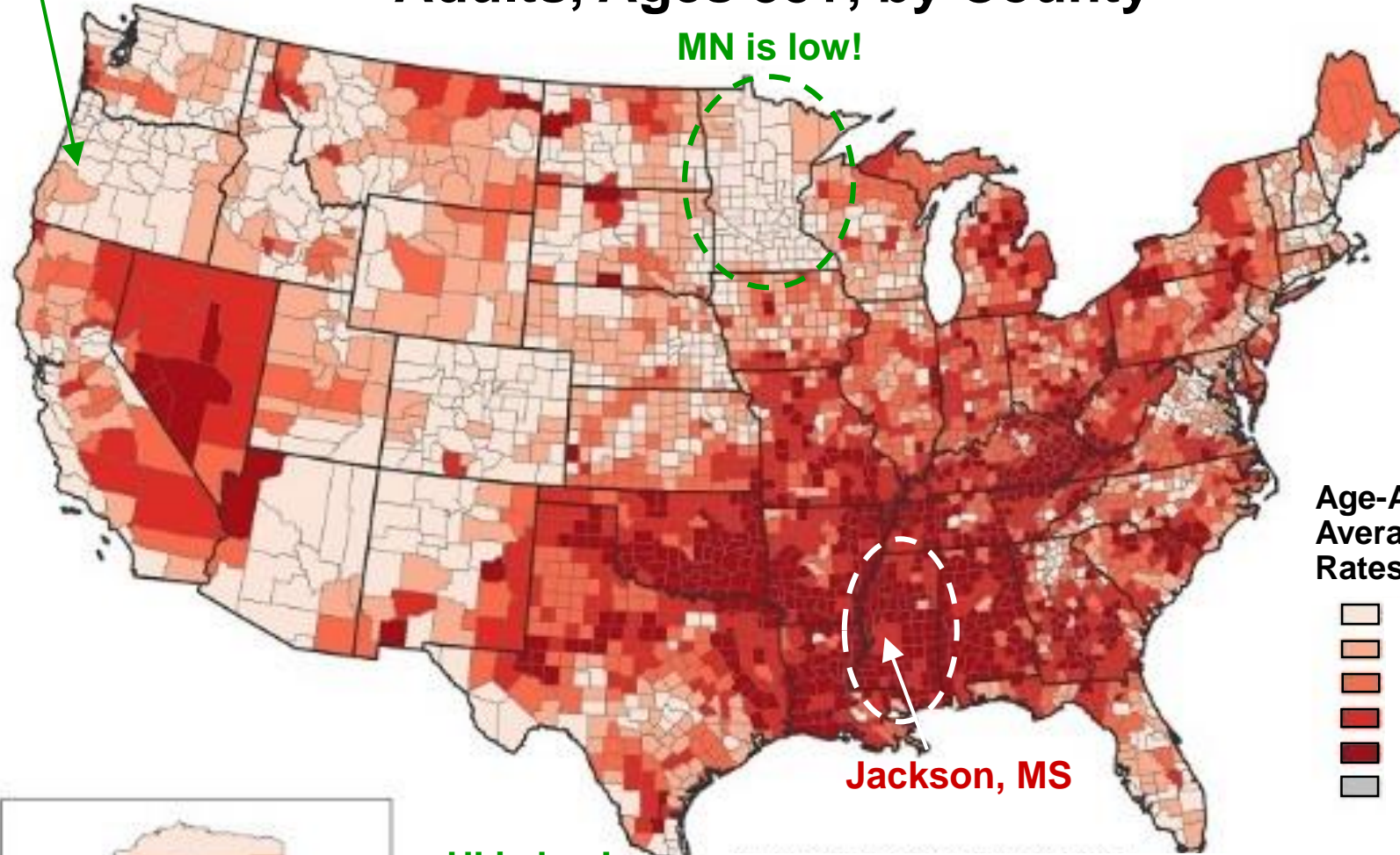
# Did you know?

- **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.**

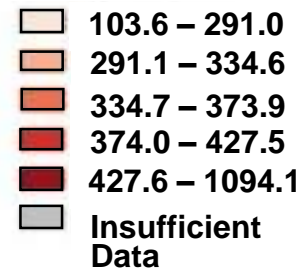
# Heart Disease Death Rates, 2011-2013 Adults, Ages 35+, by County

Eugene, OR

MN is low!



Age-Adjusted  
Average Annual  
Rates per 100,000



Jackson, MS

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

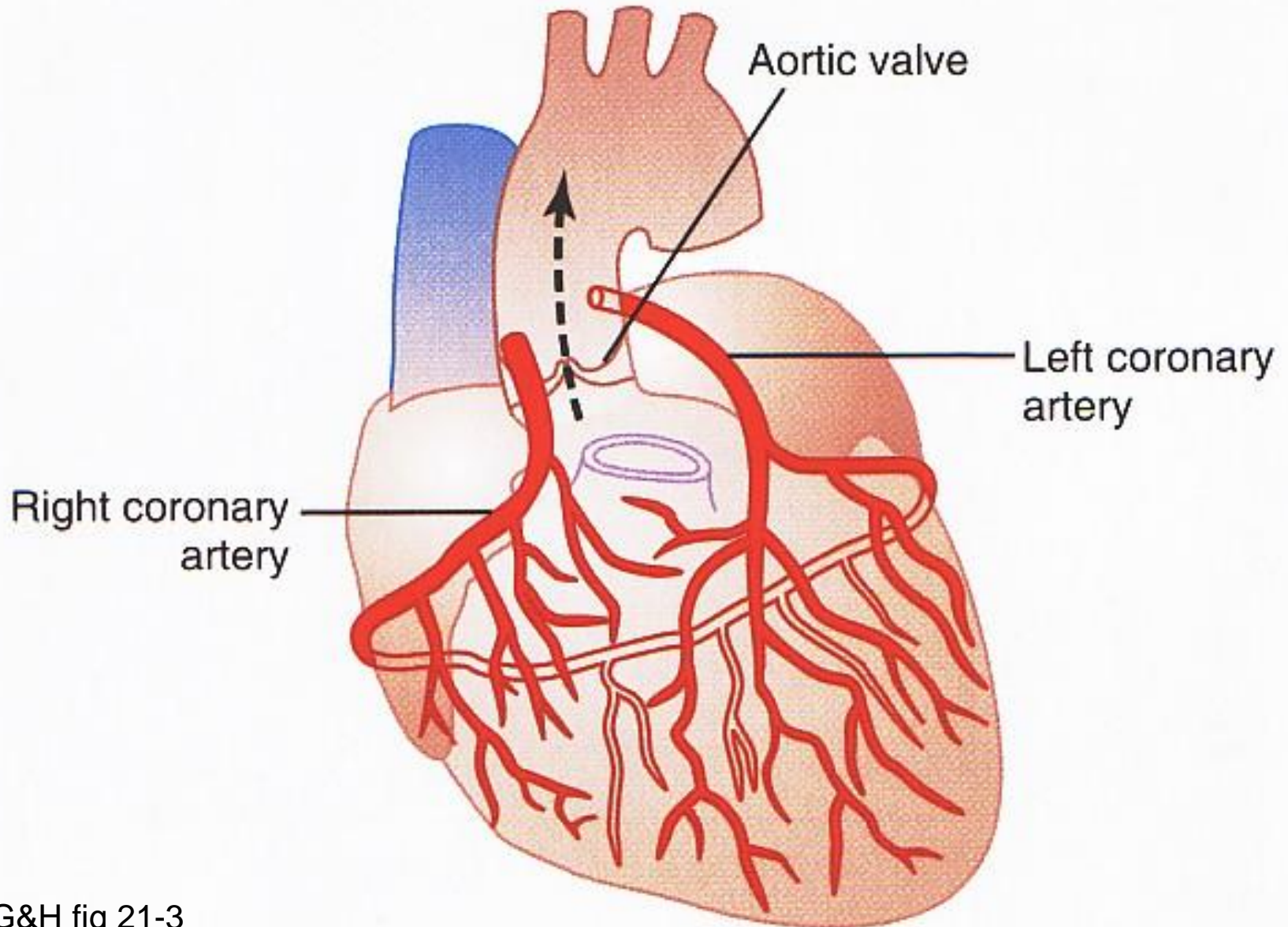
Data Source: National Vital Statistics System  
National Center for Health Statistics



HI is low!



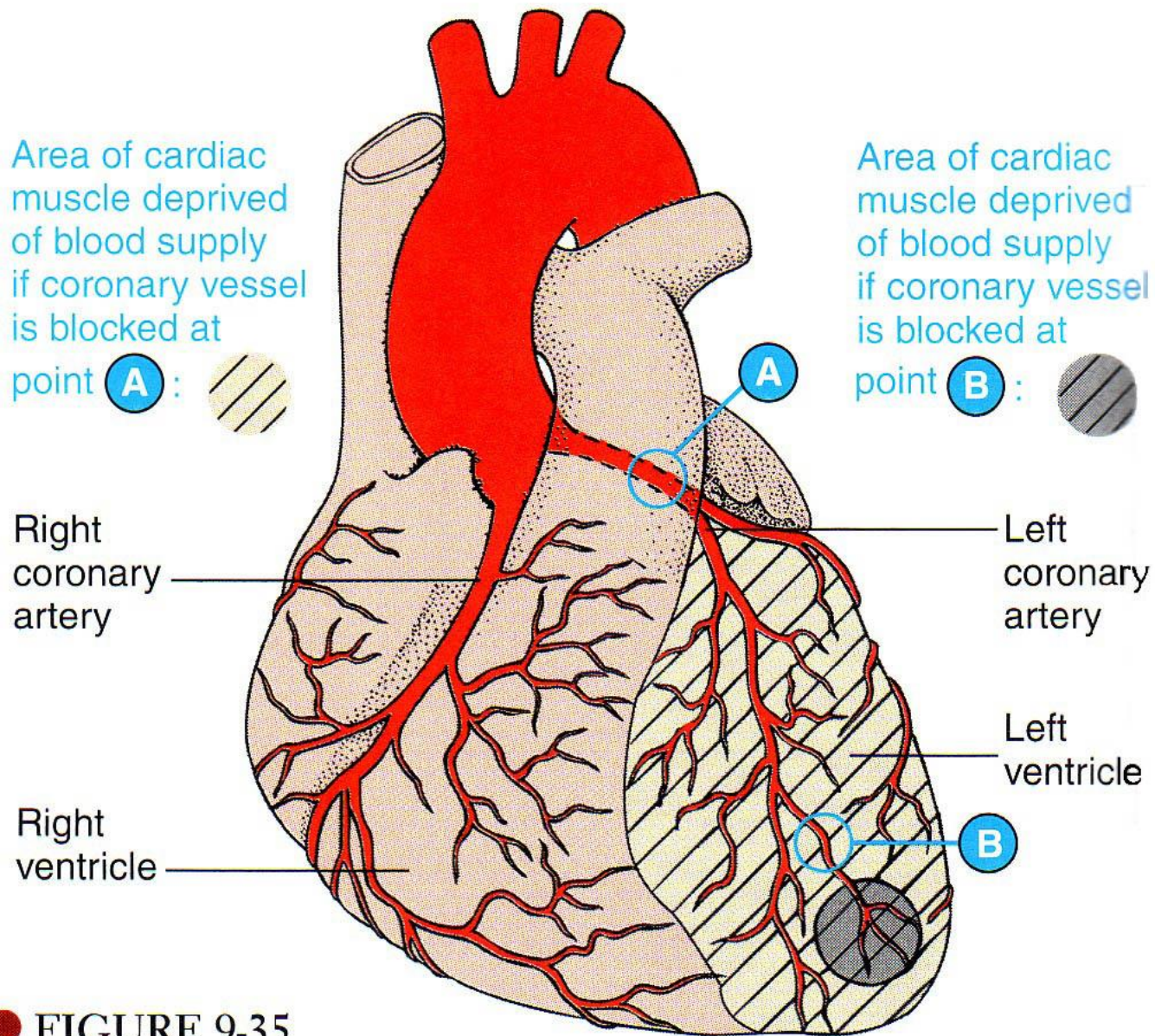
# ***Coronary Circulation ≡ Crowns the Heart!***







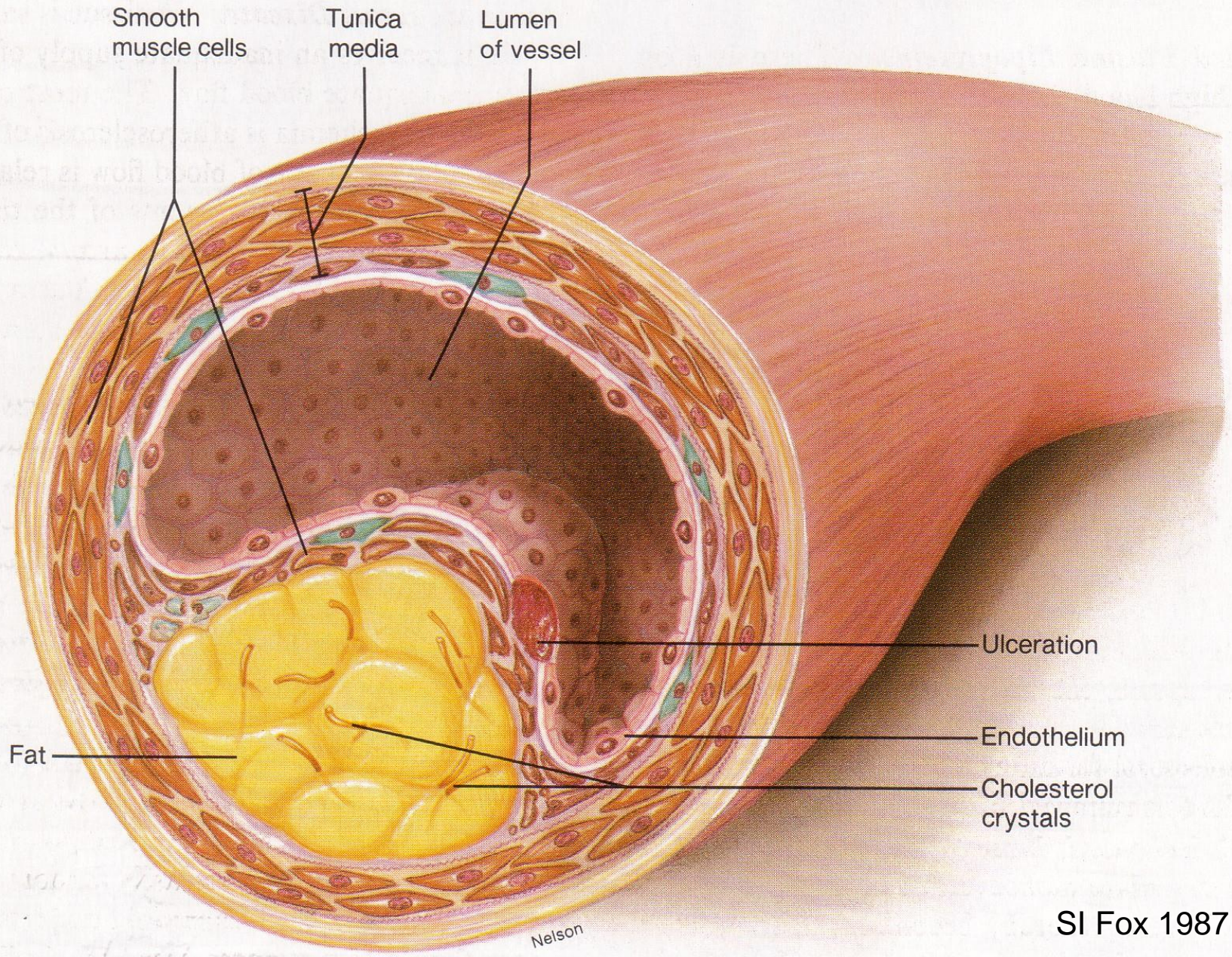




**●** FIGURE 9-35

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





Smooth muscle cells

Tunica media

Lumen of vessel

Fat

Ulceration

Endothelium

Cholesterol crystals

Nelson

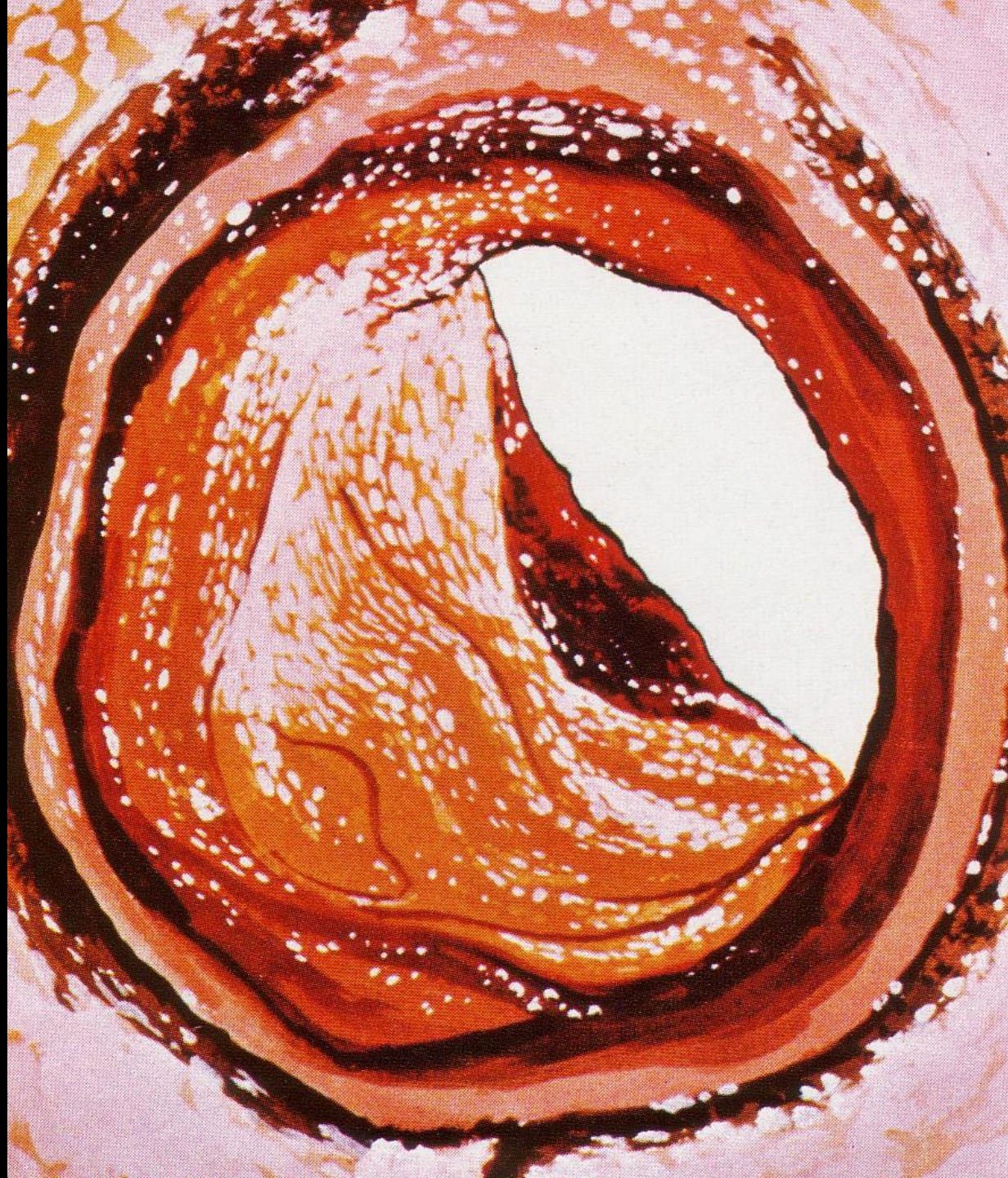
SI Fox 1987 p 370



100 yr ♀

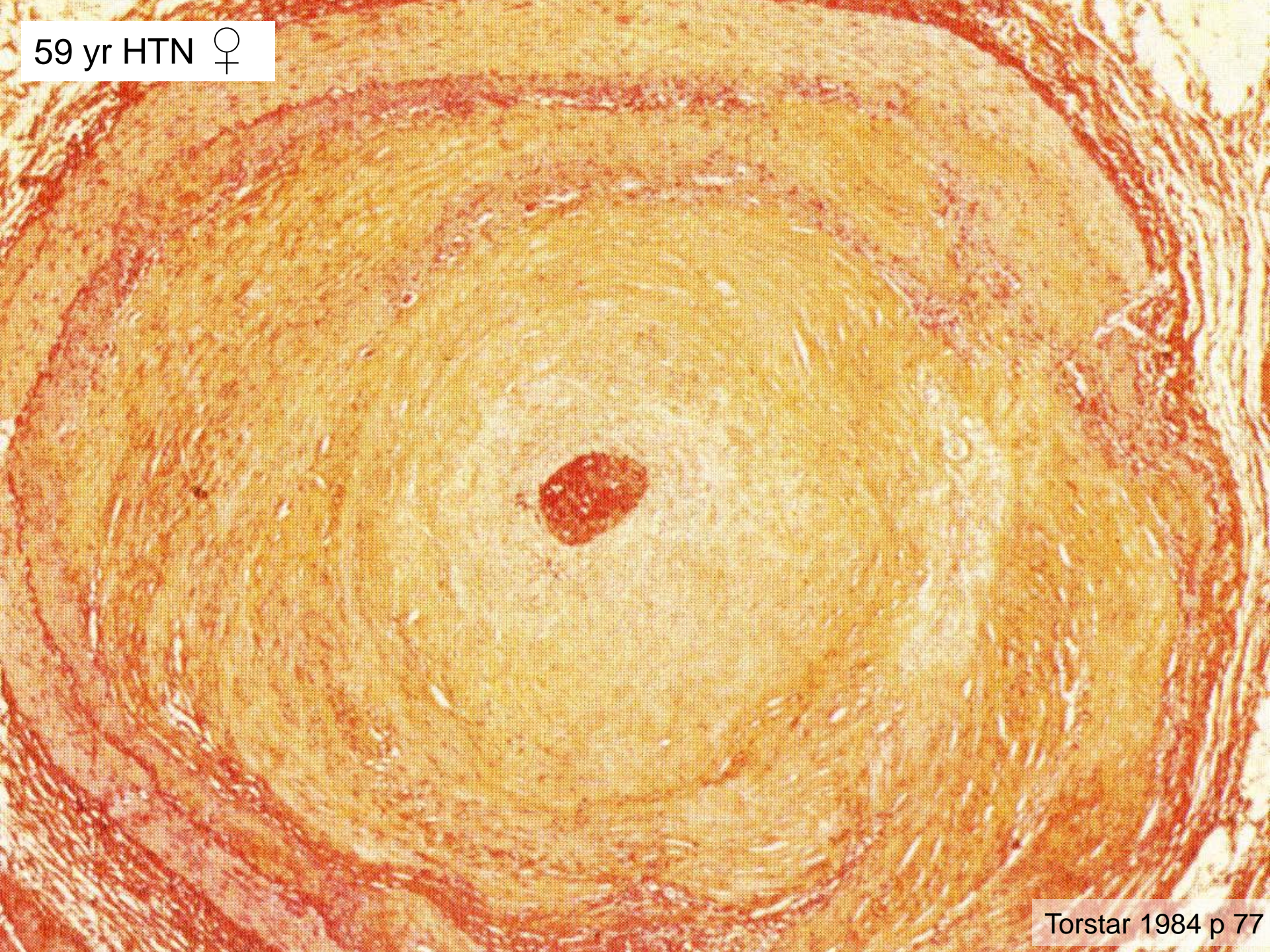








59 yr HTN ♀



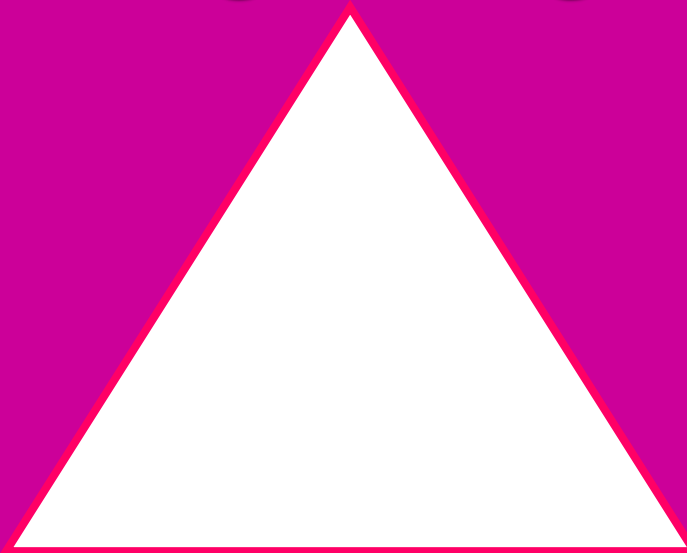


# *Treatment Triad*

NB: Last blasted resort!!



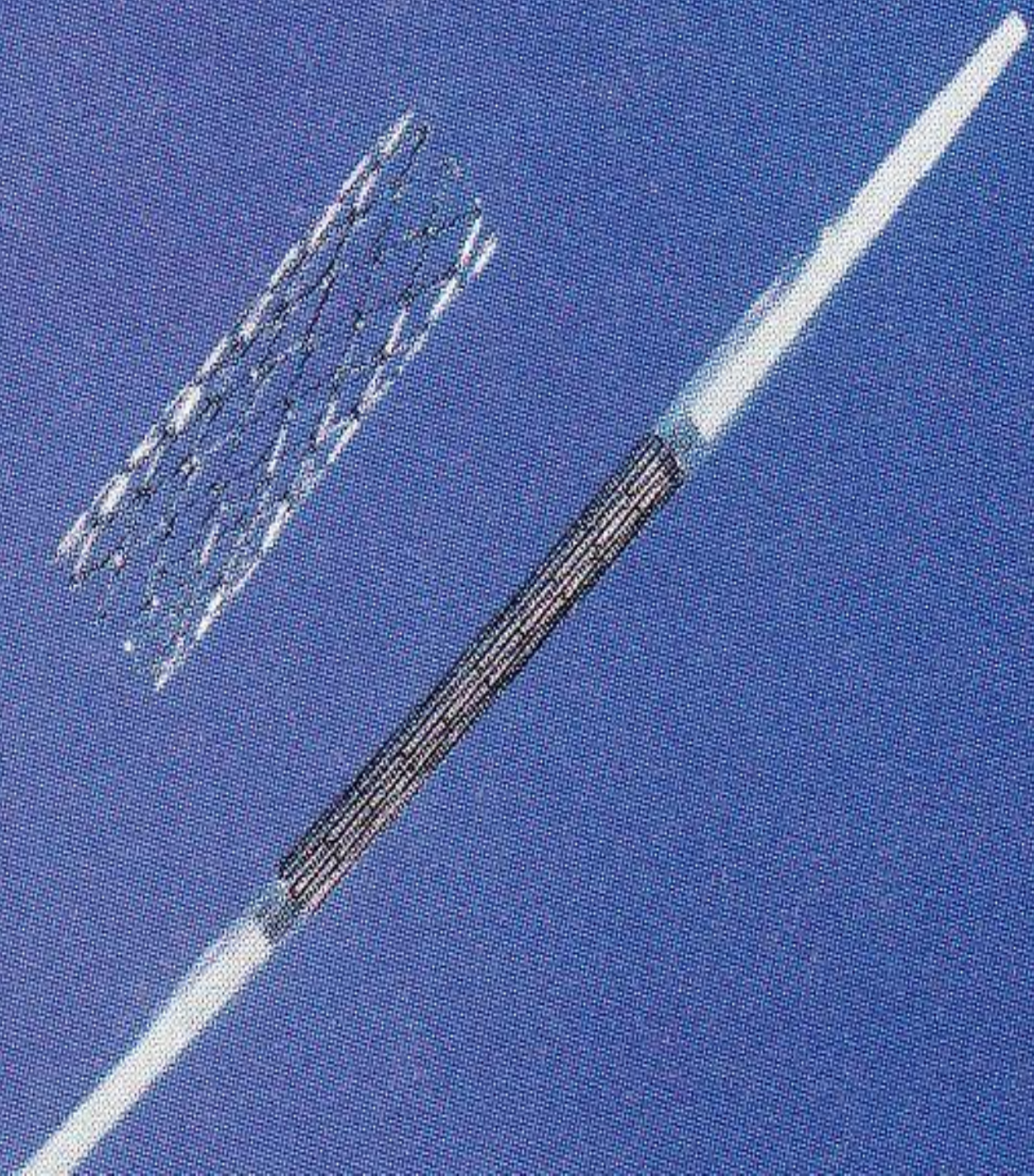
*Drugs/Surgery*



*Exercise*

*Dietary  
Modification*







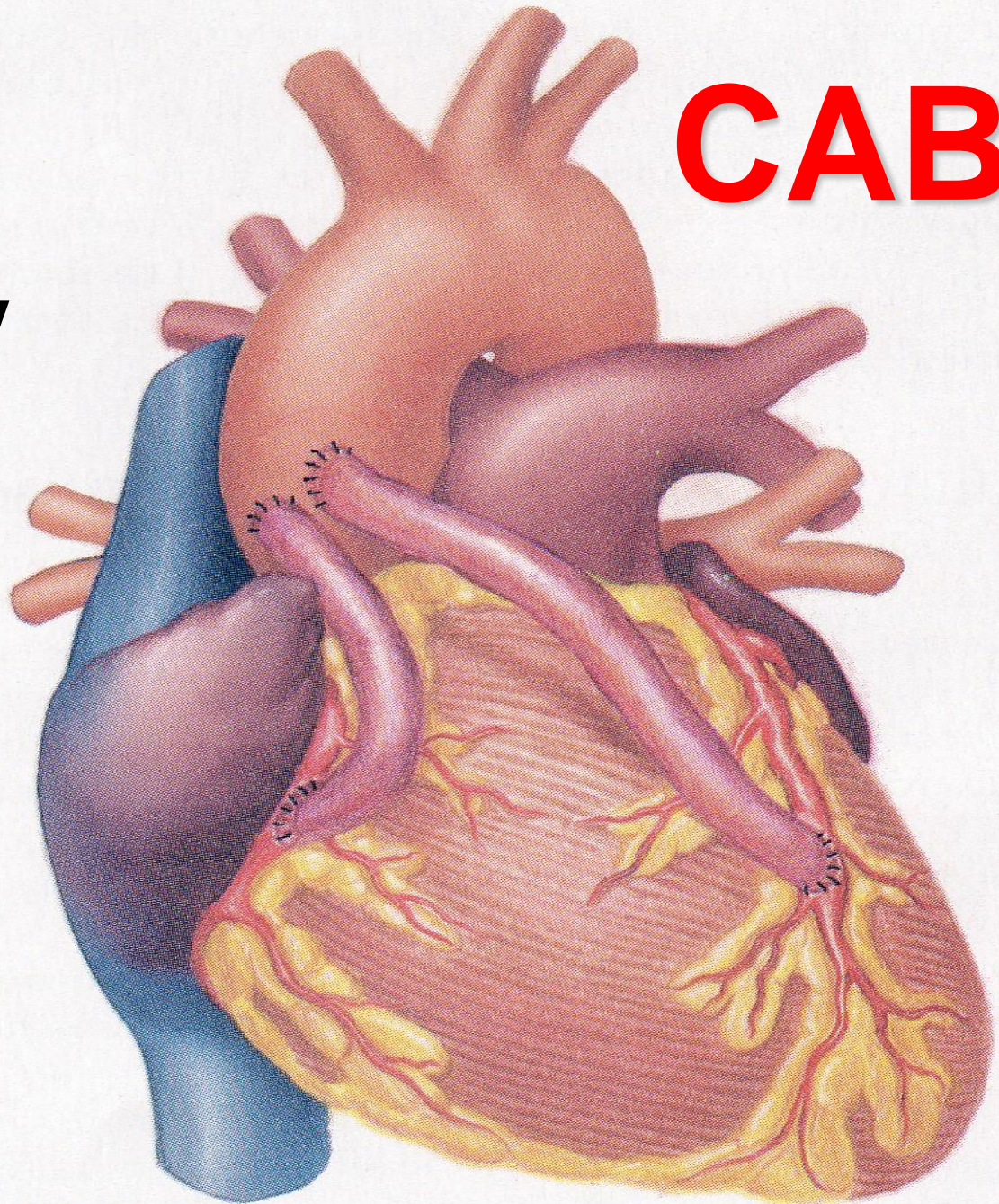
# CABG

**C**oronary

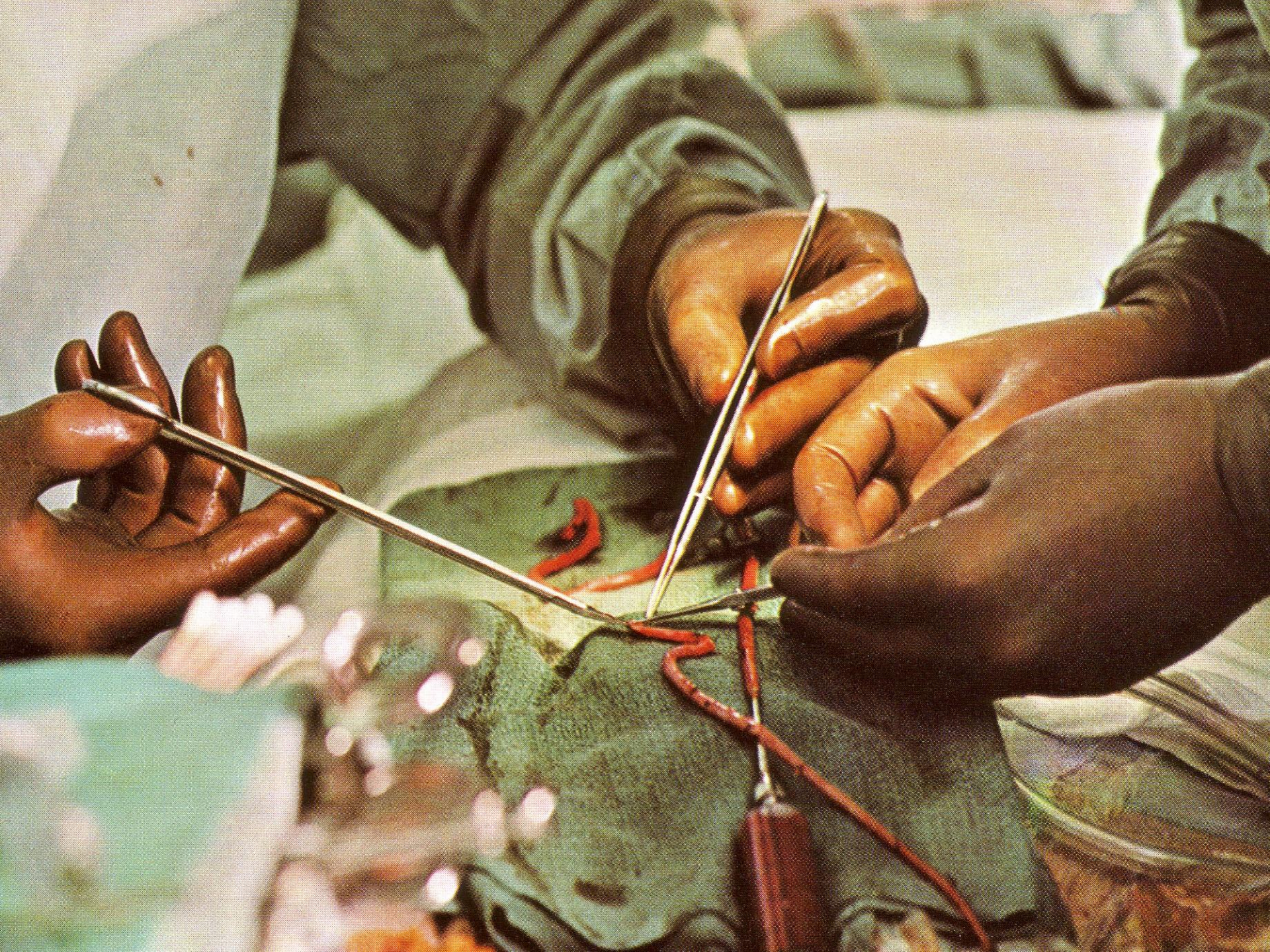
**A**rtery

**B**y-pass

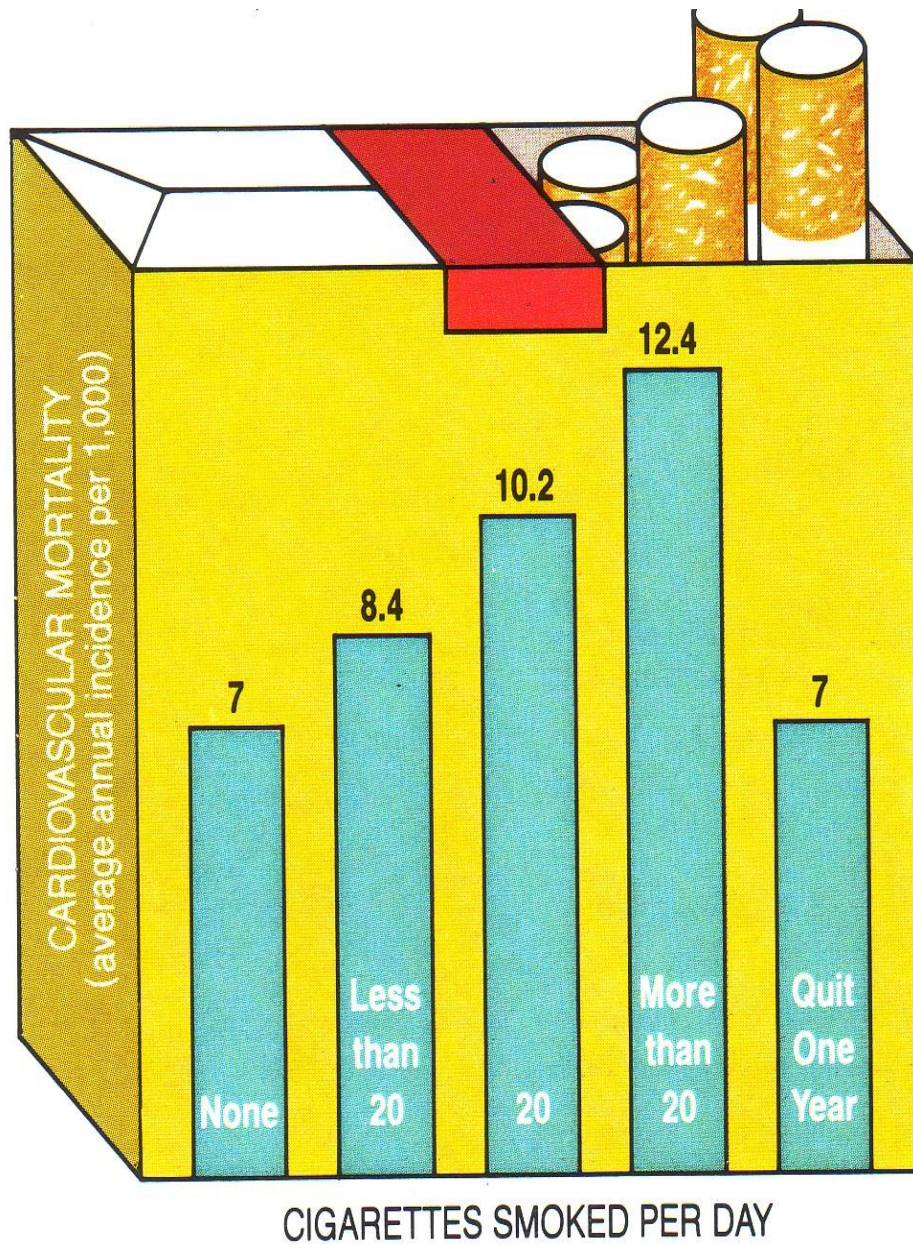
**G**raft













# 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

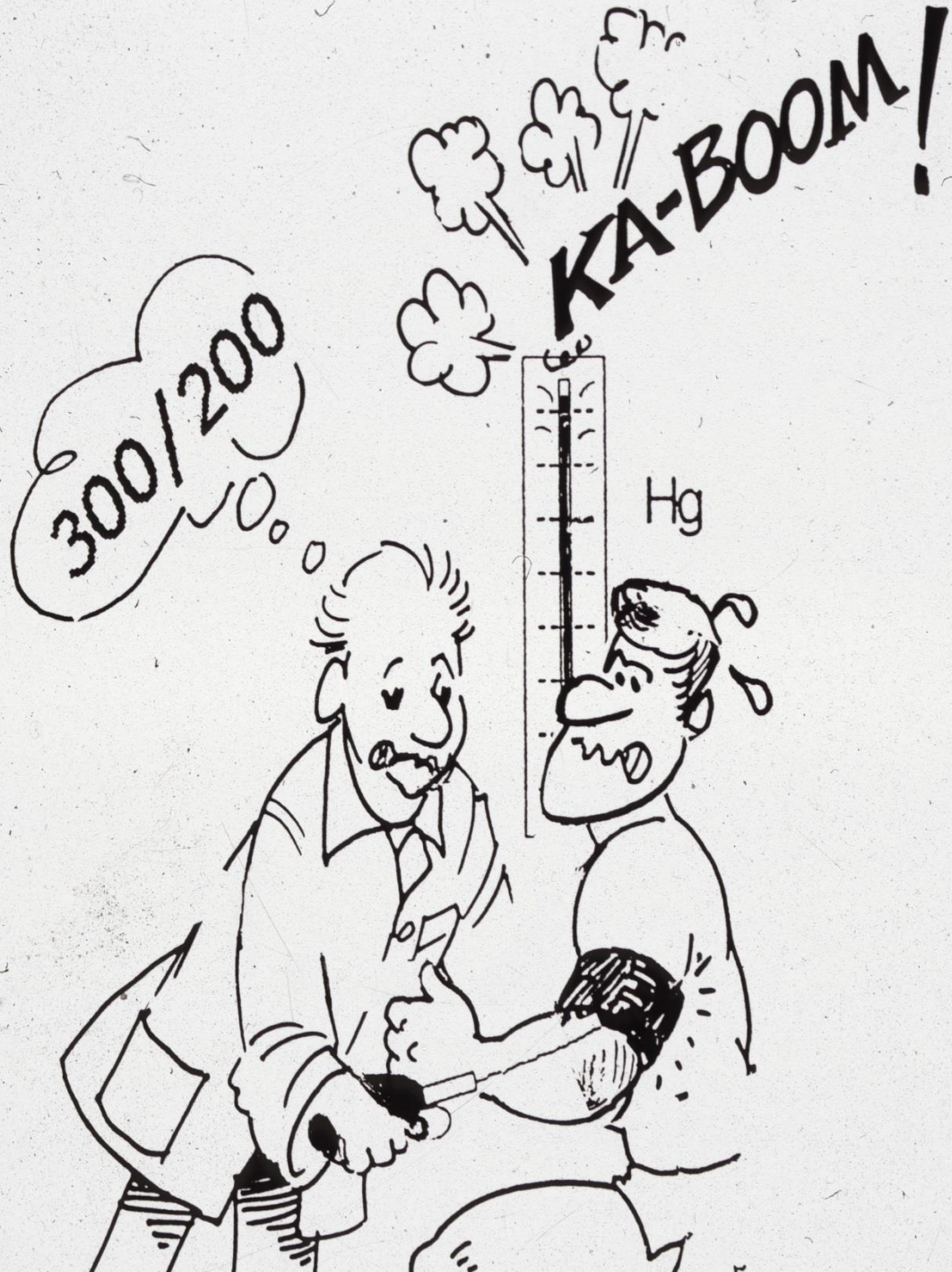


UNIVERSITY OF OREGON

[tobaccofree.uoregon.edu](http://tobaccofree.uoregon.edu)

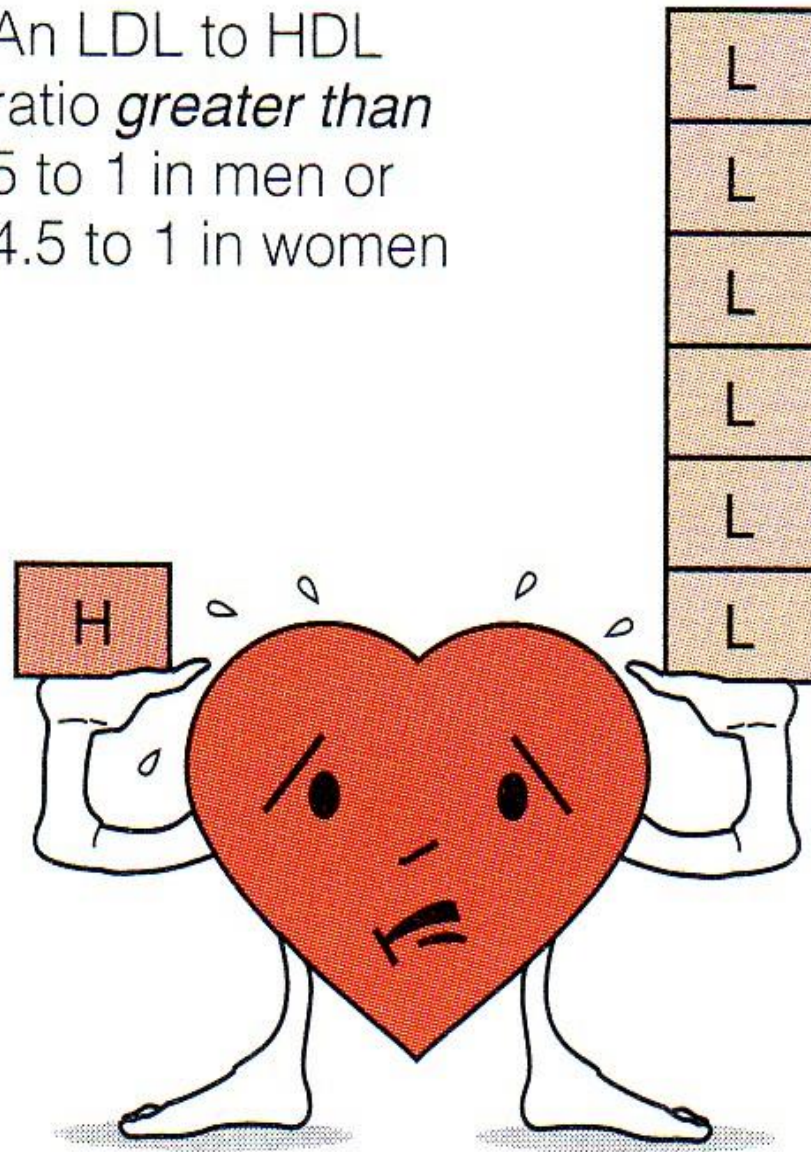


For a healthier community and cleaner  
environment, the University of Oregon  
is smoke and tobacco-free.





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



Increased risk of  
heart disease

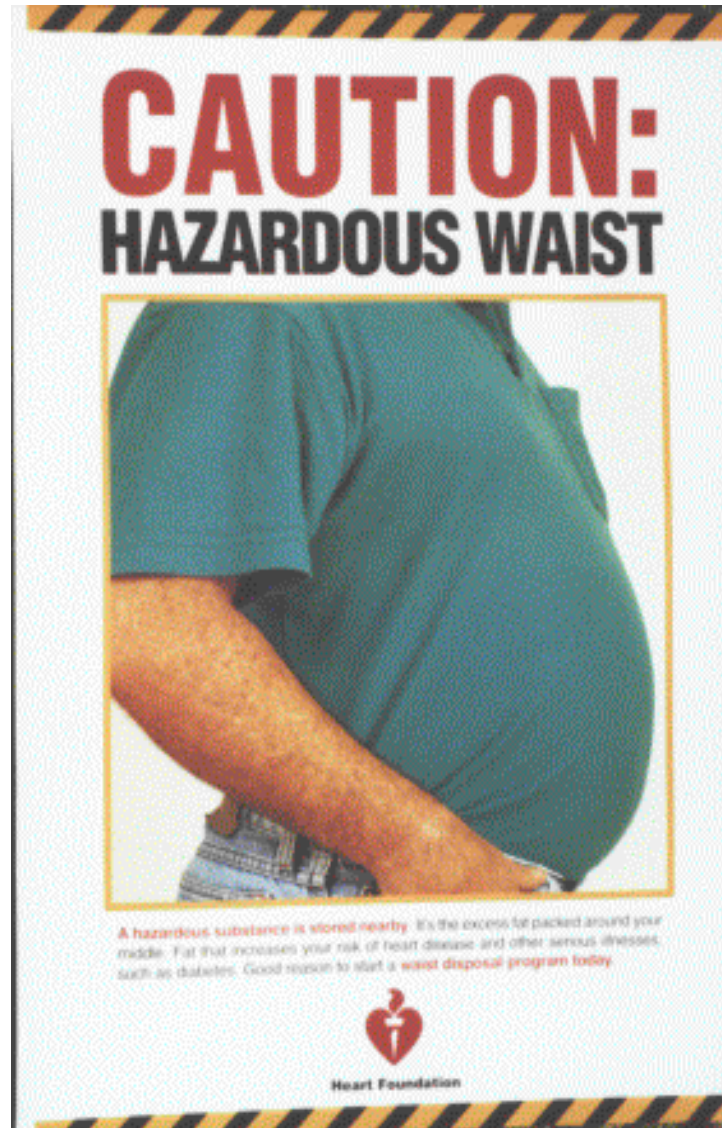


# Apple type of obesity predisposed to CVD!

Pear type of fat pattern...



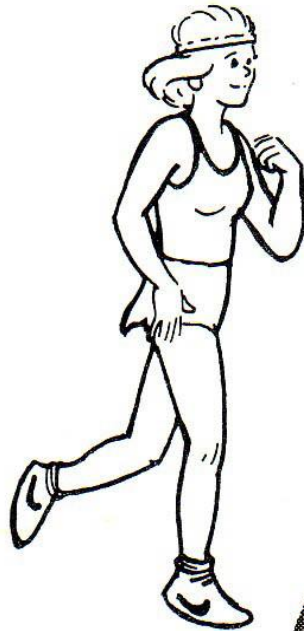
implies lower disease risk!



Eat more apples...



to help prevent the apple type of obesity!



**Cardiorespiratory  
Endurance**



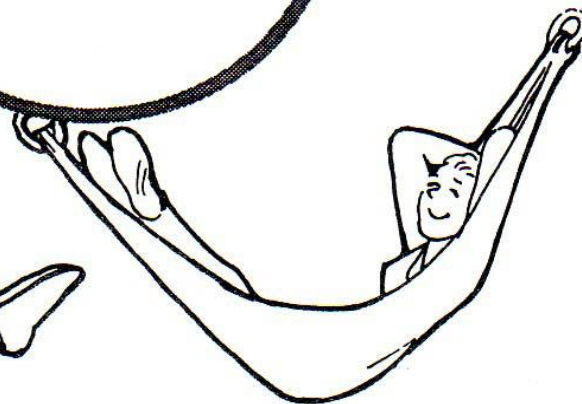
**Muscular  
Strength/Endurance**



**HEALTH-RELATED  
FITNESS**



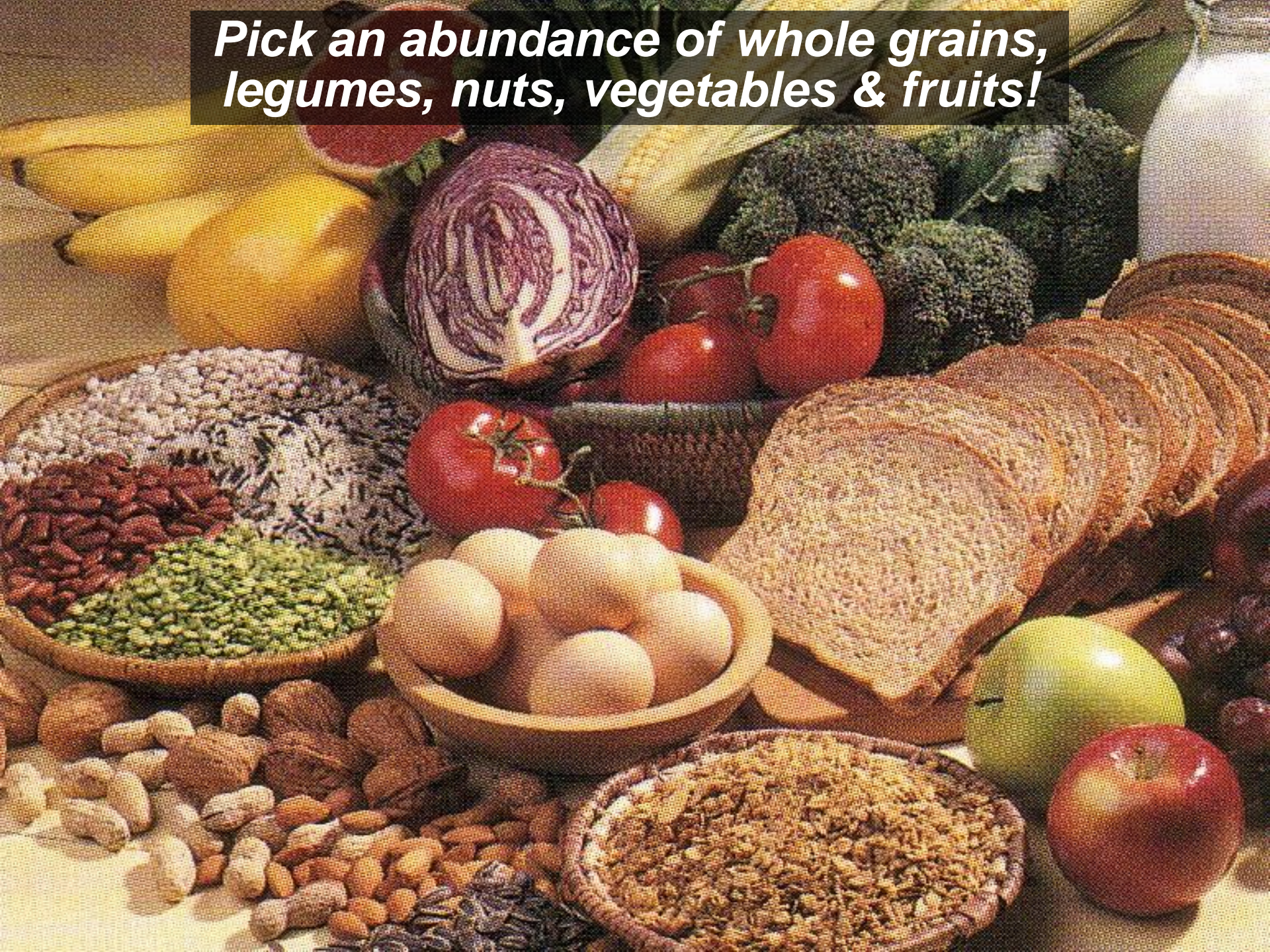
**Flexibility**



**Neuromuscular Relaxation**

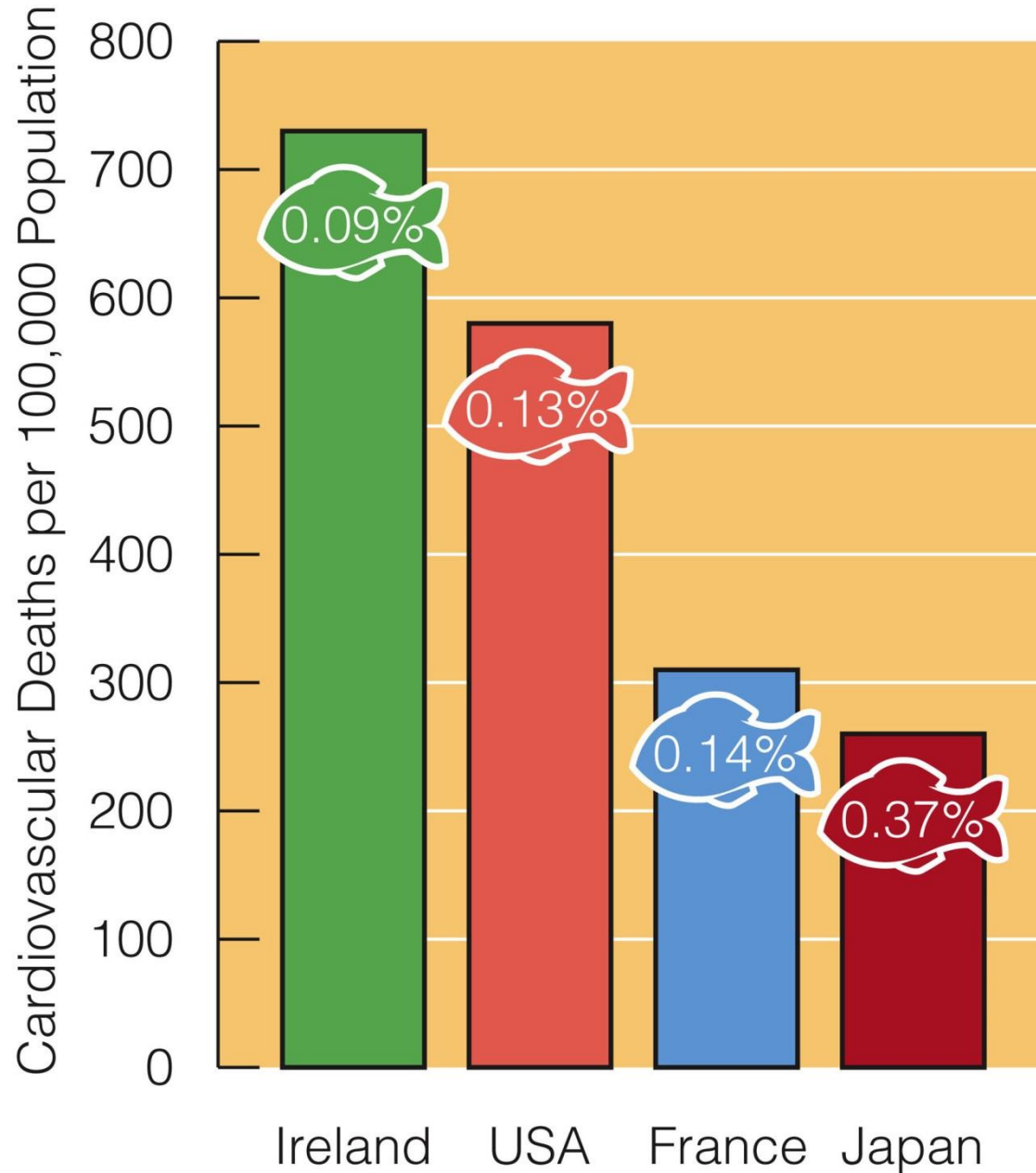


***Pick an abundance of whole grains, legumes, nuts, vegetables & fruits!***





# *Fish Oil Intakes & Cardiovascular Death Rates*







# Healthy Oils to Minimize Atherosclerosis HAPOC?

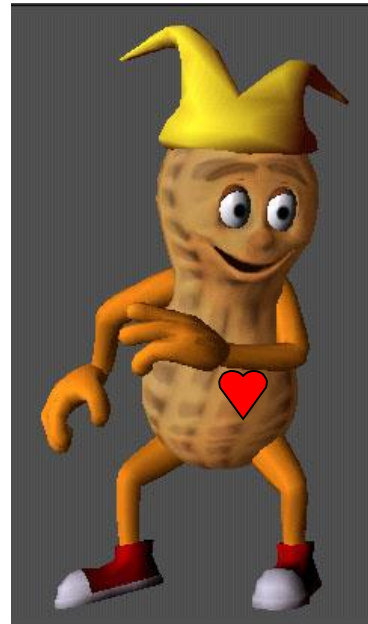
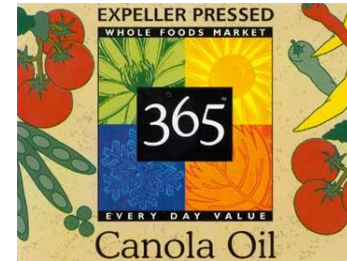
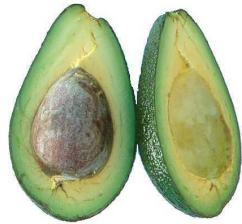
# H

# A

# P

# O

# C





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

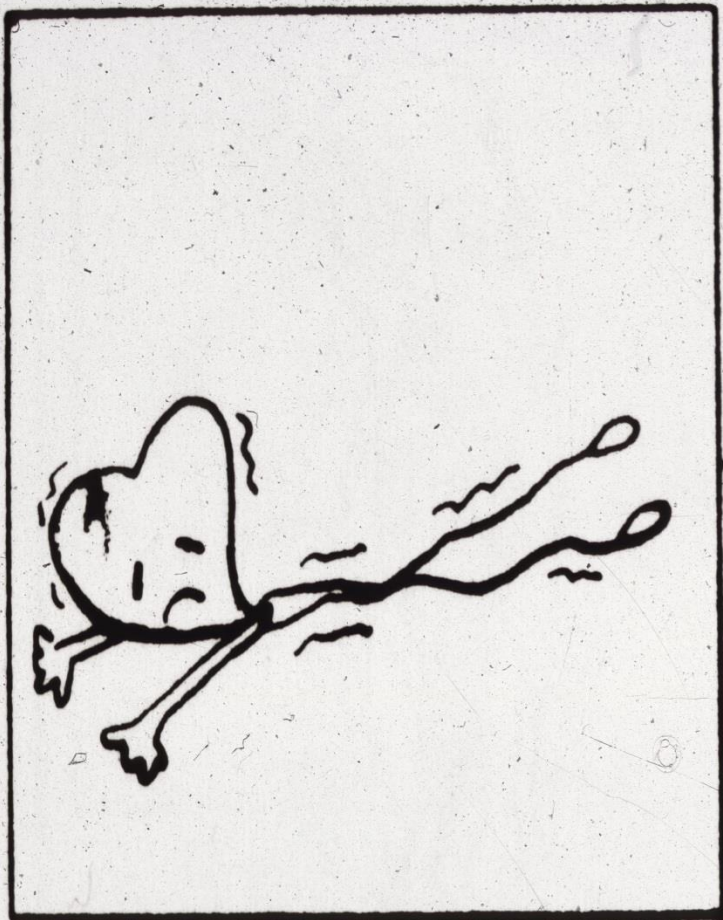




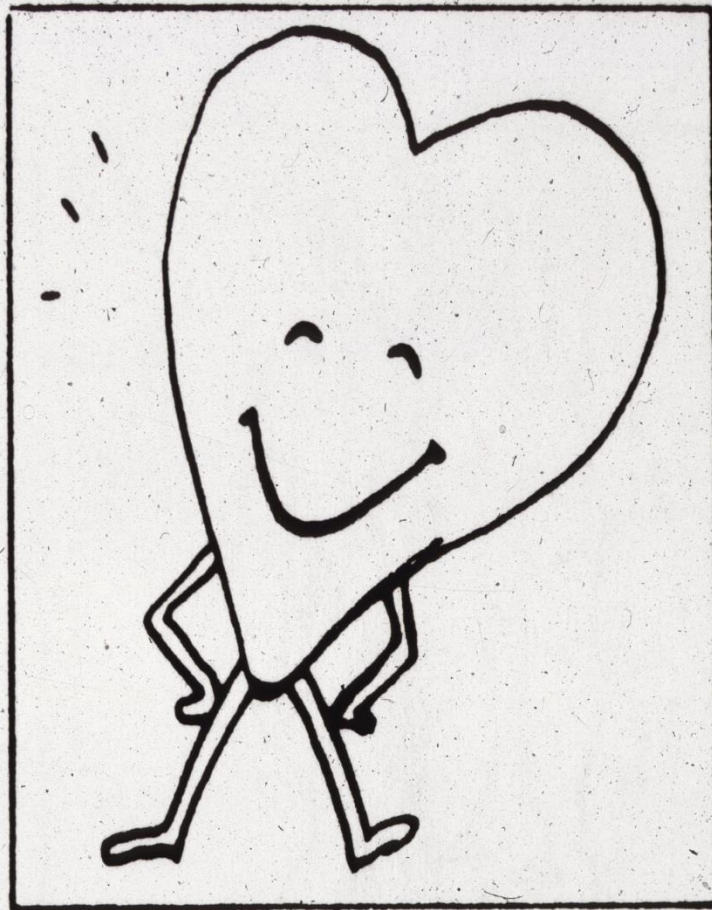
Yes for the  
spinach! — but get  
rid of the pipe!!







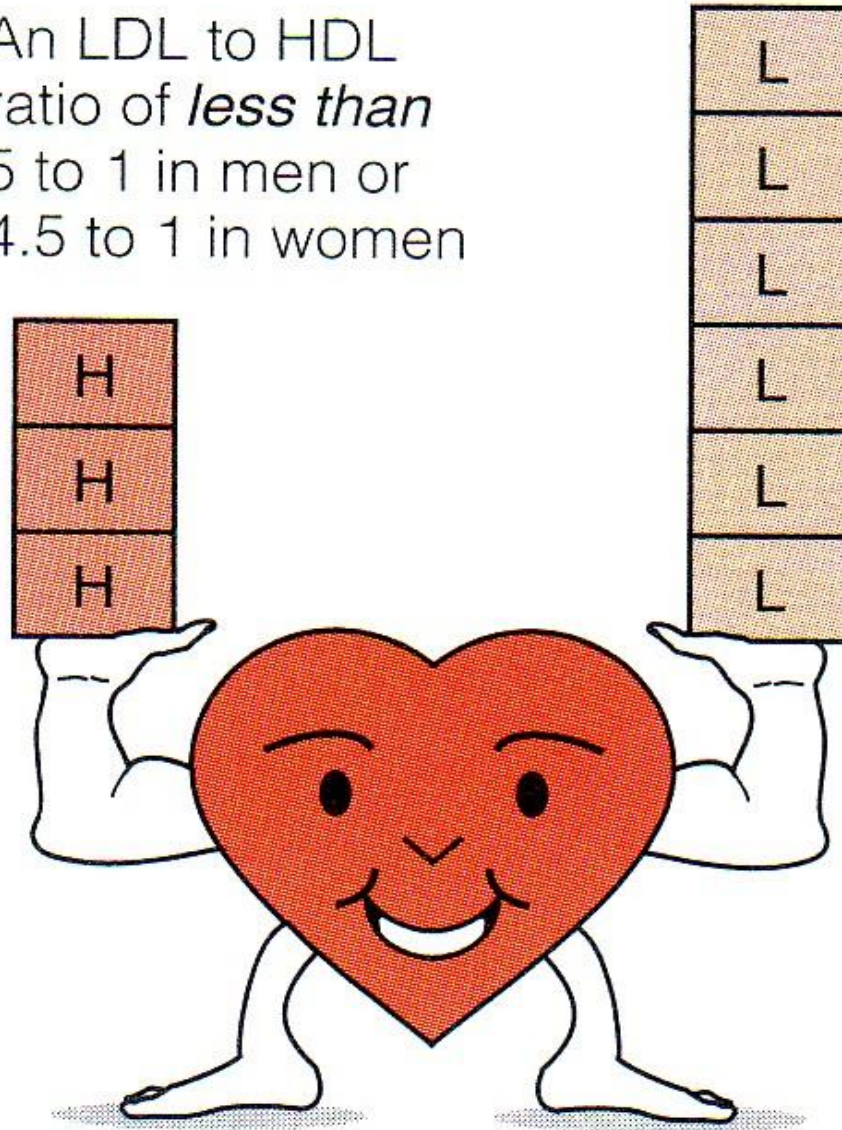
**Before**



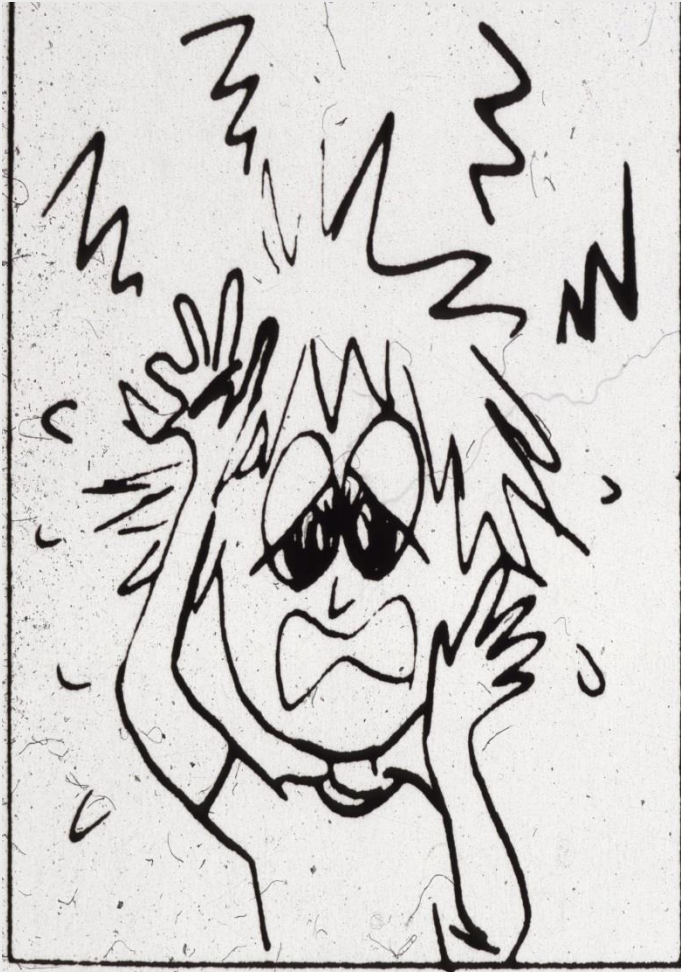
**After**



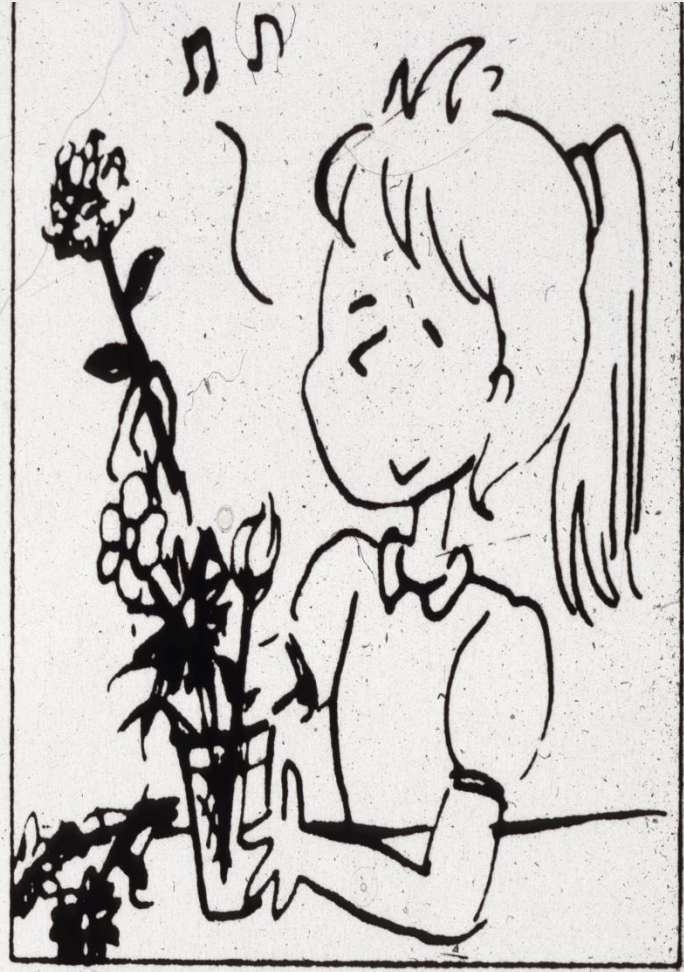
An LDL to HDL  
ratio of *less than*  
5 to 1 in men or  
4.5 to 1 in women



Reduced risk of  
heart disease

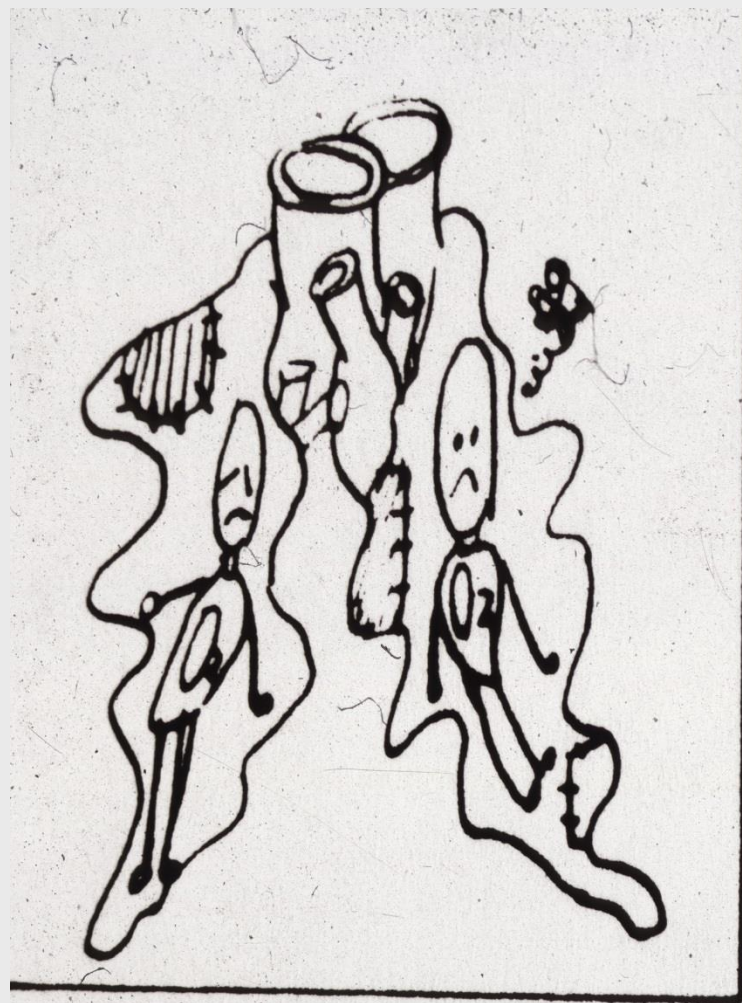


Before

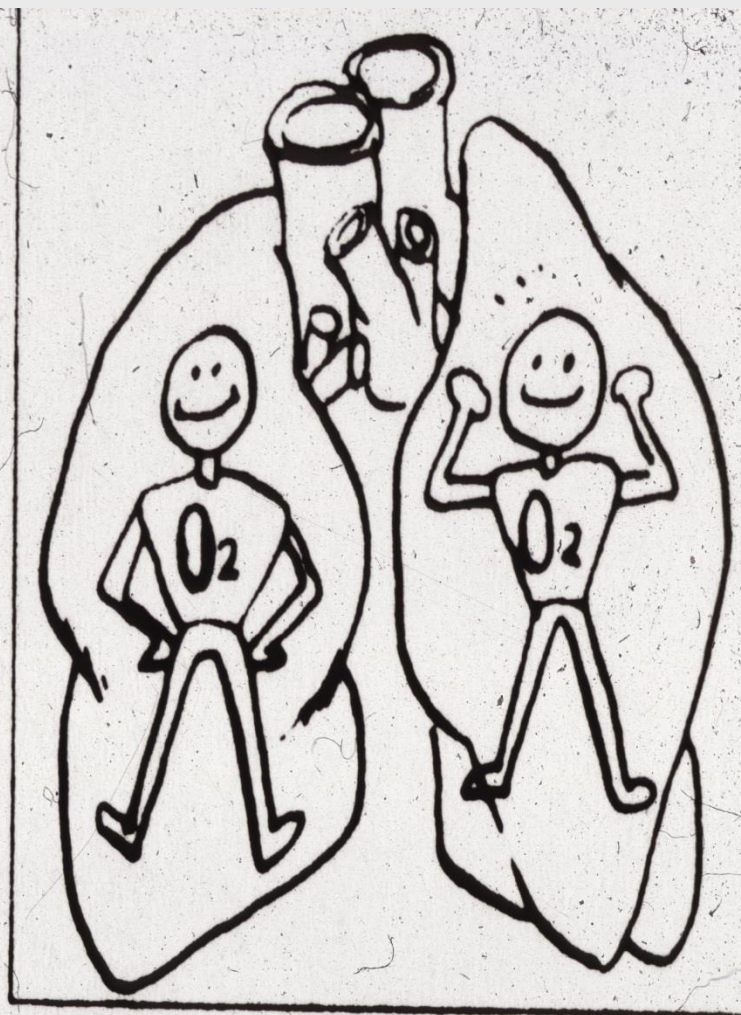


After





Before



After



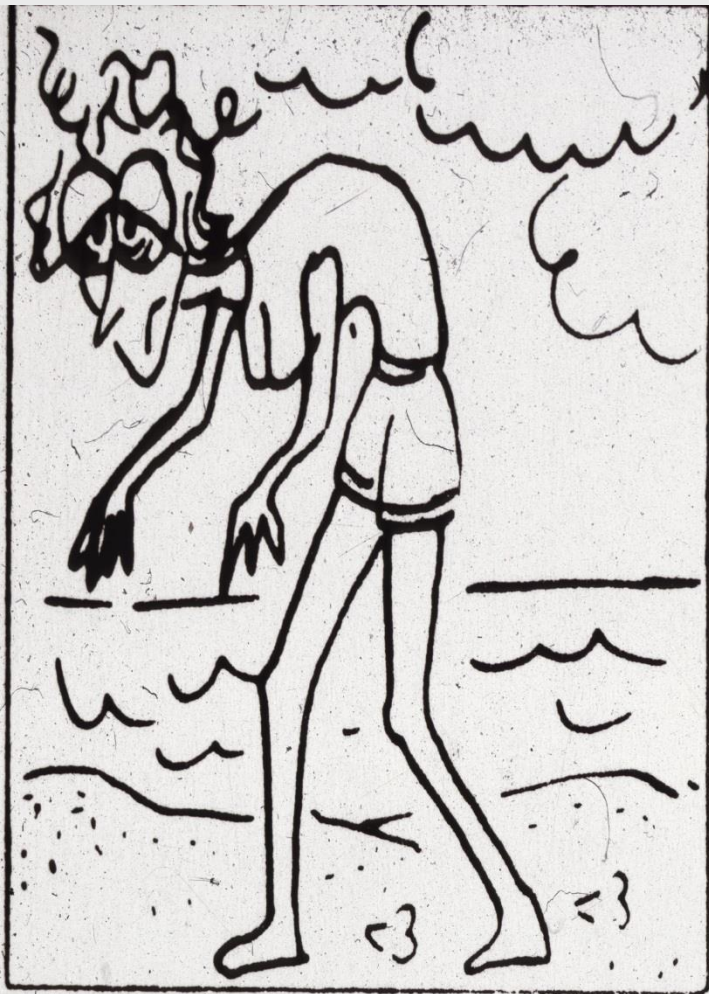


Before

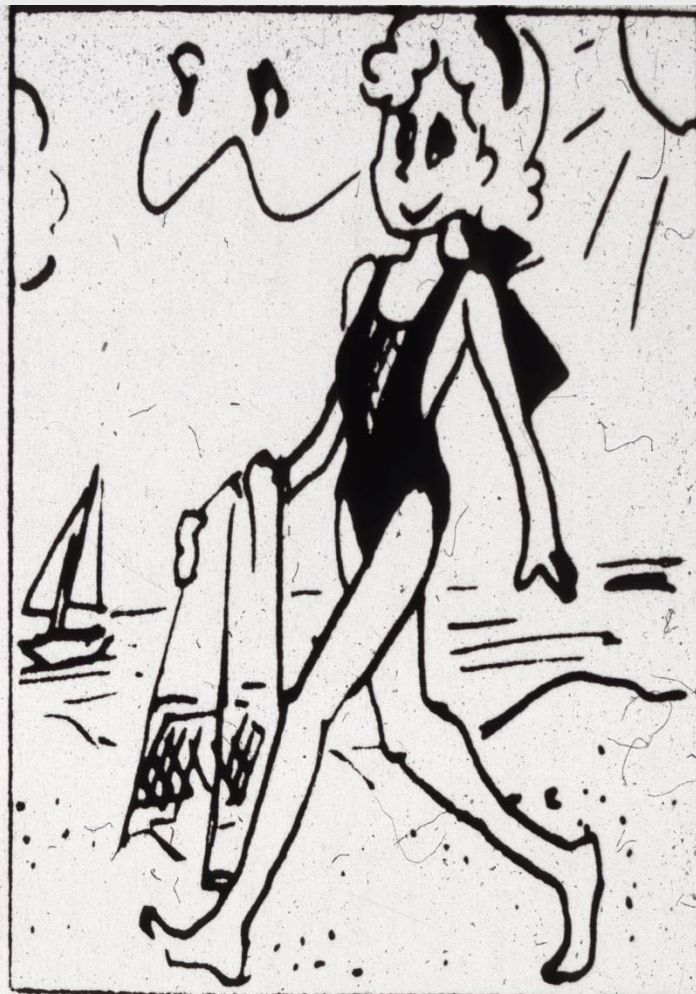


After





Before



After