

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

A. Normal vs abnormal blood flow!

B. ♥'s electrical highway + Pacemaker activity
LS fig 9-7 p 235, tab 9-1 p 236, fig 9-8 p 237



IV. CV Physiology in the News Randy Foye, NBA player with *Situs Inversus*? 1:10,000! NHLBI & AHA websites

Nicole Kidman & exercise? ACSM, AHA, CDC guidelines

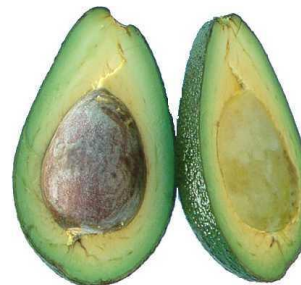
V. CV Pathophysiology & Risk Reduction LS ch 9, 10 +...

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



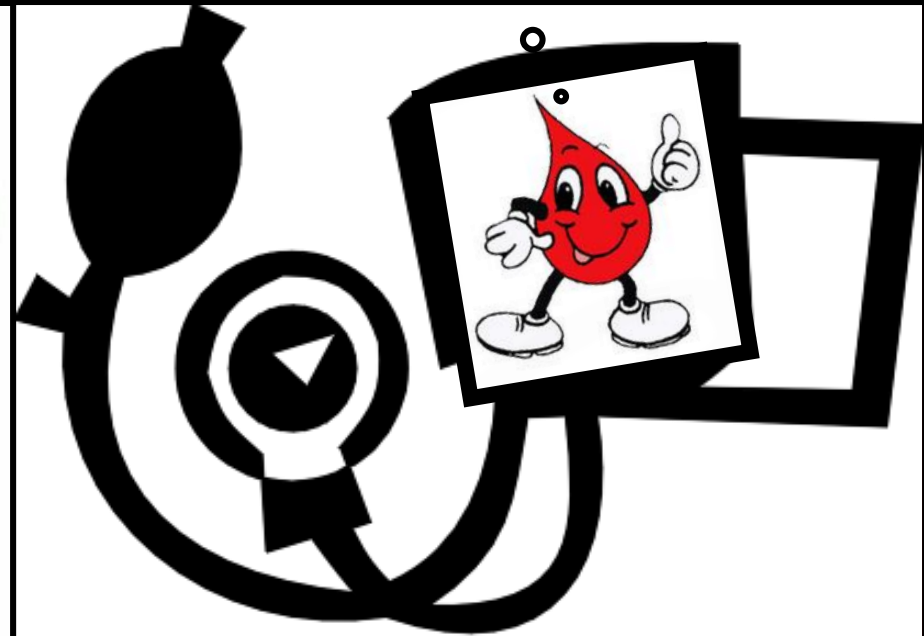
~ TOP 20-25!

Heart-Blood Pressure Lab Today!

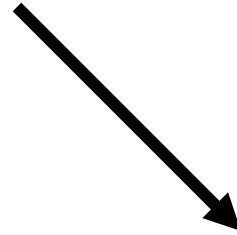
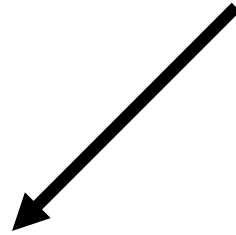
Lub-dup!



I'm cool!



Cardiac Cycle

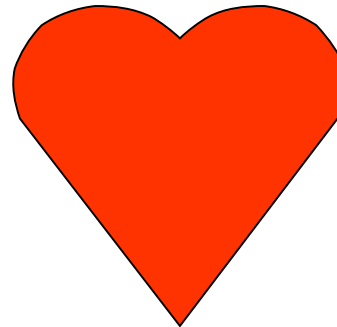
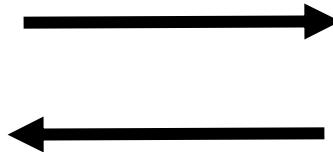
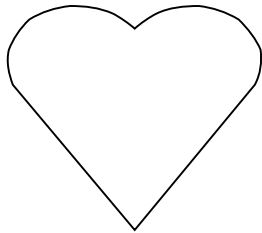


Systole

Contract
& Empty

Diastole

Relax
& Fill



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



Thanks sincerely!

PREPARATION



WASH & DRY



ALCOHOL



SAMPLE+TESTS



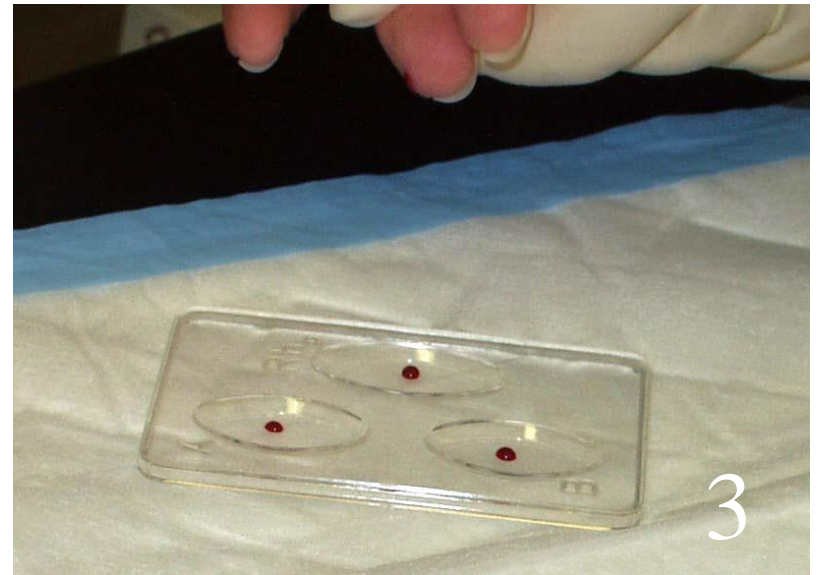
1

OBTAIN μ SAMPLE



2

BLOOD GLUCOSE



3

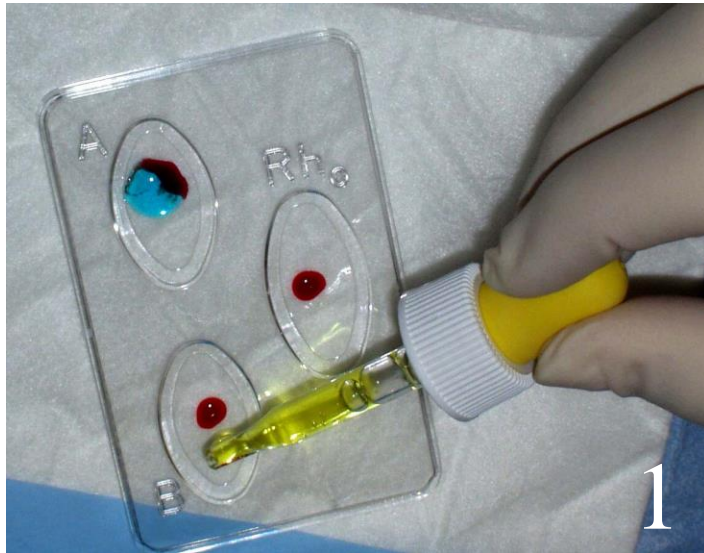
BLOOD TYPING

BLOOD GLUCOSE

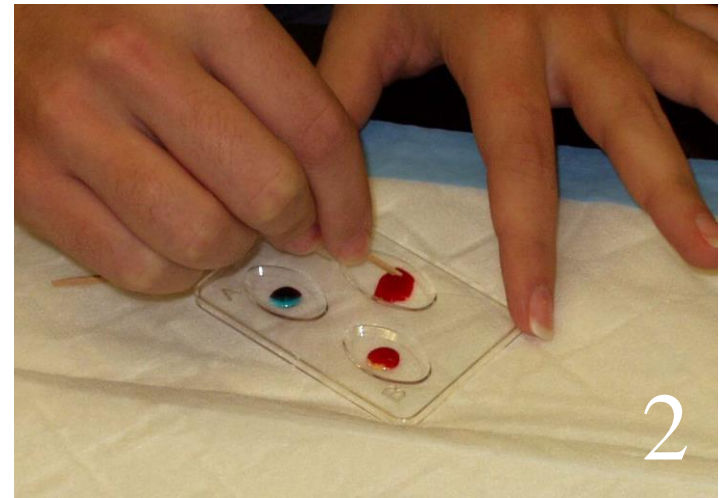


READ & RECORD!!

BLOOD TYPING



ADD ANTISERA



MIX W/TOOTHPICKS



READ & RECORD!!

CLEAN-UP!



FOLD DIAPER

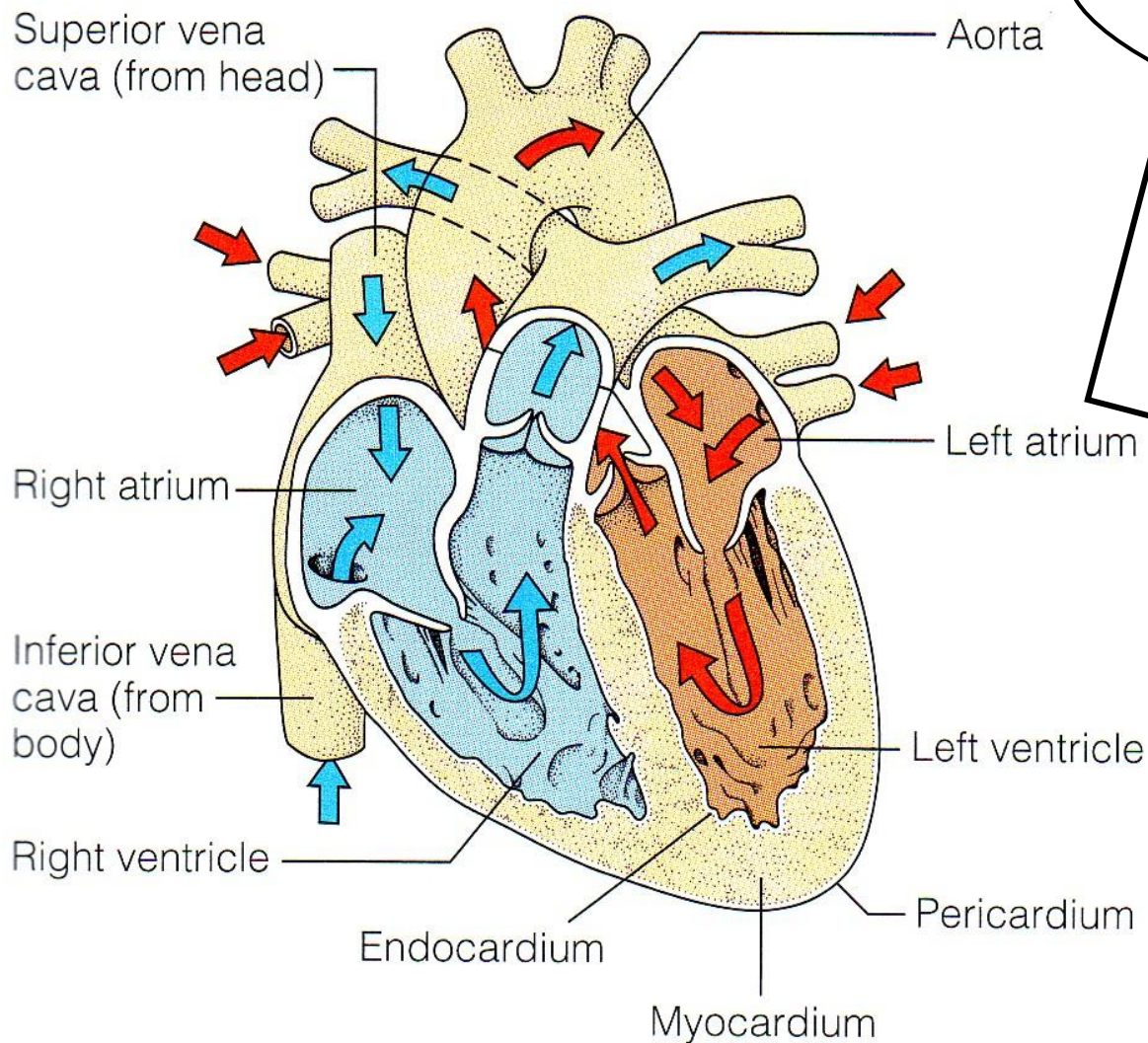


BLOOD PRODUCTS

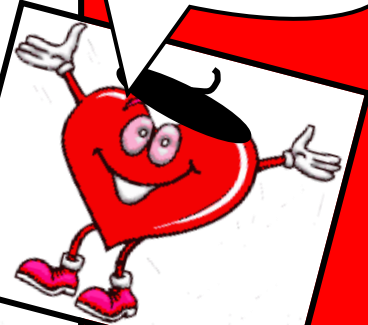


REWASH!!

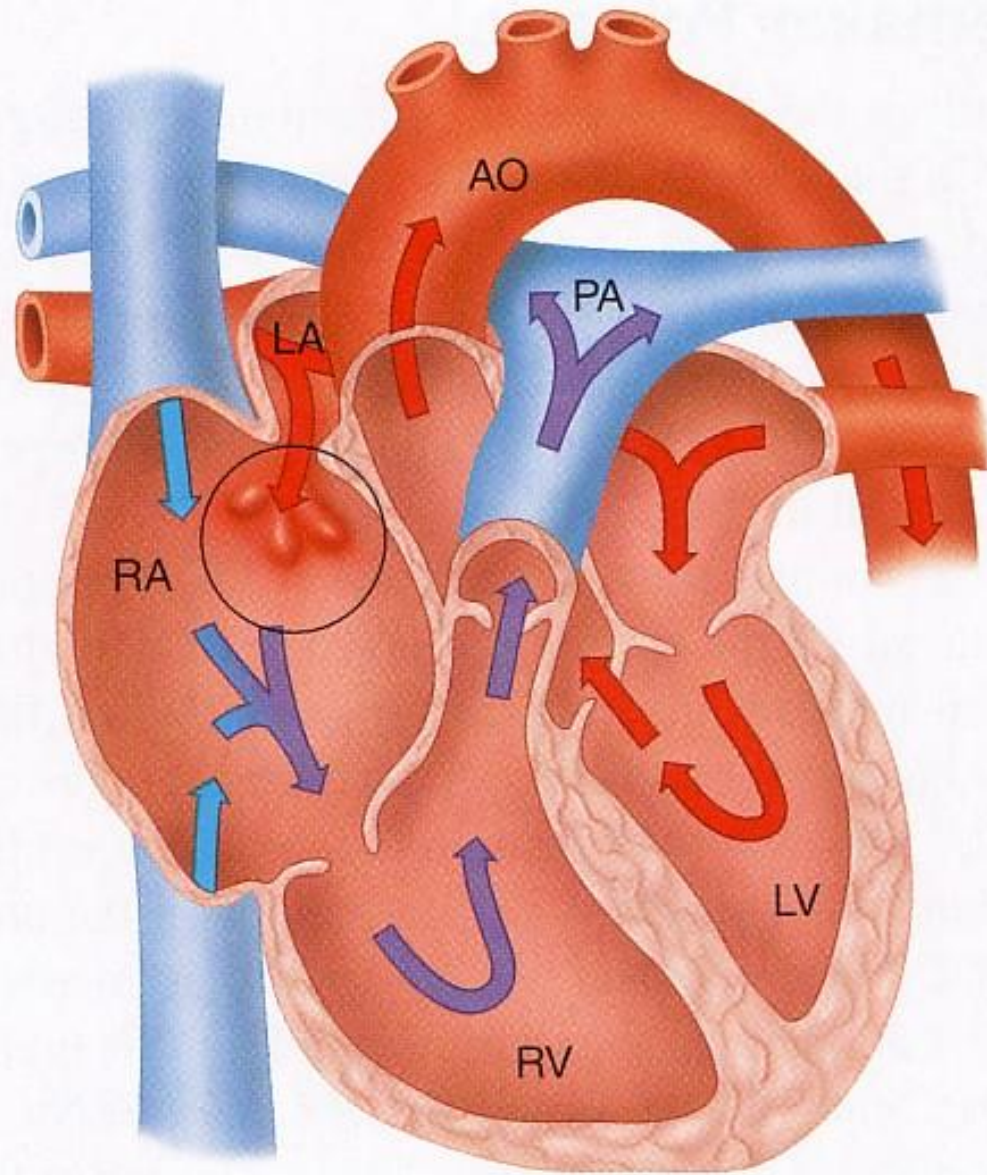
Veins → Atria → Ventricles → Arteries



VAVA!

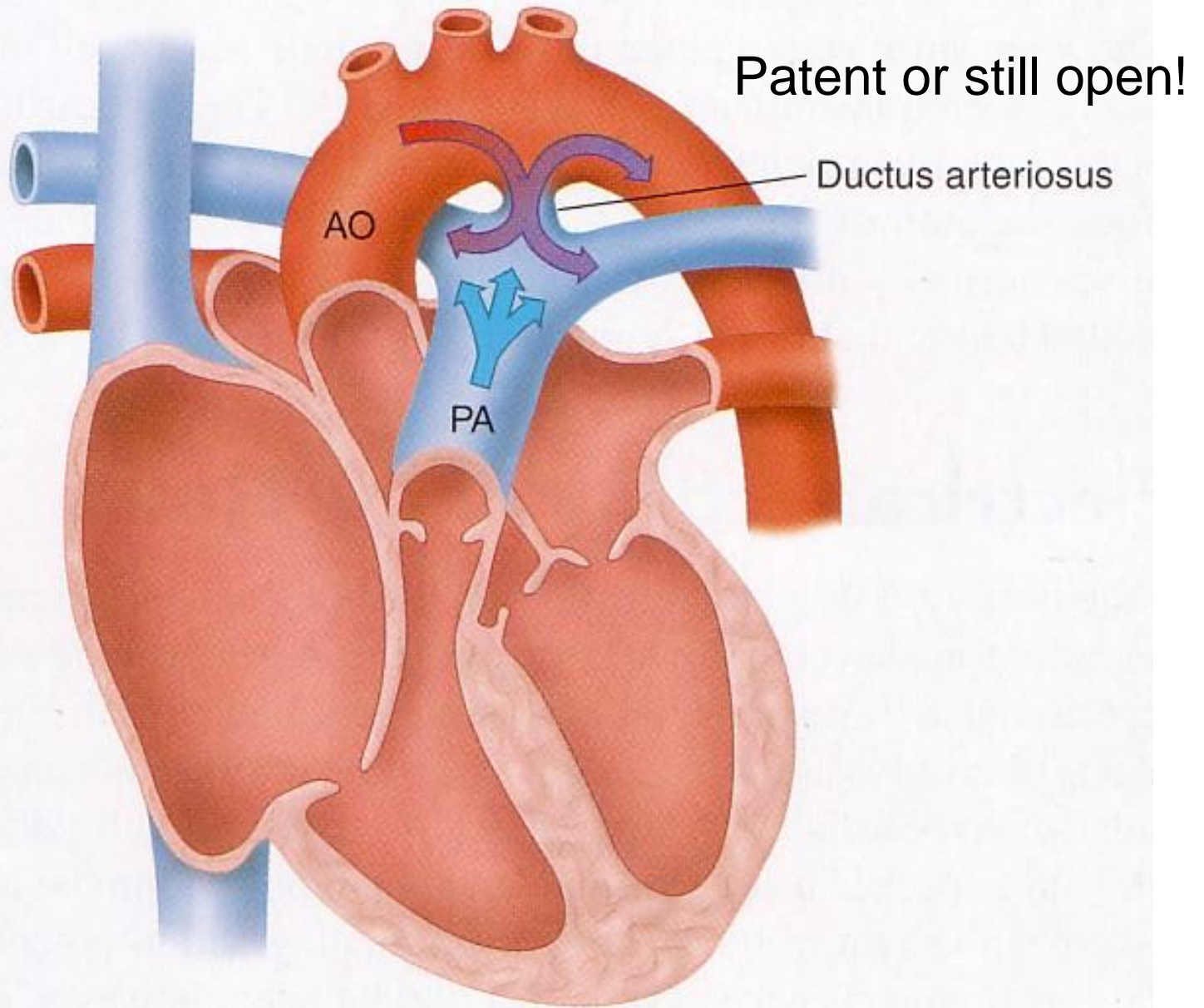


<http://www.nhlbi.nih.gov/health/health-topics/topics/hhw/contraction.html>

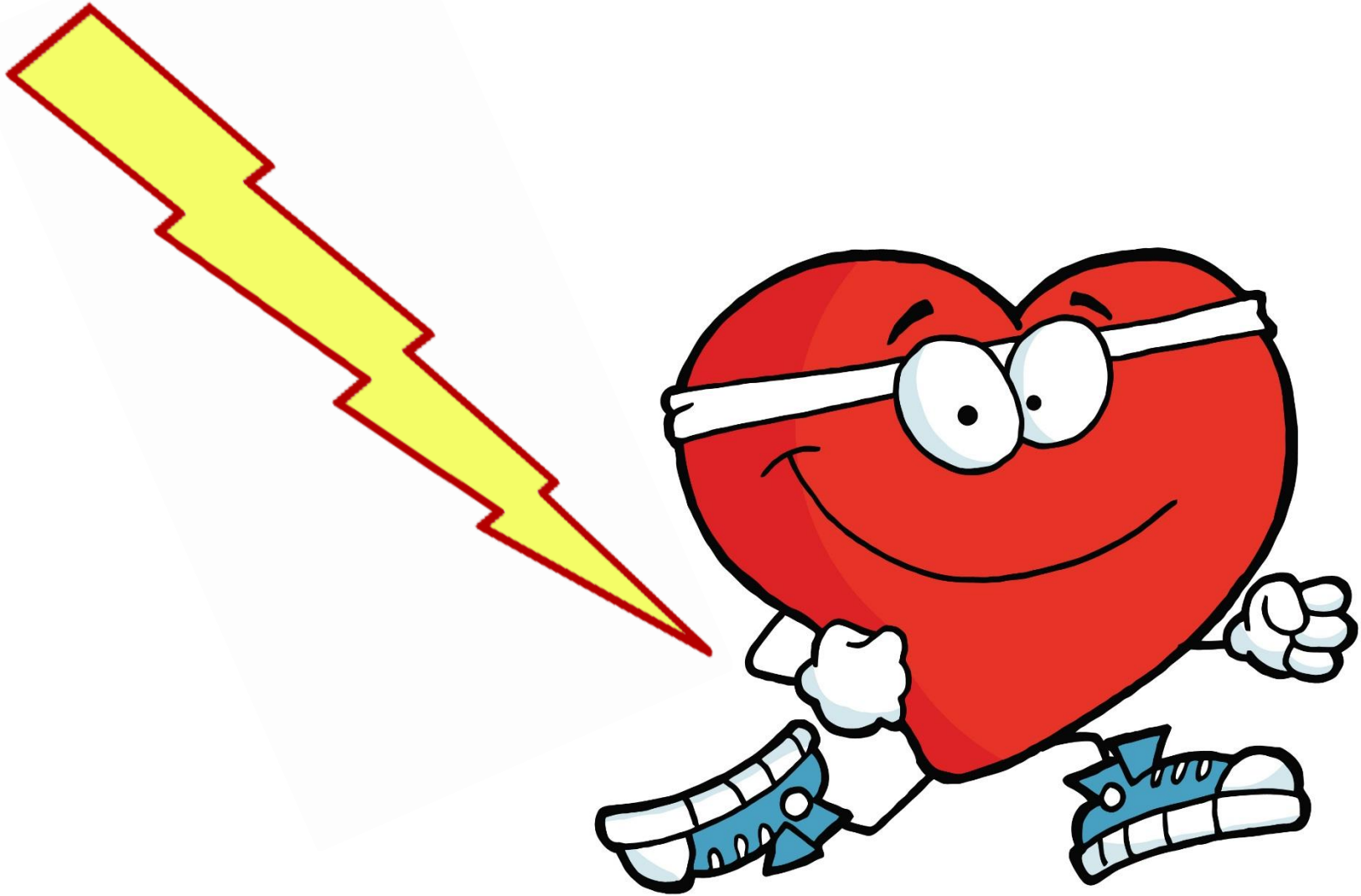


SI Fox 2009 fig 13.16 p 419

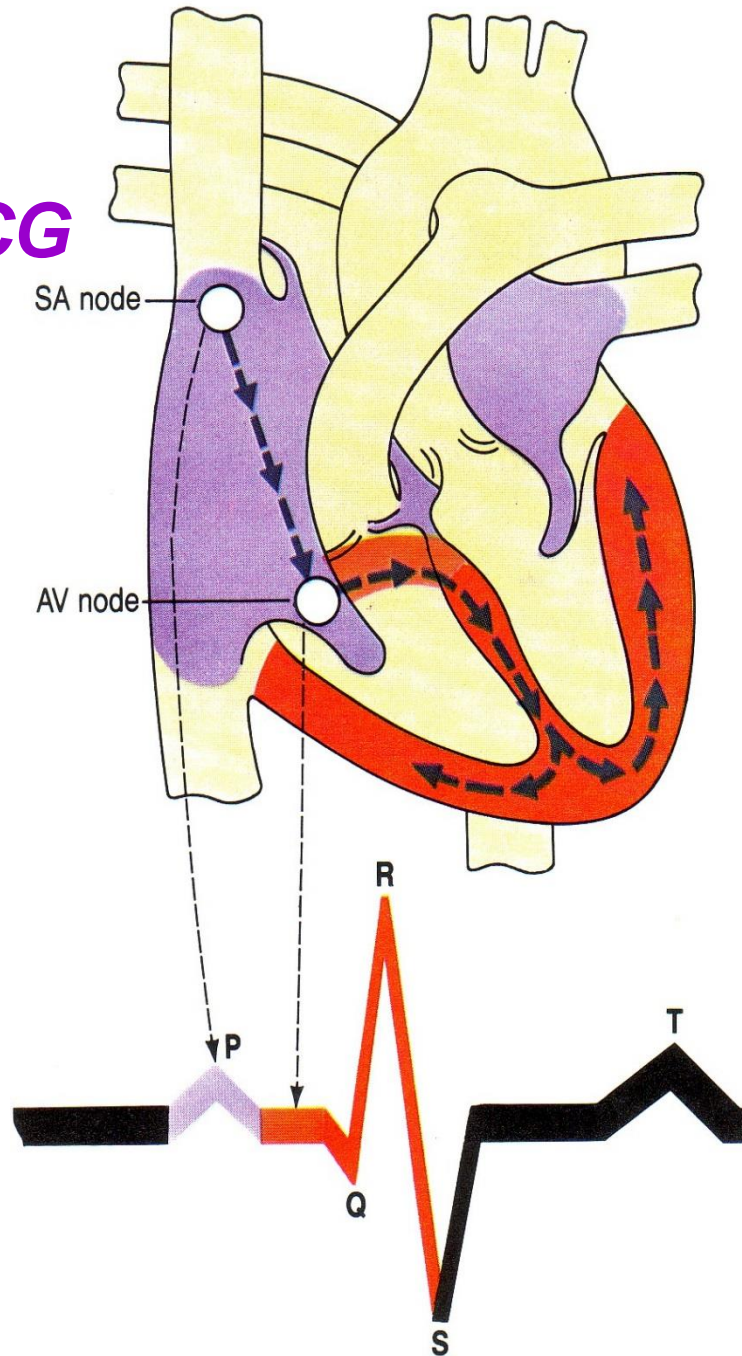
Septal defect
in atria



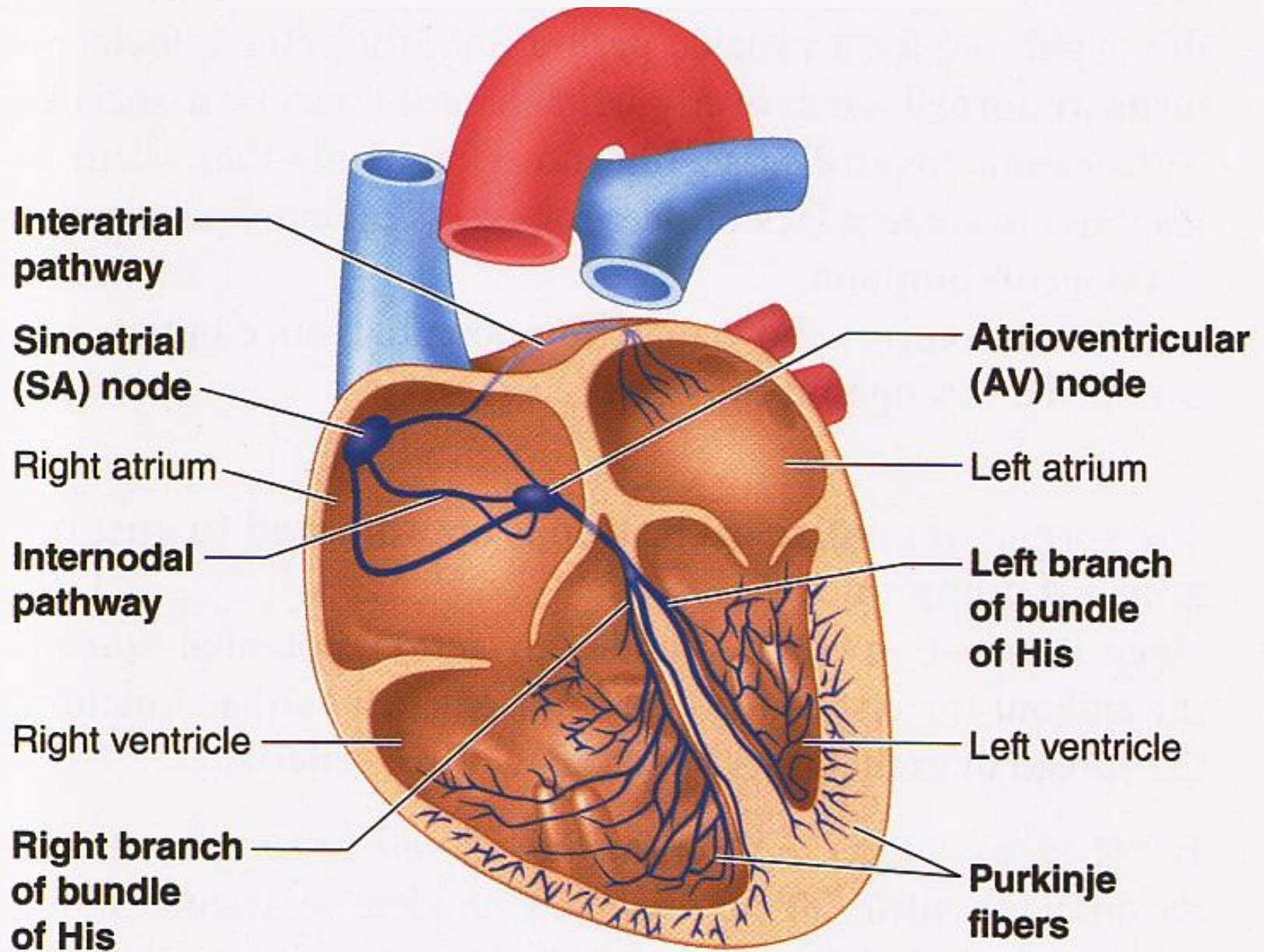
(Automatically) Shock the Heart then it Contracts!

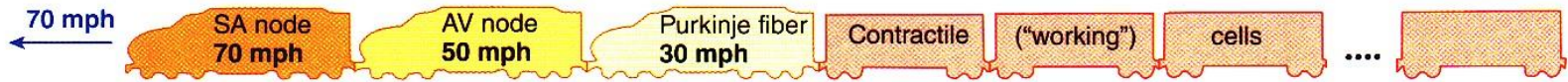


***EKG/ECG
Origin***

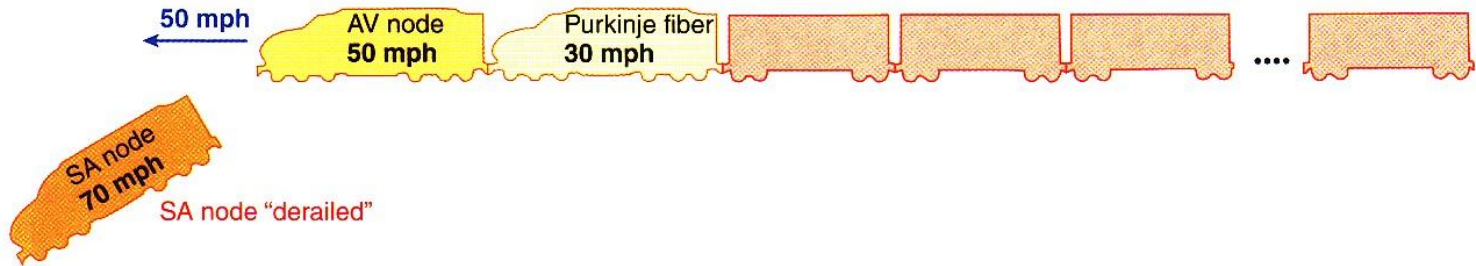


Heart's Electrical Highway!

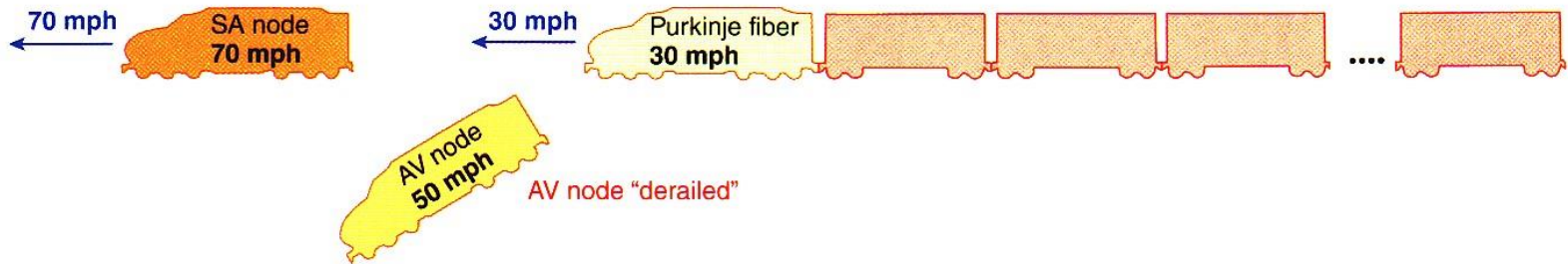




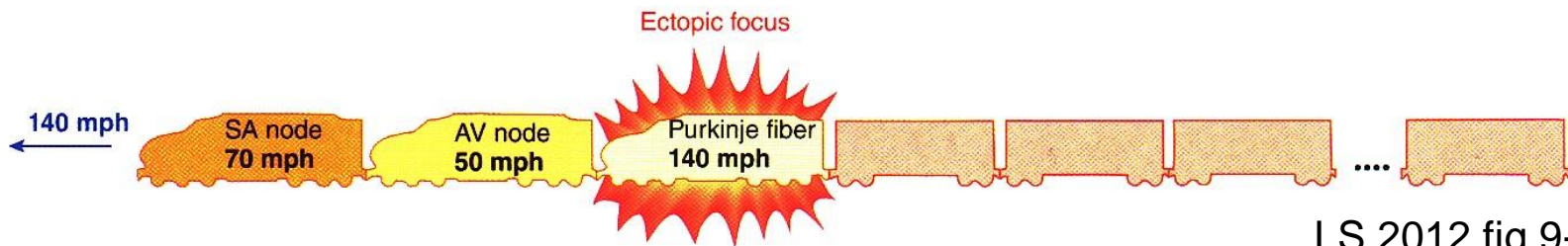
(a) Normal pacemaker activity: Whole train will go **70 mph** (heart rate set by SA node, the fastest autorhythmic tissue).



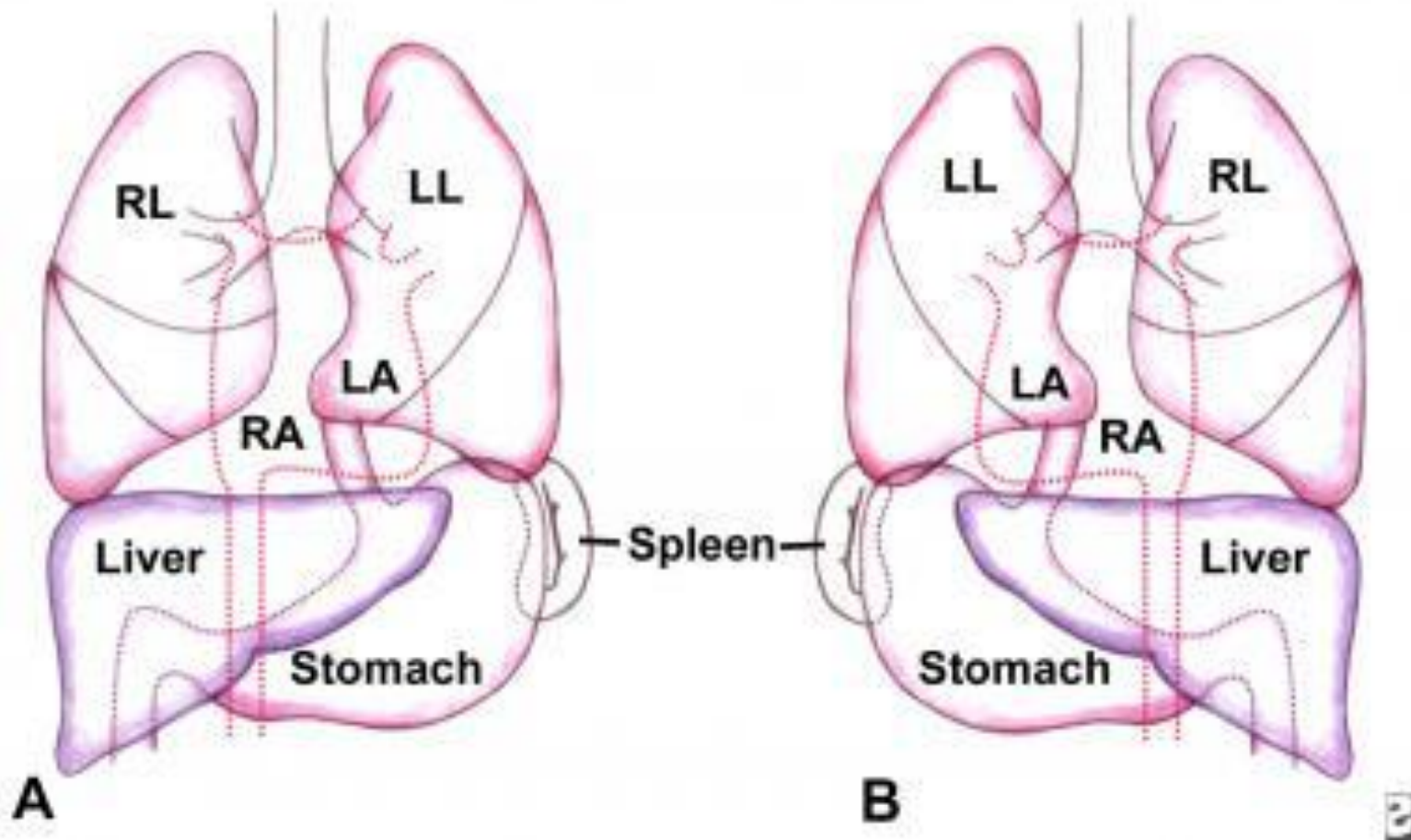
(b) Takeover of pacemaker activity by AV node when the SA node is nonfunctional: Train will go **50 mph** (the next fastest autorhythmic tissue, the AV node, will set the heart rate).



(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).



Normal (A) vs *Situs Inversus* (B): 1:10,000 live births!



SOURCE: Medscape <http://emedicine.medscape.com/article/413679-overview>

Randy Foye, NBA Player & Situs Inversus!



<http://www.pbs.org/program/nine-months-that-made-you/>

American Heart Association (AHA) & National Heart, Lung & Blood Institute

<http://www.my.americanheart.org>



<http://www.nhlbi.nih.gov/>

Department of Health and Human Services · National Institutes of Health

National Heart Lung and Blood Institute

People Science Health





We all have multimillion-dollar bodies!!

Can you believe that's Nicole?

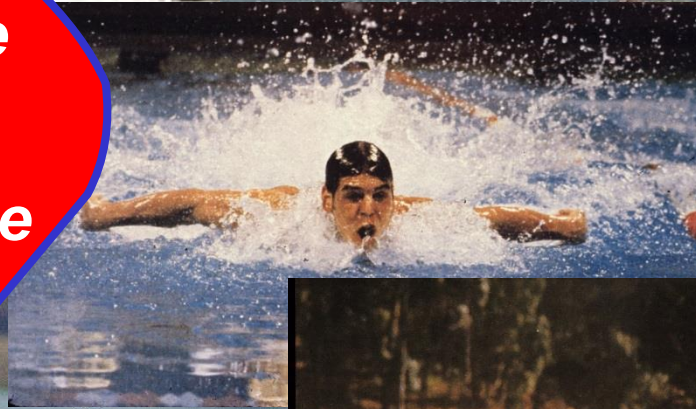
Hollywood glamour queen Nicole Kidman likes to swim to keep that multimillion-dollar body in shape. But the down-to-earth superstar doesn't need a fancy spa — she does her laps at the local YMCA! Nice goggles, Nic!



How much aerobic?



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



<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

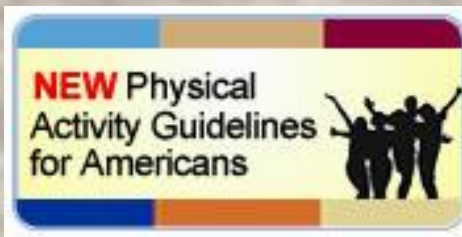
**Do 8-10 strength-training exercises
8-12 repetitions/each exercise, 2 d/wk**

How much strength?

- ✓ 2-3 days/wk
- ✓ 8-10 exercises for major muscle groups
- ✓ ≥ 1 set/exercise
- ✓ 8-12 (most) or 10-15 (frail/ $> 50-60$ yr) repetitions/set



Federal exercise guidelines include strength training for all
<http://www.health.gov/paguidelines/guidelines/default.aspx>



Adults: Moderate to Vigorous Exercise \geq 30 min, 5 d/wk

Children: Moderate to Vigorous Exercise \geq 60 min, 5 d/wk

Questions + Discussion



CVDs

AMI

CVA



TIA

HTN

PVD

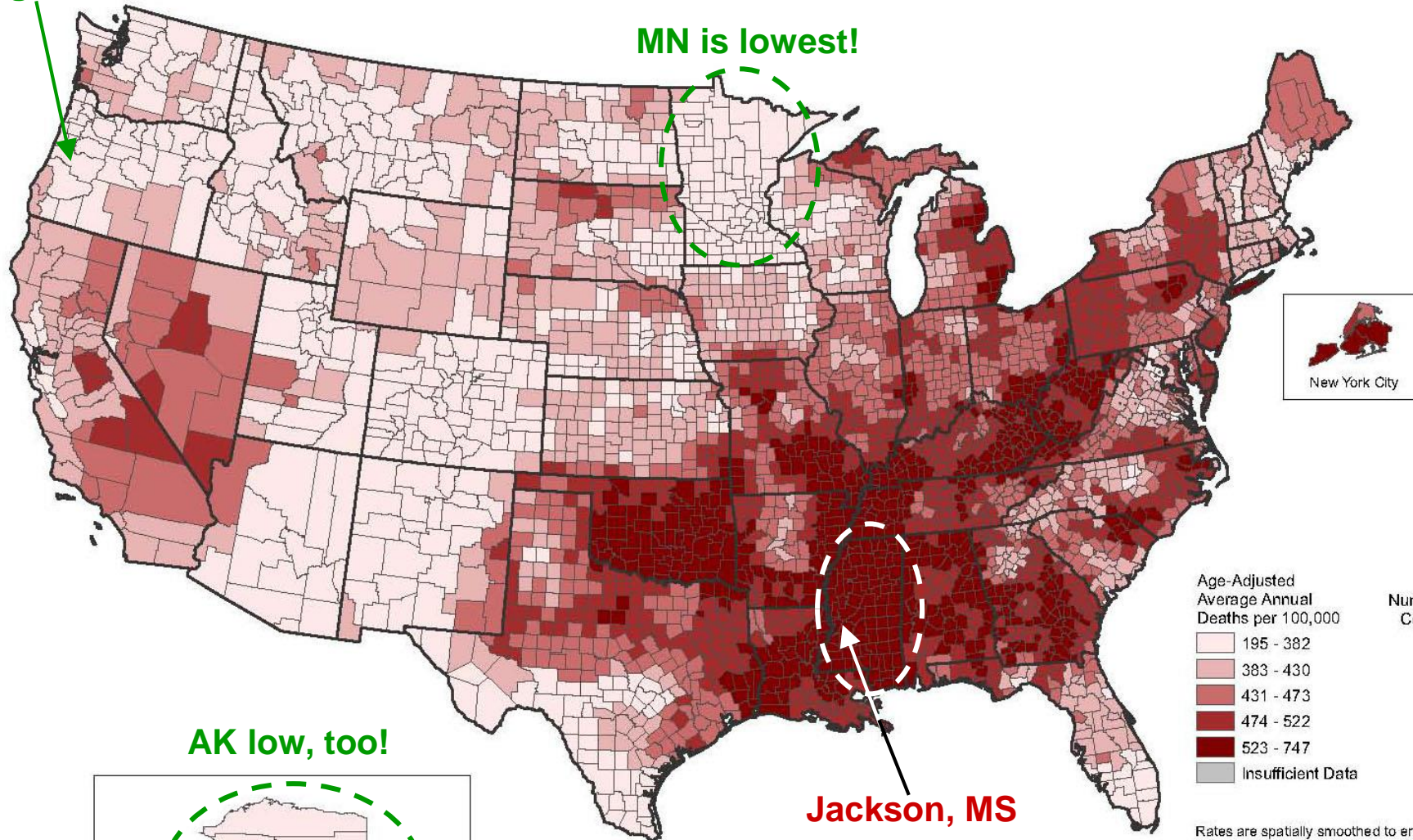
Did you know?

- **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.**

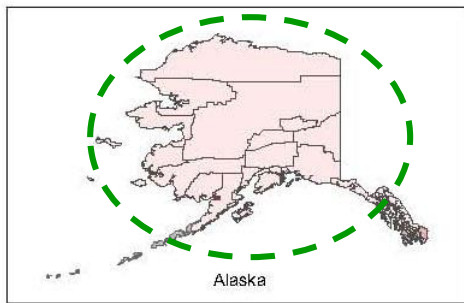
Heart Disease Death Rates, 2000-2006 Adults Ages 35+, by County

Eugene, OR

MN is lowest!



AK low, too!



Jackson, MS

Age-Adjusted Average Annual Deaths per 100,000	Number of Counties
195 - 382	632
383 - 430	648
431 - 473	629
474 - 522	624
523 - 747	606
Insufficient Data	2

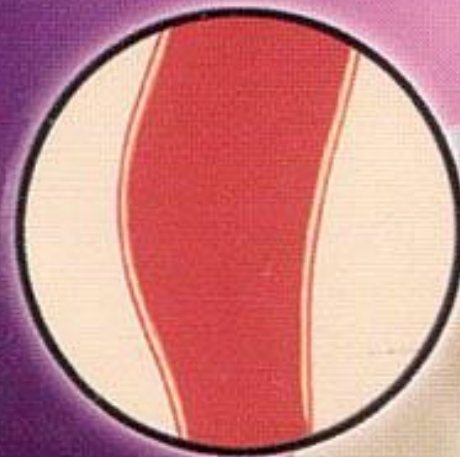
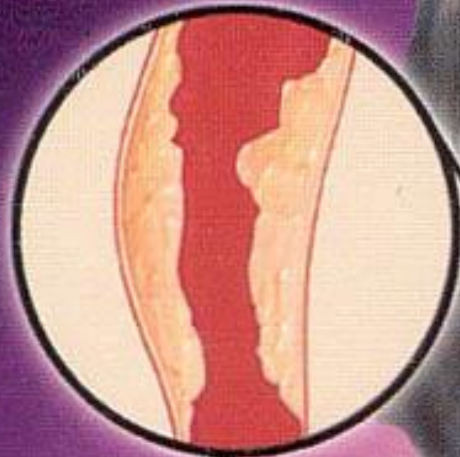
Rates are spatially smoothed to enhance the stability of rates in counties with small populations.

ICD-10 codes for heart disease: I00-I09, I11, I13, I20-I51

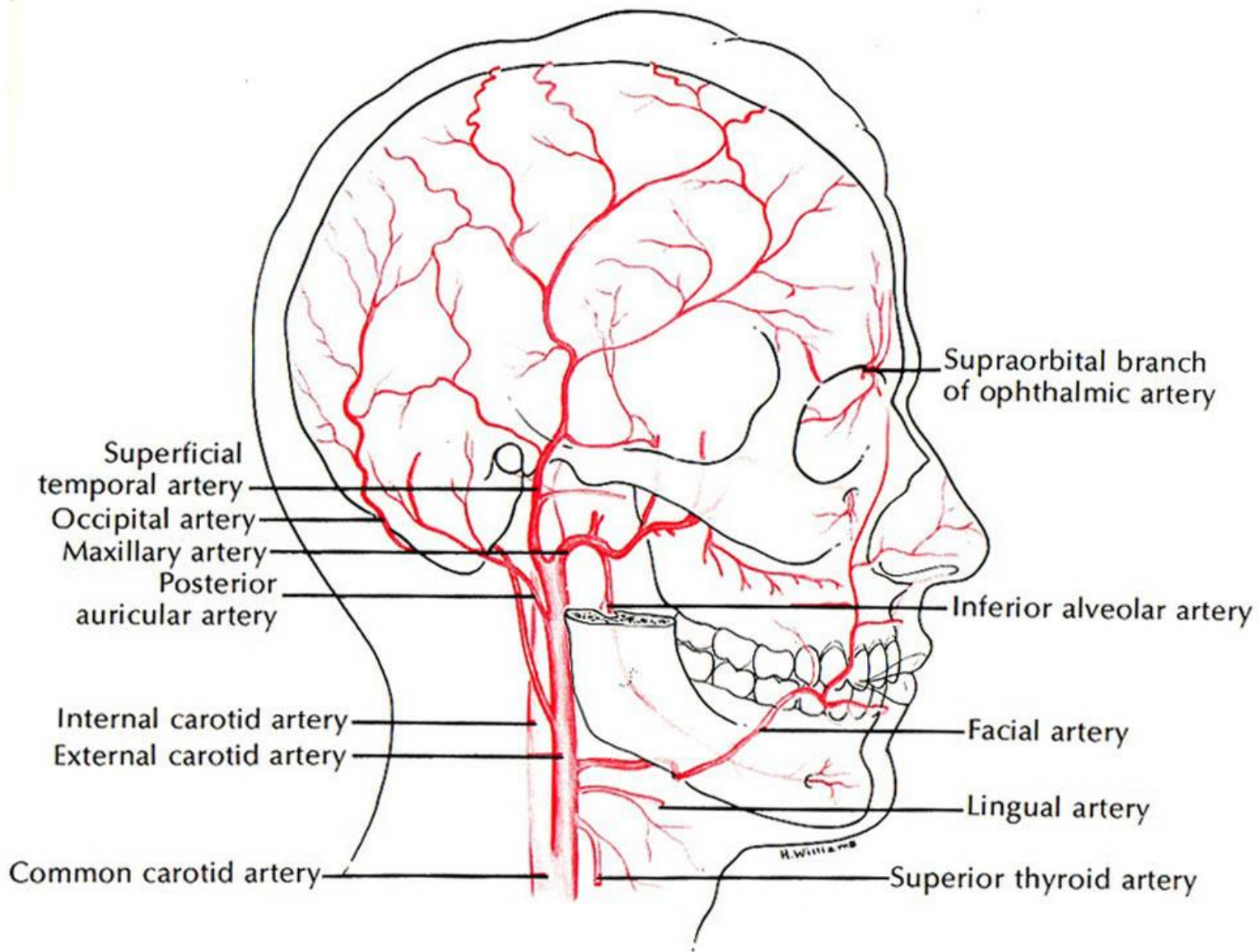
Data Source: National Vital Statistics System and the U.S. Census Bureau



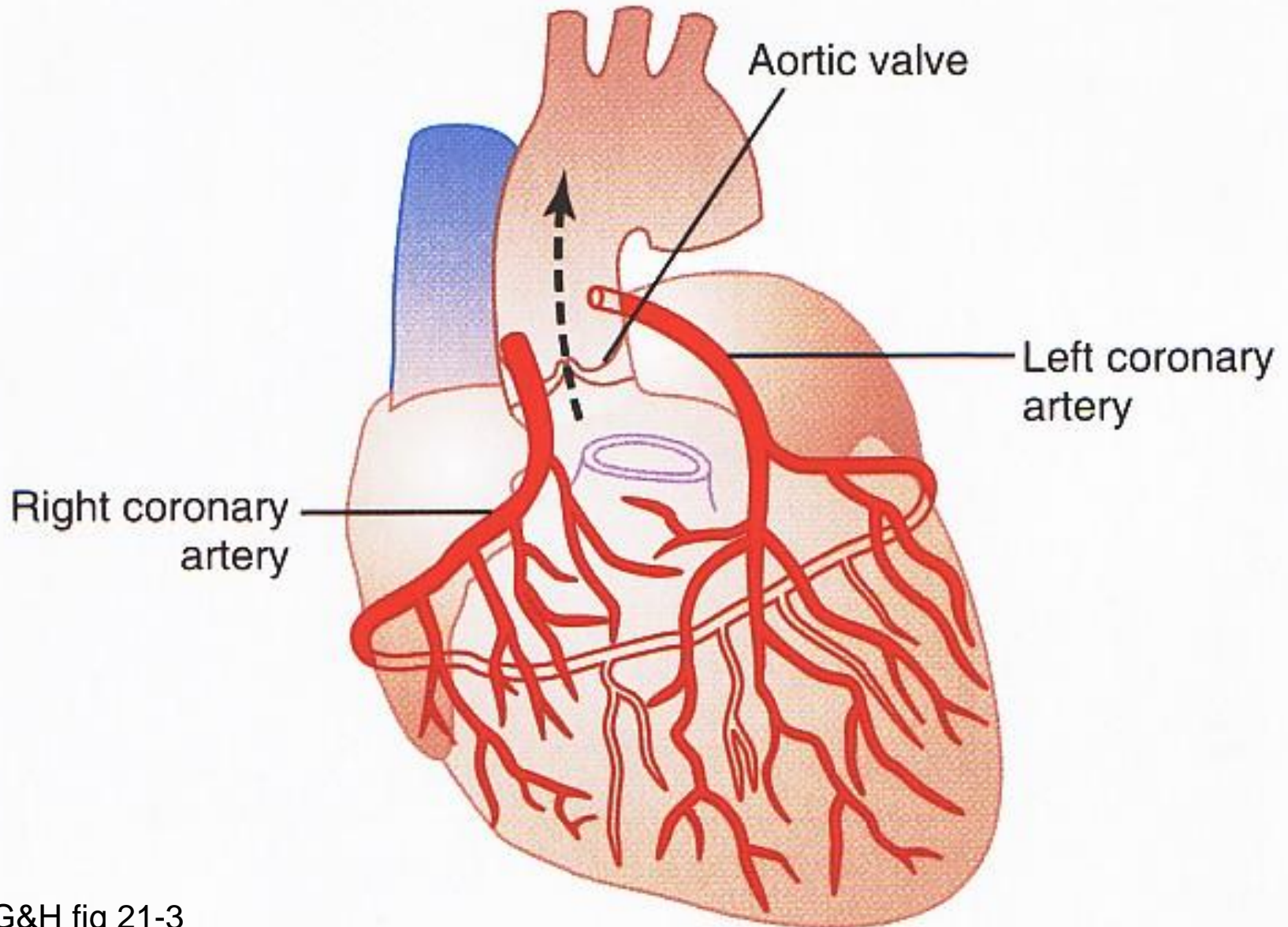
DISEASED CAROTID ARTERY



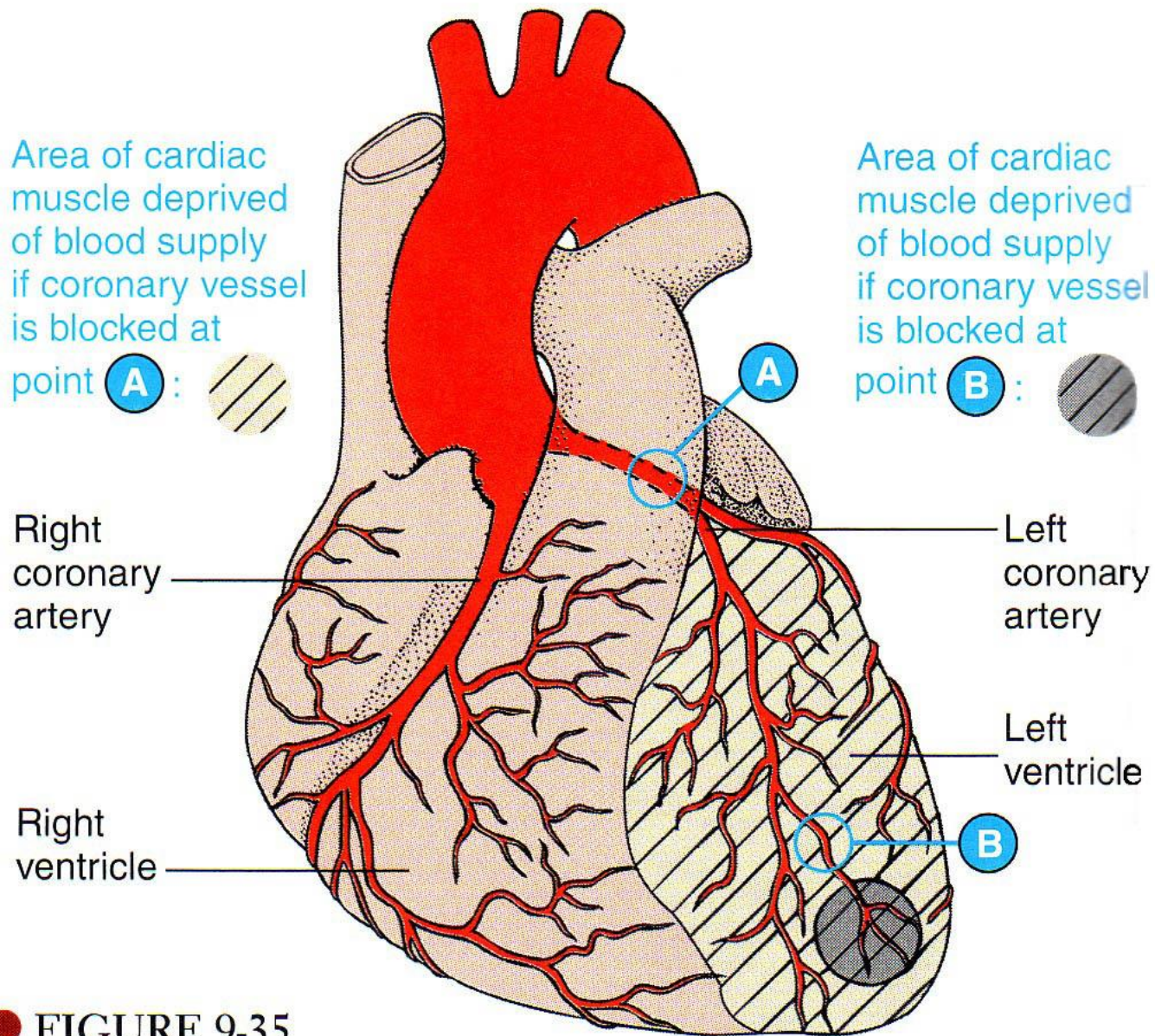
HEALTHY CAROTID ARTERY



Coronary Circulation ≡ Crowns the Heart!

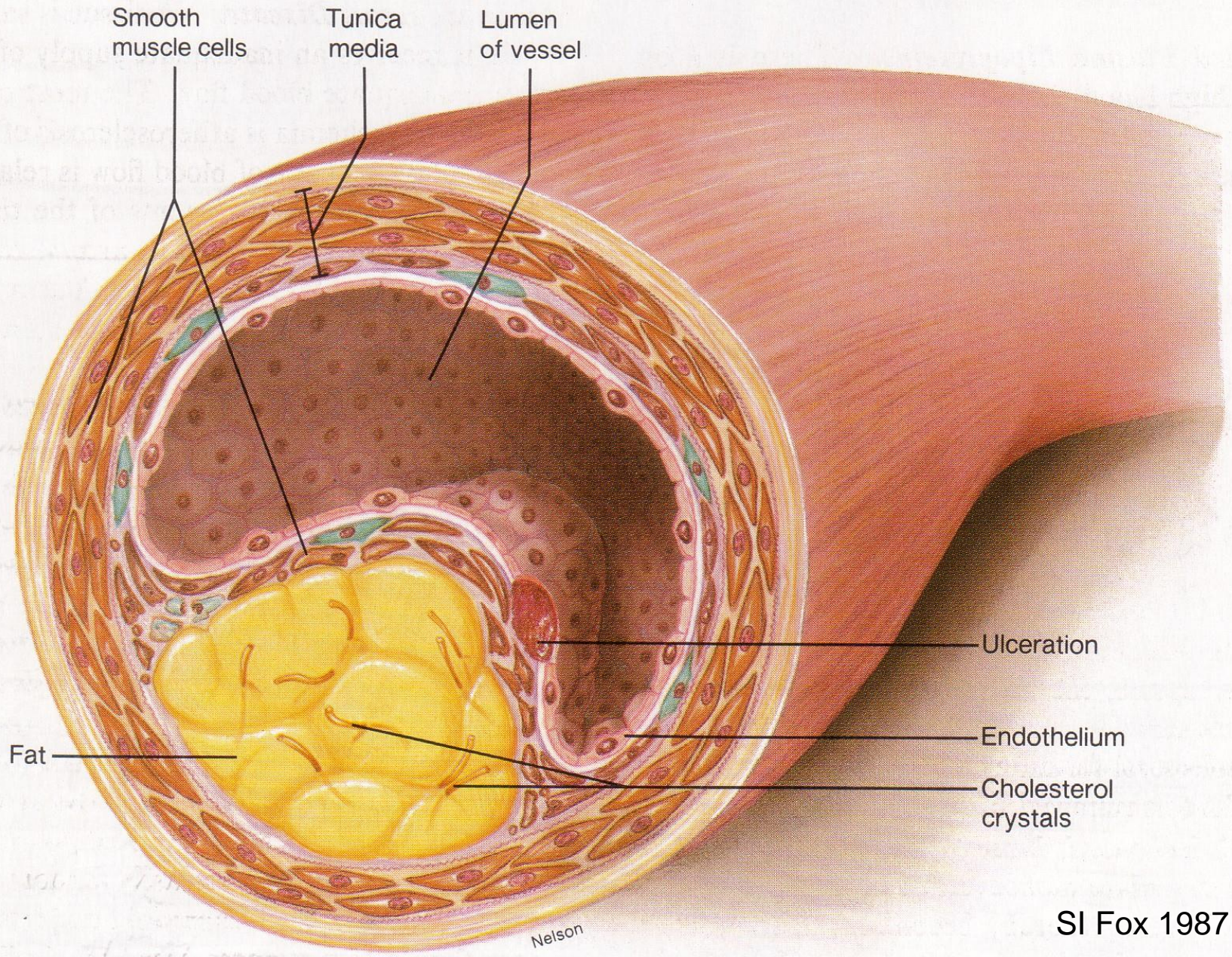






● FIGURE 9-35

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

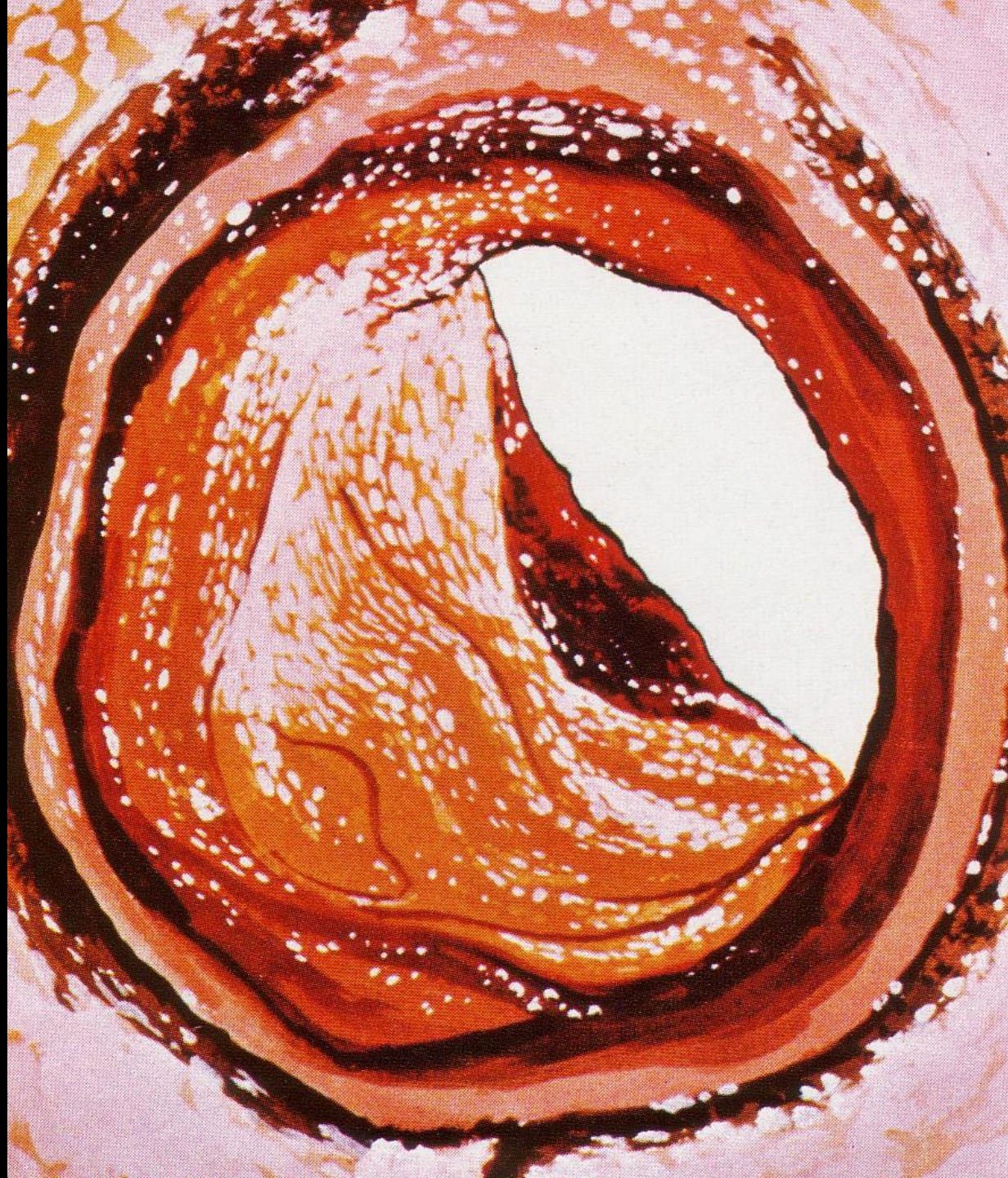
Cholesterol crystals

Nelson

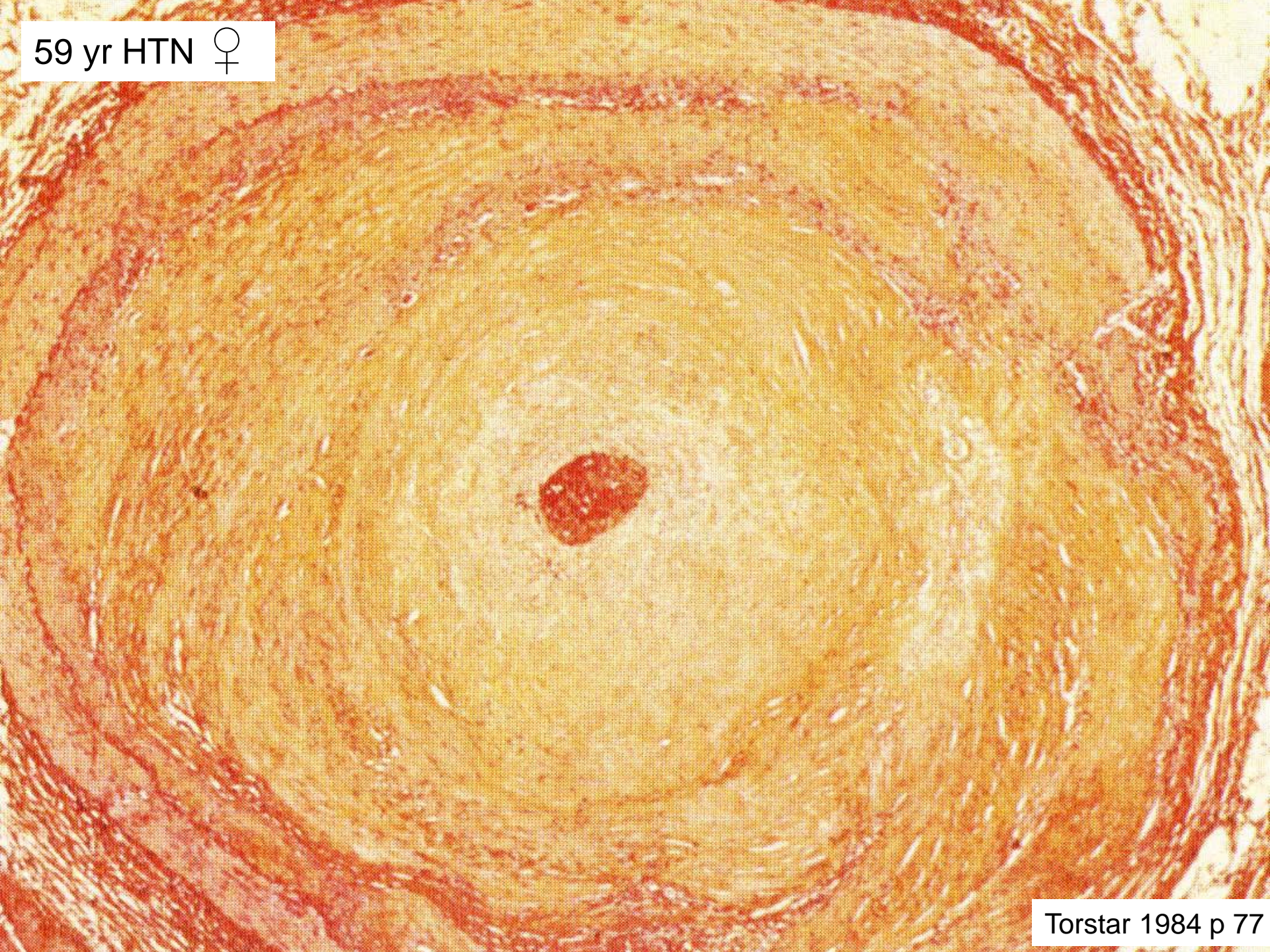
SI Fox 1987 p 370

100 yr ♀





59 yr HTN ♀

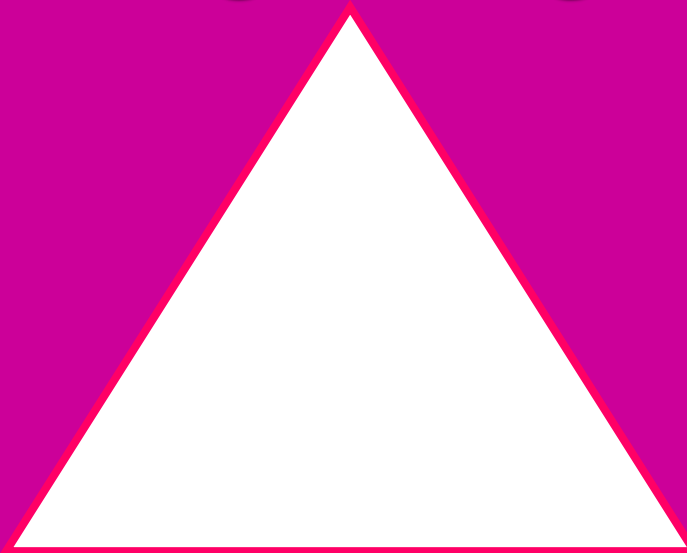


Treatment Triad

NB: Last blasted resort!!



Drugs/Surgery



Exercise

*Dietary
Modification*

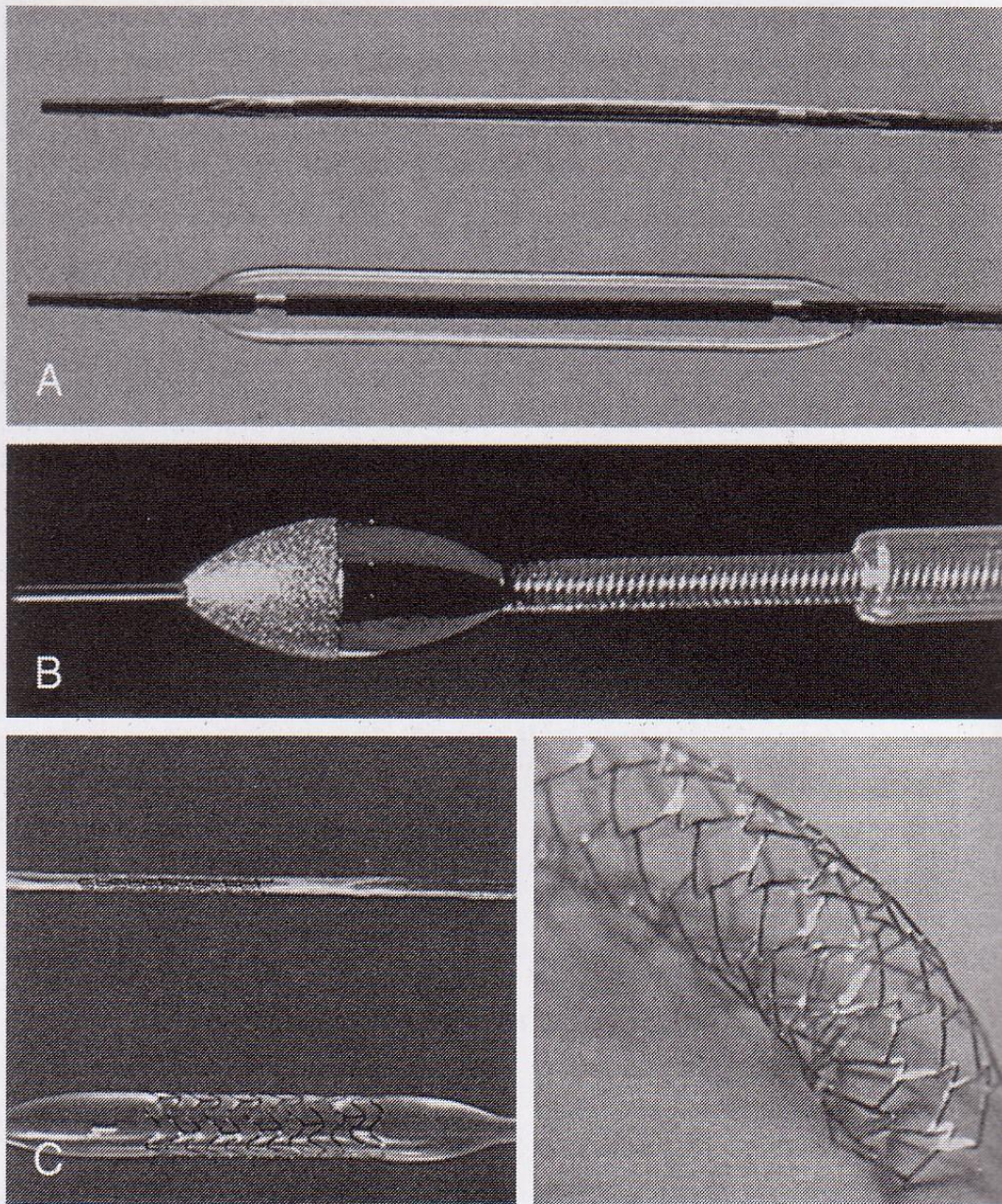
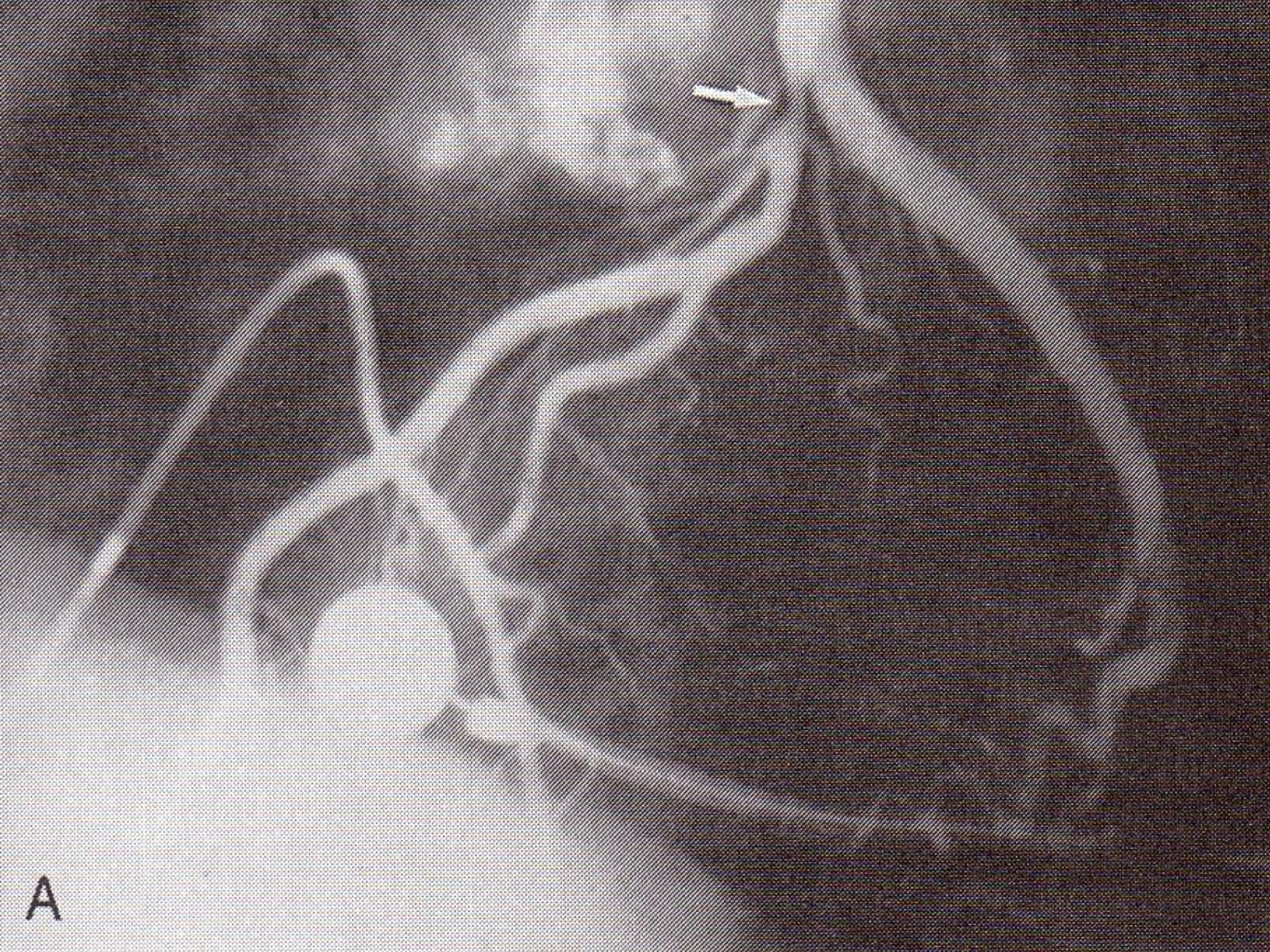
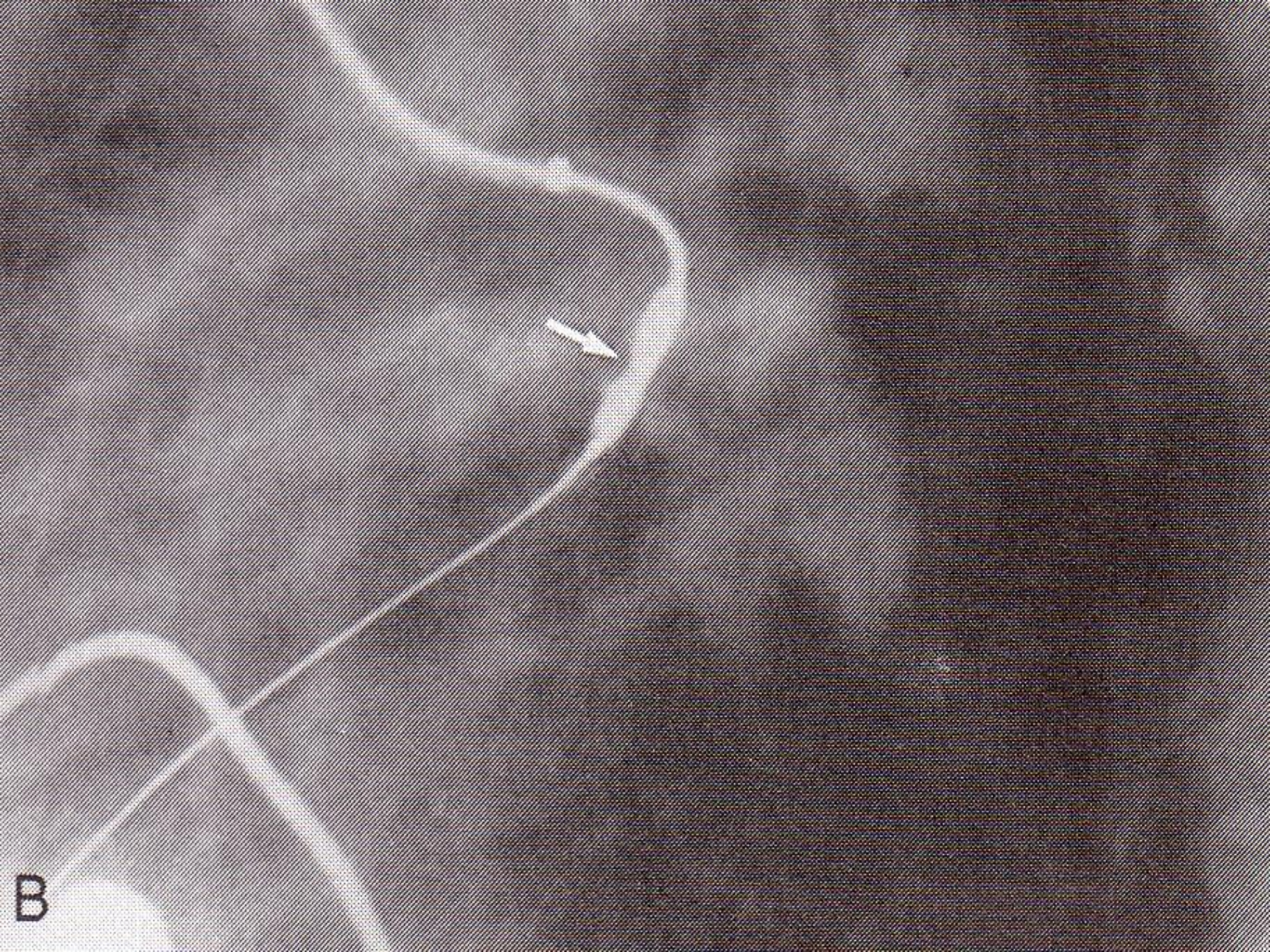


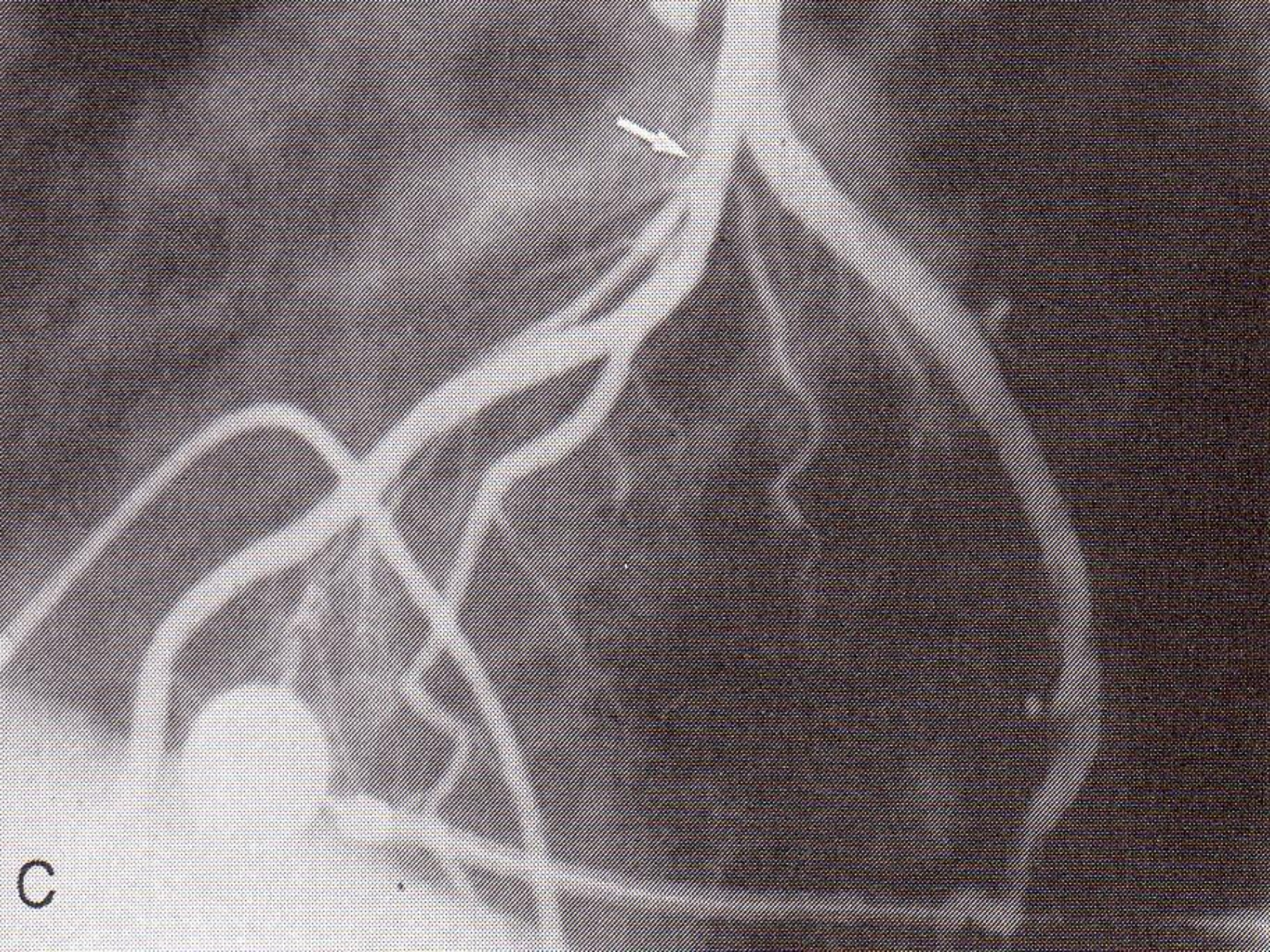
FIGURE 37-1 Devices for percutaneous transluminal coronary interventions. **A**, Coronary balloon. **B**, Rotational atherectomy burr (Rotablator). **C**, Coronary stent.



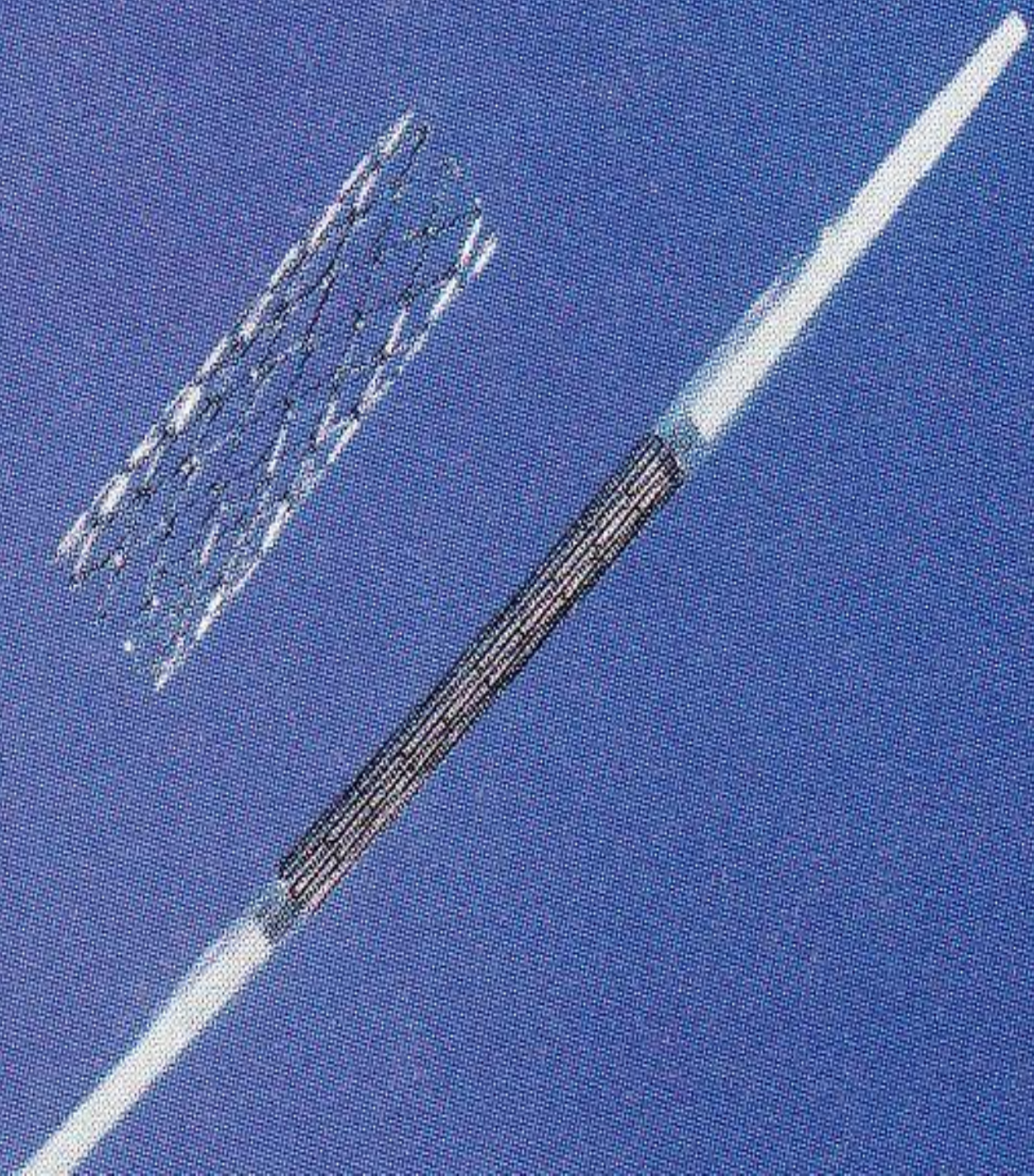
A



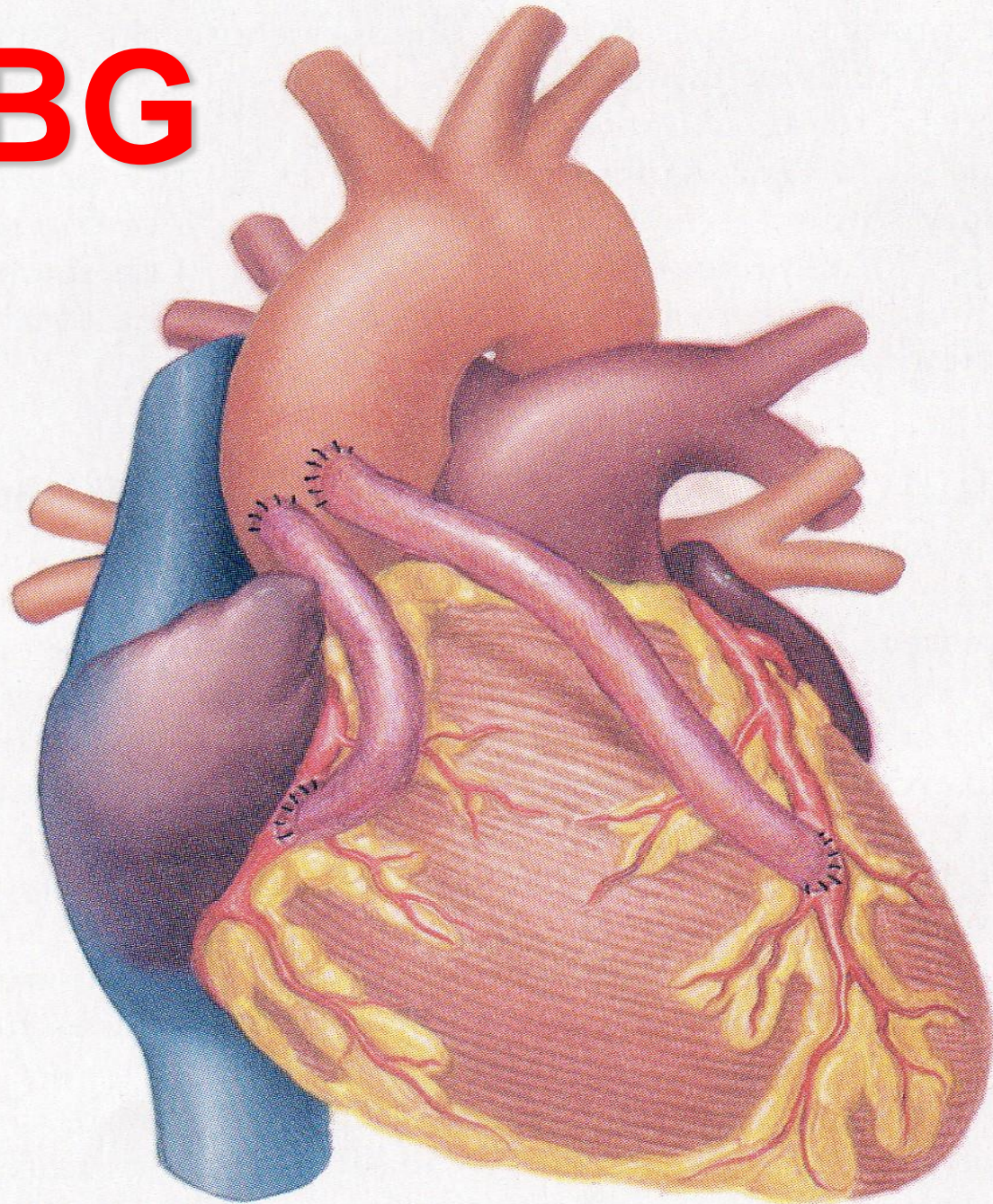
B

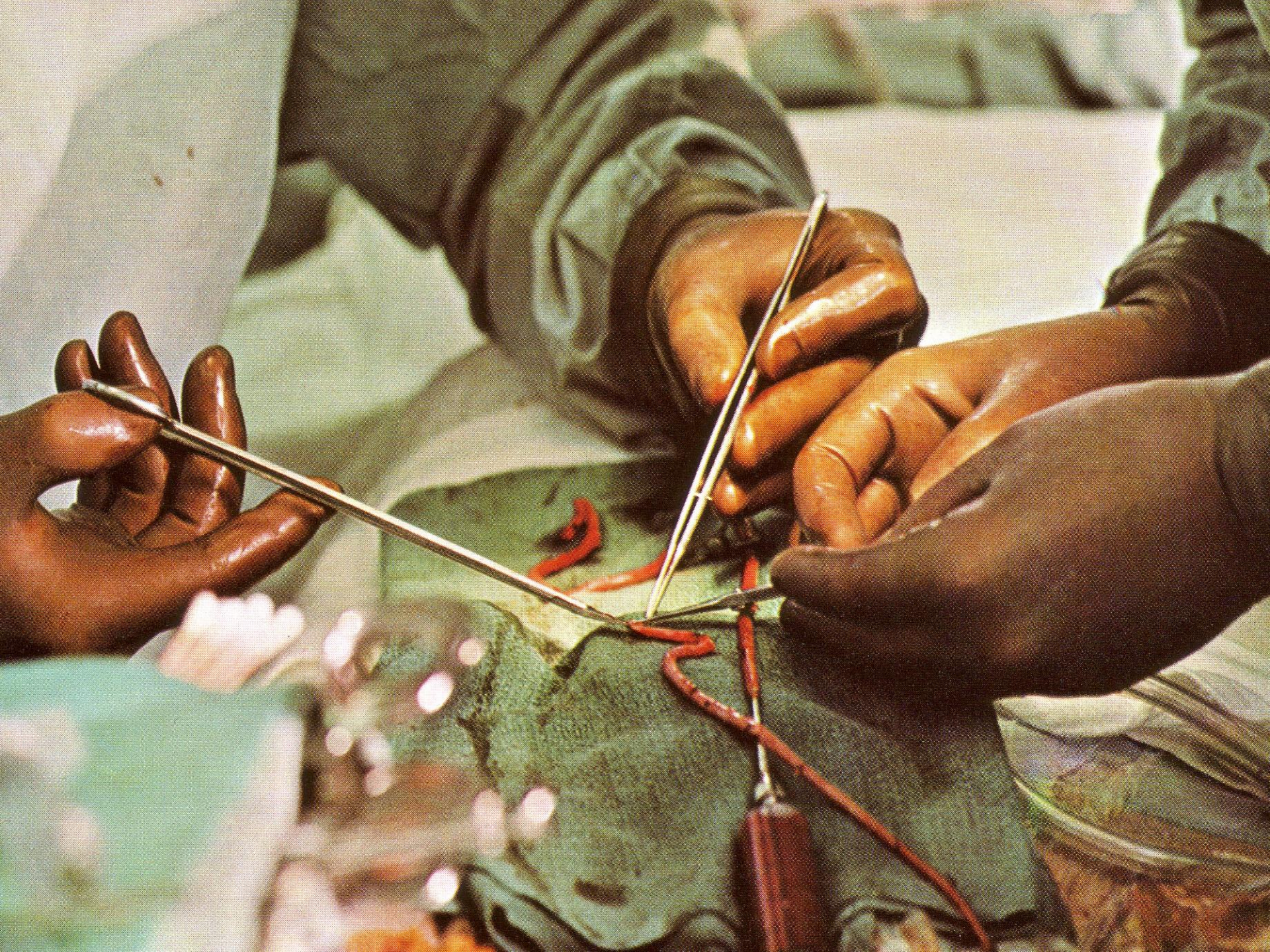


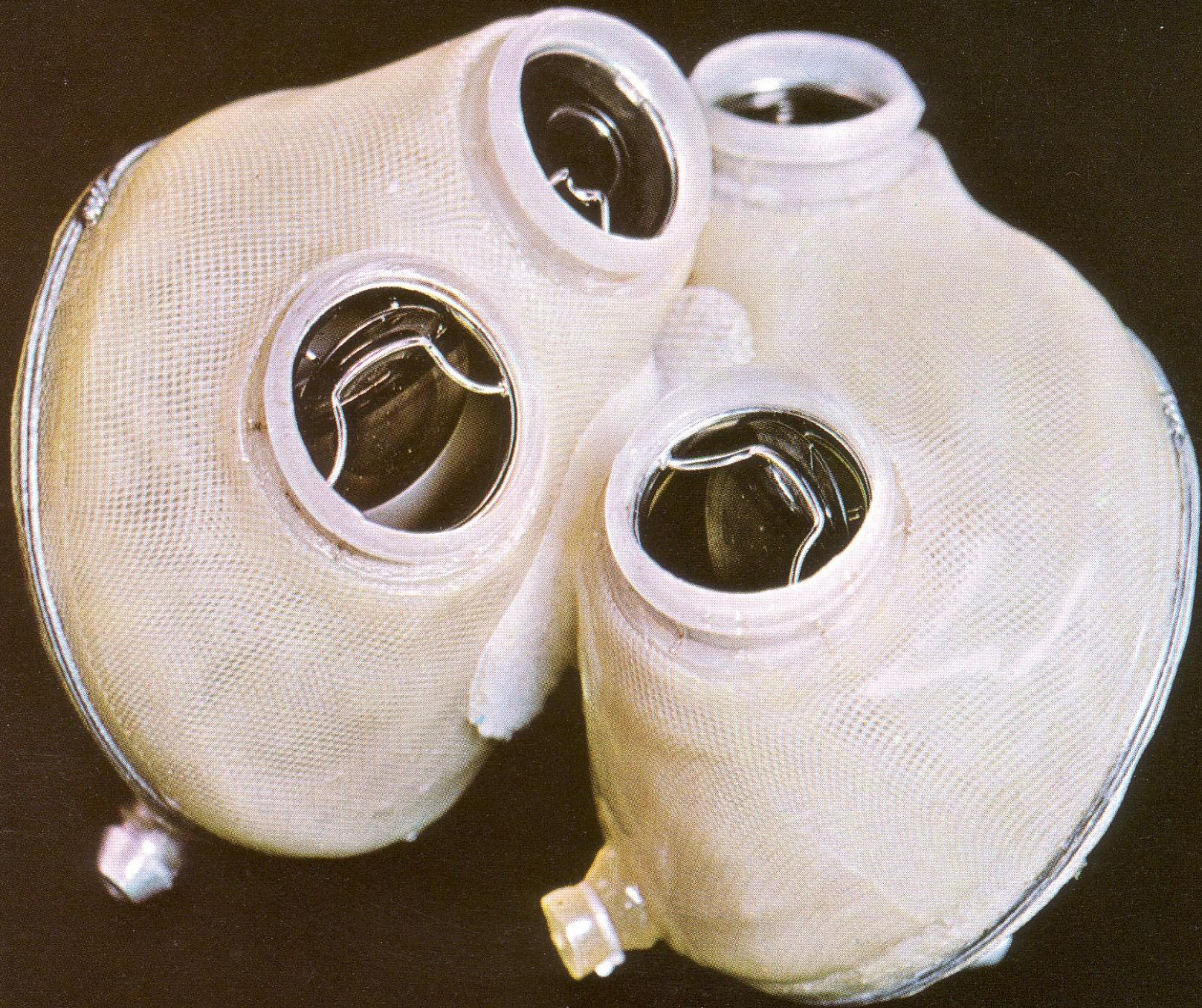
C

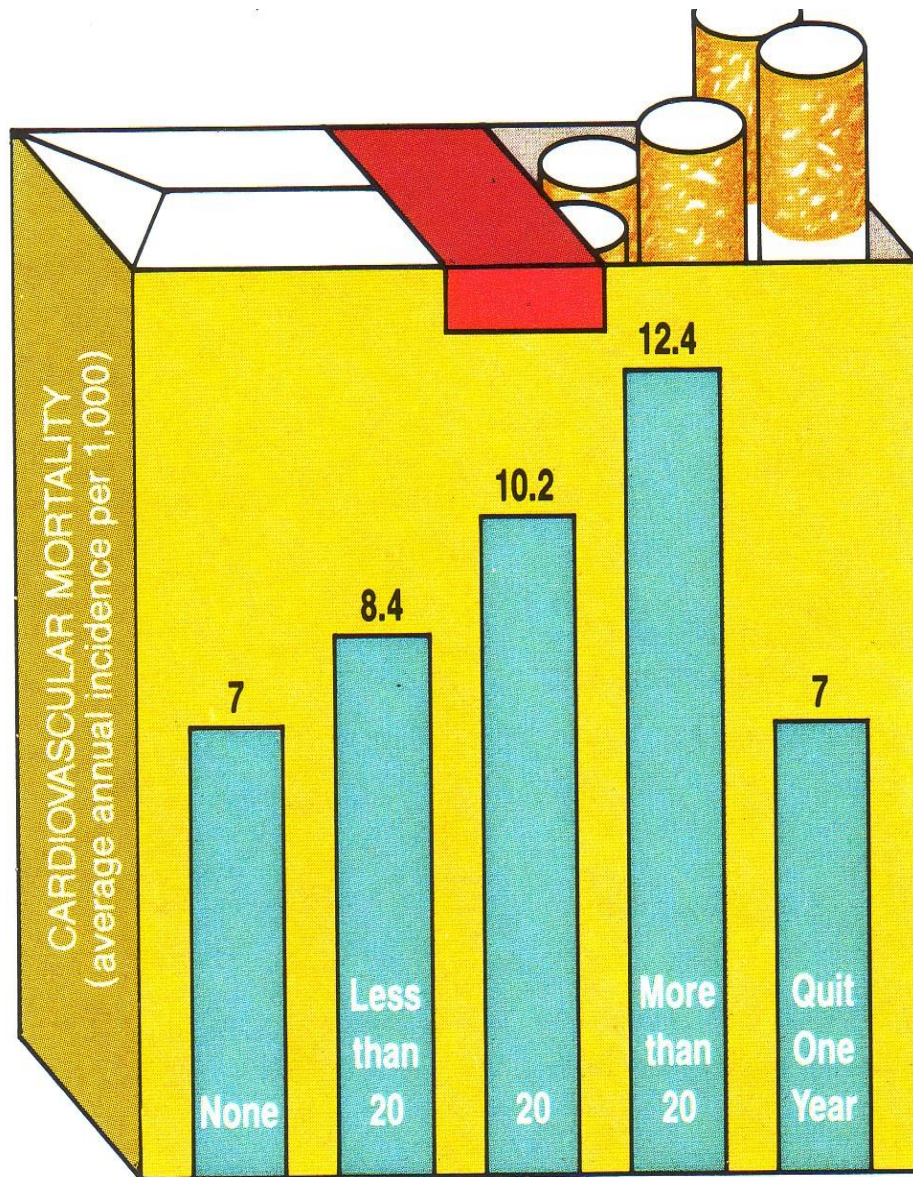


CABG









CIGARETTES SMOKED PER DAY

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 for free and low cost resources



UNIVERSITY OF OREGON

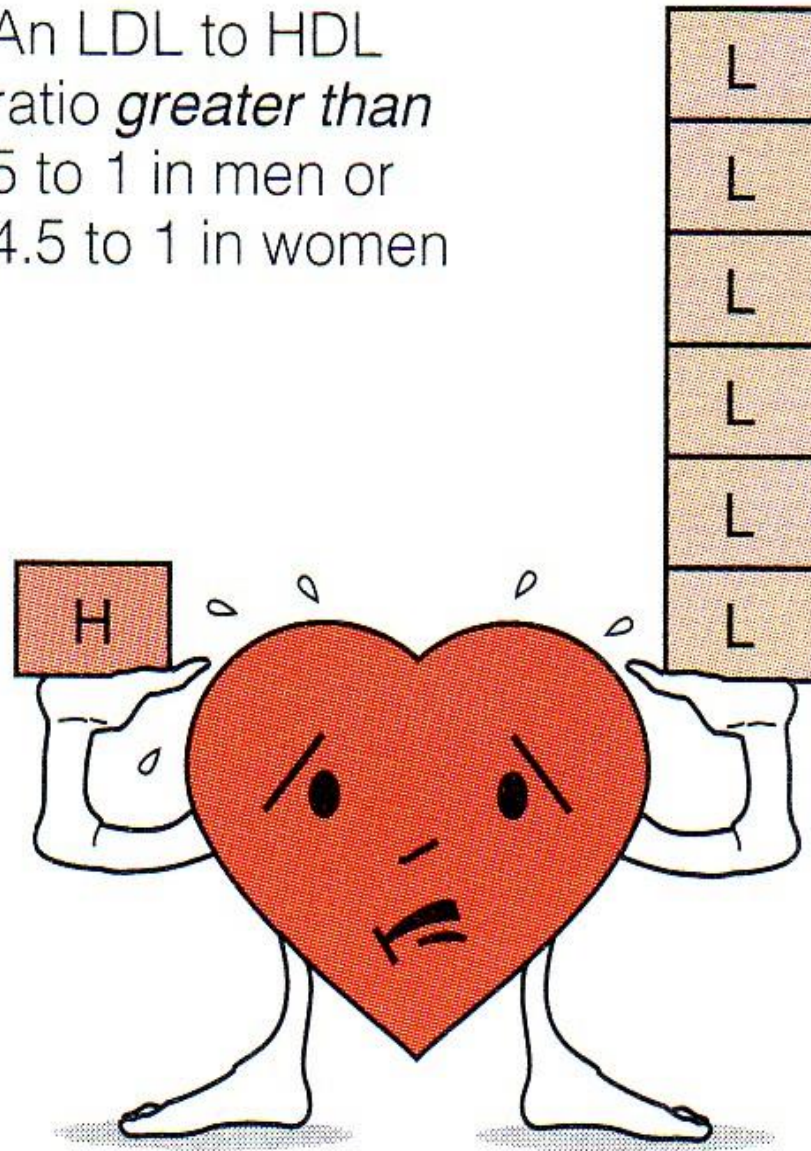
tobaccofree.uoregon.edu



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



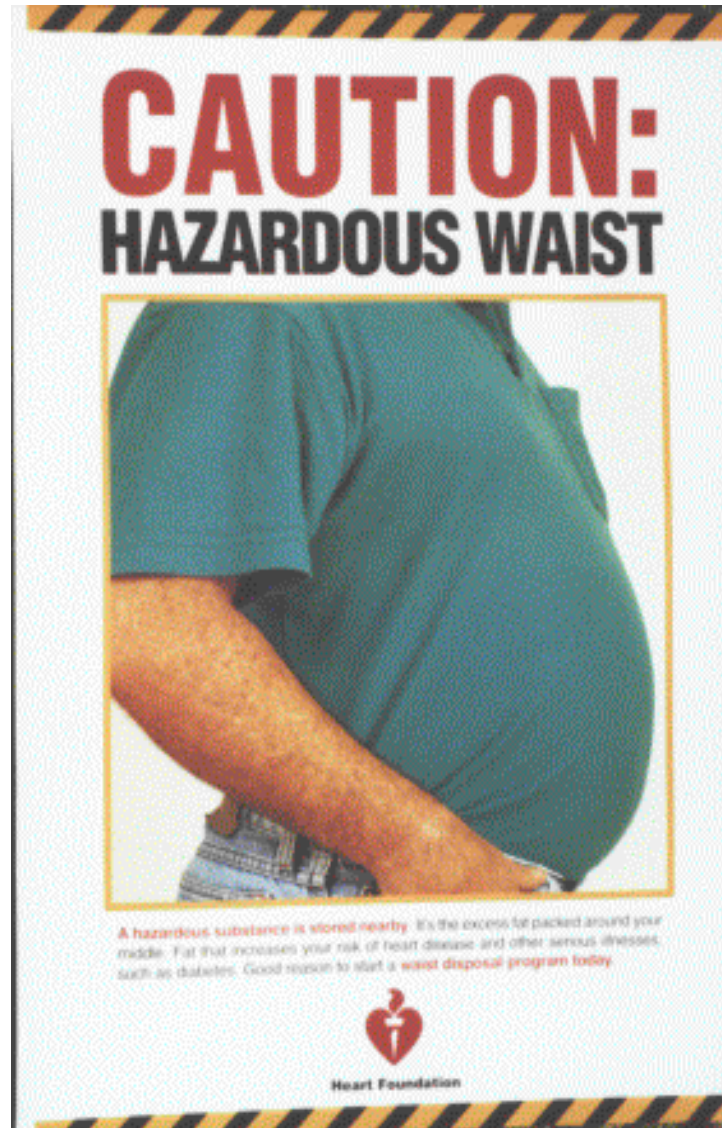
Increased risk of
heart disease

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!



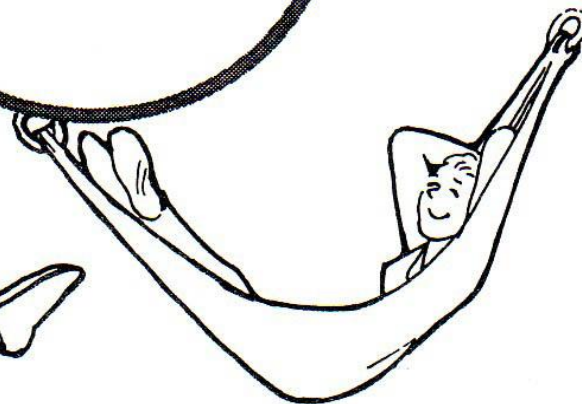
**Cardiorespiratory
Endurance**



**Muscular
Strength/Endurance**

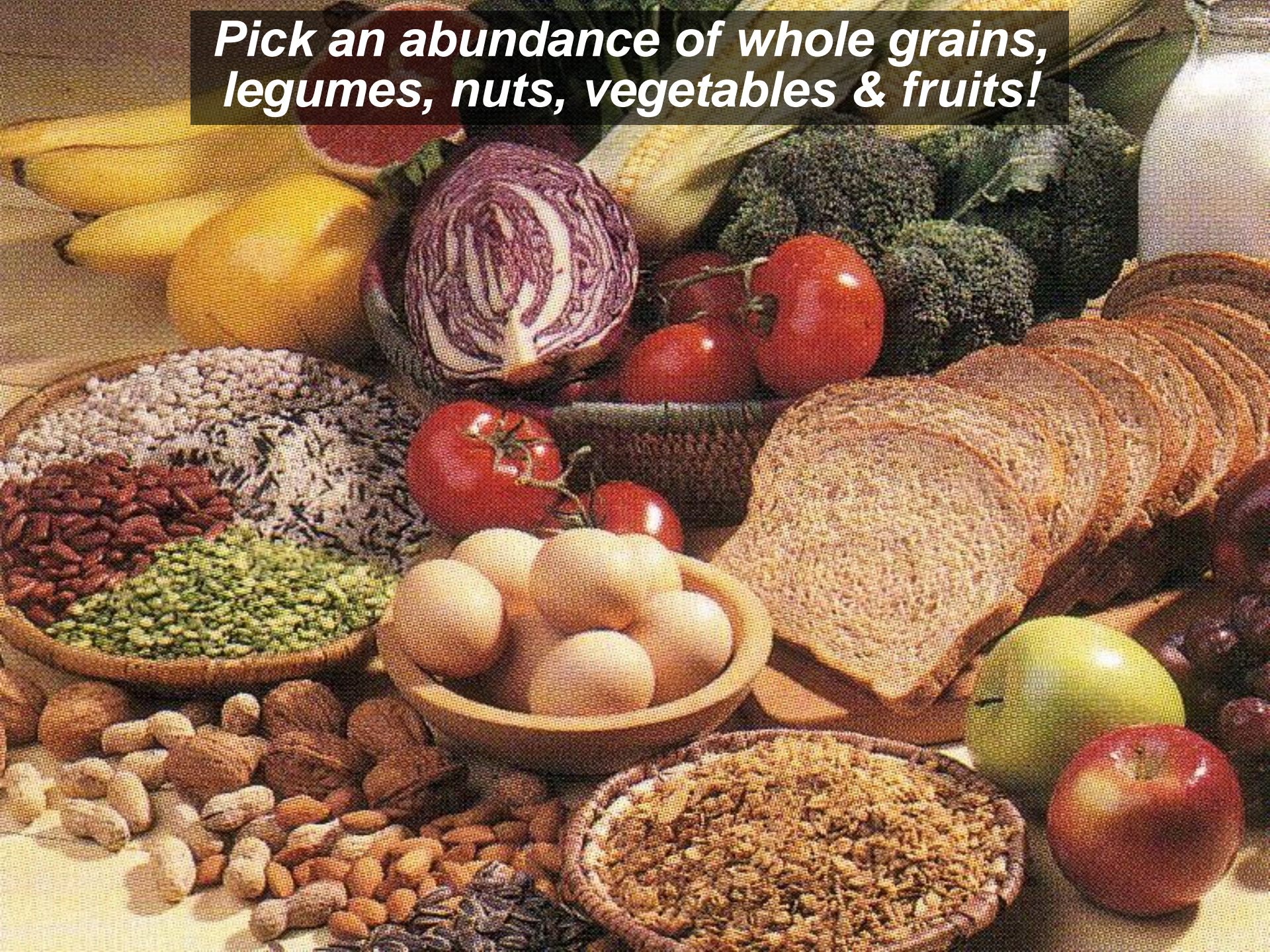


Flexibility



Neuromuscular Relaxation

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





Healthy Oils to Minimize Atherosclerosis HAPOC?

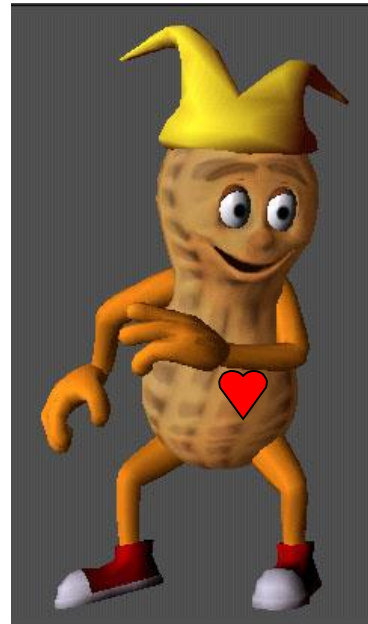
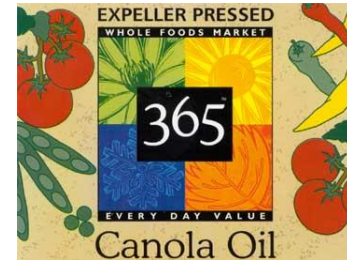
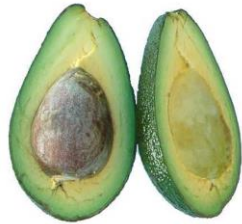
H

A

P

O

C



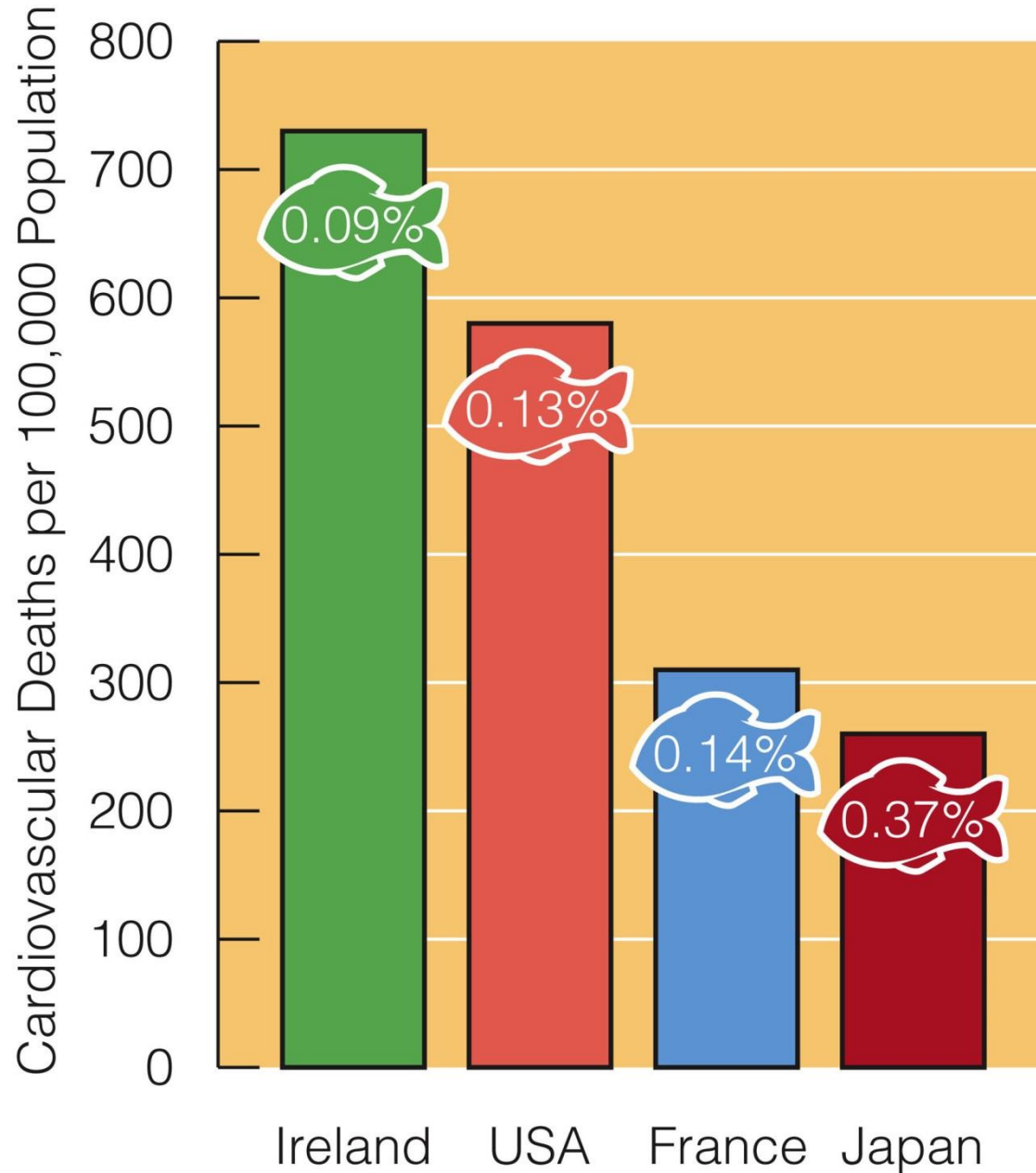
Olive Oil Loves Olive Oil & has some heartfelt advise for Popeye!!

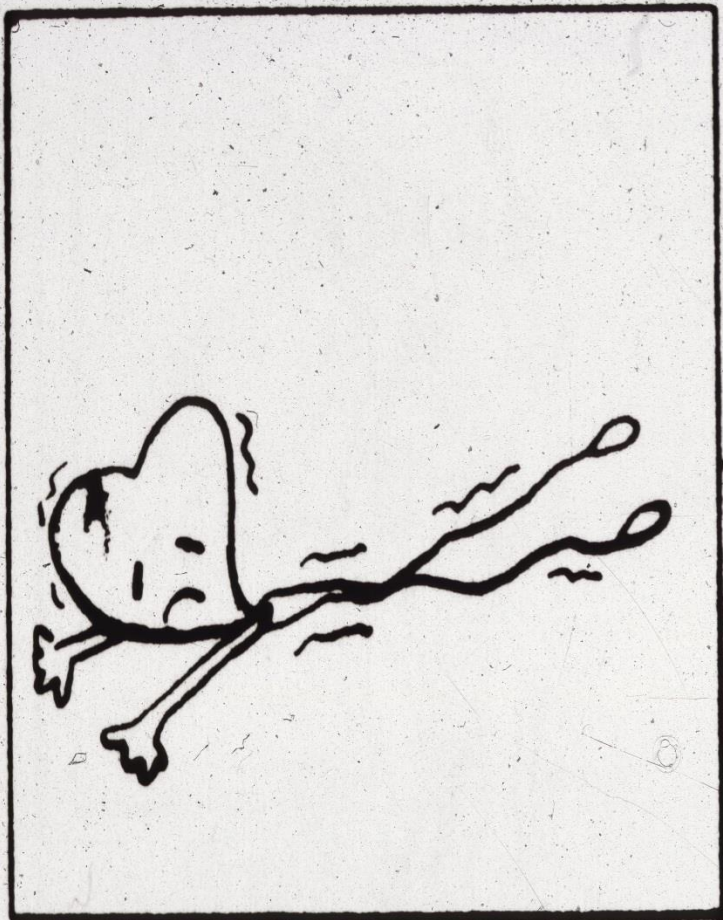


Yes for the
spinach! — but get
rid of the pipe!!

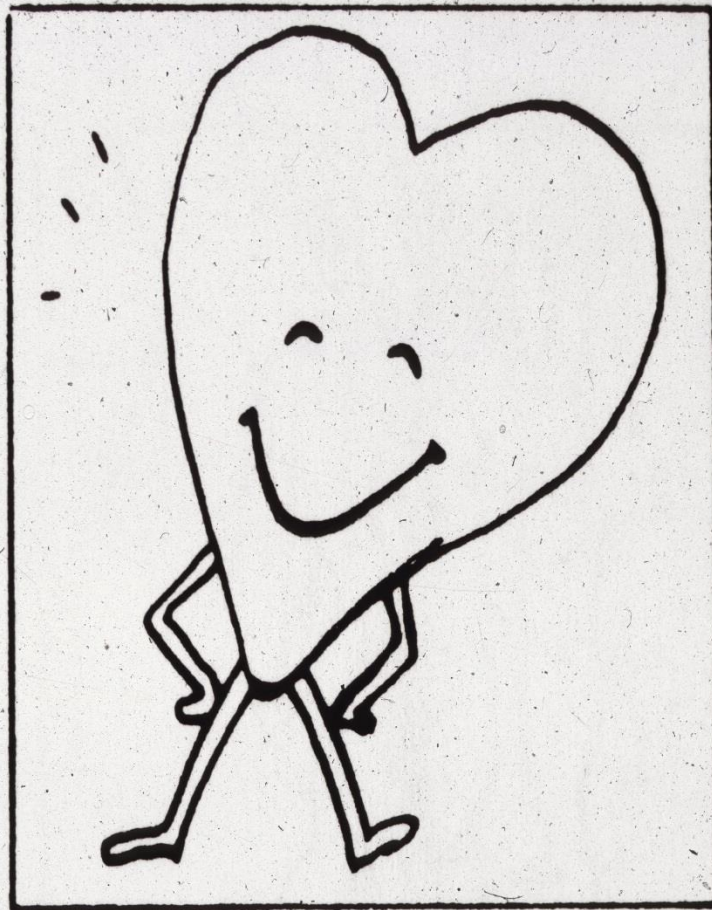


Fish Oil Intakes & Cardiovascular Death Rates



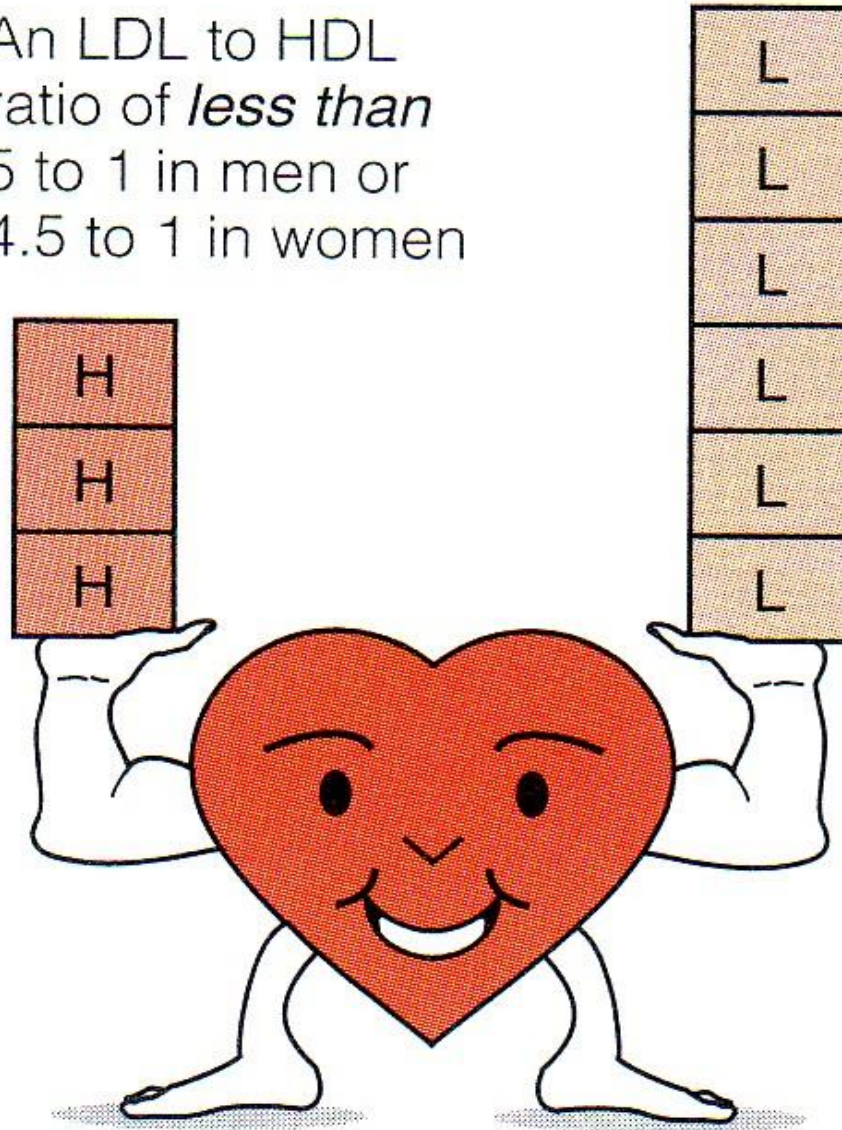


Before



After

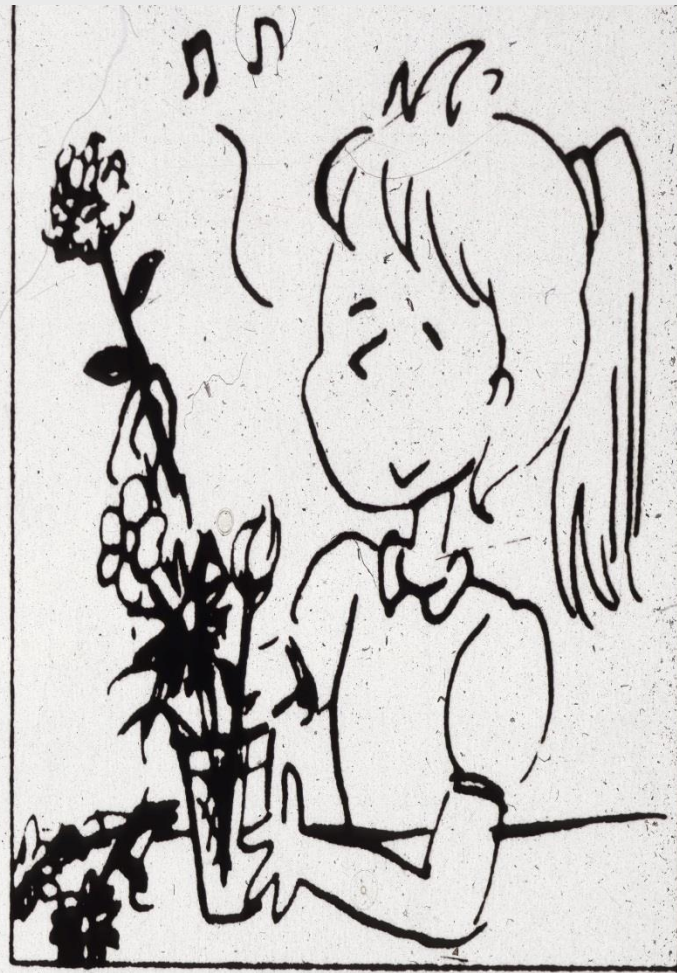
An LDL to HDL
ratio of *less than*
5 to 1 in men or
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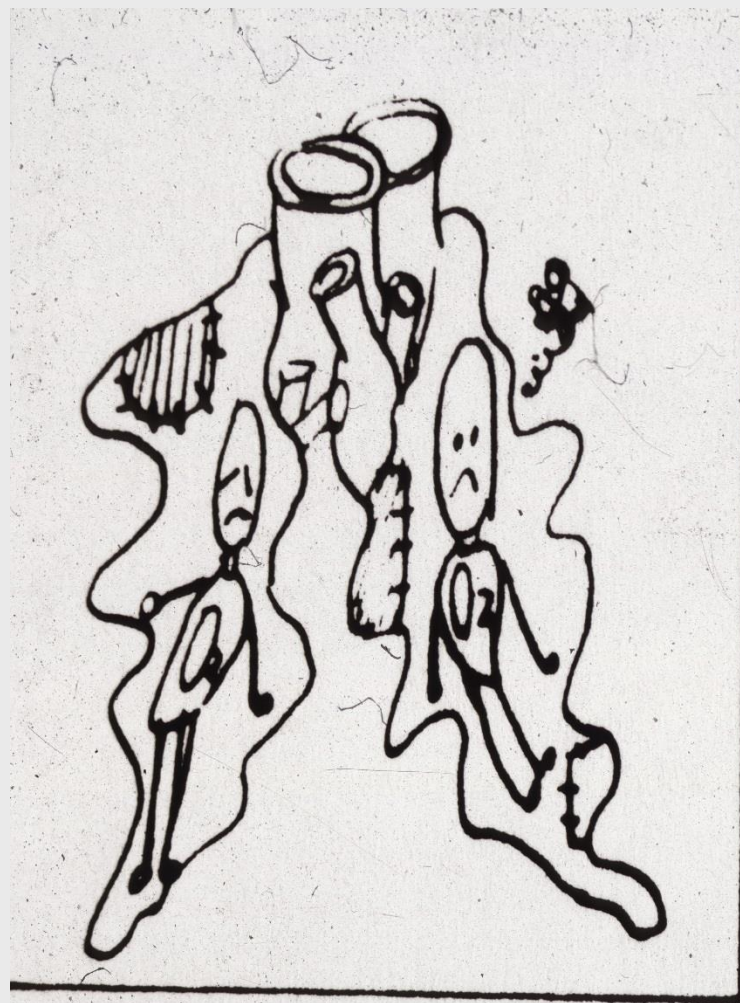
Reduced risk of
heart disease



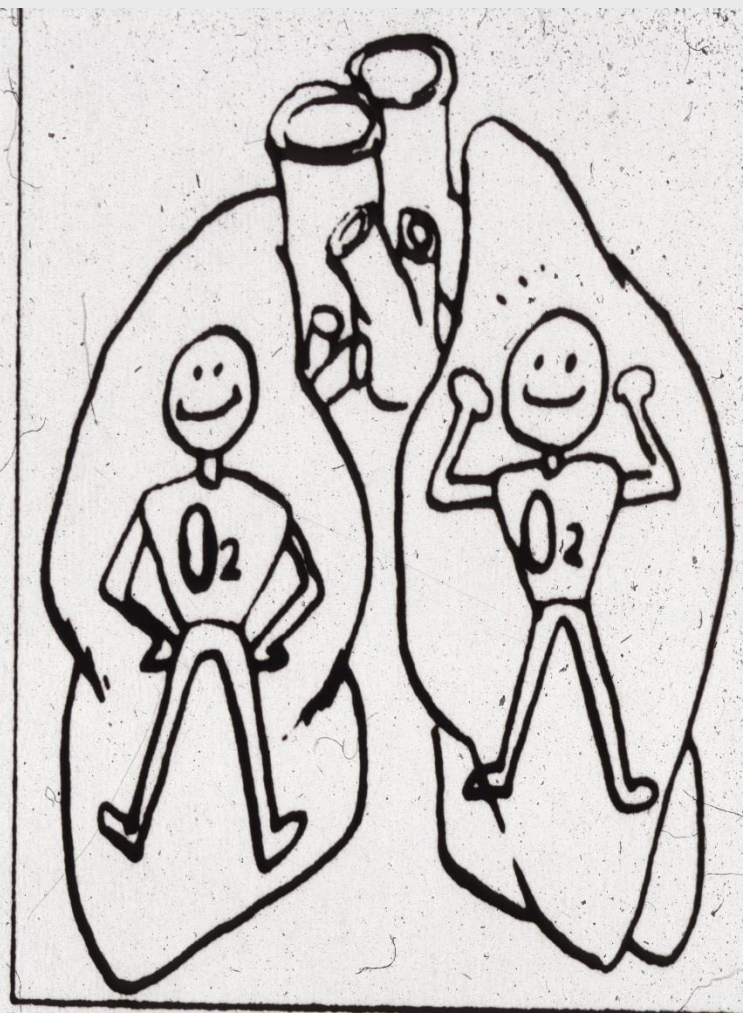
Before



After



Before



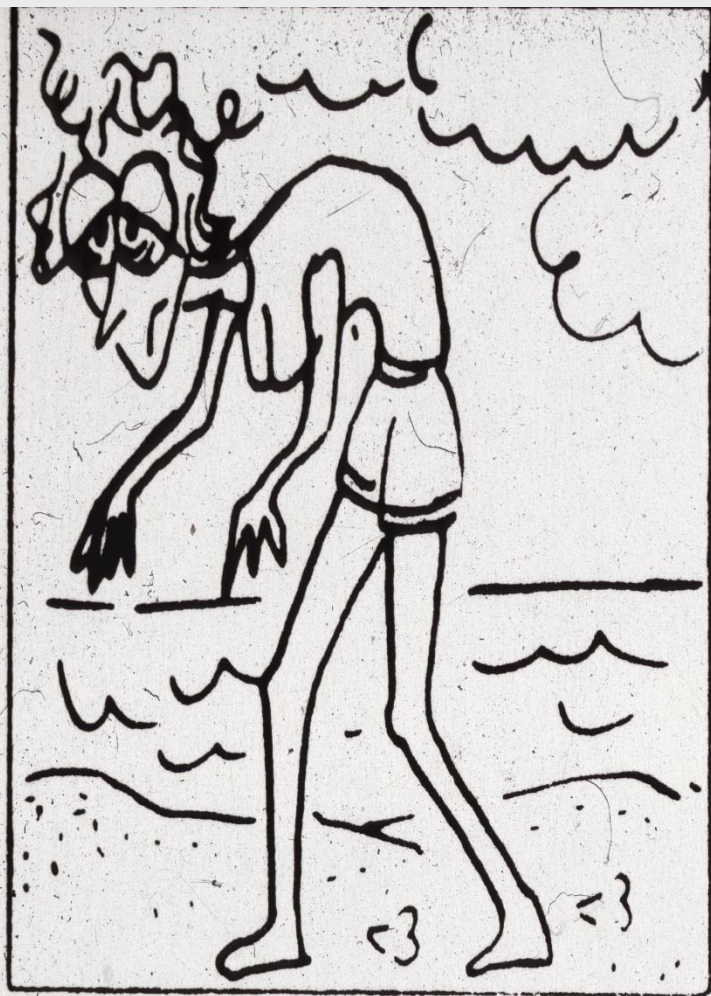
After



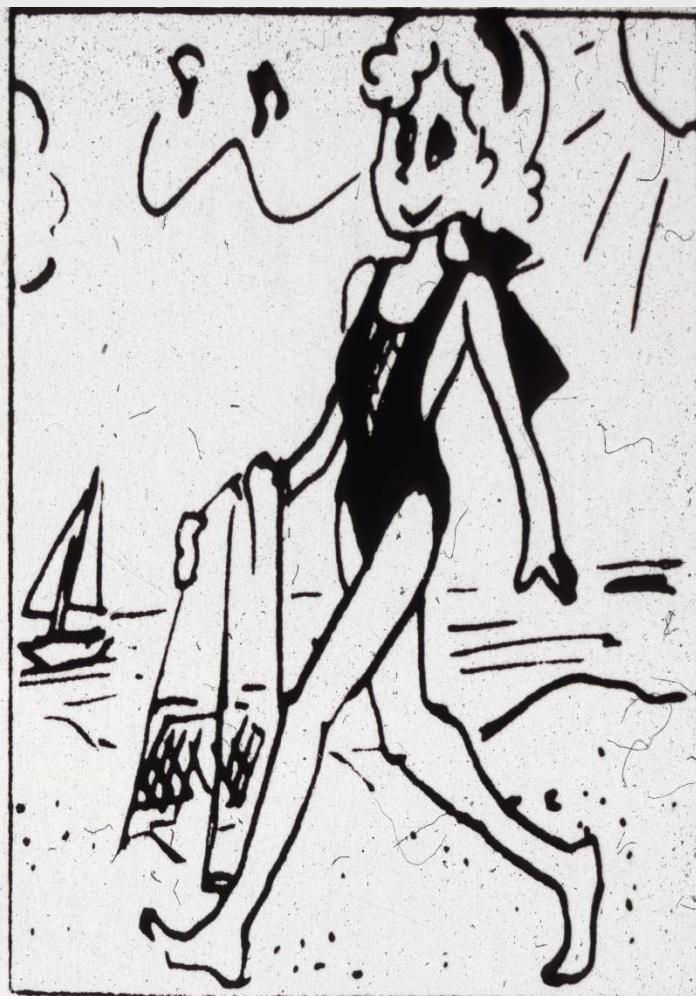
Before



After



Before



After