Cardiac Screening Initiative Officer Wellness

Jonathan Sheinberg, MD, FACC
Police Officer – Cedar Park Police Department

Patrolman Jon Sheinberg

Barnstable
Massachusetts

1989

Board Certified in Cardiovascular Disease

- Georgetown University School of Medicine
- Internal Medicine Residency
- Cardiology Fellowship
- 14 Years Service in USAF
  - Cardiologist
  - Flight Surgeon
  - Element Leader
    - Far Forward Critical Care Unit (FFCCU)
    - Operation Enduring Freedom

Police

- Sworn Officer
  - City of Cedar Park
- Central Texas Regional SWAT (CTRS)
  - Medical Director

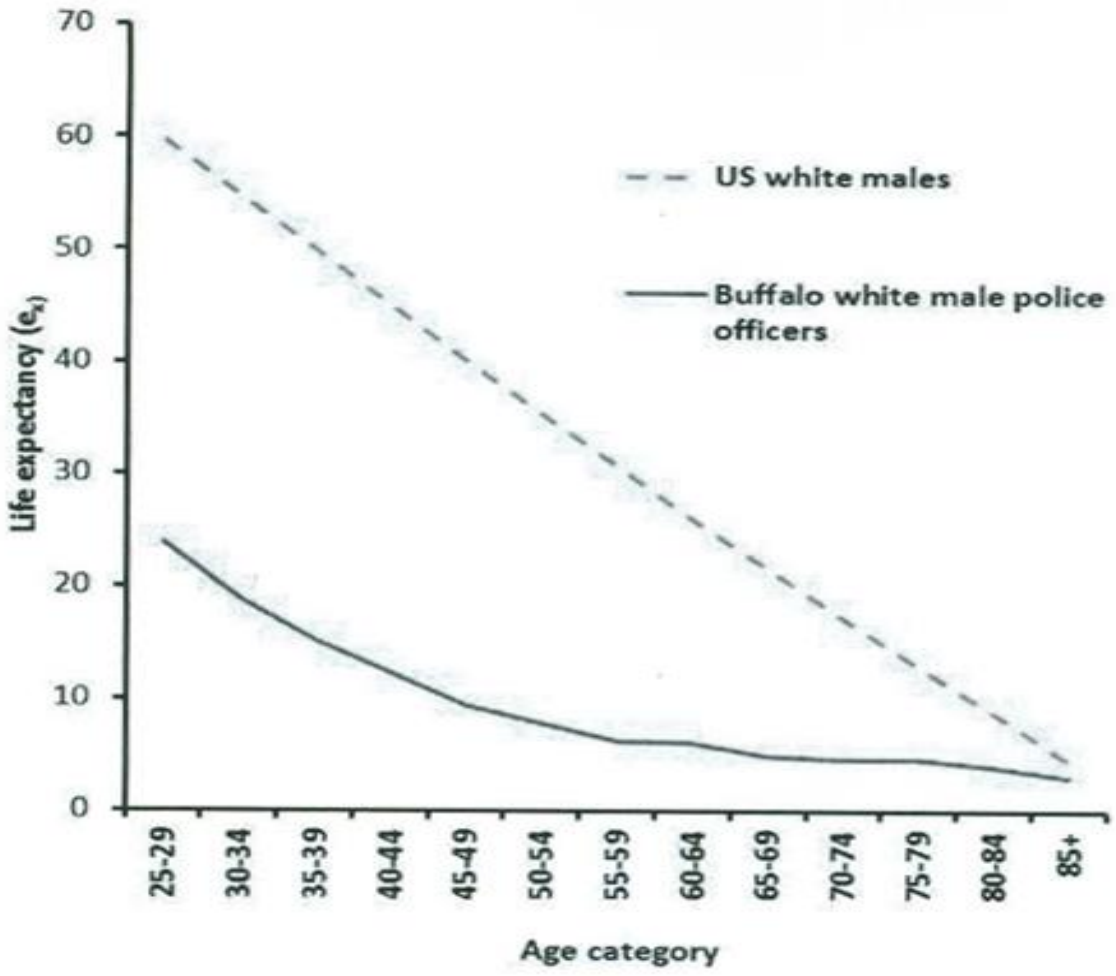
NO FINANCIAL DISCLOSURES


TBPD

	Law Enforcement	Civilian
Average age of patient with heart attack	49 years	65 years
Heart attacks under age 45	45%	7%
Average Life Expectancy	57 years	79 years

Int J Emerg Ment Health. 2013;15(4):217-28.

Officer Life Expectancy



Int J Emerg Ment Health. 2013;15(4):217 28.

POLICE
THE LAW ENFORCEMENT MAGAZINE
COMMUNITY FOR COPS

1. Police officers live an average of 15 years less than the average American.[1]

2. Nearly 50% of police officers will die from heart disease within five years of retirement.[2]

3. Statistically, we are 25 times more likely to die from cardiovascular disease (CVD) than from the action of a suspect.[3]

Police Magazine, 1993

Officer Down Memorial Page

★ ★ ★ ★ ★

REMEMBERING ALL OF LAW ENFORCEMENT'S HEROES

2014

Line of Duty Deaths: 127

9/11 related illness: 1
Assault: 2
Automobile accident: 26
Drowned: 2
Duty related illness: 3
Fire: 1
Gunfire: 47
Gunfire (Accidental): 2
Heart attack: 19
Motorcycle accident: 4
Struck by vehicle: 5
Vehicle pursuit: 5
Vehicular assault: 10

2015

Line of Duty Deaths: 32

9/11 related illness: 2
Assault: 1
Automobile accident: 9
Gunfire: 6
Gunfire (Accidental): 1
Heart attack: 9
Motorcycle accident: 1
Struck by vehicle: 2
Vehicle pursuit: 1

OFFICER DOWN MEMORIAL PAGE

REMEMBERING ALL OF LAW ENFORCEMENT'S HEROES

Extrapolated over a 24 hour day

2014 – 19 deaths

12h shift – 38

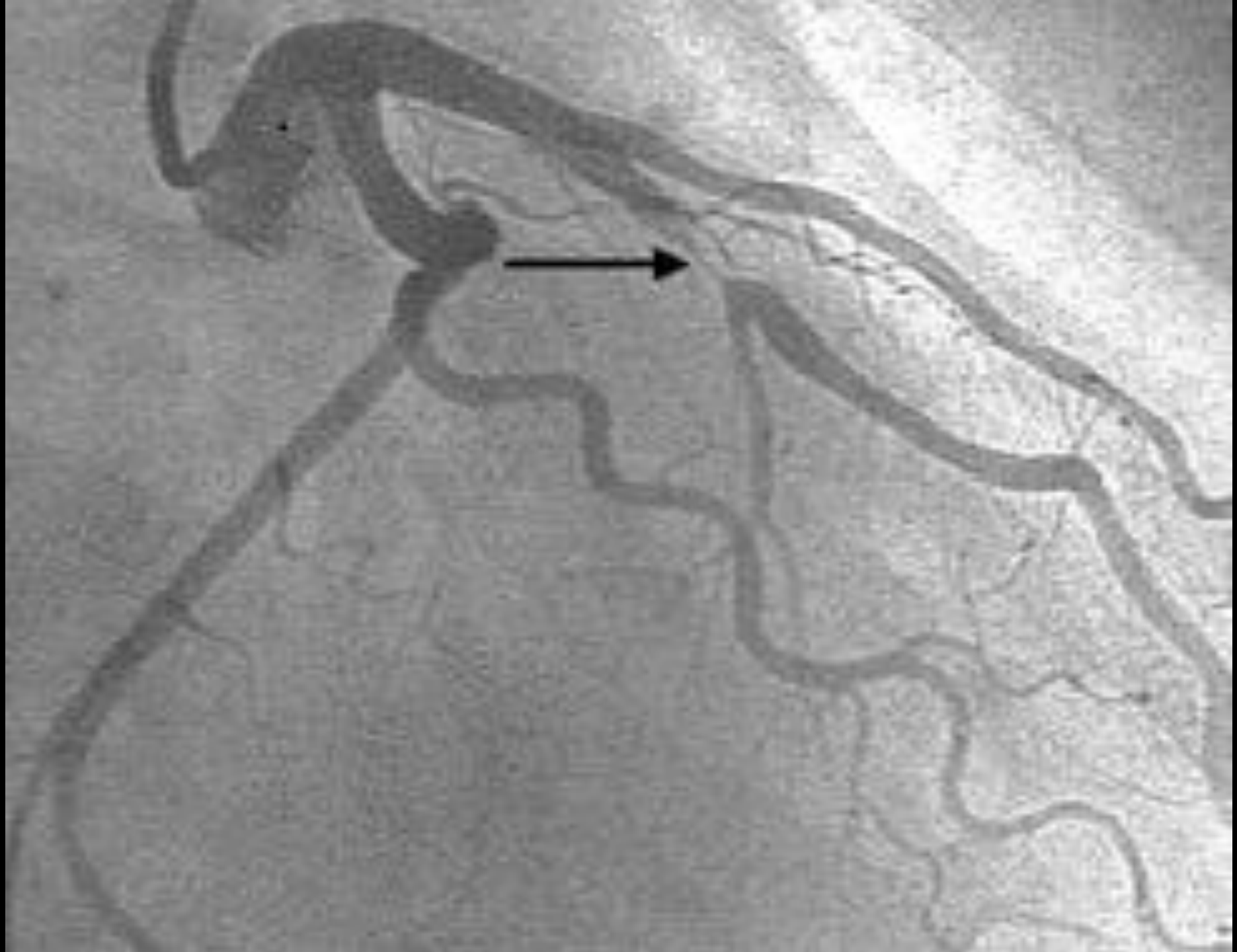
8h shift – 57

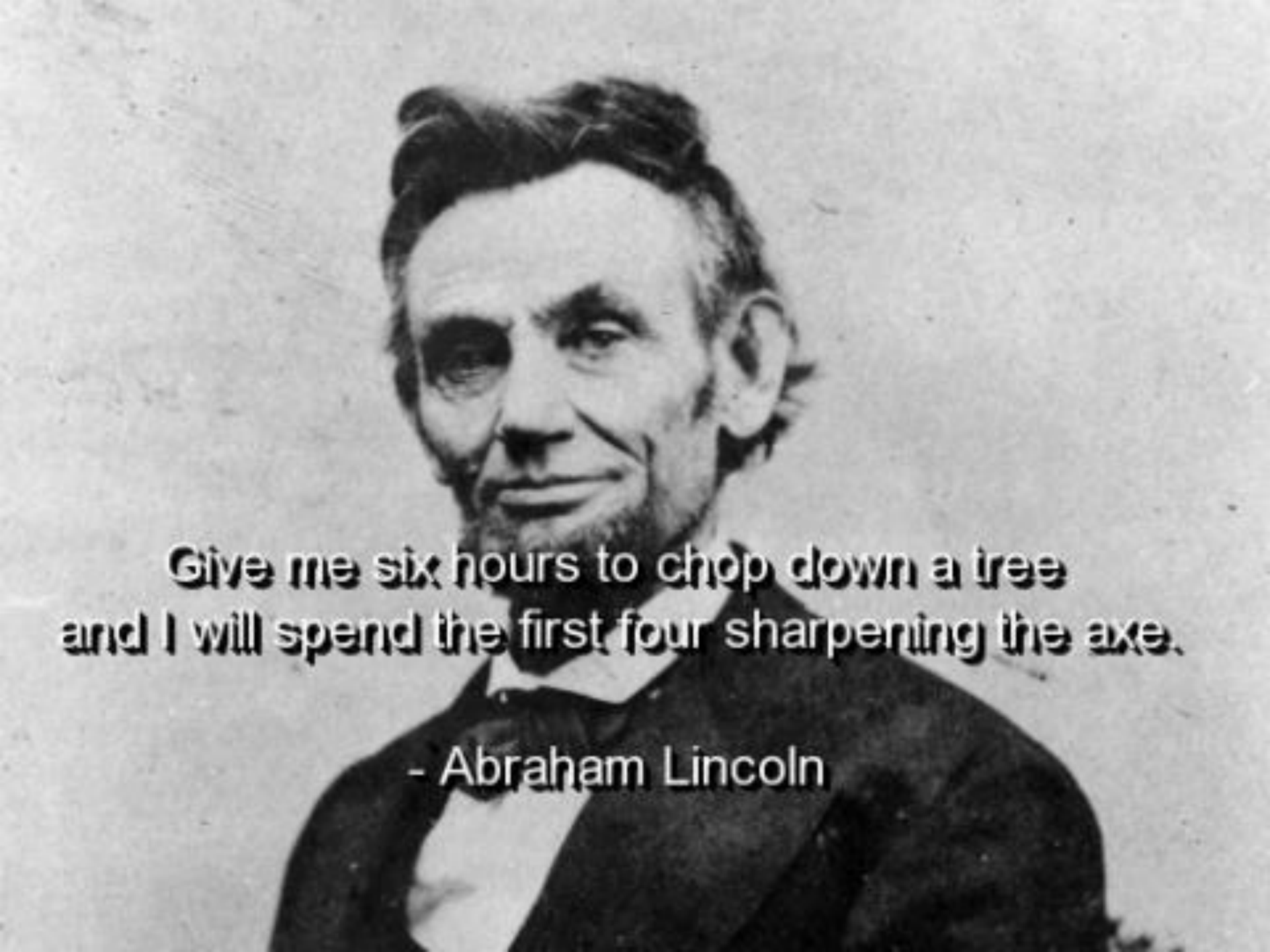
2015 – 9 deaths so far

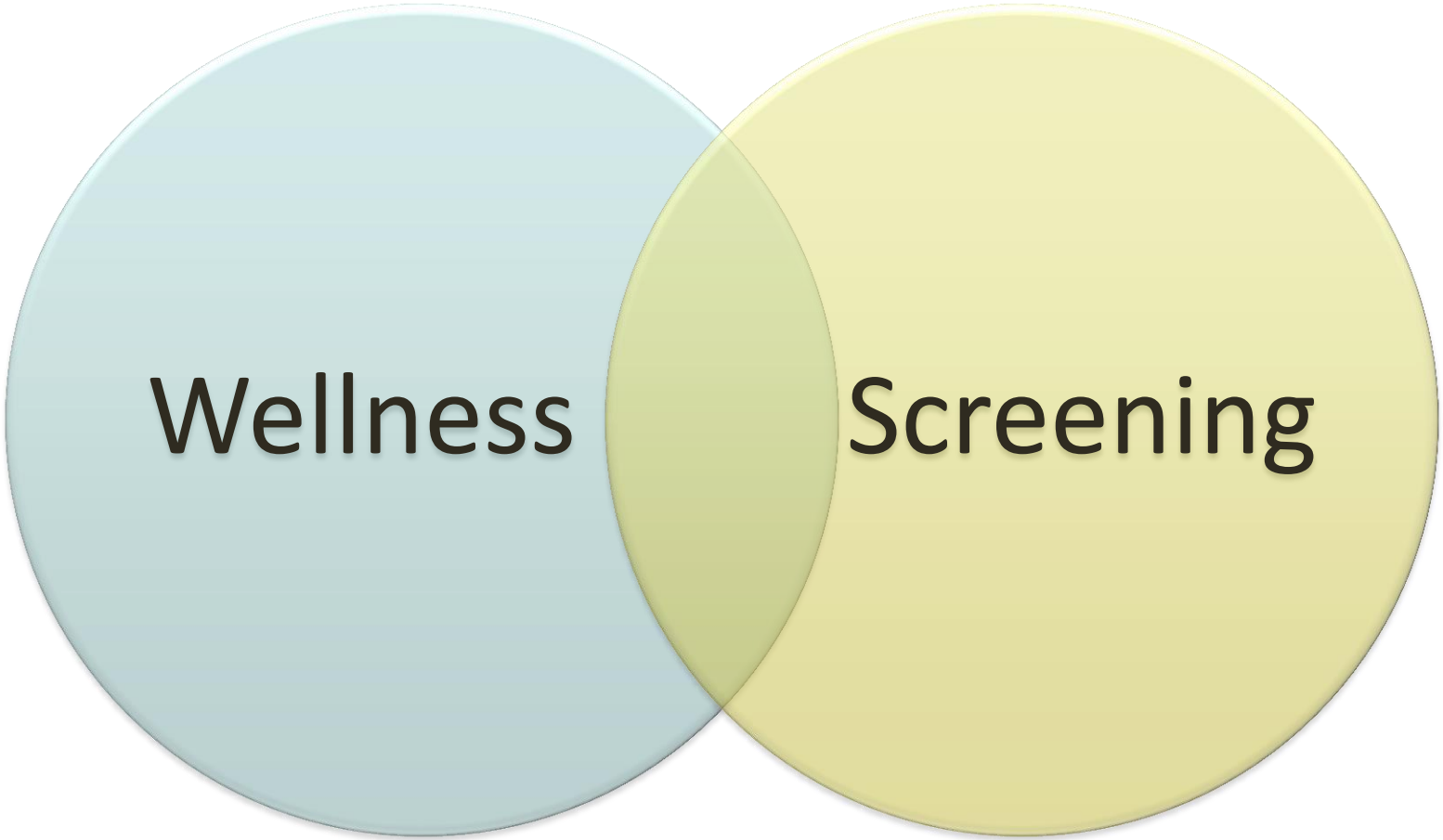
12h shift – 18

8h shift - 27

<u>High Risk</u> for heart disease

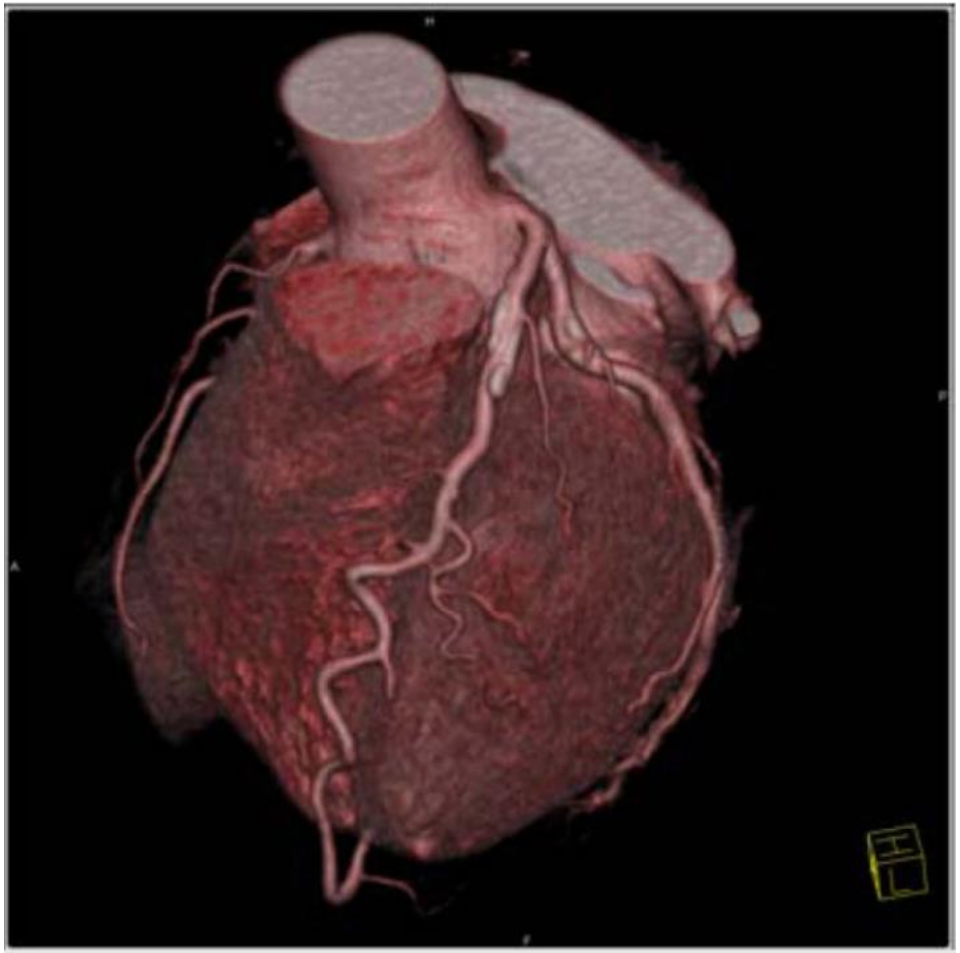



Give me six hours to chop down a tree
and I will spend the first four sharpening the axe.
- Abraham Lincoln


Wellness
Screening

Examination of a group to separate well persons from those who have an undiagnosed pathologic condition or who are at high risk

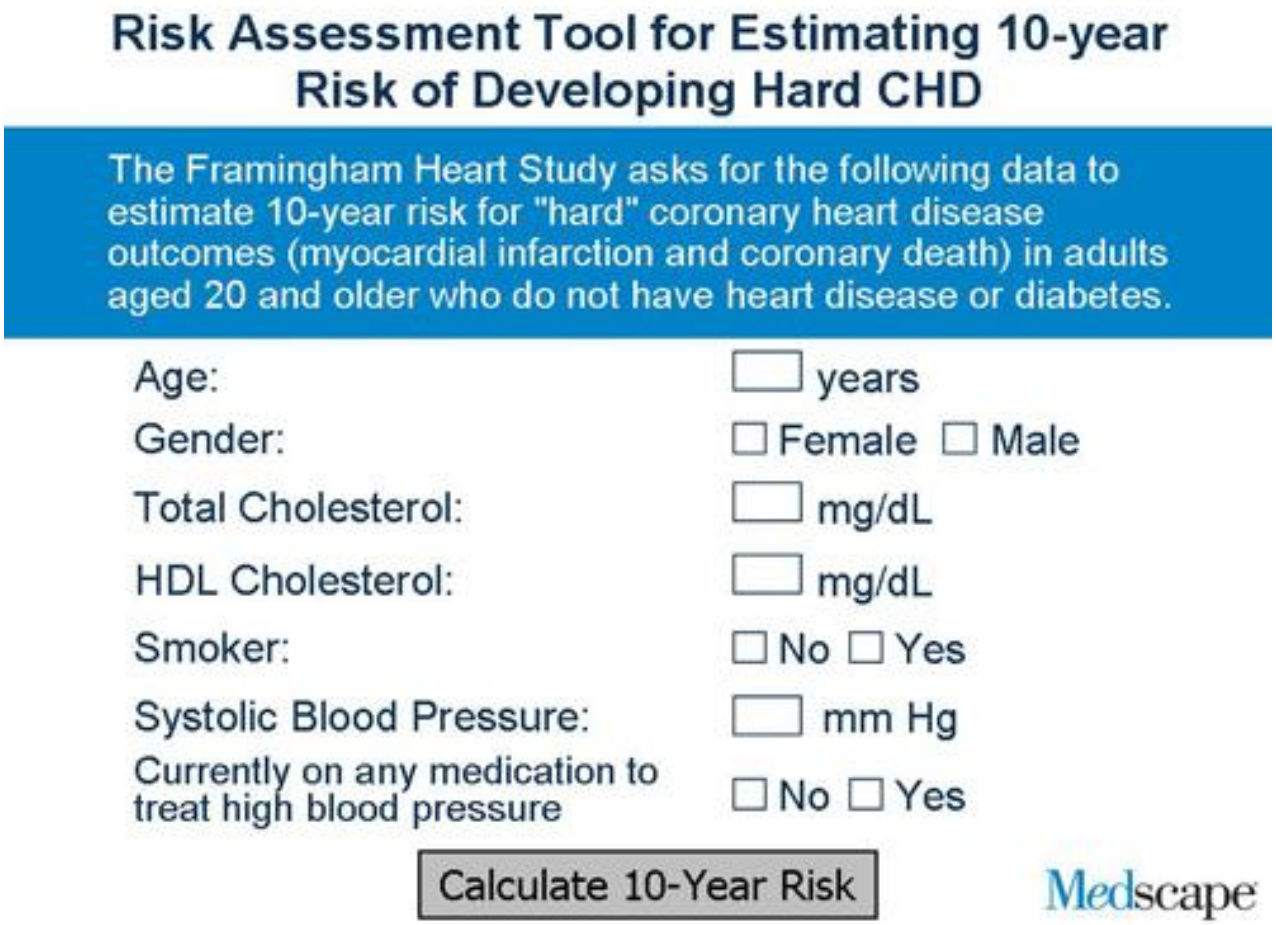
Paradigm Shift



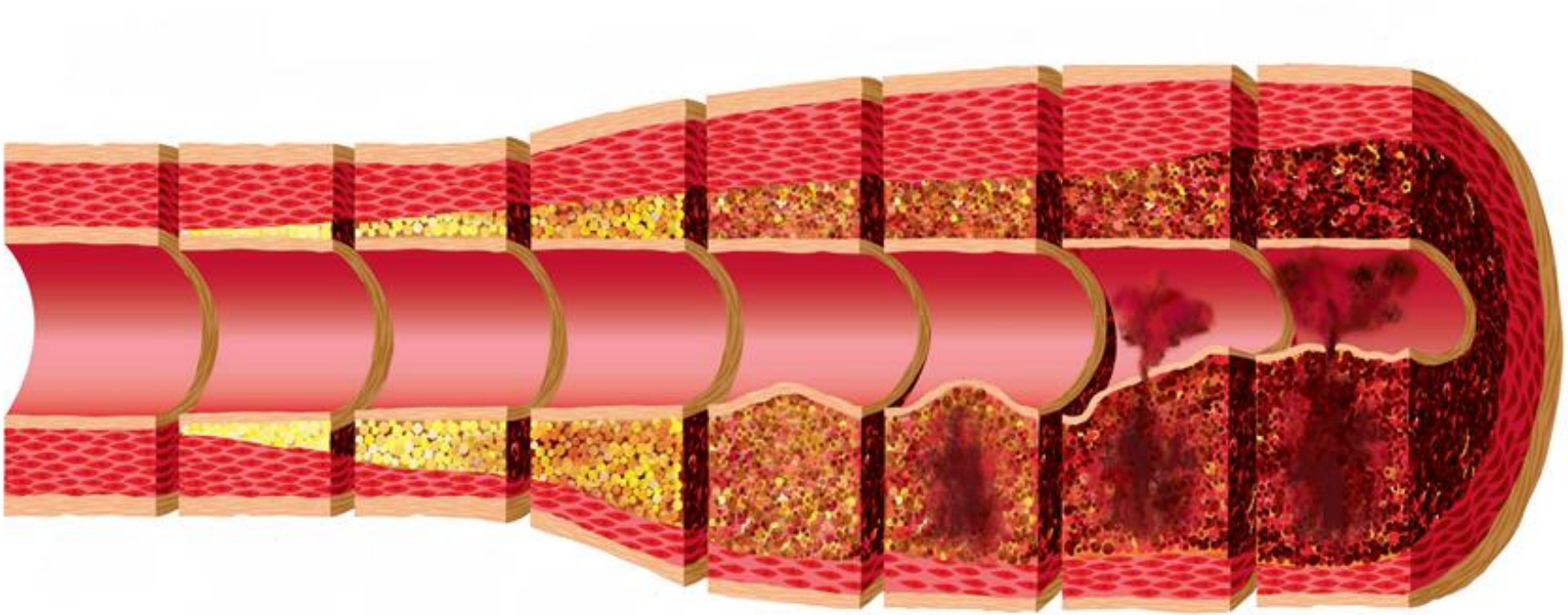
Prognostic Paradigm

Diagnostic Paradigm

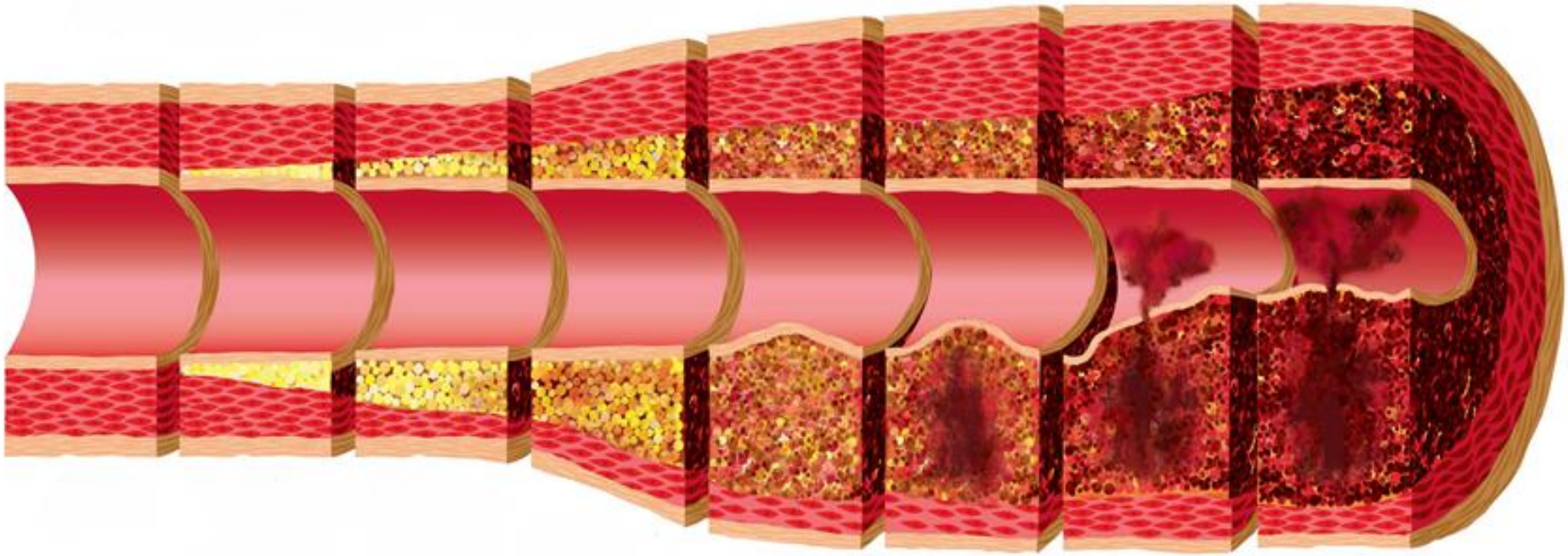
Traditional Framingham Risk



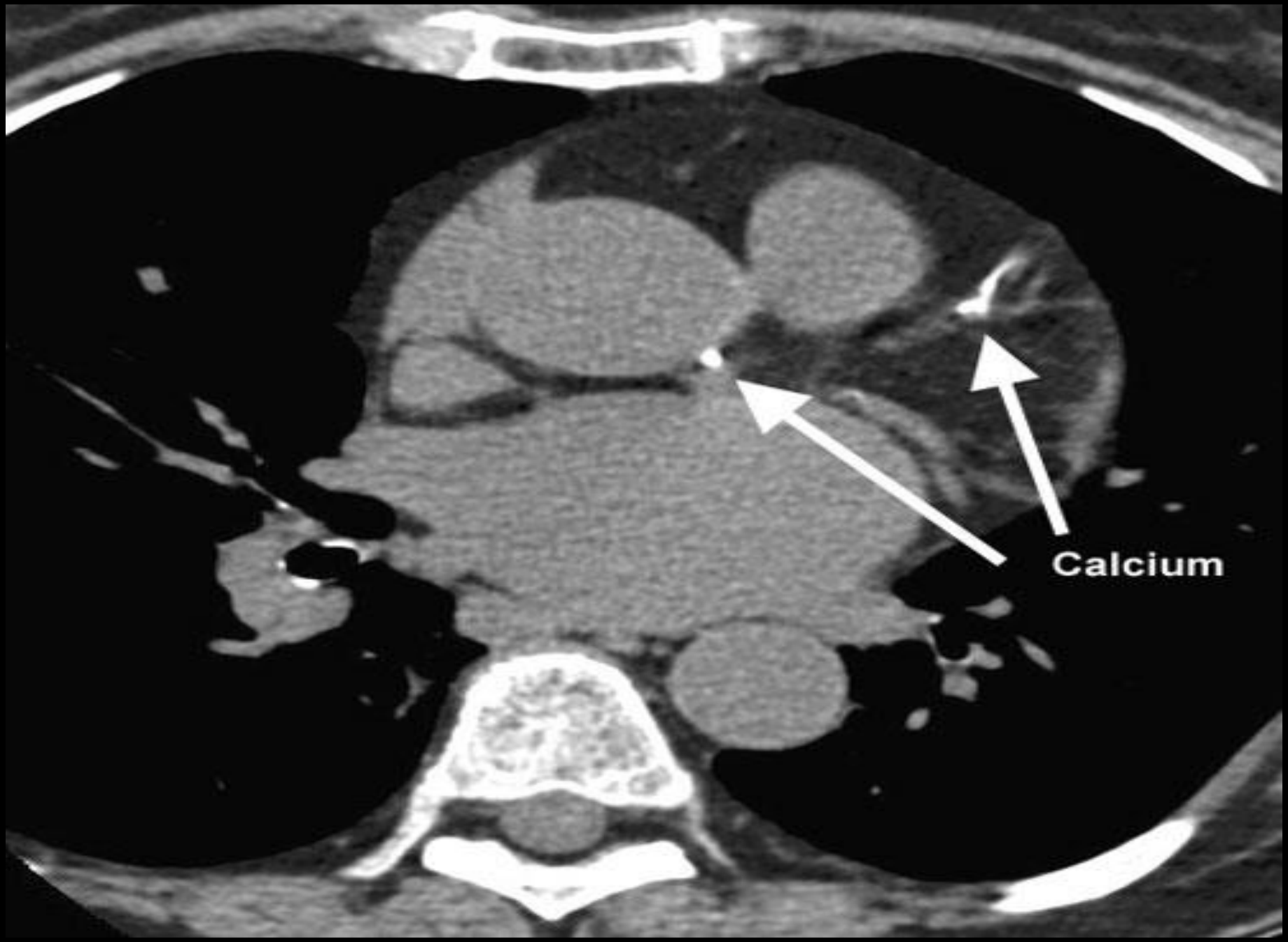
Cardiology 101



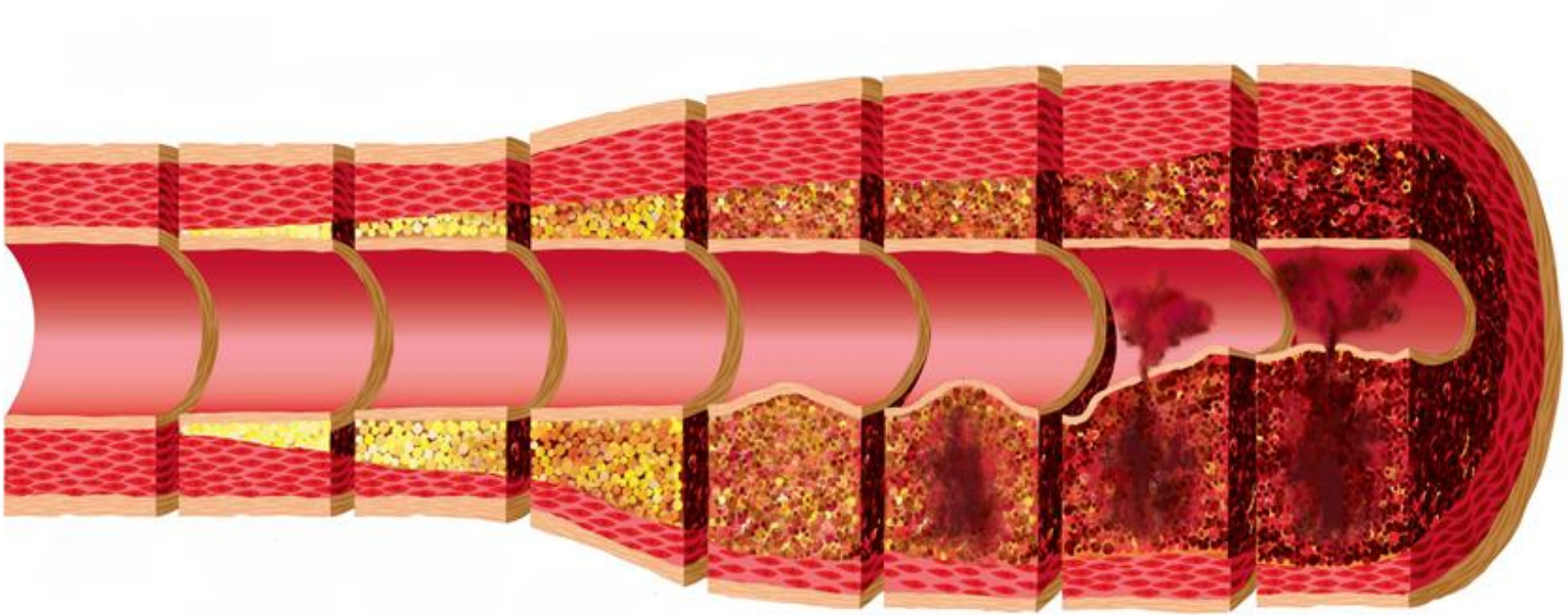
Cardiology 101

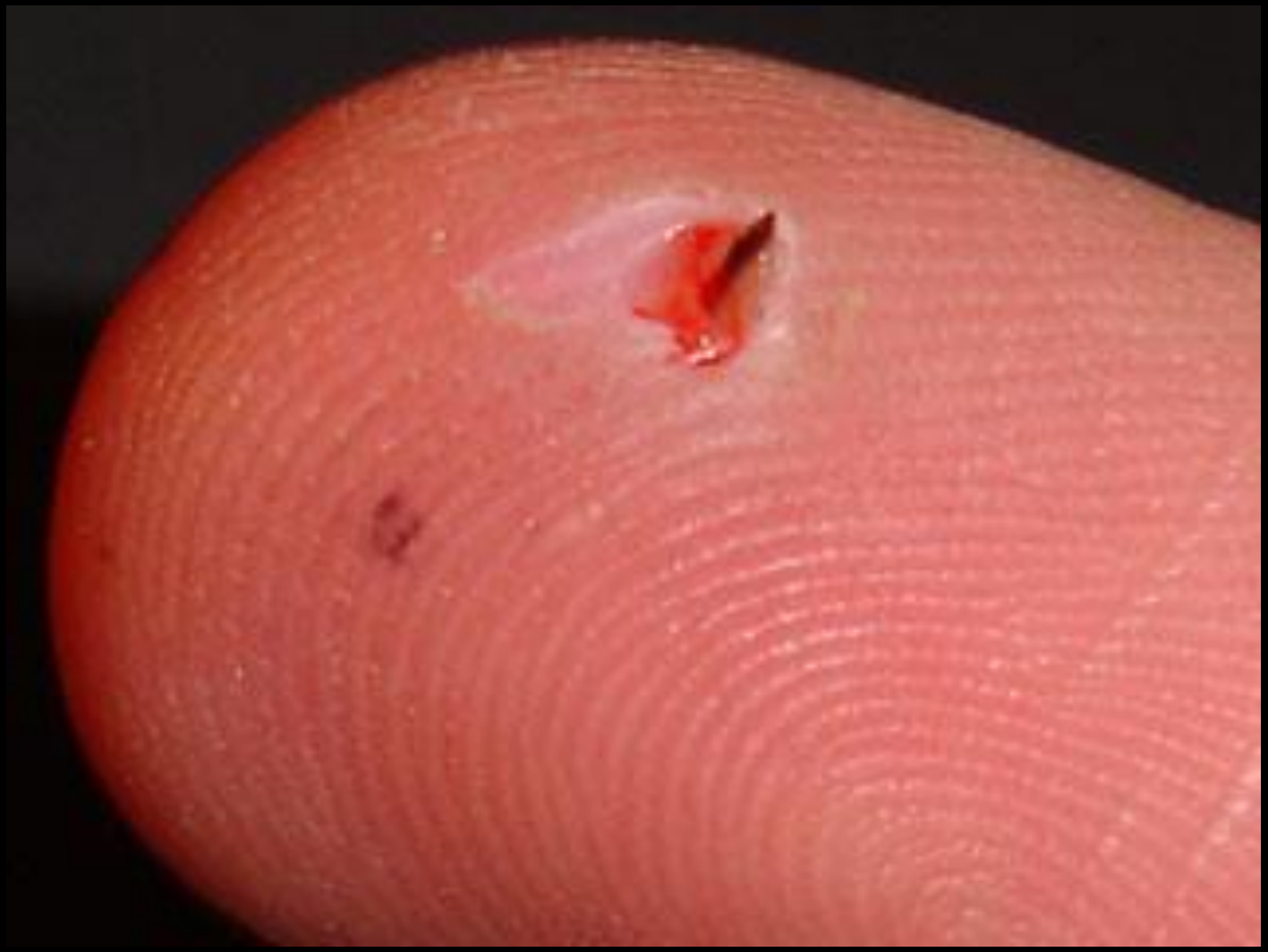



PHILIPS


Calcium

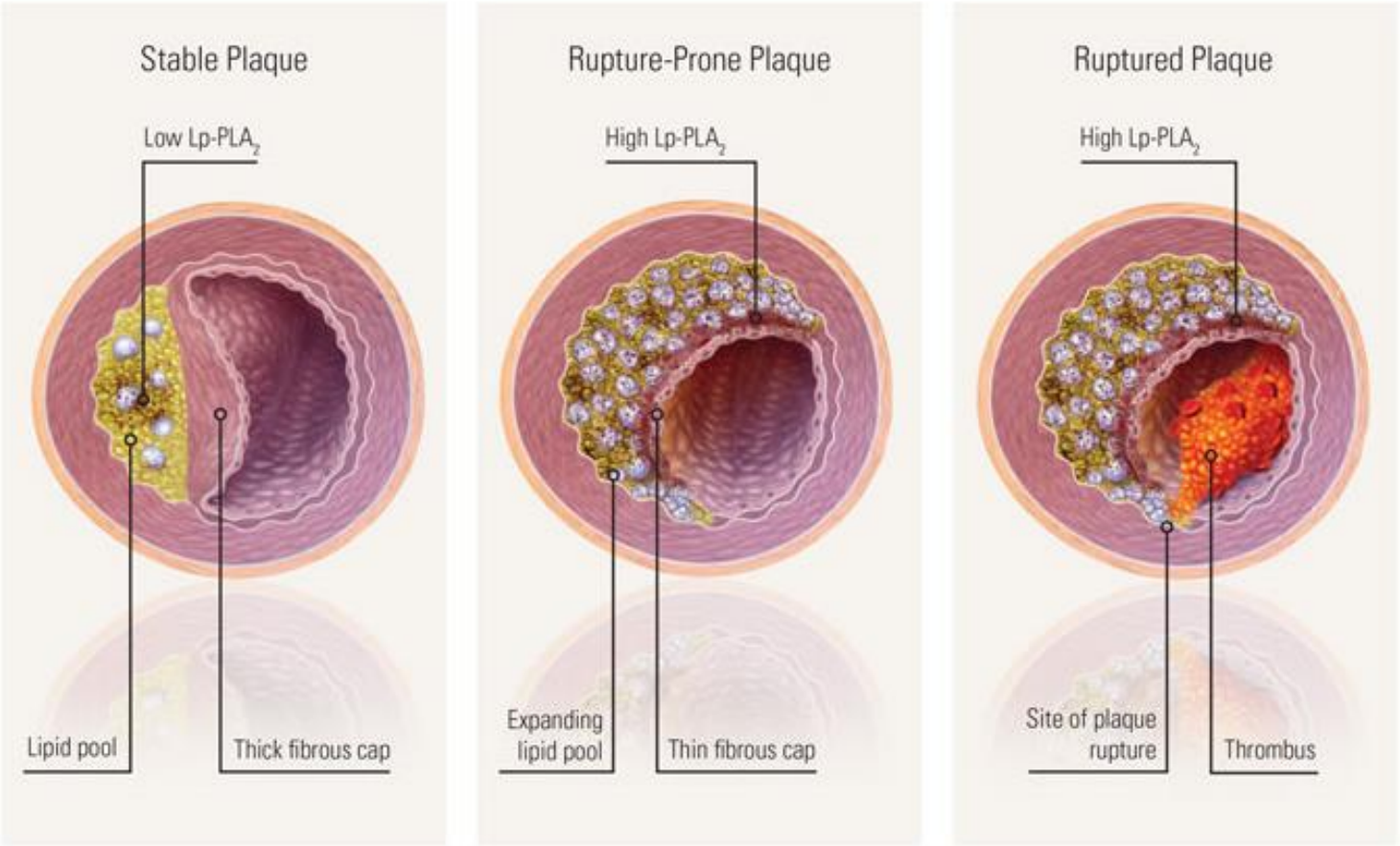
Cardiology 101



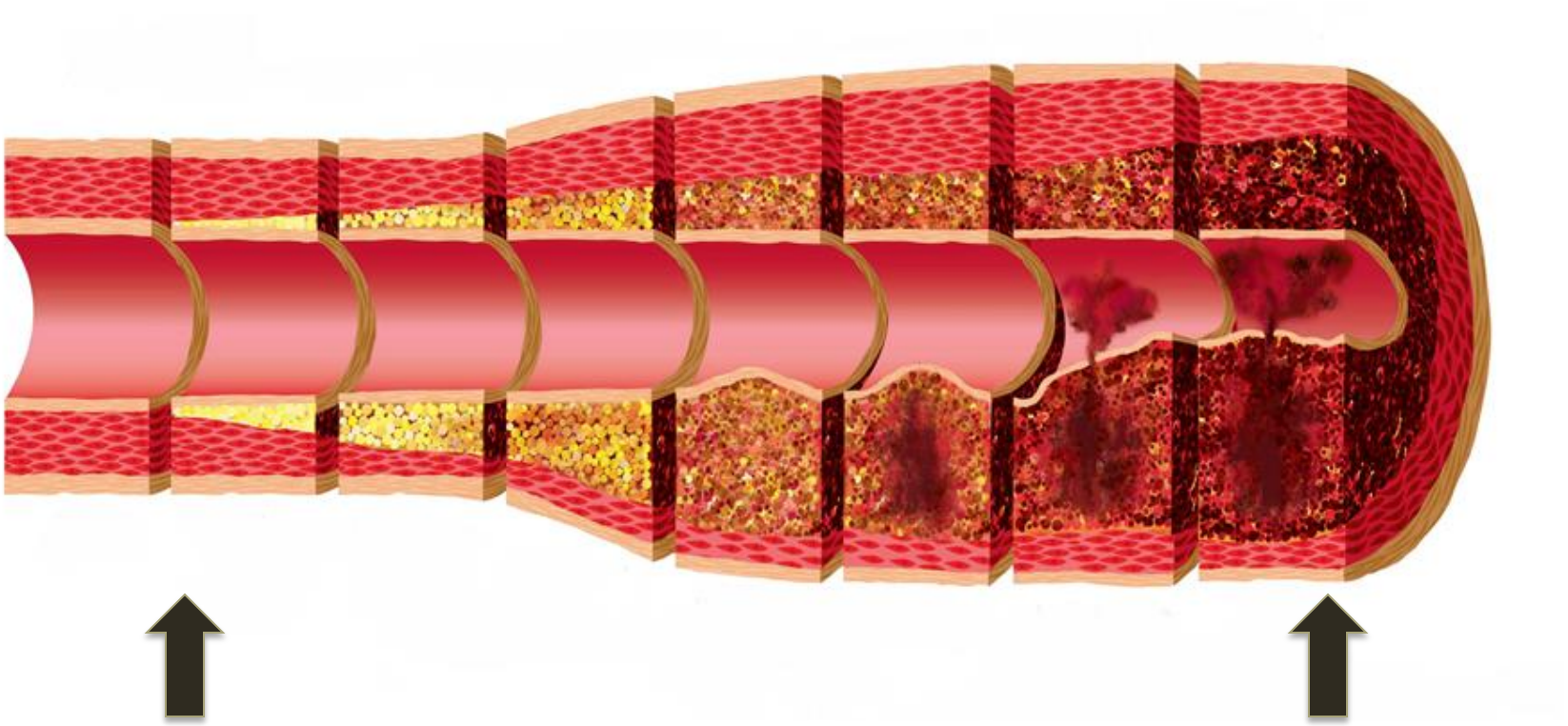


Lp-PLA$_2$

(Lipoprotein-Associated Phospholipase A2)



Cardiology 101



Coronary Disease

Calcium Score > 0

PLA_2 > 200

Circulation 2007

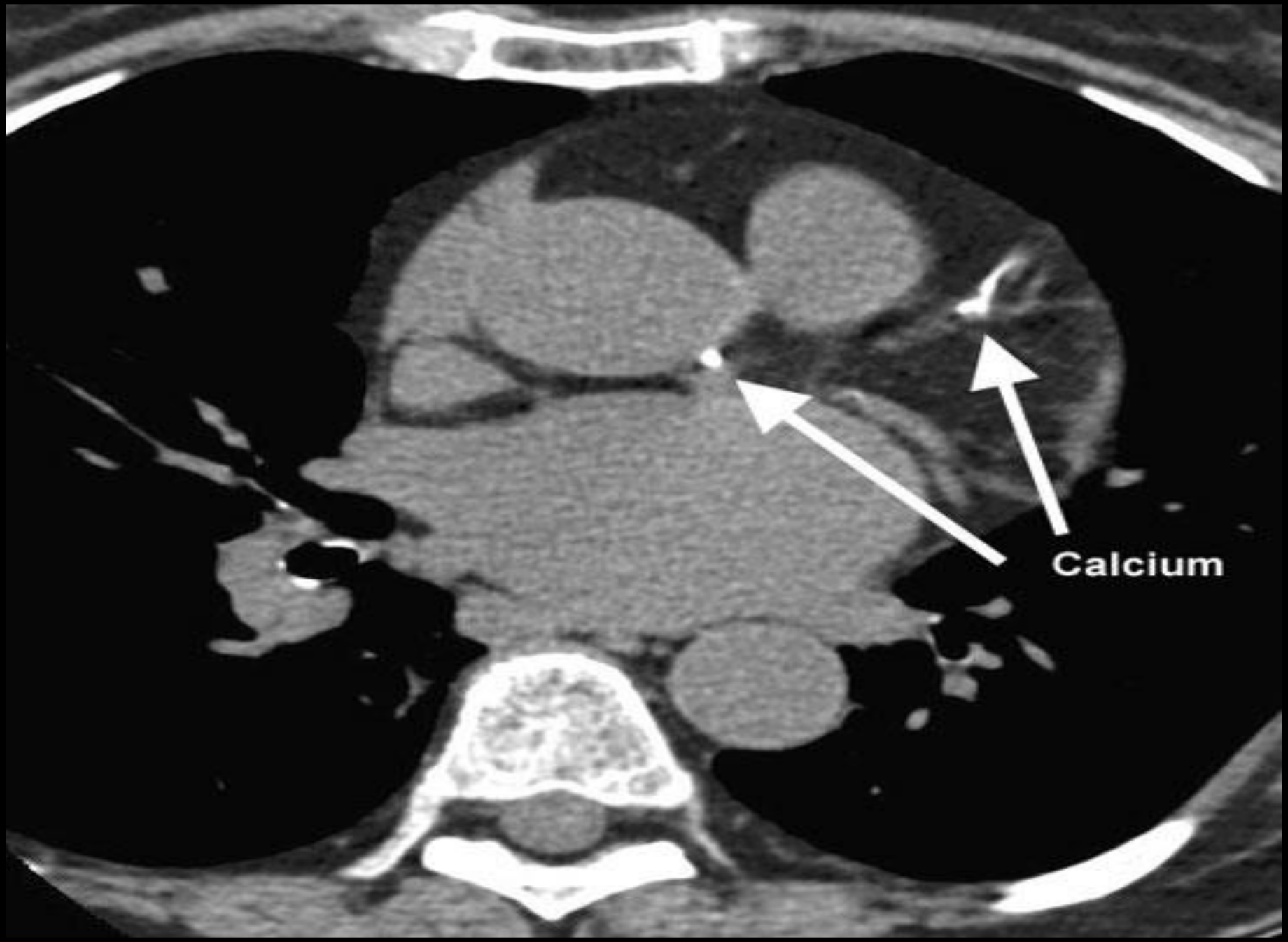
2010

Prevalence of Coronary Artery Disease in New York City Police Officers as Predicted by Coronary Artery Calcium Scoring

Jia Lin See ; Nikolas Wanahita; Nir N Somekh ; Stephen E Nelson ; Albert Barrette ; Kenneth Giedd ; Ste
R Bergmann
Beth Israel Med Cntr, New York, NY

2068 NYPD Members of the Service (officers)

- **Coronary Calcium Score**


Calcium

Circulation 2007;116:II - 853

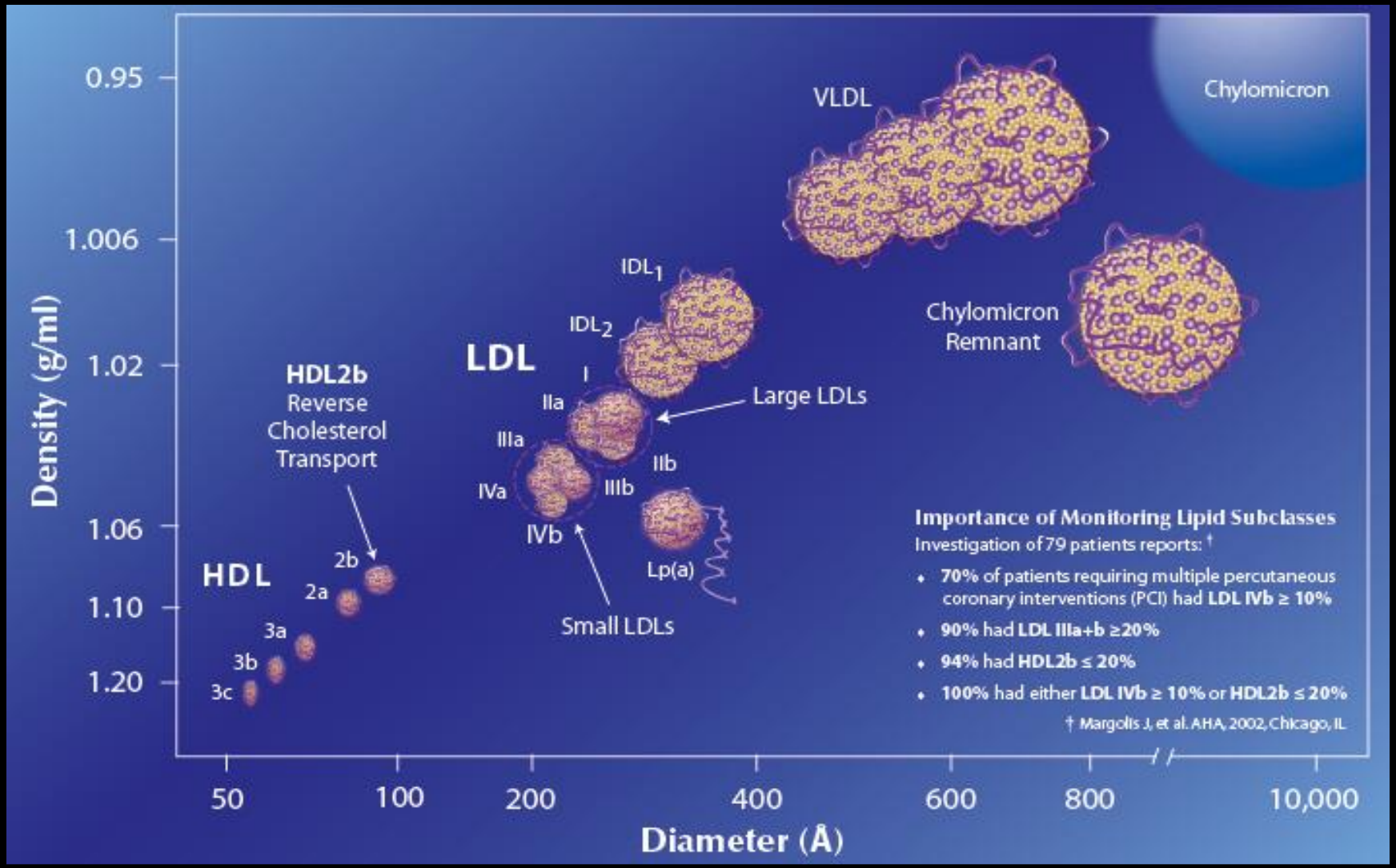
- There was NO increased prevalence of coronary disease among members of the NYPD as compared to the general population

Cardiac Screening Inititative

- 290 Police Volunteers
  - Austin Police
  - Cedar Park Police
  - Treasury Special Agents
  - US Marshall Service


PHILIPS

bostonheart diagnostics™



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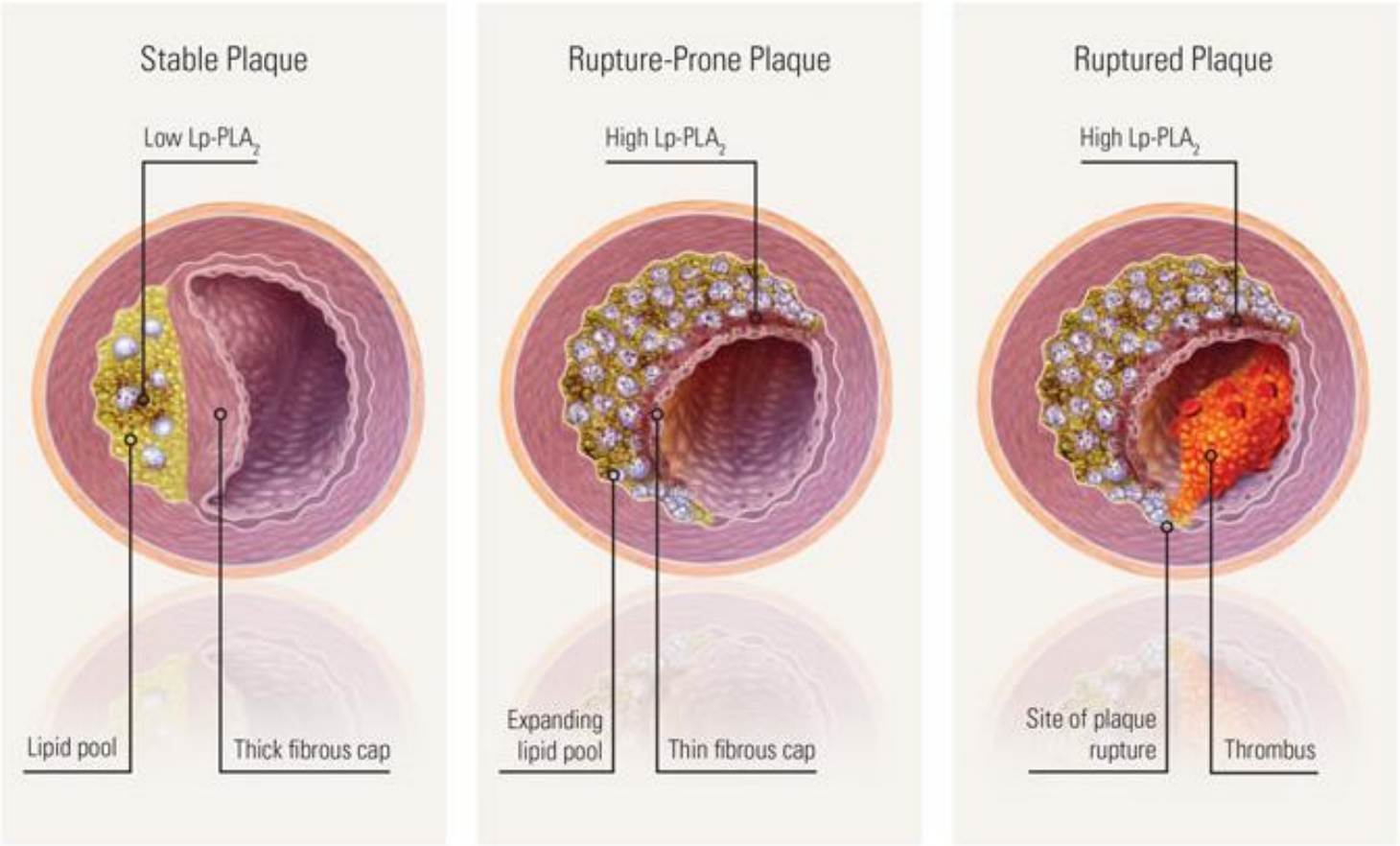
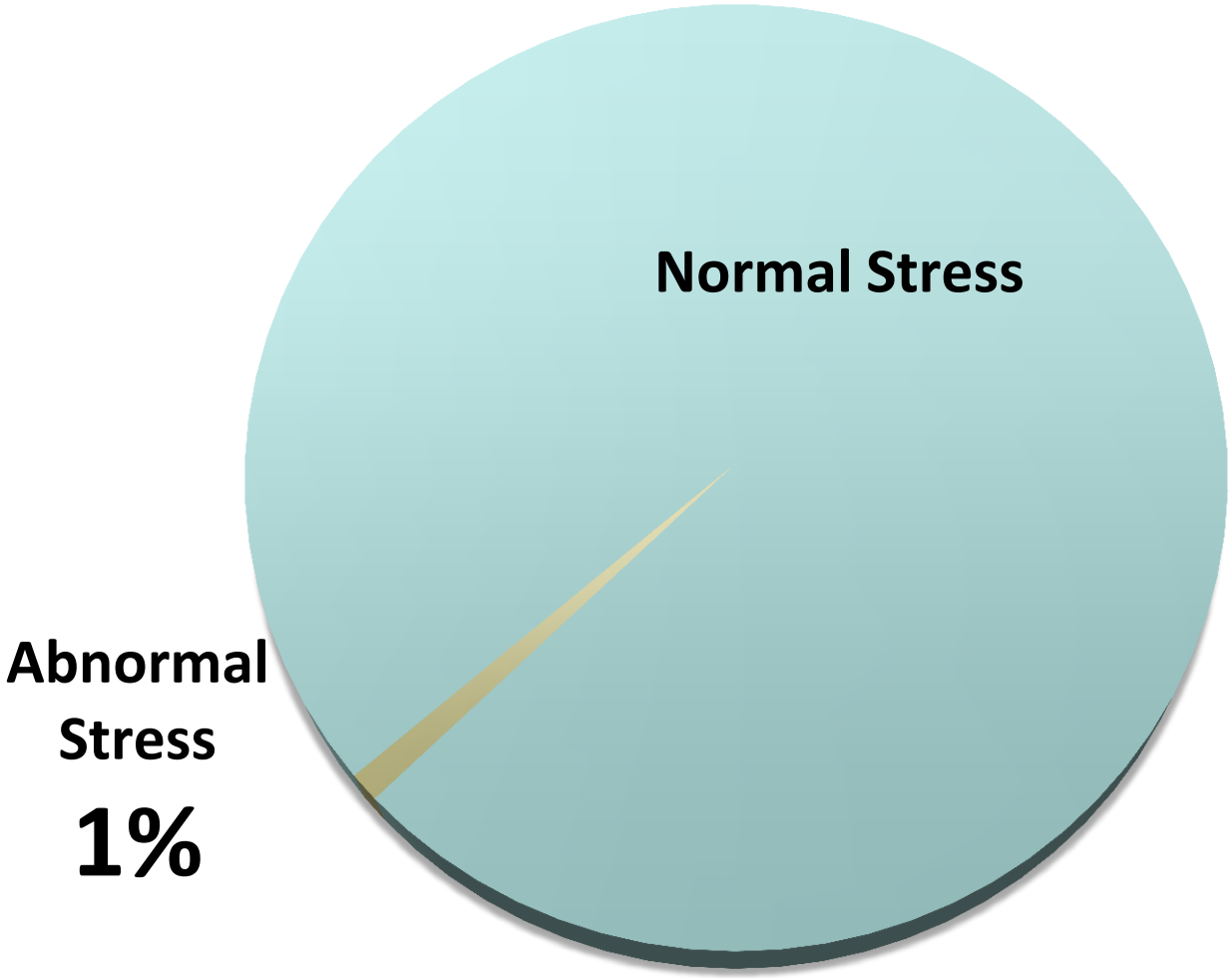
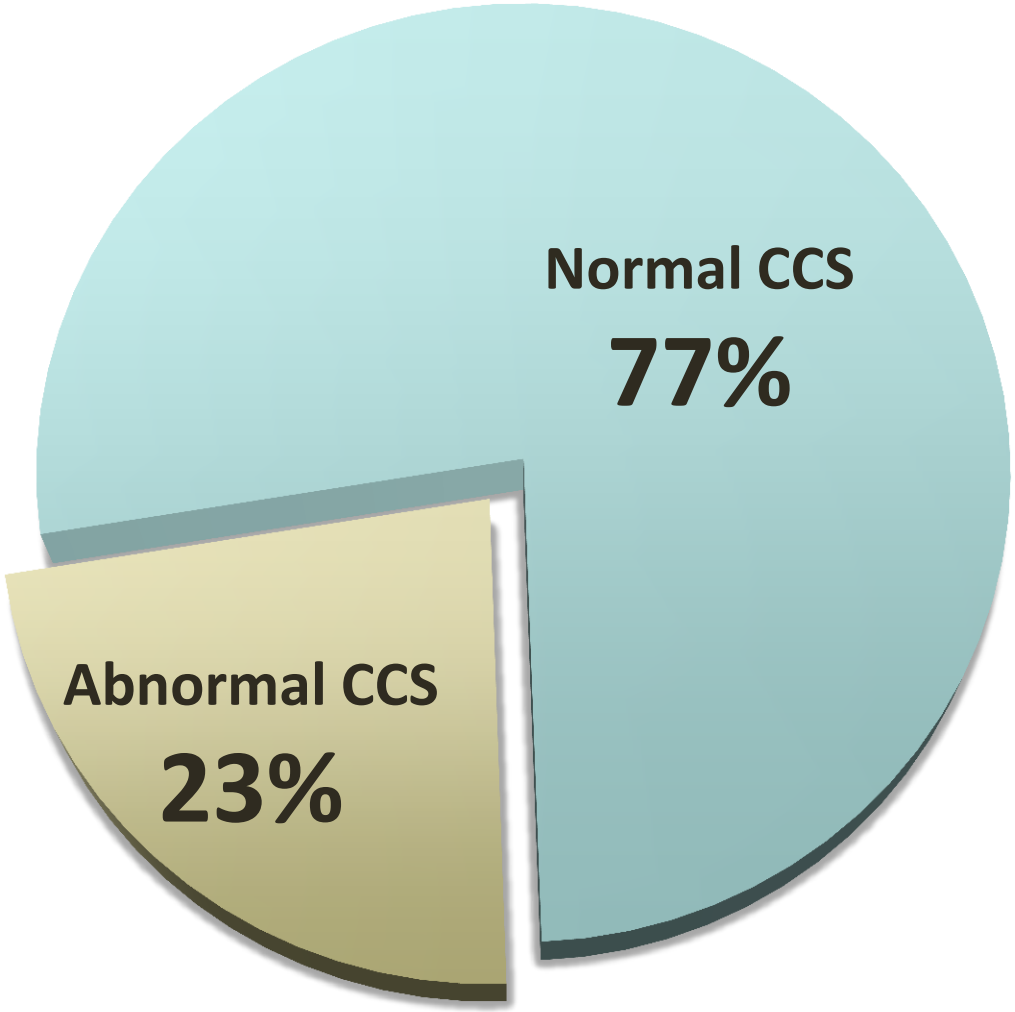


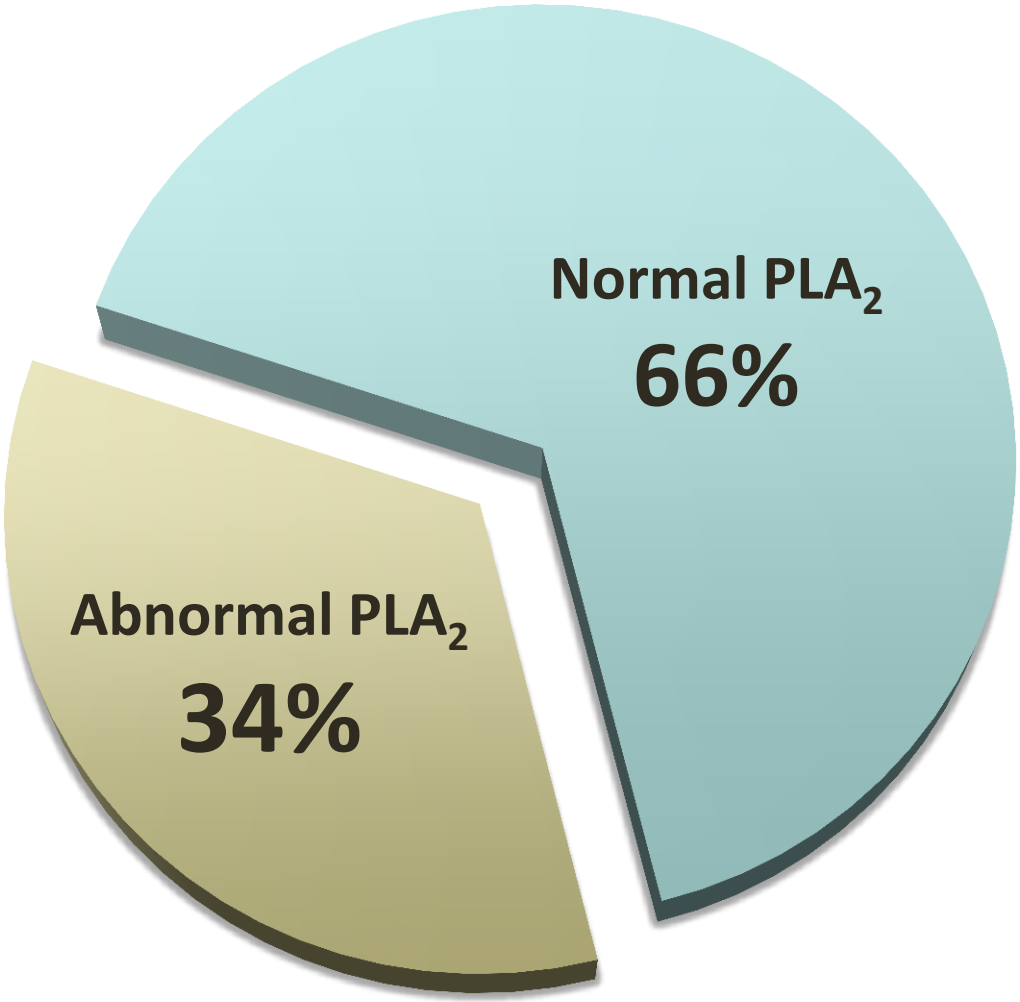
Results of Stress Test



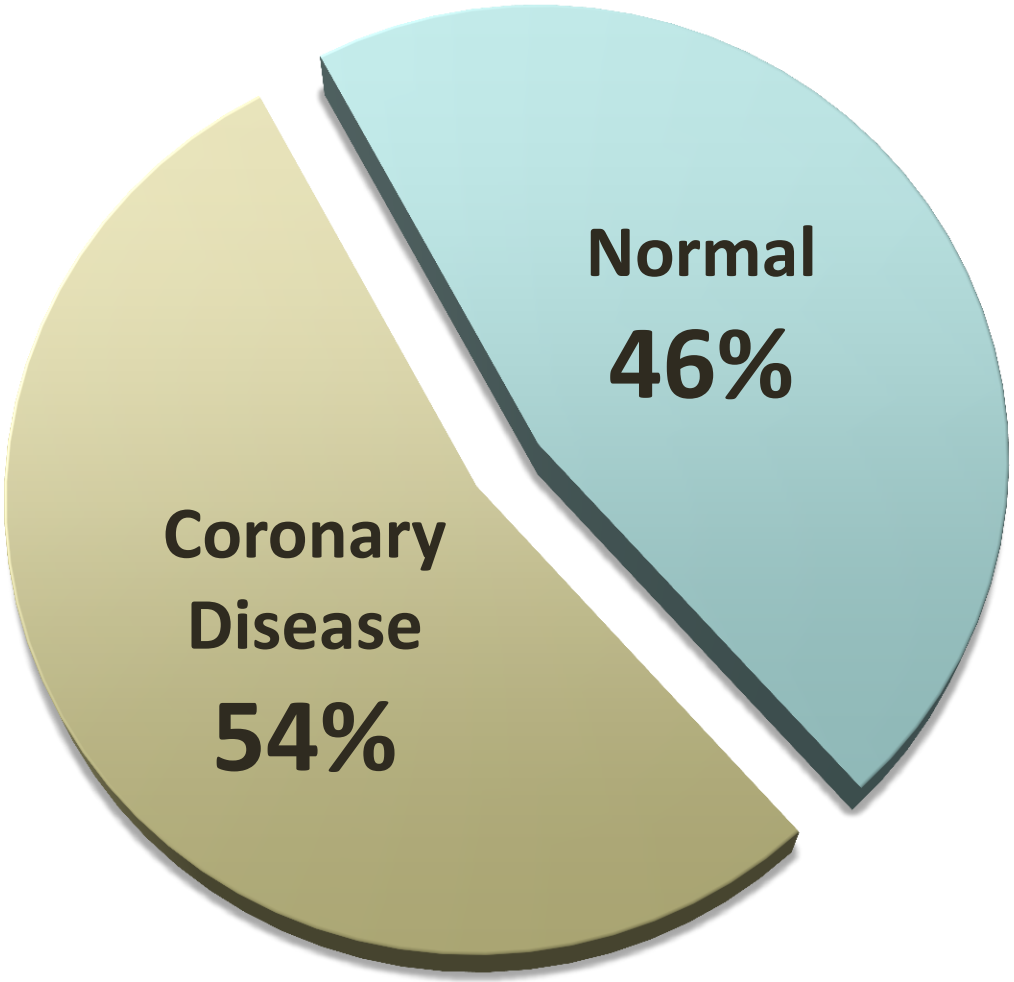
Results of Calcium Score



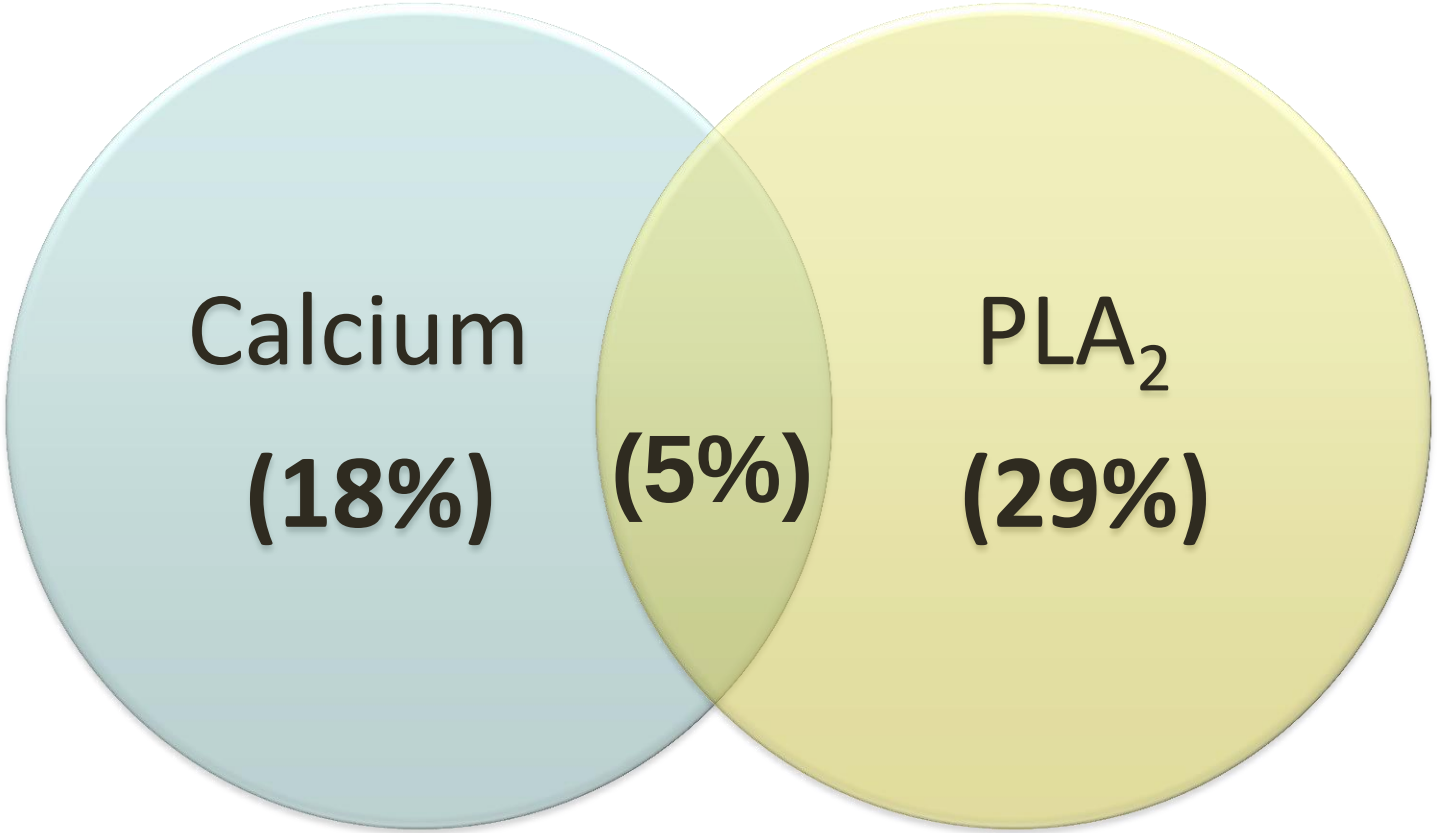
Abnormal PLA_2



Calcium Score + PLA_2



Findings



53.8%

Results

- NO association of Coronary Disease with:
  - Age
  - Gender
  - Cholesterol levels
  - Weight
  - Presence of diabetes
  - Unit

Characteristic	N (%) with disease	N (%) without disease
Admin Role	15 (62.5)	9 (37.5)
Field Role	32 (53.3)	28 (46.7)
Investigative Role	29 (46.8)	33 (53.2)
Female	10 (47.6)	11 (52.4)
Male	67 (53.2)	59 (46.8)
Normal	17 (48.6)	18 (51.4)
Overweight	30 (51.7)	28 (48.3)
Obese	30 (55.6)	24 (44.4)
Hypertensive	32 (55.2)	26 (44.8)
Normotensive	44 (50.6)	43 (49.4)
LDL > 130	36 (52.2)	33 (47.8)
LDL < 130	41 (52.6)	37 (47.4)
LDL > 100	64 (51.6)	60 (48.4)
LDL < 100	13 (56.5)	10 (43.5)
sdLDL-c > 20	63 (52.9)	56 (47.1)
sdLDL-c < 20	13 (48.2)	14 (51.8)
HDL < 50	32 (46.4)	37 (53.6)
HDL > 50	45 (57.7)	33 (42.3)
TG > 150	18 (51.4)	17 (47.6)
TG < 150	59 (52.7)	53 (47.3)

THE Risk Factor…

<u>High Risk</u> for heart disease

Lp-PLA$_2$ Included in Four Major Guidelines

2010 ACCF/AHA Guideline for Assessment of Cardiovascular Risk in Asymptomatic Adults

- Lp-PLA$_2$ testing may be considered **in intermediate-risk asymptomatic** adults.

2011 AHA/ASA Guidelines for the Primary Prevention of Stroke

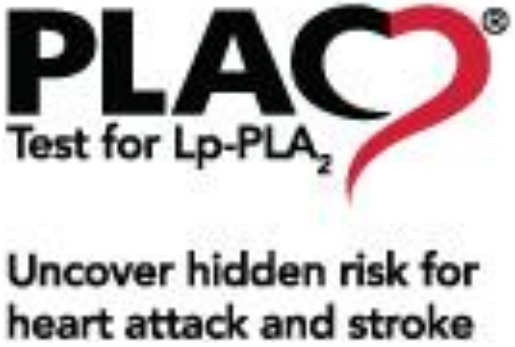
- Measurement of inflammatory markers such as hs-CRP or Lp-PLA$_2$ in patients without CVD may be considered to identify patients who may be at **increased risk**.

2012 AACE Guidelines for Management of Dyslipidemia and Prevention of Atherosclerosis.

- Test for Lp-PLA$_2$, which in some studies has demonstrated more specificity than highly sensitive CRP, when it **is necessary to further stratify a patient's CVD risk.**

2012 European Guidelines on CVD Prevention in Clinical Practice - European Society of Cardiology

- Lp-PLA$_2$ may be measured as a part of a refined risk assessment in patients **at high risk** of a recurrent acute atherothrombotic event. Class IIb.



- The only blood test cleared by the FDA to assess the risk for *both heart attack and ischemic stroke*
- Simple blood test, no fasting required prior to draw
- Lp-PLA_2 CPT Code: 83698; the PLAC Test is reimbursed by Medicare, and many insurance providers. There are more than 150 million covered lives in the US.

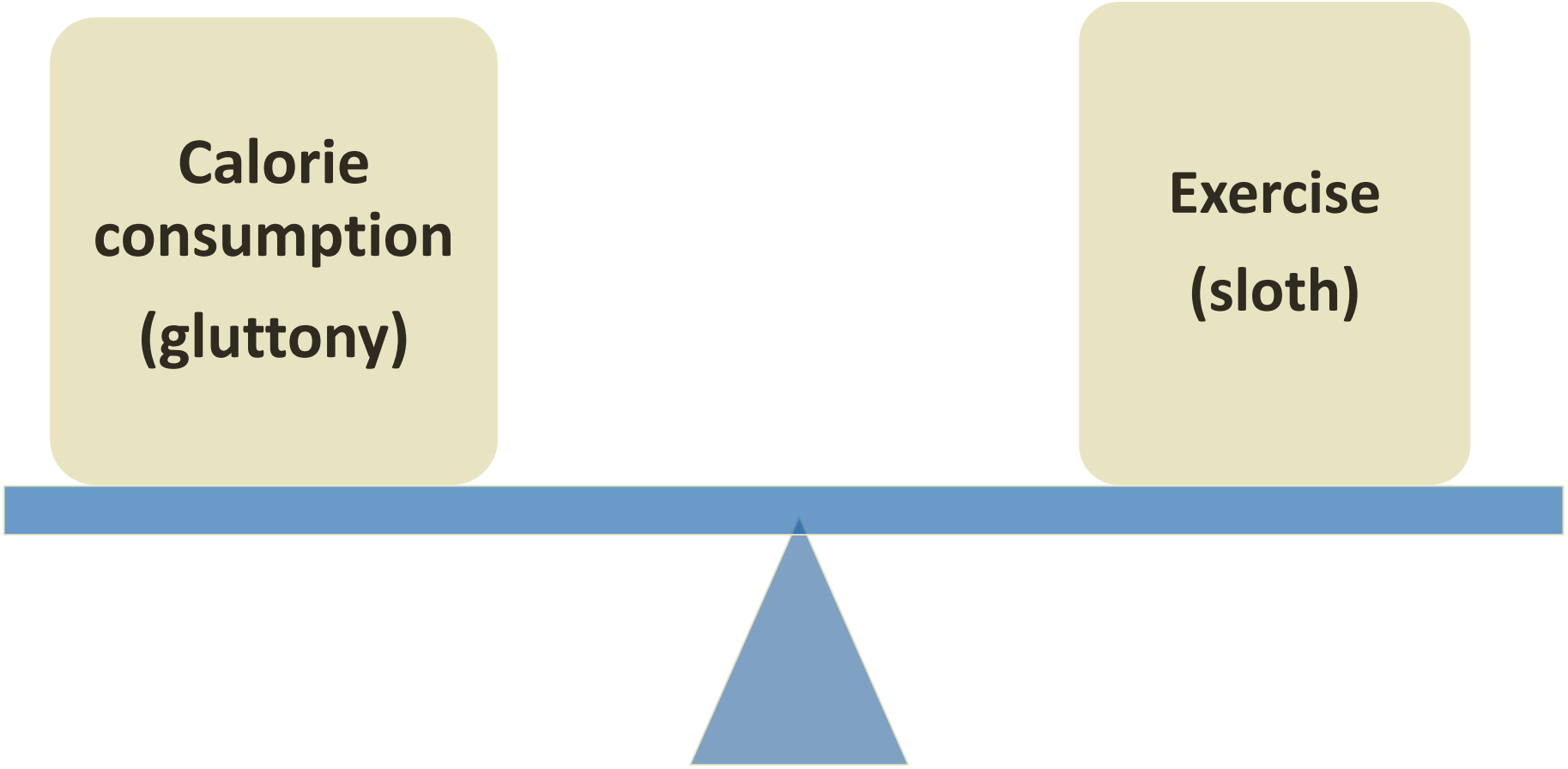
*Kolodgie F, et al. *Arterioscler Thromb Vasc Biol* 2006

The condition of good physical, mental and emotional health, especially when maintained by an appropriate diet, exercise, and other lifestyle modifications

80% of Police Officers are Overweight

The Police Executive Leadership Program Class Exercise and Nutrition Questionnaire, administered by Daniel E. Shell, Division of Public Safety Leader- ship, Johns Hopkins University

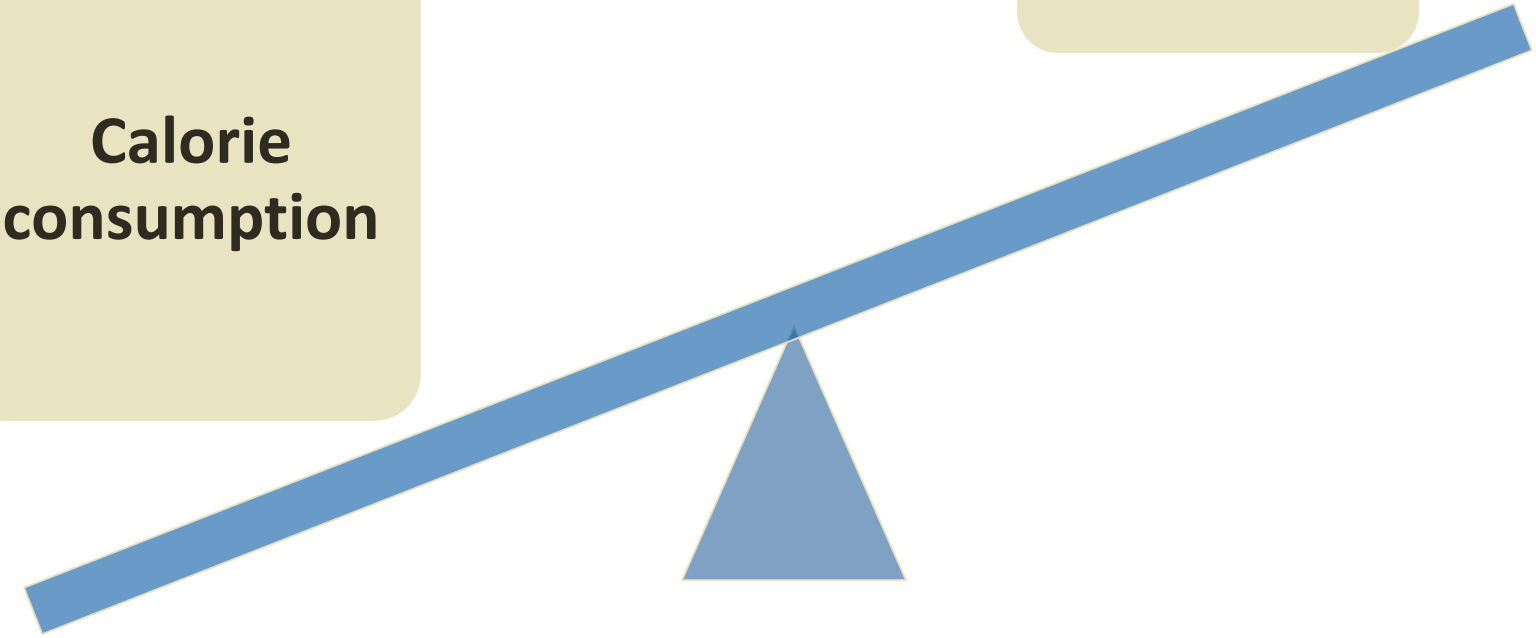
Fact or fiction



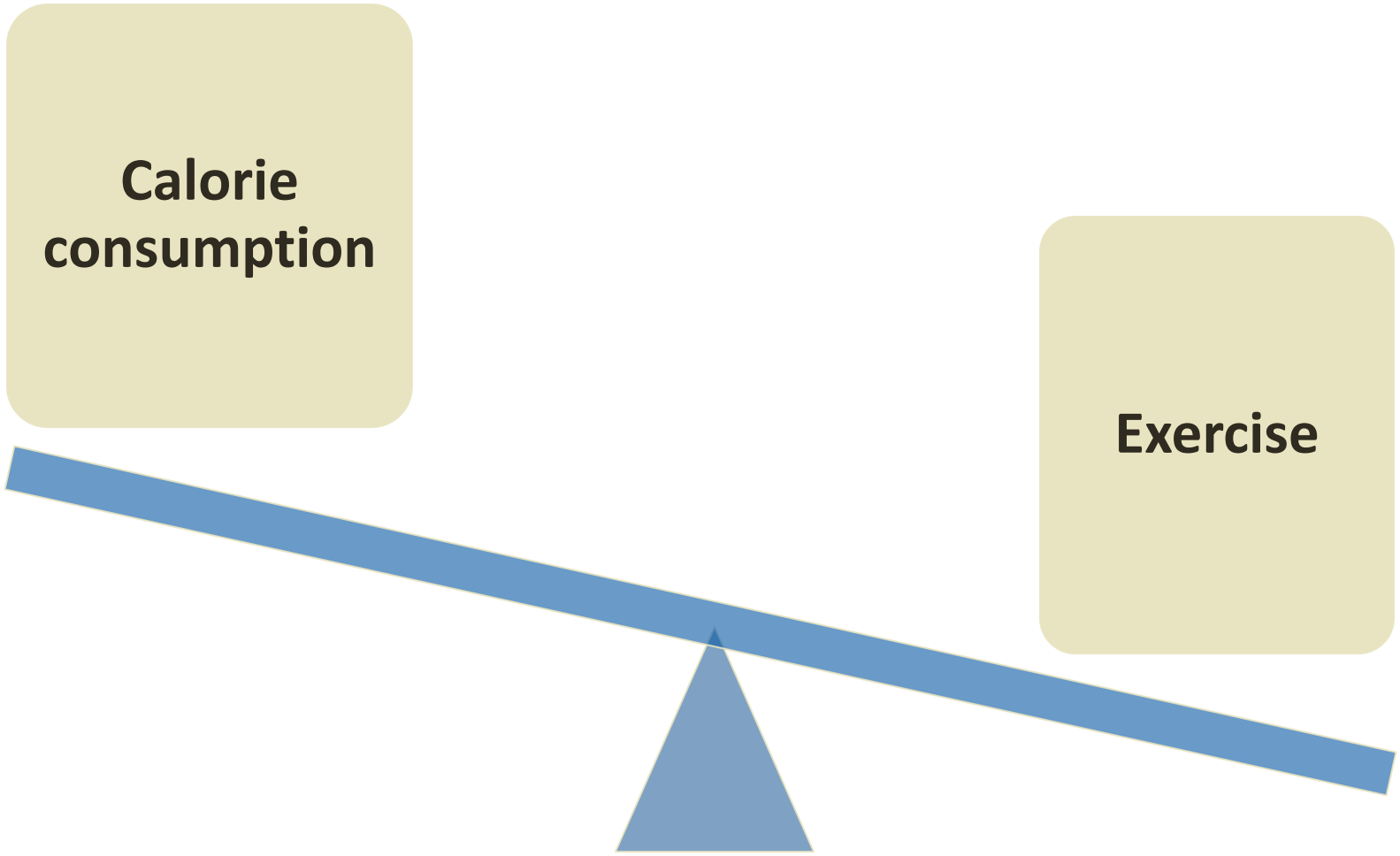
Weight Gain?

Exercise

Calorie consumption



Weight Loss?

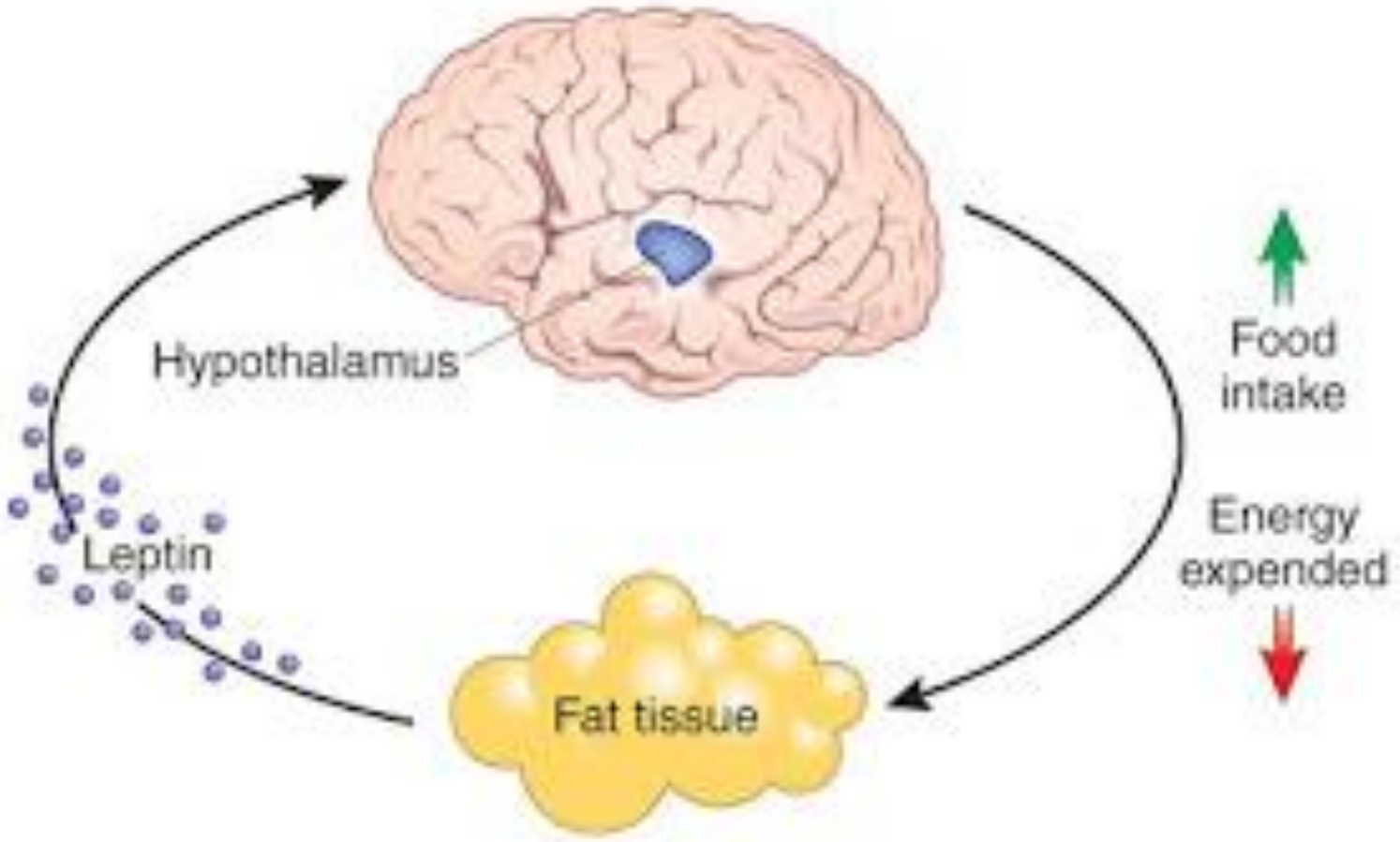


A calorie is not a calorie

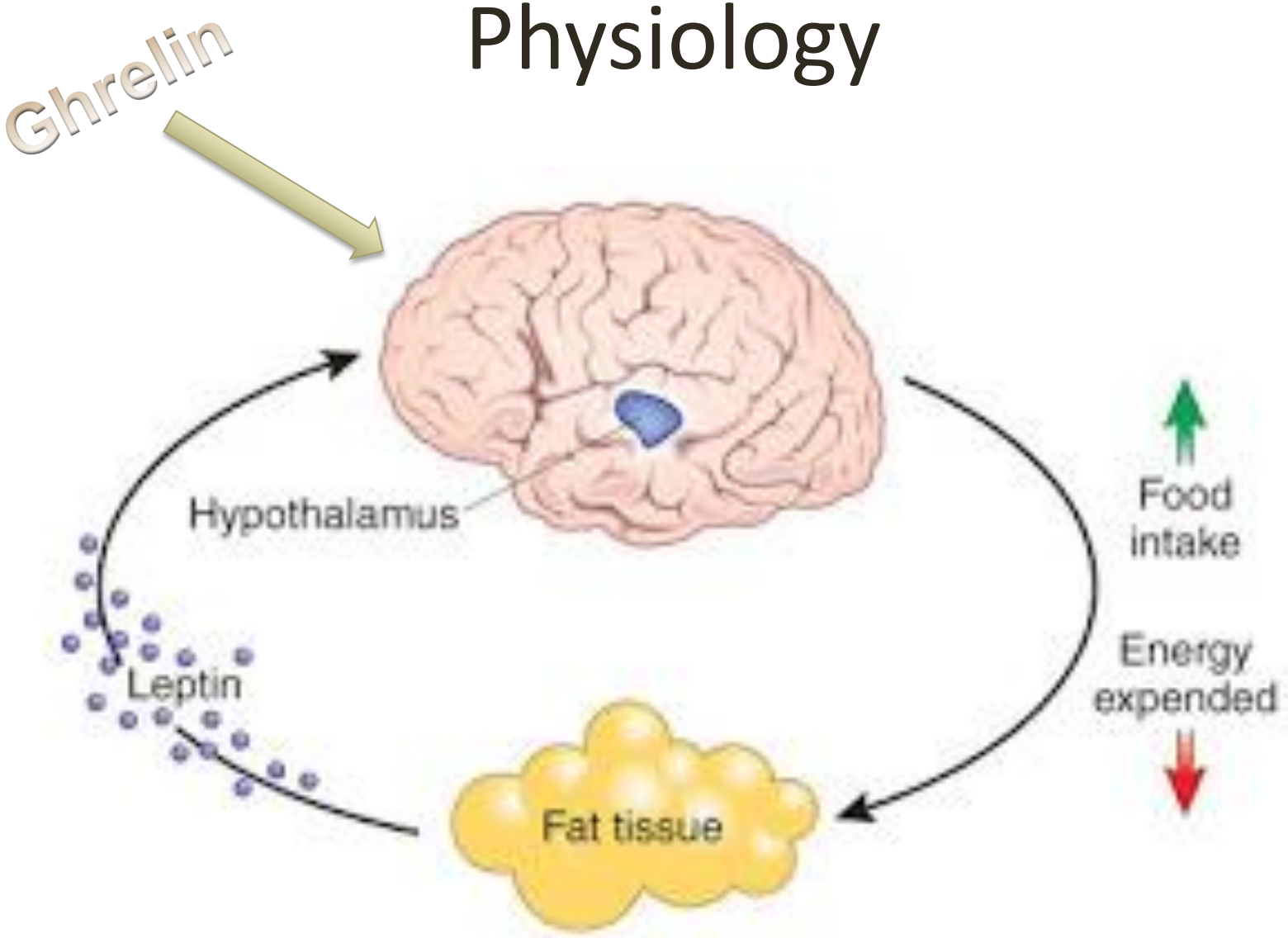
Hungry?

Ghrelin

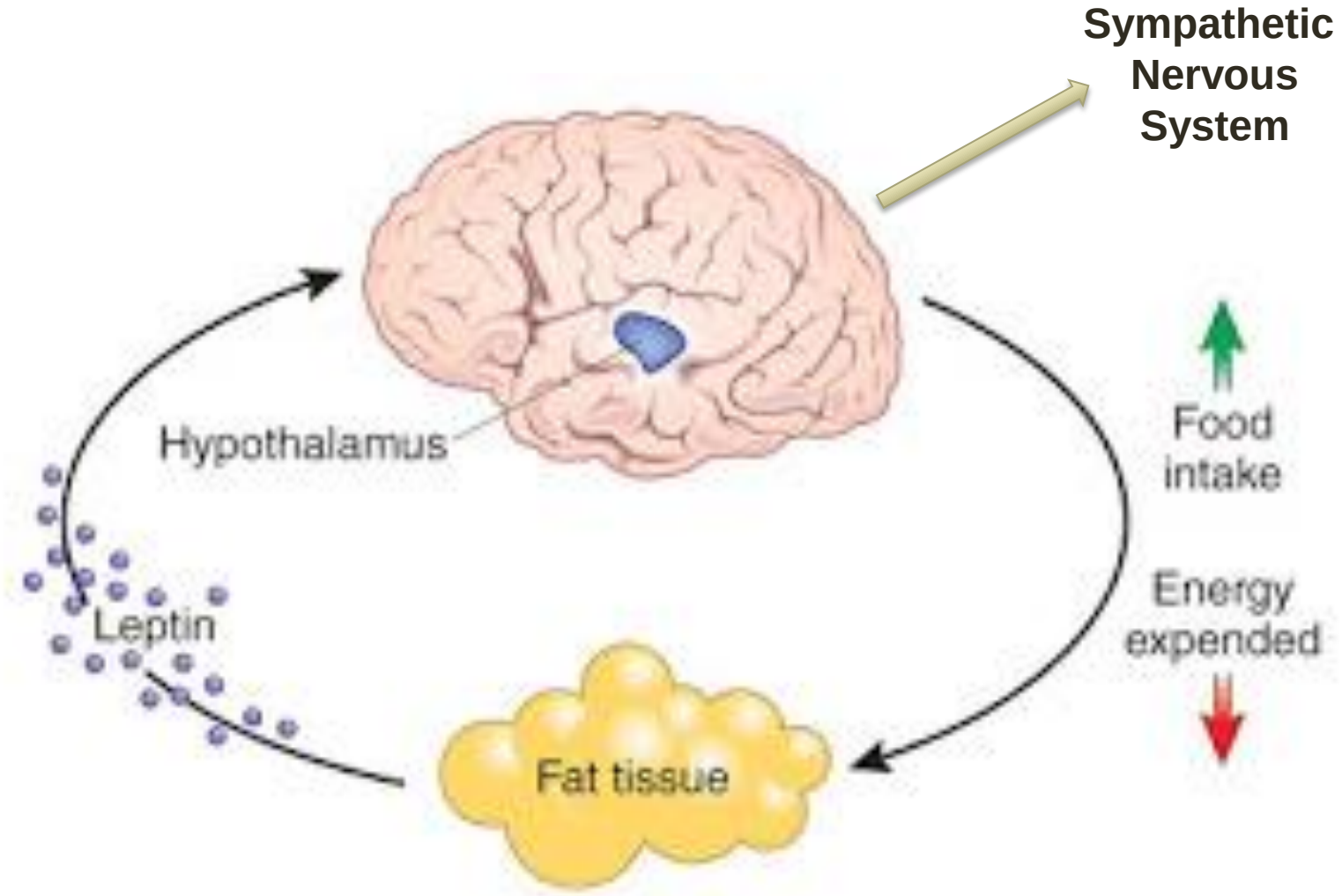
Physiology


Hypothalamus
Leptin
Fat tissue
Food intake
Energy expended

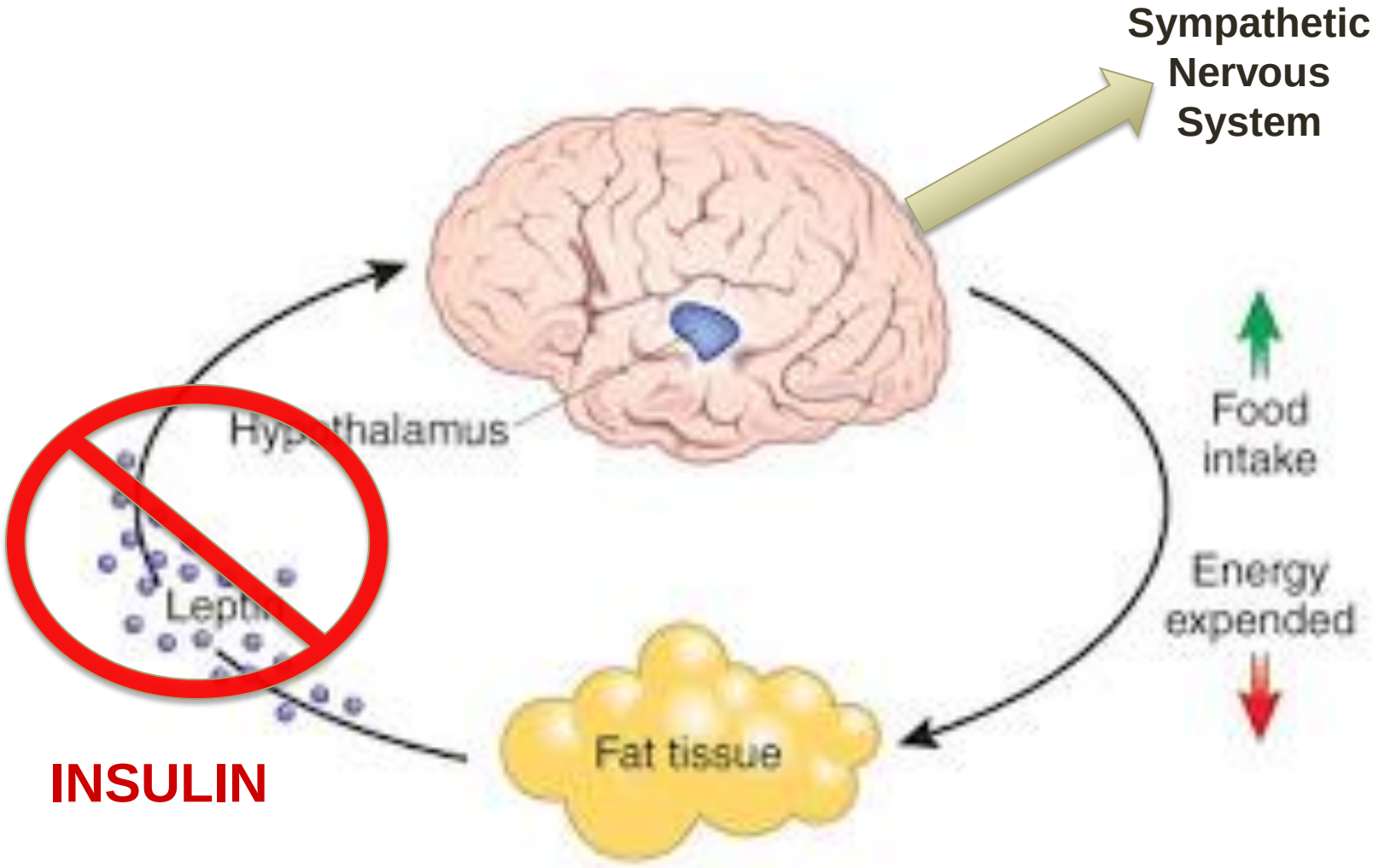
Physiology


Ghrelin
Hypothalamus
Food intake
Energy expended
Leptin
Fat tissue

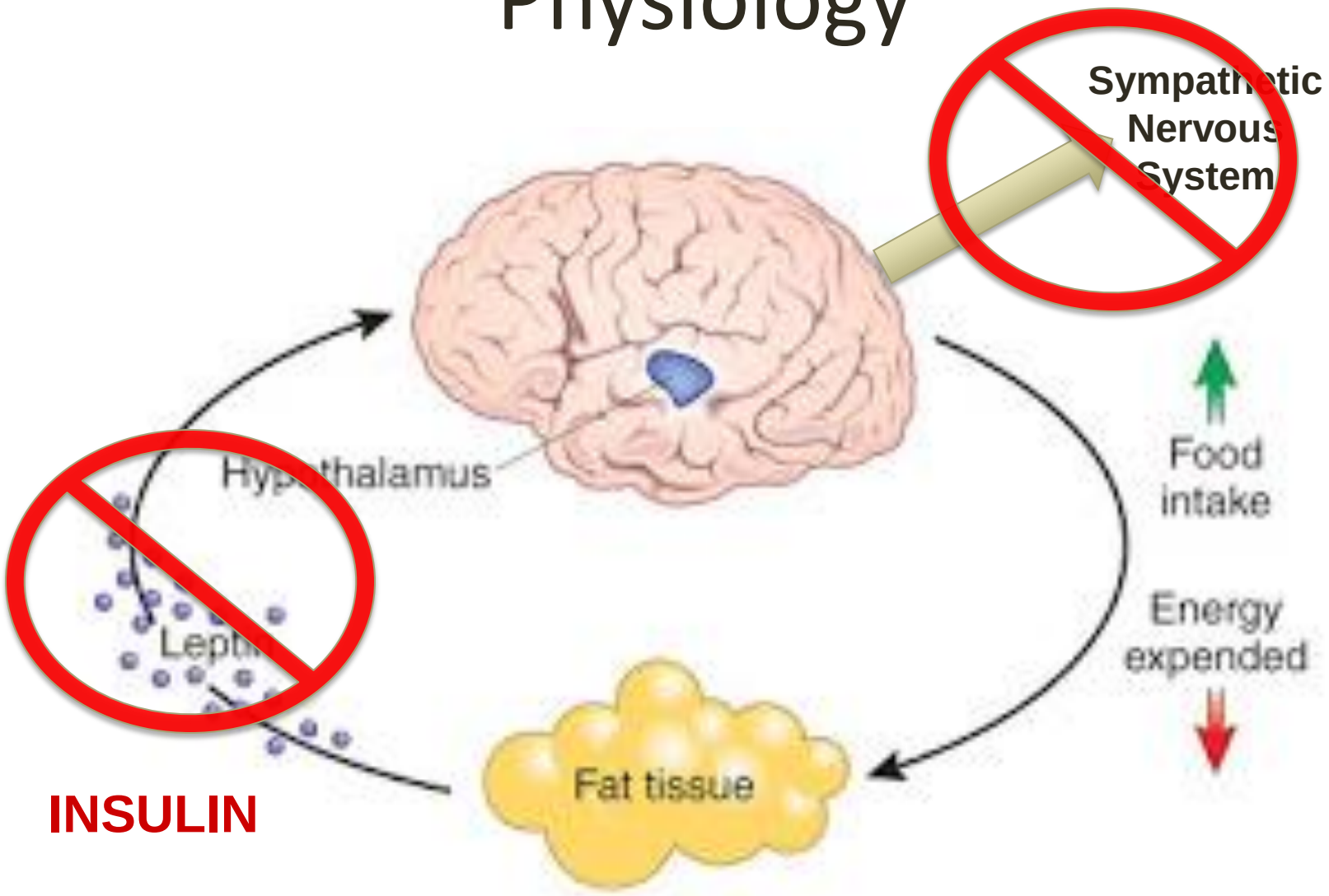
Physiology


Sympathetic Nervous System
Hypothalamus
Food intake
Leptin
Energy expended
Fat tissue

Physiology

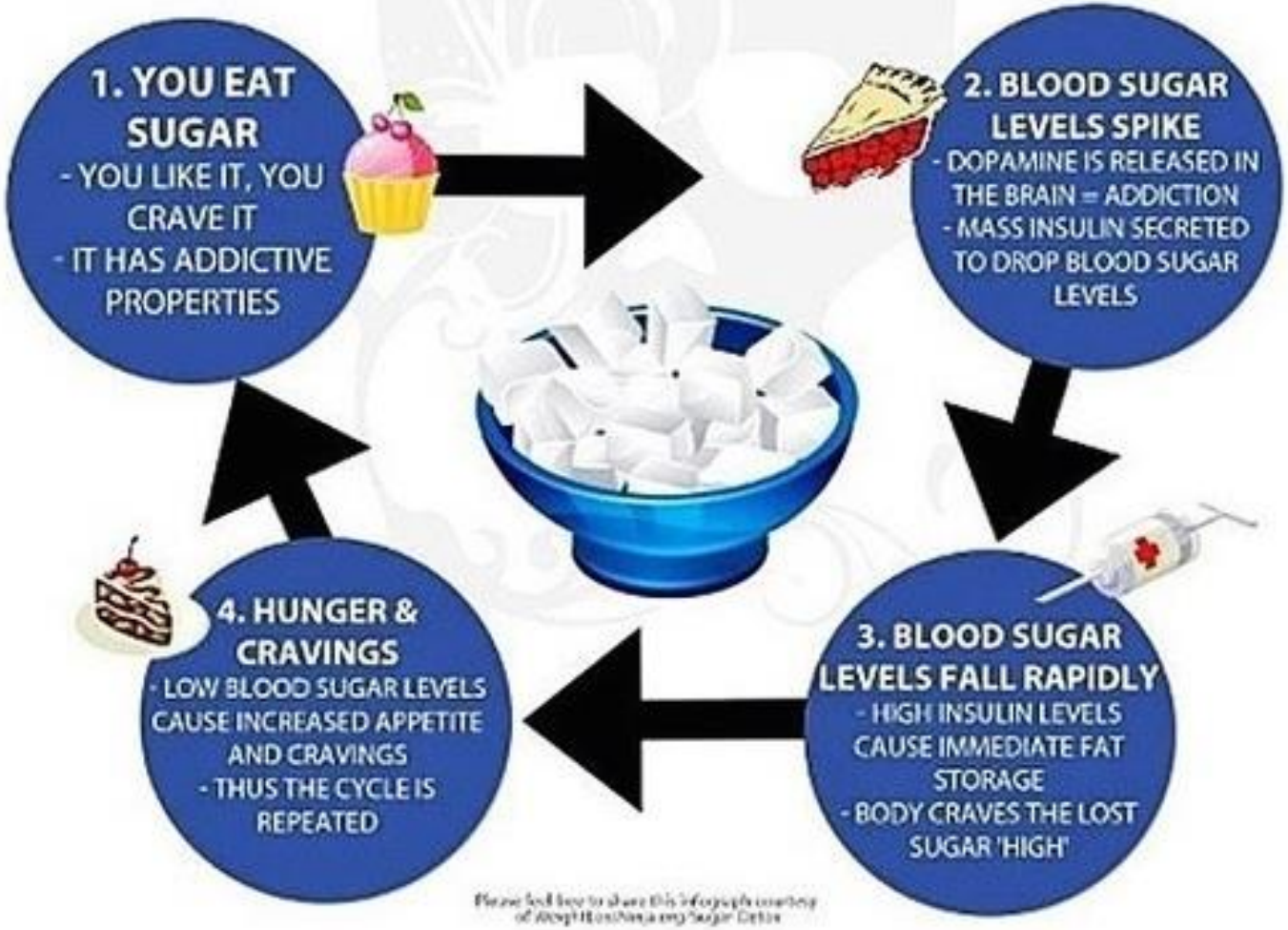

Sympathetic Nervous System
Hypothalamus
Food intake
Energy expended
Fat tissue
INSULIN

Physiology


Sympathetic
Nervous
System
Hypothalamus
Leptin
Food
intake
Energy
expended
Fat tissue
INSULIN

INSULIN

SUGAR ADDICTION:
THE PERPETUAL CYCLE

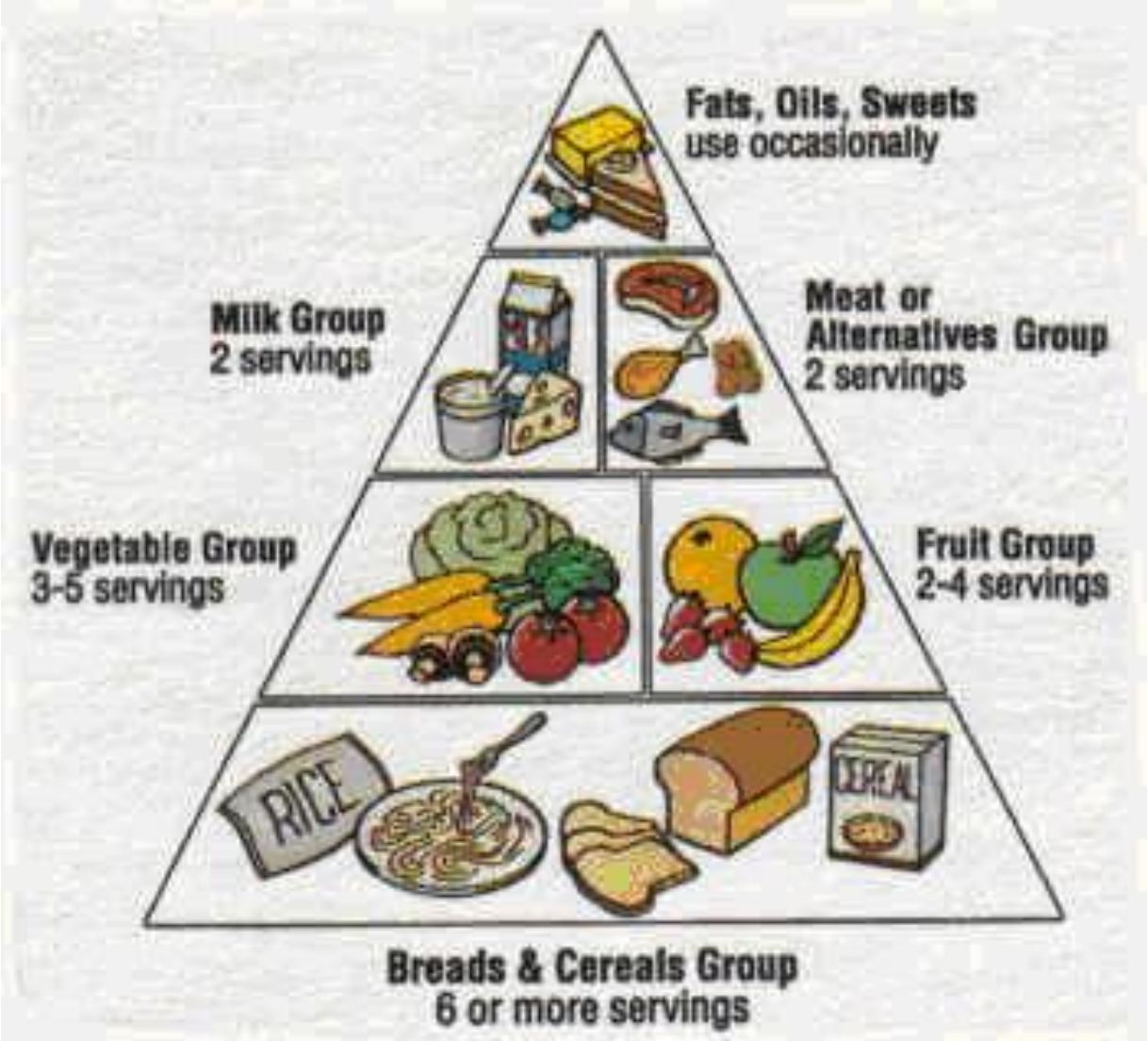


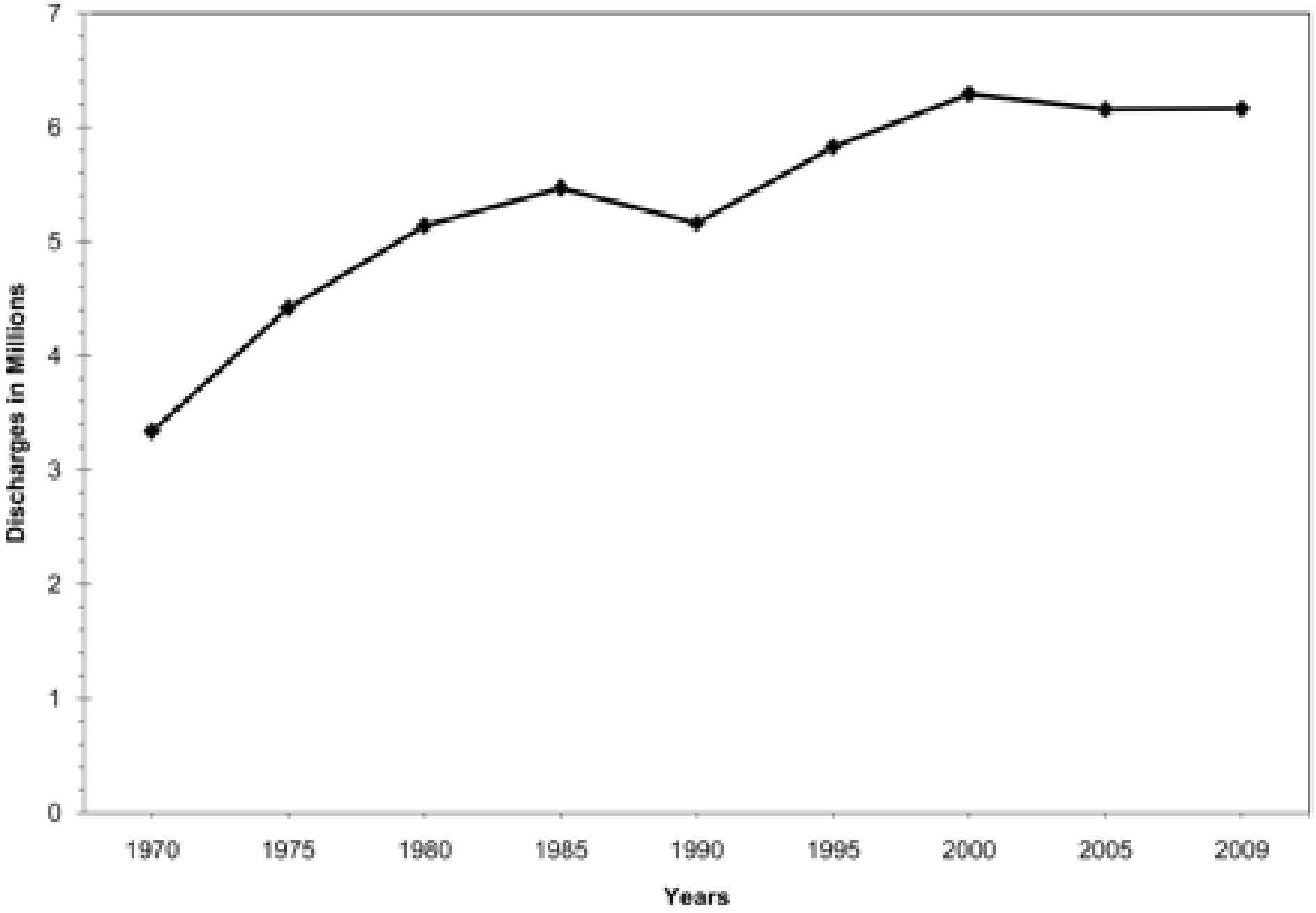

Skittles
JELL-O
Prego


Minute
Maid
Premium
ORIGINAL

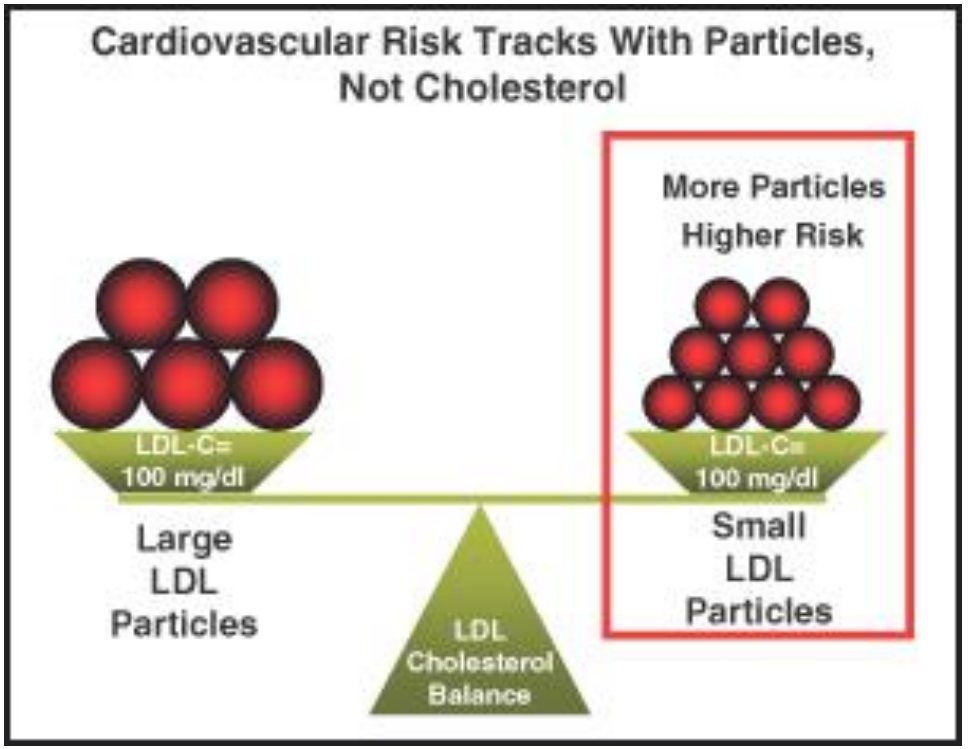
1982


Atari 800
Apple II
The Apple II (above) features color and sound. It is also the easiest of the computers to expand upon and considered a leader in the industry. The Atari 800 (right) has fantastic graphic capability in color. More software has become available for it just this year. (Both are shown with Amdek Color-1 monitor.)

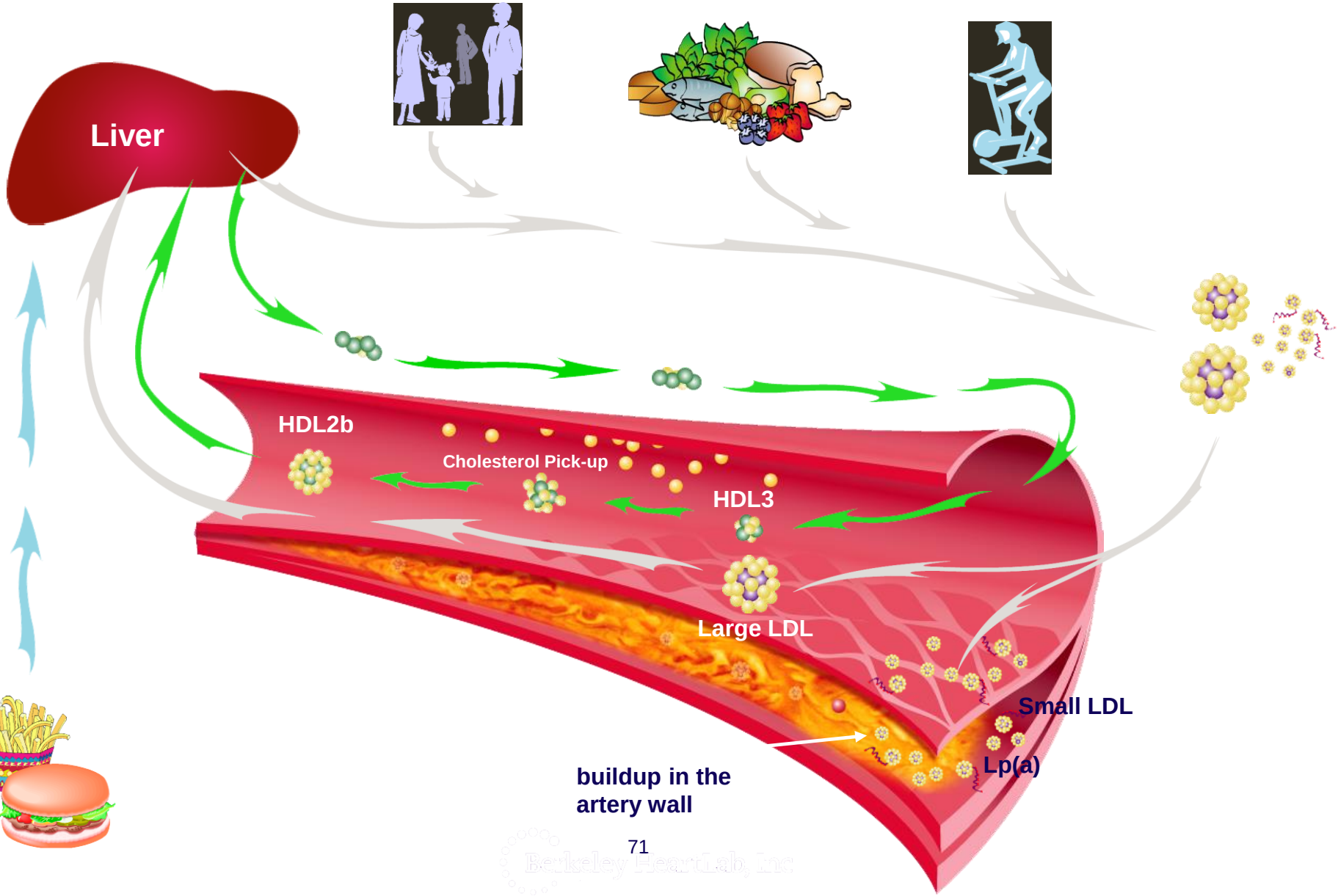

Fats, Oils, Sweets
use occasionally
Milk Group
2 servings
Meat or
Alternatives Group
2 servings
Vegetable Group
3-5 servings
Fruit Group
2-4 servings
RICE
CEREAL
Breads & Cereals Group
6 or more servings

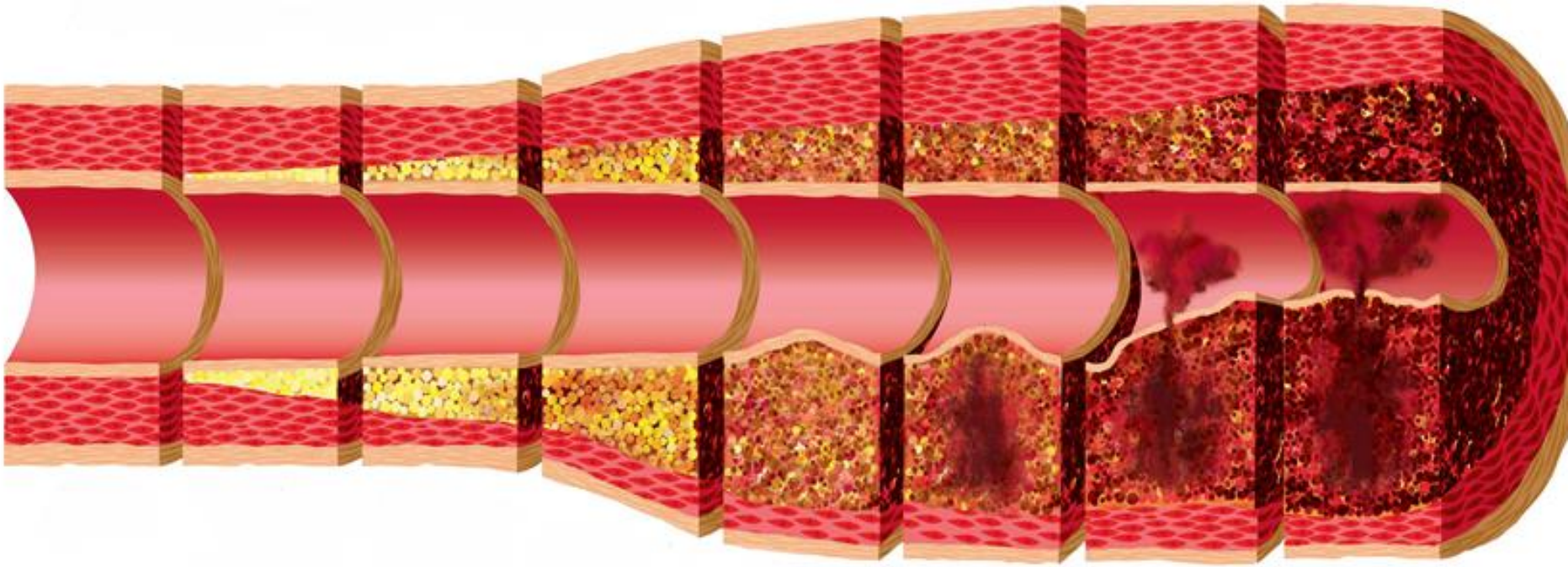

Discharges in Millions
0
1
2
3
4
5
6
7
1970
1975
1980
1985
1990
1995
2000
2005
2009
Years

Low fat = High carbohydrate/high sugar


Cardiovascular Risk Tracks With Particles, Not Cholesterol
More Particles Higher Risk
LDL-C= 100 mg/dl
LDL-C= 100 mg/dl
Large LDL Particles
Small LDL Particles
LDL Cholesterol Balance

Plaque Formation



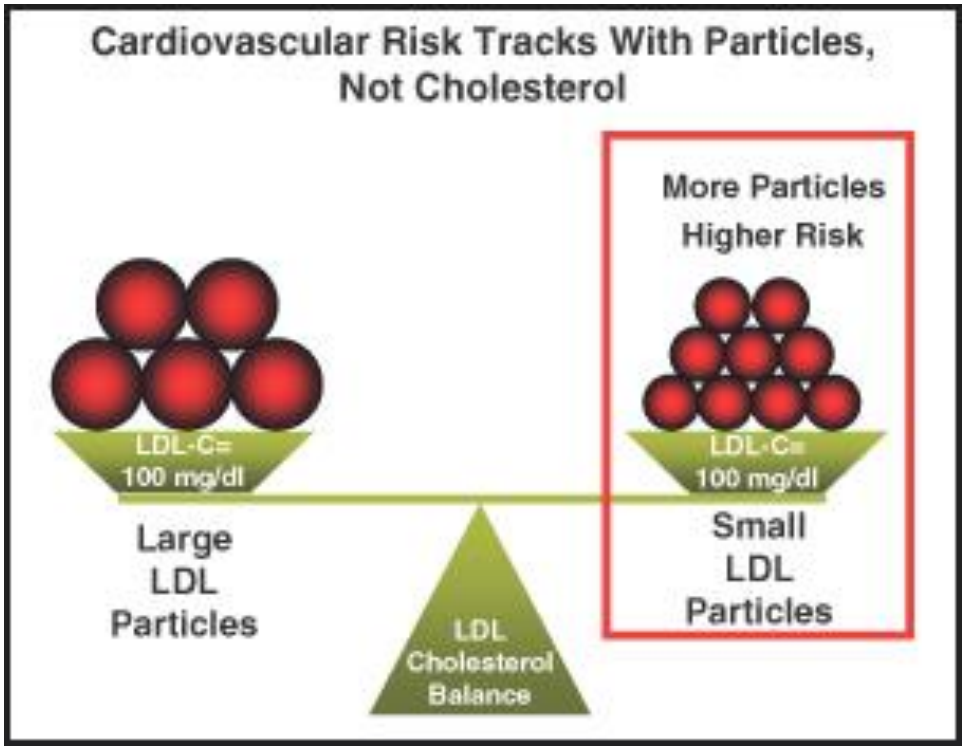


The Solution

Three Legged Stool

Lifestyle Modification


THE
PALEO
DIET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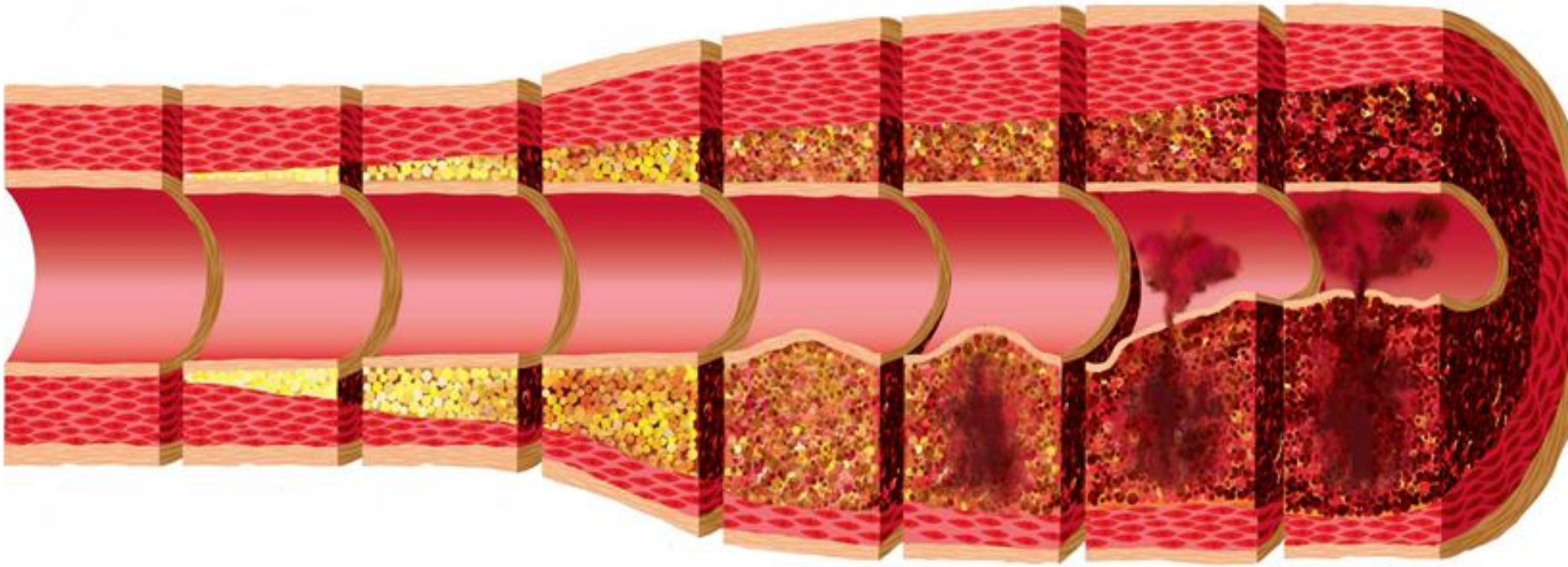
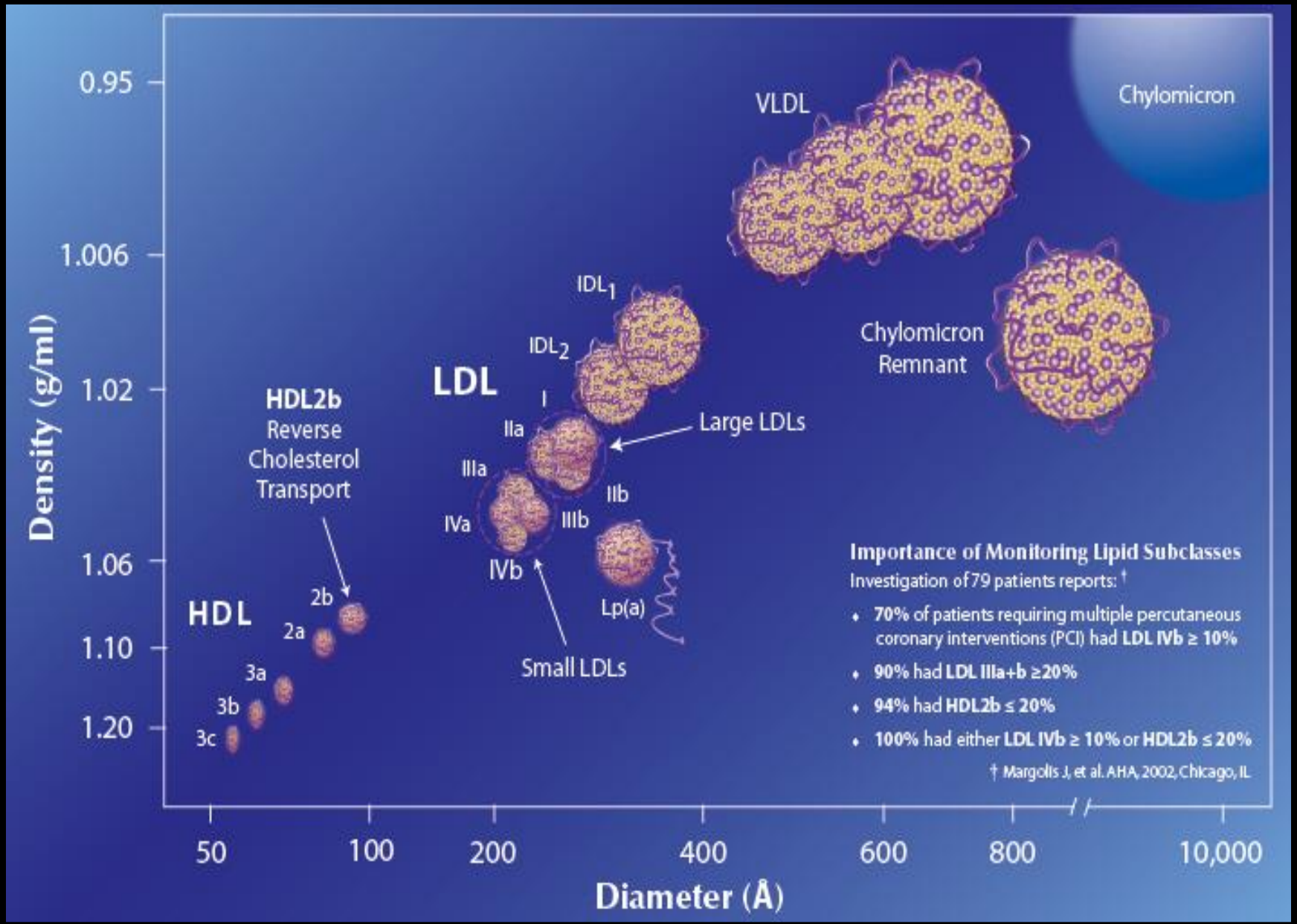
LDL-C= 100 mg/dl
Large LDL Particles
Small LDL Particles
LDL Cholesterol Balance

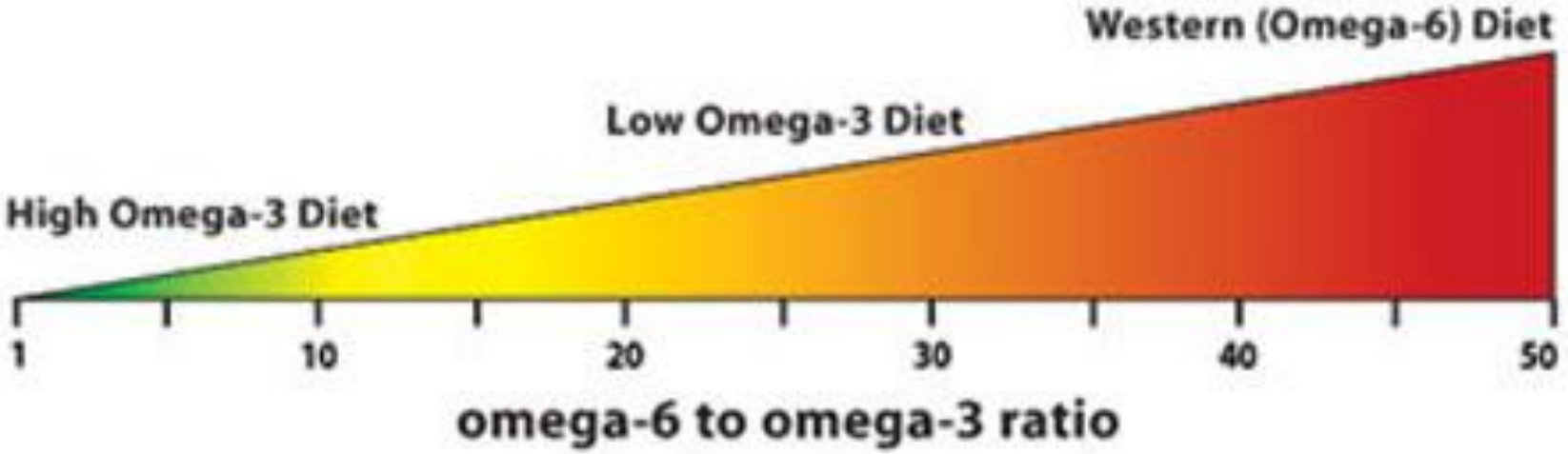



0.95
1.006
1.02
1.06
1.10
1.20
Density (g/ml)
VLDL
Chylomicron
Chylomicron Remnant
IDL1
IDL2
LDL
I
IIa
IIb
IIIa
IIIb
IVa
IVb
Large LDLs
Small LDLs
Lp(a)
HDL2b
Reverse Cholesterol Transport
HDL
2b
2a
3a
3b
3c
50
100
200
400
600
800
10,000
Diameter (Å)
Importance of Monitoring Lipid Subclasses
Investigation of 79 patients reports: †
70% of patients requiring multiple percutaneous coronary interventions (PCI) had LDL IVb ≥ 10%
90% had LDL IIIa+b ≥20%
94% had HDL2b ≤ 20%
100% had either LDL IVb ≥ 10% or HDL2b ≤ 20%
† Margolis J, et al. AHA, 2002, Chicago, IL

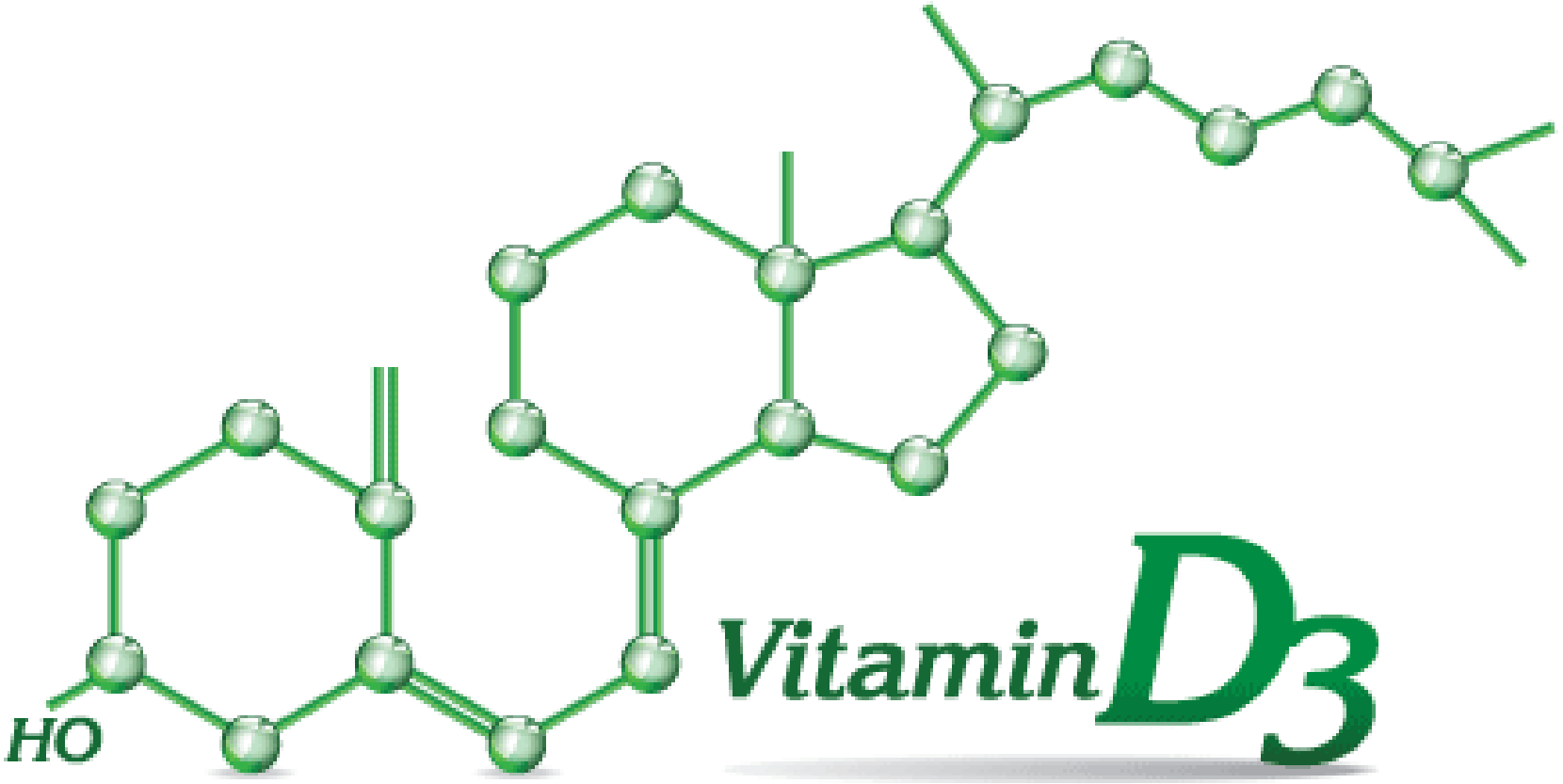
Supplements

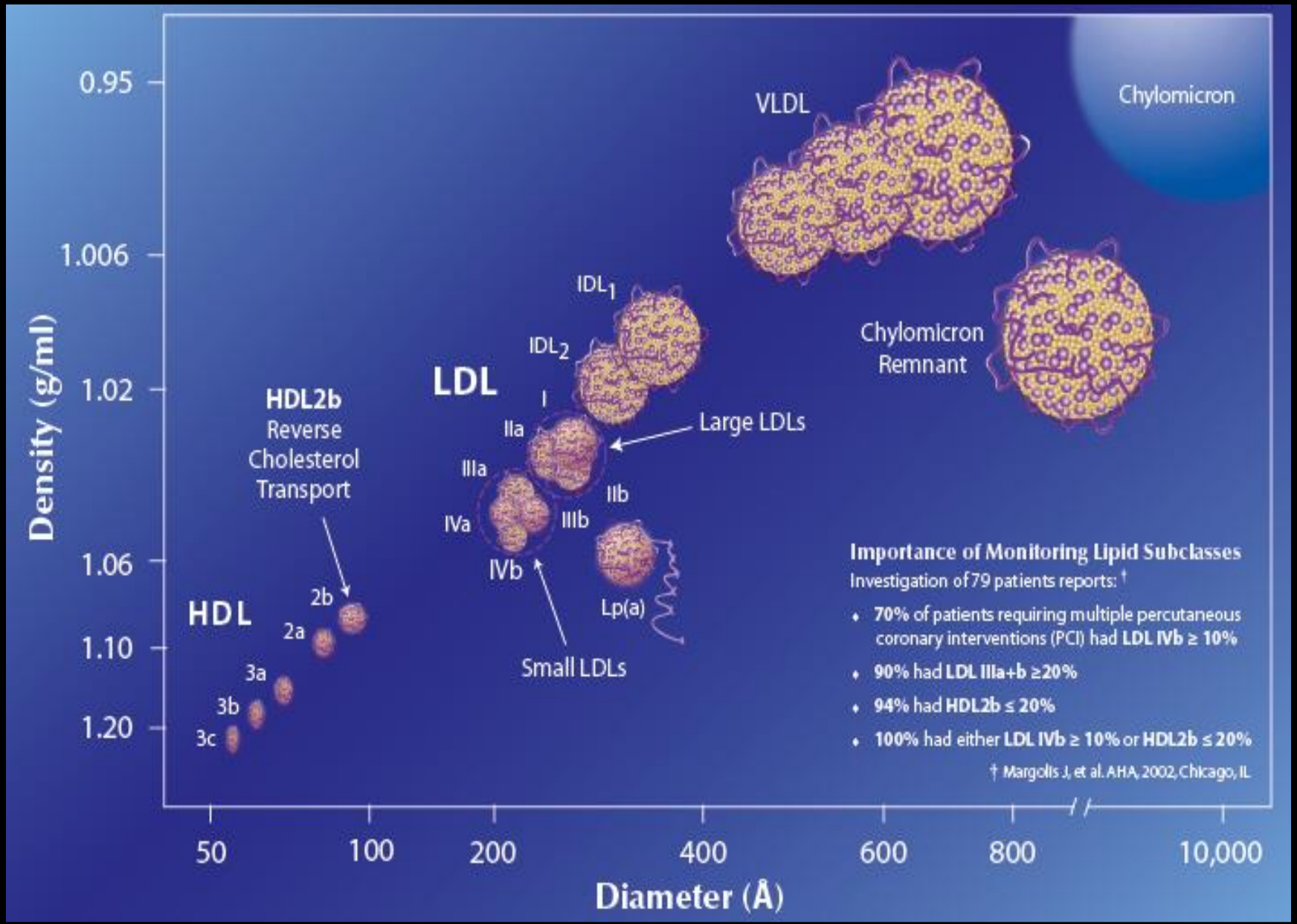

NORDIC NATURALS
OMEGA-3
PURIFIED FISH OIL
Healthy Omega-3 Levels

Omega 6 to Omega 3 Ratio in Different Populations



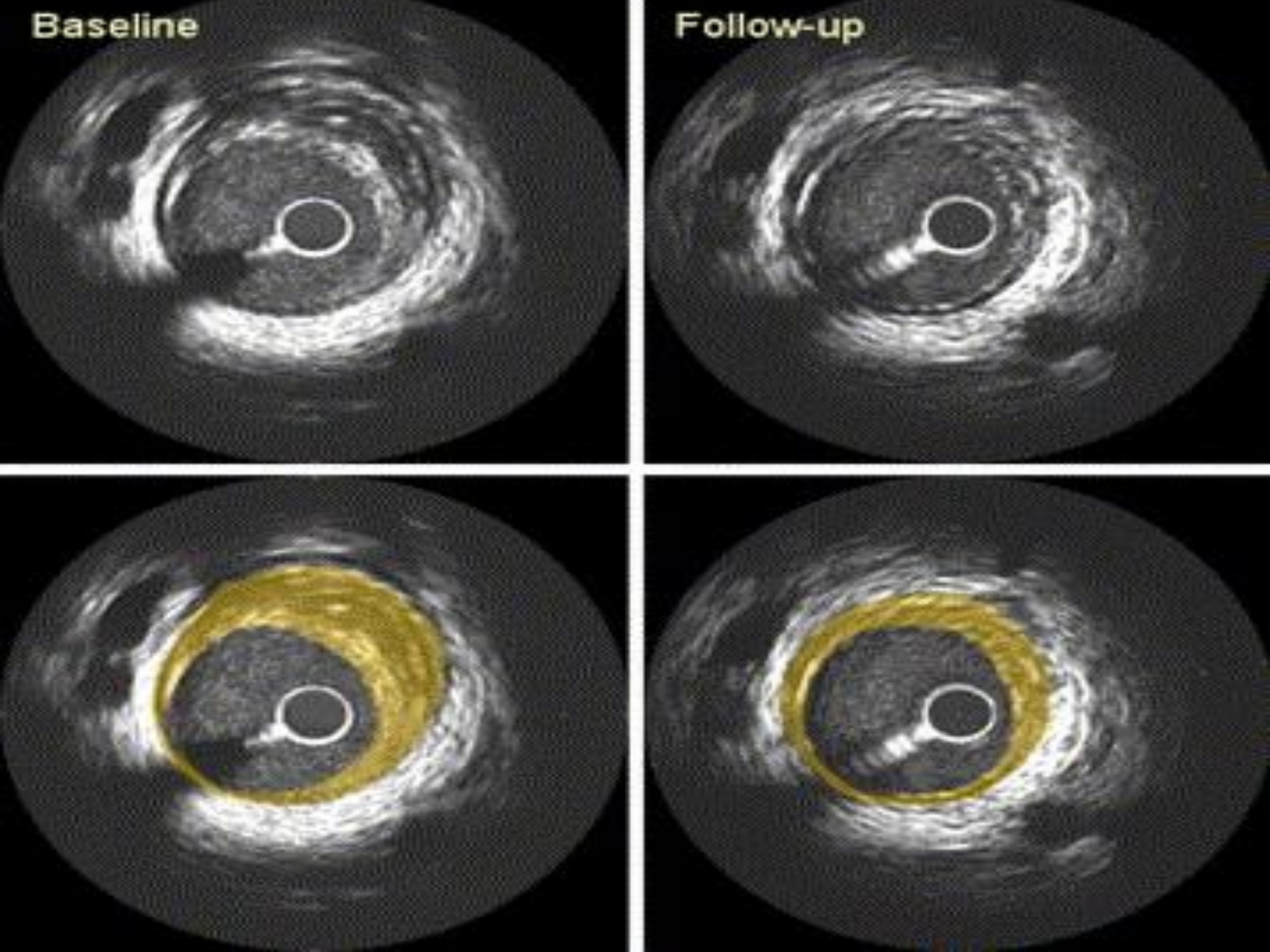

UE SIZE • VALUE SIZE • VALUE SI
NATURE'S BOUNTY
FLUSH FREE
Niacin
Inositol Hexanicotinate
500mg
Promotes:
Heart Health
Energy Metabolism
Digestive System Health
Nervous System Health
USP LAB TESTED
B
POTENCY
120 capsules
VITAMIN SUPPLEMENT

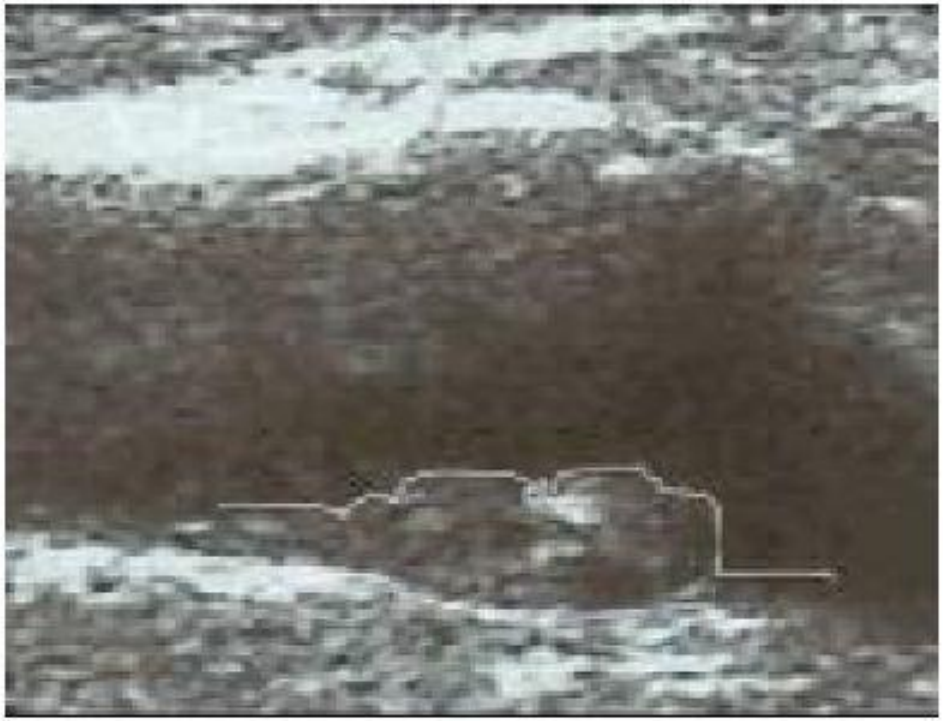

HO
Vitamin D3


0.95
1.006
1.02
1.06
1.10
1.20
Density (g/ml)
VLDL
Chylomicron
Chylomicron Remnant
IDL1
IDL2
LDL
I
IIa
IIb
IIIa
IIIb
IVa
IVb
Large LDLs
Small LDLs
Lp(a)
HDL2b
Reverse Cholesterol Transport
HDL
2b
2a
3a
3b
3c
50
100
200
400
600
800
10,000
Diameter (Å)
Importance of Monitoring Lipid Subclasses
Investigation of 79 patients reports: †
70% of patients requiring multiple percutaneous coronary interventions (PCI) had LDL IVb ≥ 10%
90% had LDL IIIa+b ≥20%
94% had HDL2b ≤ 20%
100% had either LDL IVb ≥ 10% or HDL2b ≤ 20%
† Margolis J, et al. AHA, 2002, Chicago, IL

Medication

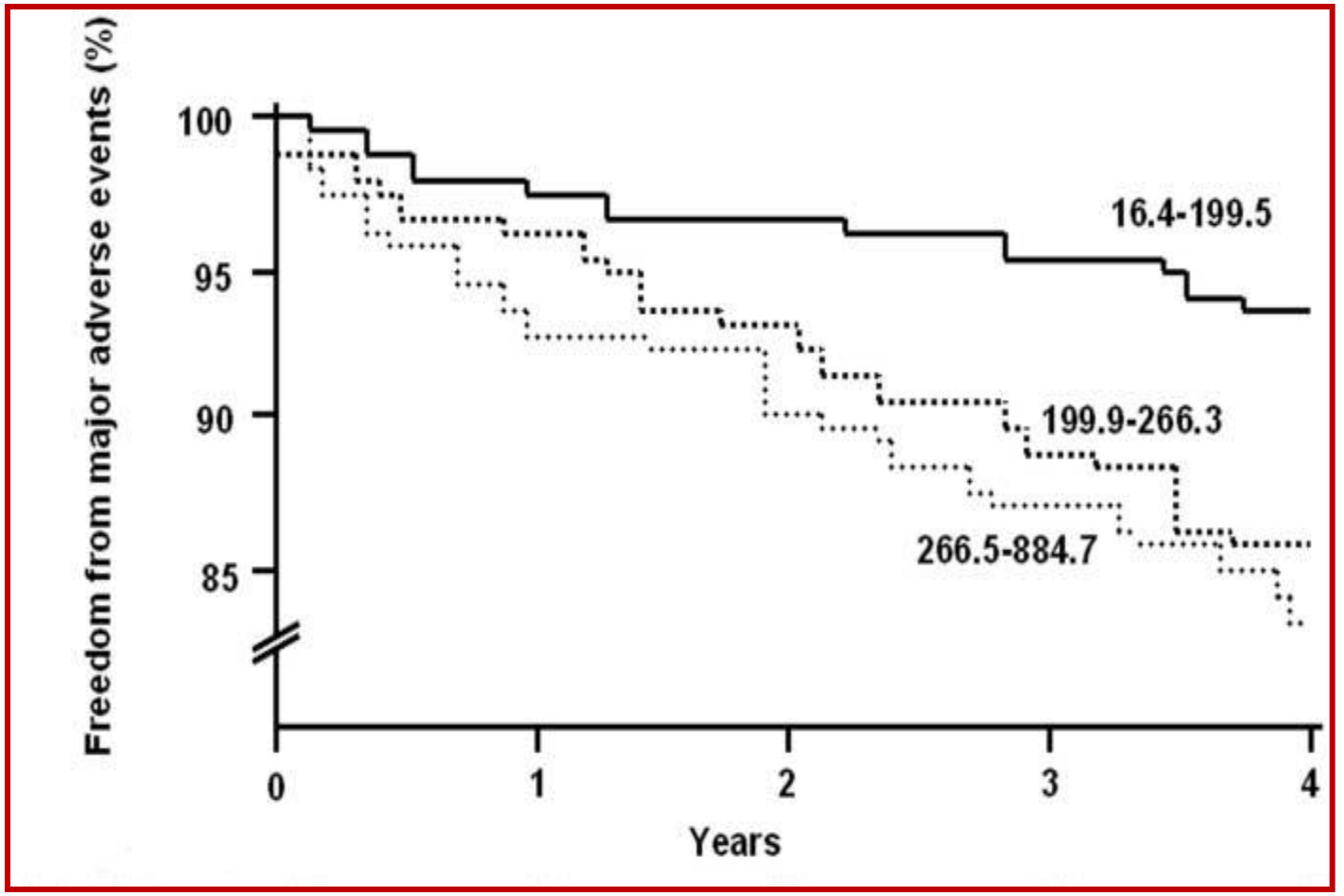

Mevacor® 20
(Lovastatin)
Store between 5 - 30°C (41 - 86°F)
Protect from light.
90 Tablets
Lipitor®
10 mg*
Lescol® XL
Extended-Release Tablets
UNIT DOSE
100 tablets
CRESTOR®
rosuvastatin calcium
10 mg tablets
Rx only
CRESTOR®
rosuvastatin calcium
10 mg tablets
Rx only
AstraZeneca


Baseline
Follow-up



Lp-PLA$_2$ Predicts Major CV Events in CHD Patients: Mayo Heart Study

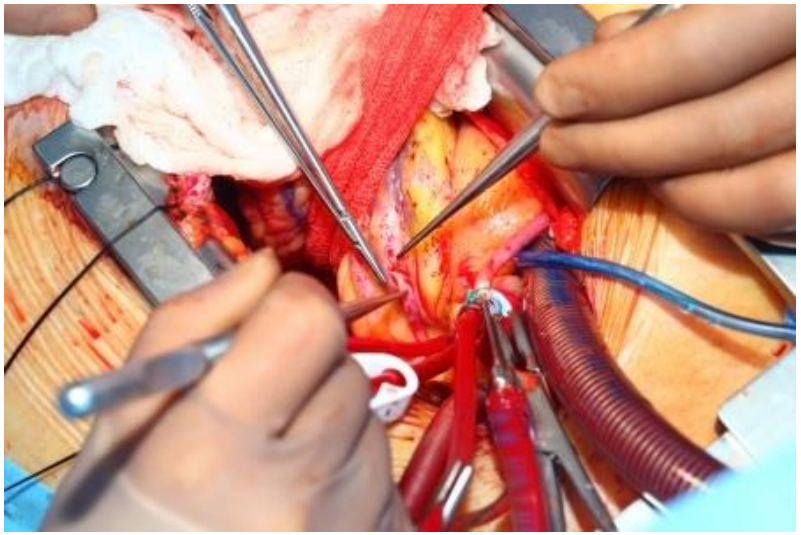
95% of patients with Lp-PLA$_2$ < 200 ng/ml were Event Free at 4 years



Brilakis ES et al. Mayo Heart Study. *Euro Heart J* 2005

Costs

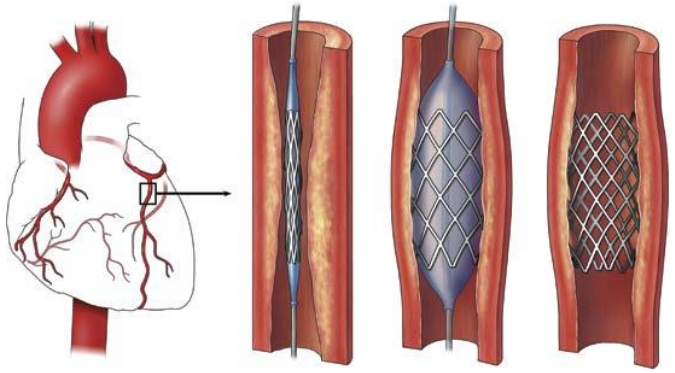
- Coronary artery bypass grafting (CABG)
  - $39,407
- Coronary Stent (PCI)
  - $20,421
- Heart Attack
  - $6,569
  - Usually leads to
    - CABG
    - PCI



Health Care Blue Book

Costs to Treat

- 1000 officers
  - 25% - CABG
    - $9.8 MM
  - 50% - PCI
    - $10.3 MM
  - 25% - Heart attack
    - $6.6 MM
      - MD visits
      - Rx
  - **TOTAL = $26.7 MM**



Costs to Prevent

- 1000
  - CCS $50,000
  - Advanced Lipid Panel $1,500,000
  - Treadmill $151,000
  - Physician visits $130,000
    - 5 years - $650,000
  - Medication/supplements –
    - - $6 mil
  - **TOTAL = $ 8.4 MM**

Cost Savings

- $18,000/officer per 5 years
- Extrapolated over 1500 officers
  - $27 MM per 5 years

Days Lost

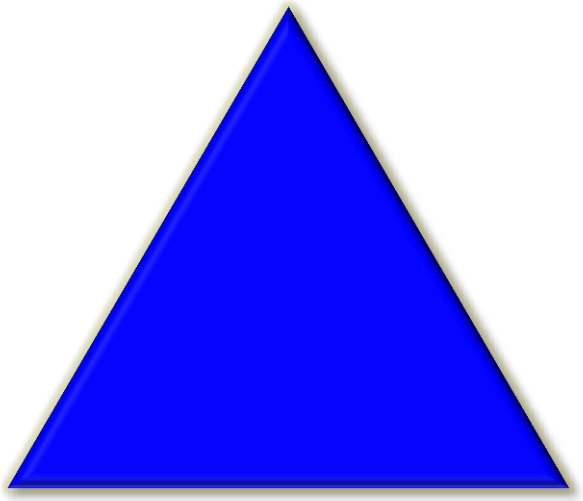
- Bypass Grafting
  - 60-90 days
- Heart attack
  - 7- 14 days
- Stent
  - 7-14 days

Recap

- Police Officers have significant increases
  - CV Events
  - CV Mortality

- Essential to identify those at risk
  - Initiate treatment
    - Reduce Mortality
    - Reduce Morbidity
    - Reduce Costs
    - Keep Officers On the Job


POLICE
DEPARTMENT



Agency Responsibilities

- Develop Wellness Program
  - Fitness
  - **NUTRITION**
  - Develop Standards
  - Collaboration
    - Executive Staff, Physician, HR manager, Cafeteria staff, Union Leader
    - Training Academy Director, Fitness professionals

- Develop Screening Programs
  - Calcium Score
  - Advanced Lipid Panel/Lp-Pla_2
  - Treadmill test/Fitness Assesment

Agency Responsibilities

- Effectively plan physical fitness and nutrition program
- Hire qualified trainers
- Conduct internal “Marketing”
- Ensure leadership advocacy
- “Stick vs Carrot”
  - Negative vs positive reinforcement
  - Balance?

Academy Responsibilities

- Set the “tone”
- Aggressive Screening prior to entry
- Education
  - Fitness
  - **Nutrition**
- Develop a culture that values wellness
- Develop understanding of future requirements

Officer/Agent Responsibilities

- Education
  - Exercise
  - Nutrition
- Accountability
- Responsibility
  - Advanced blood test
    - Lipid panel
    - Inflammatory markers PLA_2
  - Coronary Calcium Score
  - Exercise Treadmill Test

Obesity

Resources

Public Safety Cardiac Foundation

501 (c) (3)

www.LawOfficer.com/Below100

Questions?

Jonathan.Sheinberg@cedarparktexas.gov

(512) 626-0512

Incidental Findings
Cardiac Screening Initiative

- Hypertension – 41%
- Overweight – 39%
  - Obese – 37%
- Diabetes – 10%*
- Low Vitamin D_3 – 52%
- Other Illness
  - Lymphoma
  - Lung Cancer
  - Stills Disease (Rheumatologic)
  - Inflammatory Lung disease

* Based on Hgb A1C, Insulin level, or fasting blood glucose