Coronary Artery Disease

The leading cause of Heart Disease

Ben Weitz, DC

The 1st Annual Dr. Howard Elkin Memorial Lecture on Integrative Cardiology
Dedicated to my friend, Dr. Howard Elkin, Integrative Cardiologist
who passed away suddenly on August 1, 2024 at age 73

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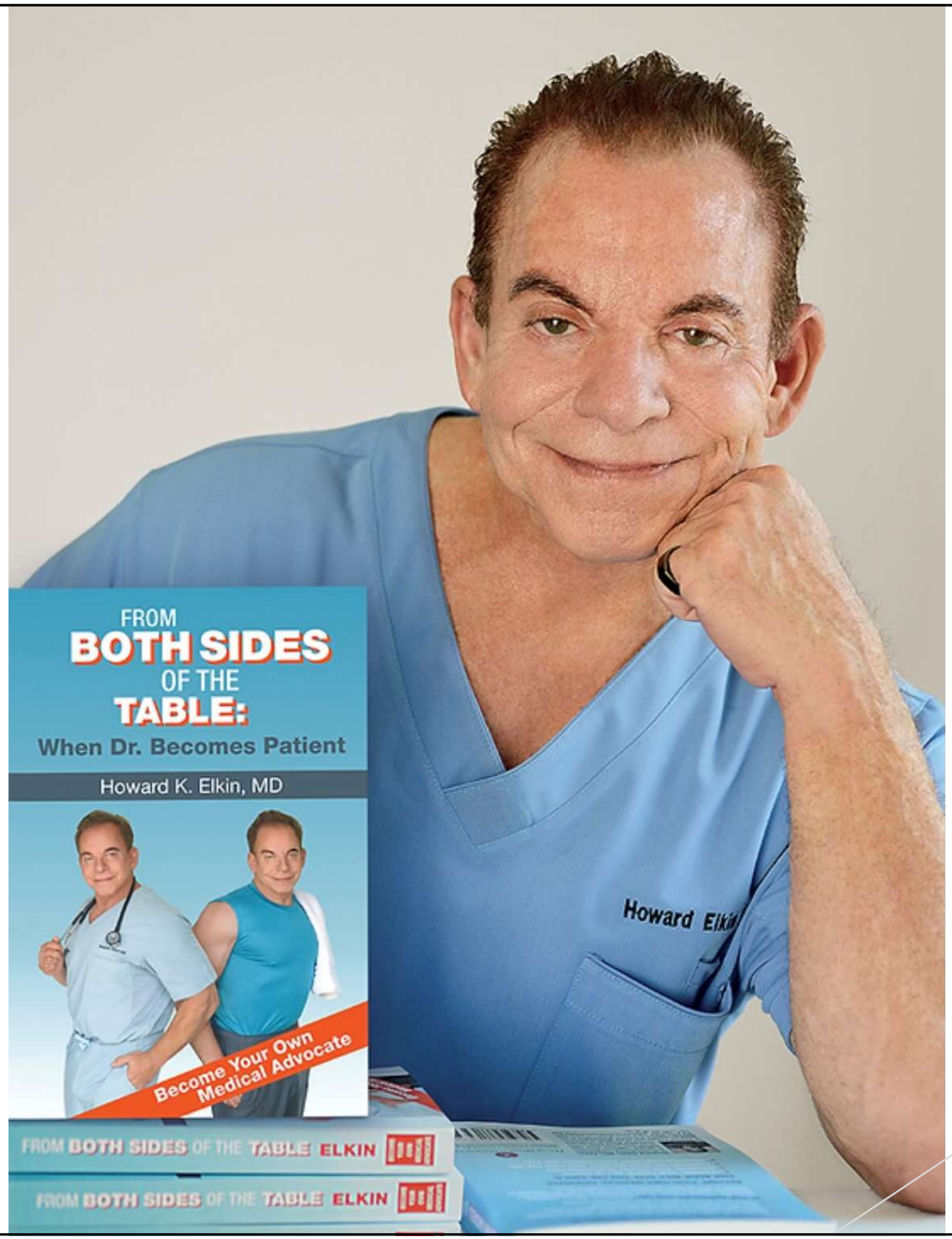

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Goals of the Presentation

- Explain Coronary Artery Disease and Mechanism from a non-cardiologist perspective
- Basic Lipid Profile vs Advanced Lipid Profile and how to interpret it—not to compete with the cardiologist, but because most cardiologists continue to rely on the basic lipid profile
- Direct Testing for Coronary Artery Disease
- Discuss dietary approaches, Nutritional Supplements, Medications, and Surgical Approaches, with an emphasis on diet and nutritional supplements

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CARDIOVASCULAR DISEASE STATISTICS

- Heart disease continues to be the leading cause of death in the United States in both men and women.
- Coronary Artery Disease (Ischemic Heart Disease) is the most common type of heart disease, killing 371, 506 people in the US in 2022.
- 805,000 people in the US sustain a heart attack (Myocardial Infarction) (MI) annually.
- Women are more fearful of breast cancer but in 2021 there were 310,661 deaths in women from CVD (1:5 deaths) as compared to 42,000 deaths from breast cancer

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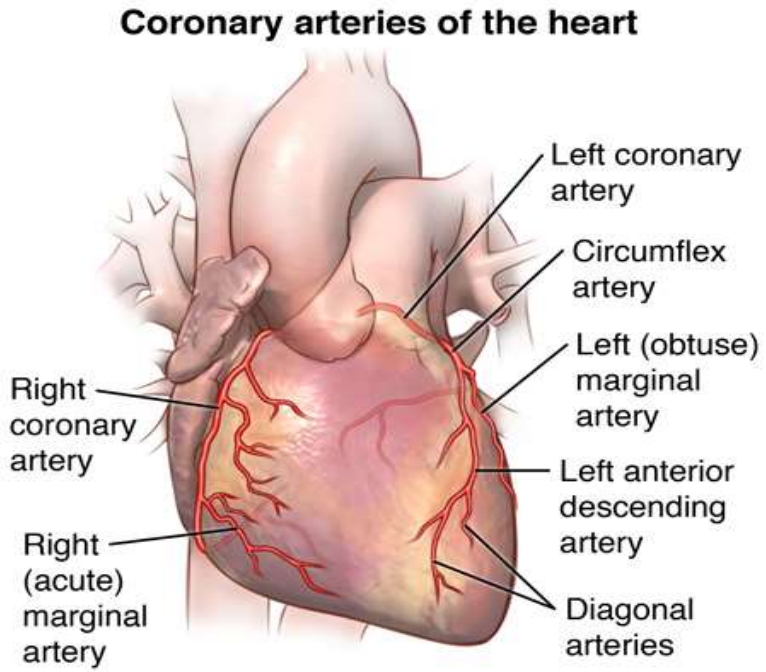
Coronary Arteries

1. Left main
2. **Left anterior descending** (Widowmaker) It is the largest coronary artery and it supplies over half of the heart muscle with blood.
3. Left circumflex artery
4. Right coronary artery



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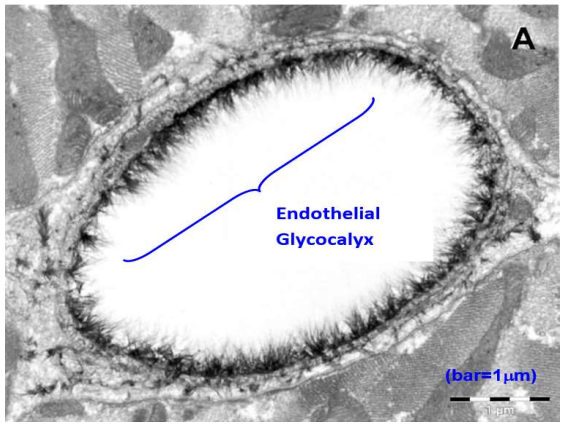
Coronary Artery Disease

- **Coronary Arteries become lined with plaque** that is composed of fatty material, oxidized cholesterol, inflammatory cells, white blood cells, immune cells, and smooth muscle cells. This can lead to decreased blood flow, resulting in angina
- **Plaque Rupture leads to MI.** If the plaque ruptures and forms a blood clot that can block the artery 100% resulting in a myocardial infarction (75% of heart attacks)
- **Inflammation/Oxidation.** The mere presence of cholesterol does not mean that plaques will develop. **There must also be inflammation or oxidative stress in the endothelial lining of the arteries, leading to endothelial damage leading to less production of nitric oxide, resulting in the arteries becoming stiffer, increased blood pressure, and increasing the risk that the artery can leak, burst or form a clot, leading to an MI or a stroke.**

Endothelium and the Glycocalyx

- The endothelium is a thin layer of cells that line the interior surface of blood vessels—one of the most important parts of the artery—makes numerous compounds, inc. nitric oxide, that regulate blood pressure, vascular inflammation, oxidative stress, and risk of clotting
- Endothelial dysfunction, or the loss of proper endothelial function, is a hallmark for vascular diseases, and is often regarded as a key early event in the development of atherosclerosis.
- One of the main mechanisms of endothelial dysfunction is the diminishing of nitric oxide, which reduces blood pressure and CHD
- The endothelial glycocalyx (eGCX) is a gel-like layer of glycoproteins and proteoglycans that coats the luminal surface of the vascular endothelium



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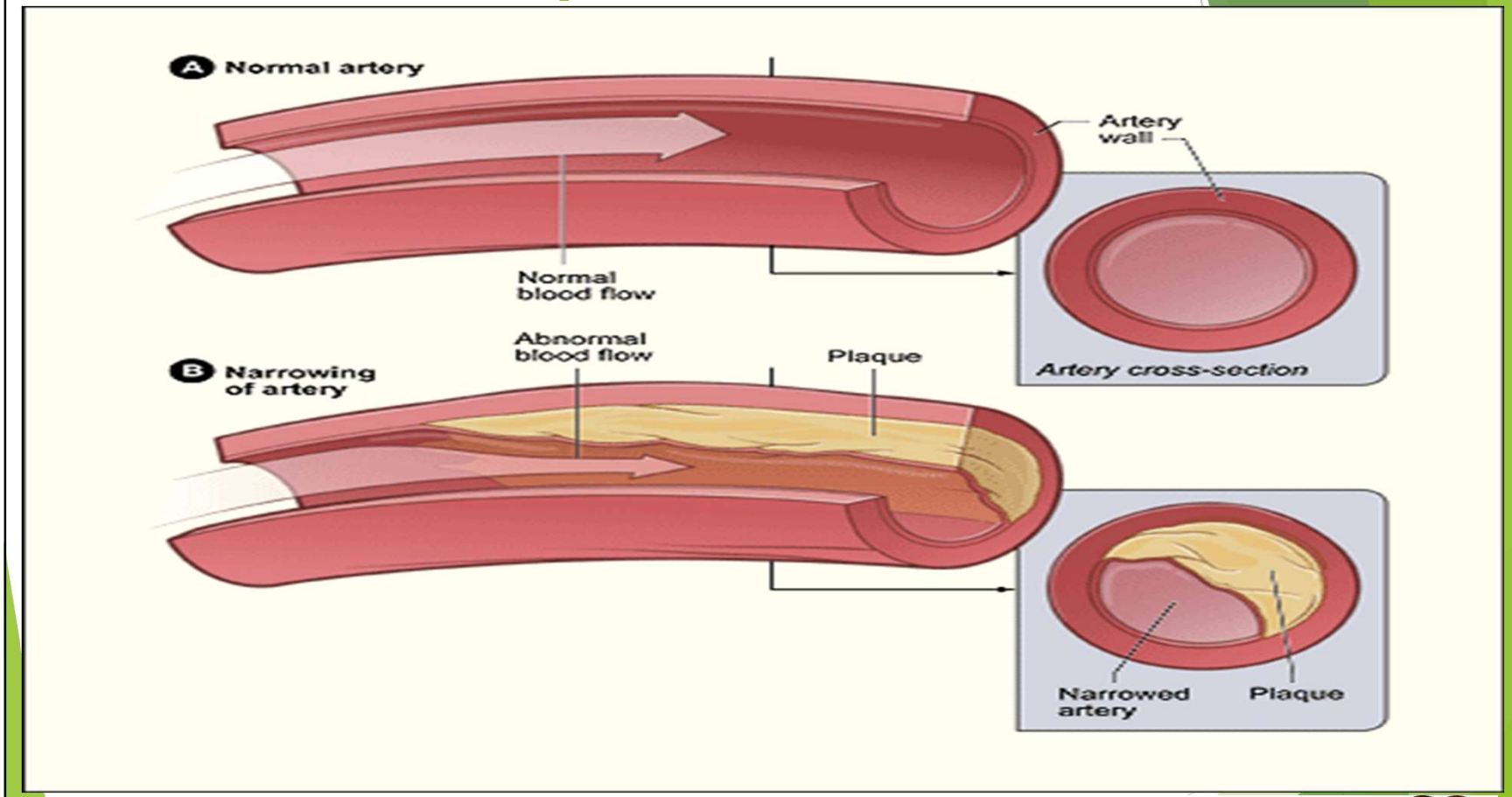
Arterial Plaque Formation



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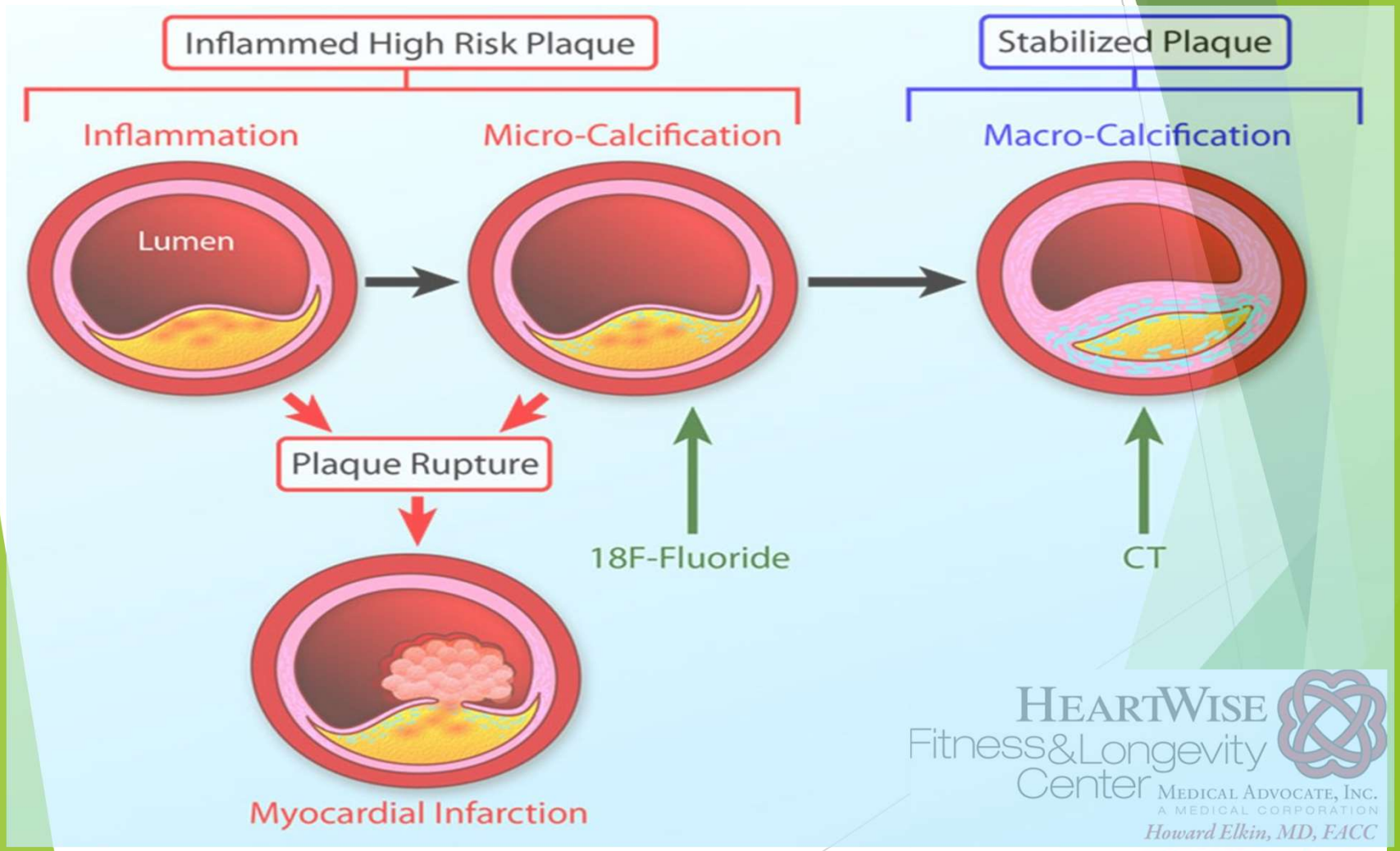
Rupture of Unstable Soft Plaque VS Calcified Stable Plaque



Dr. Houston's Recommended Supplements to Control Inflammation/Oxidation

1. Omega 3 fats==1-4 gm/day
2. Curcumin—1-2 gm/day
3. Boswellia—500 mg BID
4. Bromelin—200 mg BID
5. Cacao/dark chocolate
6. Quercetin—500 mg BID
7. Carnosine—500 mg BID
8. CoQ10—200 mg/day
9. Vit D—2000 IU/day
10. Vit C—500 mg BID
11. Vit E
12. Vit K2mk7 360 mcg
13. Lycopene—20 mg
14. Selenium—200 mcg
15. GLA—1 gm/day
16. R Lipoic acid100 mg BID
17. Lutein—5 mg/day
18. zinc—50 mg
19. Ginseng—200 mg
20. Pomegranate seeds—1/4 cup per day
21. Pycnogenol
22. Green Tea Extract
23. Trans Resveratrol 250 mg BID
24. Grape seed extract300 mg BID

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Top Antioxidant Foods

1. Small red beans
2. Wild blueberries
3. Red kidney beans
4. Pinto beans
5. Cultivated blueberries
6. Cranberries
7. Artichokes
8. Blackberries
9. Prunes
10. Raspberries

TOP RISK FACTORS FOR CAD

- HYPERTENSION
- SMOKING
- DYSLIPIDEMIA--cholesterol
- INSULIN RESISTANCE/DIABETES—3 times increased risk of Heart Disease--70% Diabetics will have a heart attack or stroke
- PHYSICAL INACTIVITY—not exercising is as bad as smoking
- OBESITY

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ADDITIONAL RISK FACTORS FOR CAD

- **Uric acid**—high uric acid increases risk for hypertension, endothelial dysfunction, high coronary artery calcium, stroke, MI, heart failure, chronic kidney disease—make sure to measure this—above 5.5
- Chronic kidney disease
- Elevated Fibrinogen—increased clotting
- **Elevated Iron/Ferritin**
- Lack of sleep
- Lack of exercise
- Stress
- **Homocysteine**
- Hypothyroid
- Low hormones
- Anything that causes inflammation, such as Chronic Infections (root canal), Toxins (heavy metals, mold, environmental toxins), Ultraprocessed foods, Gut dysbiosis (Dr. Elkin often ran GI Map on patients),
- **MICRONUTRIENT DEFICIENCIES**

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CHOLESTEROL CONTROVERSY

- **Is high cholesterol the cause of heart disease?**—a controversy that has been raised by a number of experts, including Dr. Jonny Bowden who wrote The Great Cholesterol Myth, along with Dr. Steven Sinatra, another great Integrative Cardiologist, who Dr. Elkin published a study with on the benefits of earthing for lowering blood pressure. Actually, when Dr. Sinatra died, Dr. Elkin, Jonny, Dr Drew Sinatra and I did a tribute podcast to him in December 2022.
- **Cholesterol essential** for production of Sex hormones, vitamin D, bile acids, and Brain health
- While cholesterol is contained in arterial plaques, it is **oxidation and inflammation** that set up storage and plaque rupture, so we should be focused on reducing those. According to Jonny Bowden, "trying to reduce the risk of heart disease by lowering your LDL cholesterol is like trying to reduce the calories on your whopper by taking off the lettuce."
- While we usually think that the lower the LDL-C the better, a recent study from U of Pitt found that the lowest risk for long-term mortality appears to exist in the **LDL-C range of 100-189 mg/dL** (Kip KE, Diamond D, Mulukutla S, Marroquin OC. Is LDL cholesterol associated with long-term mortality among primary prevention adults? A retrospective cohort study from a large healthcare system. BMJ Open. 2024 Mar 28;14(3):e077949. doi: 10.1136/bmjopen-2023-077949.)

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The Basic Lipid Profile

- When it comes to labs, the basic lipid profile continues to be the standard among conventional MDs, including cardiologists, while the advanced lipid profile should be a requirement. But it is not often done because it costs more and requires more time to review and explain to the patient and insurance companies run the health care system. They don't want to pay for it and they don't want to pay the doctor for the extra time required.
- **The Basic Lipid Profile** includes **Total Cholesterol, estimated LDL-C, HDL-C, and triglycerides—woefully inadequate.** But this is an add on to the CBC and Chem screen that are usually the only labs run and patients think that they are being adequately screened, when they have not been.
- If you, as their functional medicine doctor, run a detailed panel including advanced lipids, hormones, full thyroid, nutrients, etc. your patients will be impressed with how thorough you are being. Share the results with the PMD and they will be happy to work with you.

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Advanced Lipid Profile

- Some of the better Advanced Lipid Profiles are the Boston Heart Lab and the Cleveland Heart Lab, both of which Dr. Elkin used to run. I usually use Vibrant America, even though it lacks a few tests, but I can include thyroid, hormones, and nutrients and keep the cost around $400.
- An **Advanced Lipid Profile** should contain LDL particle size or small, dense LDL, LDL particle number, ApoB (Dr. Peter Attia' favorite marker for CAD risk), HDL particle number and possibly size or functionality, Oxidized LDL, Lp-PLAC, MPO, Lp(a), Homocysteine, HsCRP, IL6,
- Additional nutritionally oriented tests: Vit D, Omega 3 index, Vit K1, Vit K2, B12, folic acid, CoQ10, RBC Mg, zinc, copper, chromium
- Other tests: Uric Acid, ADMA (Nitric oxide analysis), TMAO, Ferritin—high iron increases risk, Fibrinogen—stickiness of the blood/platelet aggregation
- Genetics

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CardiaX—genetic test thru Vibrant America

1. 9p21
2. CYP4F2
3. 4q25
4. COMT
5. 1q25
6. CYP11B2
7. ApoE
8. GSHPx
9. MTHFR
10. Apo A2
11. CYP1A2
12. CYP4A11
13. Corin
14. ApoC3
15. NOS3
16. ACE I/D
17. ADR-B2
18. SCARB1
19. AGTR1
20. Apo A1
21. 6p24.1

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LIPOPROTEIN (a) Lp(a)

- A type of LDL particle that is known to be sticky and inflammatory
- High levels—above 30 mg/DL and certainly above 50 increases the likelihood of plaques or clots forming in the arteries and calcific aortic valve stenosis
- Incidence – 20-25% and more common in African ancestry
- Genetic
- There will be specific drugs on the market to lower it in a few years
- Statins may raise Lp(a)
- **PCSK9 inhibitors** 20-30% reduction
- **Niacin** 20-30% reduction
- **L-carnitine** 10-20% reduction
- **CoQ10** (100-300 mg) 10-30% reduction—also reduces LDL oxidation, increases HDL, improves endothelial function, and reduces blood pressure
- **Flaxseeds**—4-6 tablespoons—5-10% reduction
- **Vitamin C, L-Lysine, L-proline** inhibits Lp(a) from binding to artery walls (Linus Pauling)

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Homocysteine

- Homocysteine is an amino acid derived from methionine via methylation pathway
- Risk for heart disease start at levels of 5 mm/L
- Greatest risk starts at 12 or higher
- Associated with arterial damage, endothelial dysfunction, clotting, stroke, Coronary Artery Disease, neurodegenerative disease and kidney disease
- Treatment is methylated B vitamins (folate, B2, B6, B12), SAME, betaine, TMG, possibly NAC and vit C

Apo B TESTING

- Because there is one ApoB per LDL particle, regardless of density, ApoB detects the presence of these atherogenic particles, in contrast to LDL cholesterol, and thus may be better suited to guide lipid-lowering therapy.
- Is ApoB more important than LDL? Dr. Peter Attia thinks so
- Low density lipoprotein (LDL) cholesterol, aka the “bad” cholesterol, is often used as an indicator of heart disease and stroke risks. But some emerging evidence suggests that ApoB is an even more accurate marker that can identify potential high-risk patients.
- I would argue that there is not one marker to track for risk—need to look at the full picture

LDL PARTICLE NUMBER/SIZE

- Traditional lipid testing measures the amount of LDL cholesterol (LDL-C) present in the blood, but it does not count the number of LDL particles (LDL-P).
- LDL-P is often used to get a more accurate measure of LDL due to the variability of cholesterol content within a given LDL.
- Small, dense LDL more atherogenic/more likely to penetrate through the artery wall to form a plaque

HEART ATTACK SYMPTOMS

- 45% of all heart attacks are silent
- Chest discomfort/pain
- Shortness of breath
- Diaphoresis
- Nausea and vomiting
- Lightheadedness
- Upper extremity discomfort (Pain in shoulders, arms, neck, face, or upper back)

STRESS TESTING

- Treadmill testing
- Stress Echocardiography
- Nuclear stress testing—radioactive substance injected and cardiac imaging before and after exercise

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DIRECT ARTERY TESTING

- **Coronary Artery Calcium scan**—measures calcified plaque
- **Cardiac catheterization**--angiogram (gold standard)—a catheter is threaded through the arm or leg to reach the heart, where it injects dye into its arteries so X-ray images can capture how blood flows through the vessels. Though serious complications from the procedure are rare, they potentially include injury to the catheterized artery, an allergic reaction or kidney damage from the dye, as well as heart attack, stroke and more.
- **Coronary CT angiogram with artificial intelligence—CLEERLY Health scan**—visualizes soft as well as calcified plaque—noninvasive—uses less radioactive dye than cardiac cath.
- **EndoPAT and Pulse Wave Velocity** to measure endothelial dysfunction—machines used in office—most cardiologists do not use
- **Carotid Artery ultrasound VS Carotid Intimal Medial Thickness**—Ultrasound better predicts future events but CIMT can measure the actual degree of inflammation and plaque that exists in the lining of the artery

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Lipid Tests

Total Cholesterol	148				
	<200	200-240	>240 mg/dL		
Direct LDL-C		79			
	<70	70-100	>100 mg/dL		
HDL-C	54				
	>50	40-50	<40 mg/dL		
Triglycerides	75				
	<150	150-200	>200 mg/dL		
Non-HDL-C	94				
	<100	100-130	>130 mg/dL		
ApoB	76				
	<80	80-120	>120 mg/dL		
LDL-P[1]		1165			
	<1100	1100-1800	>1800 nmol/L		
sdLDL-C[1]		21			
	<20	20-40	>40 mg/dL		
%sdLDL-C		27			
	<20	20-30	>30 %		
VLDL-C	15				
	<30	30-40	>40 mg/dL		
Lp(a)	<15				
	<30	30-50	>50 mg/dL		
ApoA-1		146.0			
	>160	120-160	<120 mg/dL		

Boston Heart HDL Map® Test[1,6]

α-1	39.0				
	>35	25-35	<25 mg/dL		
α-2	56.9				
	>55	45-55	<45 mg/dL		
α-3	19.8				
	<20	20-25	>25 mg/dL		
α-4	16.6				
	<20	20-25	>25 mg/dL		
preβ–1	11.2				
	<20	20-25	>25 mg/dL		

Interpretation: This HDL map is **OPTIMAL** and is associated with a lower risk of CVD.

Boston Heart Cholesterol Balance® Test[1]

Normalized Value (µmol x 100/mmol of Total Cholesterol)
Absolute Value (mg/L)

	Normalized Value	Absolute Value	Notes
Production Markers: LOW			
Lathosterol	81	1.2	
90 – 160			
Desmosterol	<51	<0.8	
70 – 90			
Absorption Markers: HIGH			
Beta-sitosterol	447	7.1	
100 – 180			
Campesterol	496	7.6	
150 – 260			

Cholesterol Balance Score (Production/Absorption) **TNP**

Over Absorber — 0.2 — 0.5 — 1.1 — Over Producer

Interpretation: Increased amounts of Beta-sitosterol and Campesterol may indicate an

Inflammation Tests

Test Name	Optimal	Borderline	High Risk	Notes	Previous Results
Fibrinogen	296				
	<370	370-470	>470 mg/dL		
hs-CRP	0.4				
	<1.0	1.0-3.0	>3.0 mg/L		
$LpPLA_2$ Activity	121				
	<180	180-224	≥225 nmol/min/mL		
MPO[1]	287				
	<470	470-539	≥540 pmol/L		

Metabolic Tests

Test Name	Optimal	Borderline	High Risk	Notes	Previous Results
HbA1c	5.6				
	<5.7	5.7-6.4	>6.4 %		
HOMA-IR	0.6				
	<2	2-3	>3		
Glucose[2]	86				
	70-99	100-125	<70 or >125 mg/dL		
GSP		203			
	<200	200-250	>250 µmol/L		
Adiponectin[1]			5.8		
	>10	7-10	<7 µg/mL		

Test Name	Low	Optimal	High	Notes	Previous Results
Insulin[3]	3			9	
	<5	5-15	>15 µU/mL		
C-Peptide[3]		1.67		9	
	<1.40	1.40-3.30	>3.30 ng/mL		

Interpretation:
LOW Adiponectin levels indicate high risk of developing insulin resistance and diabetes.

Consideration: Consider encouraging dietary modification supported by education. If indicated encourage weight reduction, smoking cessation, increased activity and control blood pressure.

Cardiac Muscle Function Tests

Test Name	Optimal	Borderline	High Risk	Notes	Previous Results
NT-proBNP		140		9	
	<125	125-450	>450 pg/mL		

Genetic Tests by Genotyping[1,4]

Test Name	Test Result	Interpretation	Notes
Reported Date: 06.18.18			
Statin Induced Myopathy (SLCO1B1)[7]	T/T	Normal statin transporter.	
Reported Date: 06.18.18			
ApoE	E3/E4	Genotype associated with higher LDL-C levels than the common E3/E3. E4 individuals can have greater intestinal absorption and delayed clearance of cholesterol than E3 leading to elevated LDL-C. Consider recommending lifestyle modification and combination therapy with statin and ezetimibe.	

Test Name	Test Result	Interpretation	Notes
Reported Date: 06.18.18			
Factor II	-/-	Normal risk of clot formation.	
Reported Date: 06.18.18			
Factor V Leiden	-/-	Normal risk of clot formation.	
Reported Date: 06.18.18			
MTHFR	677 C/T 1298 A/C	677(C/T) genotype – single copy of variant. 1298(A/C) genotype – single copy of variant. Due to elevated homocysteine consider nutritional therapy and/or folate and other B vitamin supplementation.	10

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Boston Heart Fatty Acid Balance™ Test[1]

Saturated Fatty Acid Index	28.7			Saturated FA Index is OPTIMAL.		
	<30.0	30.0-33.0	>33.0 %			
Trans Fatty Acid Index	0.44			Trans FA Index is OPTIMAL.		
	<0.50	0.50-0.70	>0.70 %			
	Optimal	Borderline	Low			
Monounsaturated Fatty Acid Index		19.6		Monounsaturated FA Index is BORDERLINE. Higher plasma levels of MUFA have been associated with a lower risk of CVD. Consider increasing intake of almonds, avocado or plant based oils (including olive).		
	>22.0	19.0–22.0	<19.0 %			
Unsaturated/Saturated Ratio Index	2.43			Unsaturated/Saturated Ratio Index is OPTIMAL.		
	>2.25	2.00–2.25	<2.00			
Omega-3 Fatty Acid Index	4.83			Omega-3 FA Index is OPTIMAL. Eicosapentaenoic Acid (EPA) level is BORDERLINE. Increased EPA levels have been associated with lower risk of heart disease. Docosahexaenoic Acid (DHA) level is BORDERLINE. Increased DHA levels have been associated with a lower risk of heart disease. The Omega-3 FA Index is the amount of EPA and DHA divided by total fatty acids. Consider recommending consumption of at least 2-3 meals of oily fish such as salmon, sardines, herring, tuna, and mackerel weekly or a fish oil or EPA supplement.		
	>4.50	2.50-4.50	<2.50 %			
EPA		44.2				
	>50.0	20.0-50.0	<20.0 µg/mL			
DHA		76.1				
	>100.0	60.0-100.0	<60.0 µg/mL			
ALA		26.0		Alpha Linolenic Acid (ALA) level is BORDERLINE. Higher levels of ALA have been associated with a lower risk of CVD. Consider recommending increasing intake of walnuts, chia seeds, ground flaxseeds, and canola or flaxseed oil.		
	>30.0	14.0–30.0	<14.0 µg/mL			

Chemistry Tests

Test Name	Low	Optimal	High	Notes	Previous Results
BUN		19.0			
	<3.0	3.0-25.0	>25.0 mg/dL		
Creatinine		1.14			
	<0.67	0.67-1.17	>1.17 mg/dL		
Albumin		4.7			
	<3.5	3.5-5.2	>5.2 g/dL		
Uric Acid	6.8				
	<7	7-10	>10 mg/dL		
Glucose[2]	86				
	70-99	100-125	<70 or >125 mg/dL		
AST	36				
	<40	40-120	>120 U/L		
ALT	34				
	<40	40-120	>120 U/L		
Alkaline Phosphatase	65				
	<130	130-200	>200 U/L		

Thyroid Tests

Test Name	Low	Optimal	High	Notes	Previous Results
TSH		2.10		9	
	<0.27	0.27-4.2	>4.2 µIU/mL		

Other Kidney Tests

Test Name	Optimal	Borderline	High Risk	Notes	Previous Results
Cystatin C	0.81				
	<=1.20		>1.20 mg/L		
BUN/Creatinine	16.7				
	<=23		>23		
eGFR / Non-African American	76			11	
	>60	30-60	<30 mL/min/1.73 m²		
eGFR / African American	88			11	
	>60	30-60	<30 mL/min/1.73 m²		
eGFR / Cystatin C	108.36			11	
	>60	30-60	<30 mL/min /1.73m²		

Muscle Tests

Test Name	Low	Mid	High	Notes	Previous Results
Creatine Kinase (CK)		509			
	<300	300-1500	>1500 U/L		

Other Tests

Other Tests

Test Name	Optimal	Borderline	High Risk	Notes	Previous Results
Vitamin D, 25-OH		43			
	<30	30-100	>100 ng/mL		
CoQ10[1]		0.97		6	
	>1.40	0.70-1.40	<0.70 mg/L		
Homocysteine		12.2			
	<10	10-14	>14 µmol/L		

Male Hormone Tests

Test Name	Test Results	Range	Notes	Previous Results
Estradiol	65.2	11.3-43.2 pg/mL	9	
Progesterone	0.35	<0.05-0.15 ng/mL	9	
LH	<0.1	1.7-8.6 mIU/mL	9	
FSH	<0.3	1.5-12.4 mIU/mL	9	
SHBG	60.1	16.5-55.9 nmol/L	9	

Test Name	Test Results	Range	Notes	Previous Results
Total Testosterone	2430.8	249.0-836.0 ng/dL	9	
Free Testosterone	517.2	50.0-210.0 pg/mL	9	
DHEA-S	141.4	44.3-331.0 µg/dL	9	

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Cardiac Health Panel

VibrantAmerica
Vibrant America | 3521 Leonard Ct., Santa Clara, CA 95054
1(866) 364-0963 | support@vibrant-america.com | www.vibrant- america.com

LAST NAME	FIRST NAME	GENDER	DATE OF BIRTH	ACCESSION ID	DATE OF SERVICE
[redacted]		MALE	[redacted]		

Lipids

Test name	In Control	Moderate	High Risk	In Control Range	Moderate Range	High Risk Range	Previous
Cholesterol, Total (mg/dL)		231		≤199	200~240	≥241	
LDL Calculation (mg/dL)			165	≤99	100~129	≥130	
HDL Direct (mg/dL)		39		≥56	35~55	≤34	
Cholesterol/HDL Ratio			5.9	≤3.5	3.6~4.9	≥5.0	
Triglyceride (mg/dL)	134			≤149	150~200	≥201	

LDL Direct

Test name	In Control	Moderate	High Risk	In Control Range	Moderate Range	High Risk Range	Previous
LDL Direct (mg/dL)			158	≤99	100~129	≥130	

Apolipoproteins

Test name	In Control	Moderate	High Risk	In Control Range	Moderate Range	High Risk Range	Previous
Apo B (mg/dL)			135	≤89	90~119	≥120	

Inflammation

Test name	In Control	Moderate	High Risk	In Control Range	Moderate Range	High Risk Range	Previous
PLAC (nmol/min/mL)	190			≤224		≥225	
Homocysteine (µmol/L)		11		≤9	10~14	≥15	
hs-CRP (mg/L)			4.5	≤0.9	1.0~3.0	≥3.1	
ox-LDL* (U/L)	32.8			≤60.0	60.1~70.0	≥70.1	
MPO* (pmol/L)	555.0			≤599.9	600.0~ 2999.9	≥3000.0	

LipoProtein Markers

Test name	In Control	Moderate	High Risk	In Control Range	Moderate Range	High Risk Range	Previous
sdLDL* (mg/dL)	43.3			≤50.0		≥50.1	
Lp(a) (mg/dL)	<7			≤29		≥30	

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Diabetes Panel

VibrantAmerica
Vibrant America | 3521 Leonard Ct., Santa Clara, CA 95054
1(866) 364-0963 | support@vibrant-america.com | www.vibrant- america.com

LAST NAME	FIRST NAME	GENDER	DATE OF BIRTH	ACCESSION ID	DATE OF SERVICE
[redacted]		MALE	[redacted]		

Glycemic Control

Test name	In Control	Moderate	High Risk	In Control Range	Moderate Range	High Risk Range	Previous
Hemoglobin A1c (%)		6.2		≤5.6	5.7~6.4	≥6.5	

Beta Cell Function

Test name	In Control	Moderate	High Risk	In Control Range	Moderate Range	High Risk Range	Previous
Insulin (µU/mL)	16.3			2.6~24.9		≤2.5 ≥25.0	

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Liver & Kidney Function Panel

VibrantAmerica
Vibrant America | 3521 Leonard Ct., Santa Clara, CA 95054
1(866) 364-0963 | support@vibrant-america.com | www.vibrant- america.com

LAST NAME	FIRST NAME	GENDER	DATE OF BIRTH	ACCESSION ID	DATE OF SERVICE
[redacted]		MALE	[redacted]		

Comprehensive Metabolic Panel

Test Name	Current	Reference Range	Previous
Sodium (mmol/L)	139	136~145	
Potassium (mmol/L)	5.1	3.5~5.1	
Chloride (mmol/L)	102	98~107	
Carbon Dioxide (mmol/L)	24	18~29	
Glucose(Renal) (mg/dL)	**113 H**	70~100	
BUN (mg/dL)	**24 H**	6~20	
Creatinine (mg/dL)	1.06	0.70~1.20	
eGFR (mL/min/1.73m2)	80	≥60	
eGFR(African-American) (mL/min/1.73m2)	>90	≥60	
BUN/Creatinine Ratio	**23 H**	10~20	
Calcium (mg/dL)	9.5	8.9~10.6	
Albumin (g/dL)	4.7	3.5~5.2	
ALT (U/L)	39	≤41	
AST (U/L)	27	≤40	
Bili, Total (mg/dL)	0.6	≤1.2	
Protein, Total (g/dL)	7.3	6.2~8.0	
Alkaline Phosphatase (U/L)	74	40~129	
Serum osmolality, calculated (mOsm/kg)	303.0	285.0~315.0	

Thyroid Panel

VibrantAmerica
Vibrant America | 3521 Leonard Ct., Santa Clara, CA 95054
1(866) 364-0963 | support@vibrant-america.com | www.vibrant- america.com

LAST NAME	FIRST NAME	GENDER	DATE OF BIRTH	ACCESSION ID	DATE OF SERVICE
[redacted]		MALE	[redacted]		

Thyroid

Test Name	Current	Reference Range	Previous
Free T3 (pg/mL)	2.8	2.0~4.4	
Free T4 (ng/dL)	1.3	0.9~1.7	
TSH (µIU/mL)	3.540	0.111~4.910	
Anti-TPO (IU/mL)	<12	≤34	
Reverse T3* (ng/dL)	20	7~23	
Anti-TG (IU/mL)	15.6	≤115.0	

Hormones Panel

VibrantAmerica
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LAST NAME	FIRST NAME	GENDER	DATE OF BIRTH	ACCESSION ID	DATE OF SERVICE
[redacted]		MALE	[redacted]		

Hormones

Test Name	Current	Reference Range	Previous
Estradiol (pg/mL)	**21.5 L**	25.8~60.7	
DHEA-S (µg/dL)	**412.0 H**	44.3~331.0	
SHBG (nmol/L)	22.4	16.5~55.9	
Testosterone, Total (ng/dL)	**145.0 L**	204.7~1450.1	
Free Testosterone (ng/dL)	**3.17 L**	3.55~36.86	

Complete Blood Count

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LAST NAME	FIRST NAME	GENDER	DATE OF BIRTH	ACCESSION ID	DATE OF SERVICE
[redacted]		MALE	[redacted]		

CBC w/ differential and Platelets

Test Name	Current	Reference Range	Previous
WBC (x 10^3/µL)	7.94	4.23~9.07	
RBC (x 10^6/µL)	5.66	4.63~6.08	
Hemoglobin (g/dL)	16.8	13.7~17.5	
Hematocrit (%)	49.1	40.1~51.0	
MCV (x 10^3/µL)	86.7	79.0~92.2	
MCH (pg)	29.7	25.7~32.2	
MCHC (g/dL)	34.2	32.3~36.5	
RDW - SD (fL)	40.1	35.1~43.9	
RDW - CV (%)	12.8	11.6~14.4	
Platelet Count (x 10^3/µL)	261.0	129.0~326.0	
Neutrophil (%)	36.9	34.0~67.9	
Lymphocytes (%)	52.4	21.8~53.1	
Monocytes (%)	7.4	5.3~12.2	
Eosinophils (%)	1.4	0.8~7.0	
Basophils (%)	**1.3 H**	0.2~1.2	
Immature Granulocyte (%)	0.6	≤2.1	
Neutrophil Count (x 10^3/µL)	2.93	1.78~5.38	
Lymphocyte Count (x 10^3/µL)	**4.16 H**	1.32~3.57	
Monocytes Count (x 10^3/µL)	0.59	0.20~0.90	
Eosinophil Count (x 10^3/µL)	0.11	≤0.54	
Basophil Count (x 10^3/µL)	**0.10 H**	≤0.08	
Immature Granulocyte Count (x 10^3/µL)	0.050	≤0.100	
MPV (Mean Platelet Volume) (fL)	12.2	9.4~12.4	
Nucleated RBC count (x 10^3/µL)	<0.010	≤0.012	
Nucleated RBC % (/100WBC)	<0.0	≤0.2	

Other Markers

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LAST NAME	FIRST NAME	GENDER	DATE OF BIRTH	ACCESSION ID	DATE OF SERVICE
[redacted]		MALE	[redacted]		

Other Markers

Test Name	Current	Reference Range	Previous
Uric Acid (mg/dL)	**10.5 H**	3.4~7.0	
Human IGF-I (ng/mL)	102	48~209	
GGT (U/L)	22	≤60	

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Omega Fatty Acids

VibrantAmerica
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1(866) 364-0963 | support@vibrant-america.com | www.vibrant- america.com

LAST NAME	FIRST NAME	GENDER	DATE OF BIRTH	ACCESSION ID	DATE OF SERVICE
[redacted]		MALE	[redacted]		

Fatty Acids: Omega-3 & 6

Test Name	Current	Reference Range	Previous
Docosahexaenoic acid (DHA)* (%)	9.06	2.42~10.52	
Eicosapentaenoic acid (EPA)* (%)	0.90	0.15~2.26	
Docosapentaenoic acid (DPA)* (%)	0.92	0.45~1.80	
Total Omega-3* (%)	11.57	3.25~13.99	
Arachidonic acid (AA)* (%)	18.85	5.50~19.01	
Linoleic acid (LA)* (%)	7.43	3.22~10.49	
Total Omega-6* (%)	31.13	11.03~34.96	
AA/EPA	**20.9 H**	2.5~10.9	

Index

Test name	In Control	Moderate	High Risk	In Control Range	Moderate Range	High Risk Range	Previous
Omega-3 Index* (%)	9.96			8.00~12.65	2.66~7.99	≤2.65 ≥12.66	

Labnotes

Omega-3 Index :- Omega-3 Index is the sum of EPA % and DHA % as measured in red blood cells, and derived by validated calculations to yield the equivalent sum of EPA % and DHA % in red blood cell membranes.
Please note this value is a percentage, with the denominator being the sum of all Fatty Acids measured in the red blood cells and thus the index can vary based on fatty acid composition of the diet.

DIAGNOSTIC AND WELLNESS CENTER
AT HARBOR-UCLA MEDICAL CENTER

Coronary Calcium Report

Mail to:

Referring Physician:
Elkin, Howard
8038 Painter Avenue
Whittier, CA 90602

Date of Birth
Reading Physician: Matthew Budoff, MD

Procedure Date:
Gender:

Procedure:
Coronary Artery Scanning (CAC) -- CT of the chest was performed on a GE Revolution 256-Slice scanner with at least 30 slices of 2.5mm using high-resolution, volume mode scanning in order to visualize the coronary arteries. There are four major coronary arteries.
CAC Series DLP: 63.20, CTDIvol: 4.51
BP: 158/84 HR: 70

Findings:

Coronary Artery	Prior CAC Score	Current Score
Date		8/3/2023
Left Main		26
Left Anterior Descending		1502
Circumflex		224
Right		1335
Total		3087

Interpretation:

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Cardiometabolic Report

Test Name	Current Result & Relative Risk: Optimal	Current Result & Relative Risk: Non-Optimal	Reference Range/Relative Risk Categories: Optimal	Moderate	High	Units	Historical Result & Relative Risk 03/15/2021	Historical Result & Relative Risk //
INFLAMMATION								
Myeloperoxidase[21]		579	<470	470-539	≥540	pmol/L	629	
Lp-PLA$_2$ Activity[11]	74		≤123	N/A	>123	nmol/min/mL	85	
hs-CRP		3.4	<1.0	1.0-3.0	>3.0	mg/L	7.3	
ADMA (Asymmetric dimethylarginine)[2]		135	<100	100-123	>123	ng/mL		
SDMA (Symmetric dimethylarginine)		205 H		73-135		ng/mL		
OxLDL	39		<60	60-69	≥70	U/L	38	

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LIPIDS							
Lipid Panel							
Cholesterol, Total	119	<200	N/A	≥200	mg/dL	132
HDL Cholesterol	34	≥40	N/A	<40	mg/dL	32
Triglycerides	177	<150	150-199	≥200	mg/dL	115
LDL Cholesterol	60	<100	100-129	≥130	mg/dL (calc)	79
Chol/HDL-C	3.5	≤3.5	3.6-5.0	>5.0	calc	4.1
Non-HDL Cholesterol	85	<130	130-189	≥190	mg/dL (calc)	100
Ion Mobility Fractionation							
LDL Particle Number	1259	<1138	1138-1409	>1409	nmol/L	1236
LDL Small	261	<142	142-219	>219	nmol/L	267
LDL Medium	204	<215	215-301	>301	nmol/L	240
HDL Large	6657	>6729	6729-5353	<5353	nmol/L	4963

Test Name	Current Result & Relative Risk		Reference Range/Relative Risk Categories				Historical Result & Relative Risk	
	Optimal	Non-Optimal	Optimal	Moderate	High	Units	03/15/2021	/ /
LDL Pattern		B	A		B	Pattern	B	
LDL Peak Size[14]		210.3	>222.9	222.9-217.4	<217.4	Angstrom	212.7	
Apolipoproteins								
Apolipoprotein B	59		<90	90-119	≥120	mg/dL	77	
Lipoprotein (a)	12		<75	75-125	>125	nmol/L		
HDLfx Apolipoproteins								
AALP Apo A1[4]		136.06 L		181.36-359.23		nmol/L		
AALP Apo C1[5]		10.85 L		23.11-57.57		nmol/L		
AALP Apo C2[6]		1.57 L		3.67-14.55		nmol/L		
AALP Apo C3[7]		8.42 L		11.34-40.54		nmol/L		
AALP Apo C4[8]		0.12 L		0.29-1.10		nmol/L		
HDLfx Score								
HDLfx pCAD Score	0.65		≤0.90	N/A	>0.90			

METABOLIC							
Glucose	103	65-99	100-125	<65 OR ≥126	mg/dL	142
HbA1c	5.3	<5.7	5.7-6.4	>6.4	%	8.0
Estimated Average Glucose	105	<117	117-137	>137	mg/dL	183
Adiponectin(1)	3.0		SEE COMMENT		ug/mL	5
Cystatin C with eGFR						
Cystatin C	2.15 H		0.52-1.16		mg/L	2.27
eGFR	26 L		≥60		mL/min/1.73 m²	25
Homocysteine	20.0	<11.4	N/A	≥11.4	umol/L	31.0
Insulin Resistance Panel w/Score						
Insulin Resistance Score	59	<33	33-66	>66		68
Insulin, Intact, LC/MS/MS(12)	6	≤16	N/A	>16	uIU/mL	8

Test Name	Result & Relative Risk		Optimal	Moderate	High	Units	Result & Relative Risk
	Optimal	Non-Optimal					03/15/2021 / /
C-peptide, LC/MS/MS[13]		3.09	≤2.16	N/A	>2.16	ng/mL	3.14
VITAMINS/SUPPLEMENTS							
Coenzyme Q10[3]	0.67		>0.35	N/A	<0.36	ug/mL	0.66
Folate, Serum	23.8			>5.4		ng/mL	
Vitamin B12	480			200-1100		pg/mL	602
Vitamin D, 25-Hydroxy by LC-MS/MS[22]	39.6		≥30.0	20.0-29.9	<20.0 OR >150.0	ng/mL	38.8
FATTY ACIDS							
OmegaCheck® (Whole Blood: EPA+DPA +DHA)[10]	6.5		≥5.5	3.8-5.4	≤3.7	% by wt	5.2
Arachidonic Acid/EPA Ratio	8.3			3.7-40.7			13.2
Omega-6/Omega-3 Ratio	5.8			3.7-14.4			7.6
Omega-3 total		6.5				% by wt	5.2
EPA	1.3			0.2-2.3		% by wt	1.0
DPA	1.6			0.8-1.8		% by wt	1.1
DHA	3.6			1.4-5.1		% by wt	3.1
Omega-6 total		37.5				% by wt	39.5
Arachidonic Acid	10.8			8.6-15.6		% by wt	13.2
Linoleic Acid	24.3			18.6-29.5		% by wt	23.9

GENETIC CARDIOVASCULAR MARKERS

Test Name	Result	Comments (See Guidance Statements)
KIF6 Genotype[18] (SJC)	Trp/Trp	Homozygous noncarrier: See Guidance Statements.
9p21 Genotype[16] (SJC)		Homozygous carrier (rs10757278 and rs1333049). Increased 9p21 associated CVD risk. See Guidance Statements.
rs10757278[SJC]	gg	
rs1333049[SJC]	cc	
ApoE Genotype[17] (SJC)	3/3	Apo E3 Carrier. Most common (normal) genotype. See Guidance Statements.
4q25-AF Risk Genotype[15] (SJC)		rs2200733 homozygous noncarrier and rs10033464 heterozygous carrier: increased 4q25 associated risk of atrial fibrillation and/or cardioembolic stroke. See Guidance Statements.

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Test Name	Current Result & Relative Risk		Reference Range/Relative Risk Categories				Historical Result & Relative Risk
	Optimal	Non-Optimal	Optimal	Moderate	High	Units	03/15/2021 / /
Test Name		**Result**	**Comments (See Guidance Statements)**				
rs2200733(SJC)		cc					
rs10033464(SJC)		gt					
Factor V Leiden Mutation(19) (SJC)		NEGATIVE	FACTOR V LEIDEN (R506Q) VARIANT NOT DETECTED See Guidance Statements.				
MTHFR Mutation(20) (SJC)		POSITIVE	RESULT: POSITIVE FOR ONE COPY OF THE C677T VARIANT See Guidance Statements.				

UND = UNDETECTABLE INC = INCOMPUTABLE

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ROUTINE PANELS

Comprehensive Metabolic Panel

Glucose		103 H	65-99	mg/dL	Z4M	142 H

For someone without known diabetes, a fasting glucose value between 100 and 125 mg/dL is consistent with prediabetes and should be confirmed with a follow-up test.

Calcium, Total	9.5		8.5-10.5	mg/dL	Z4M	9.7
Sodium	139		136-145	mmol/L	Z4M	139
Potassium	4.1		3.5-5.1	mmol/L	Z4M	4.6
Chloride	106		95-108	mmol/L	Z4M	102
CO_2 (Carbon Dioxide, Bicarbonate)	24		21-33	mmol/L	Z4M	22
BUN (Blood Urea Nitrogen)		36 H	8-23	mg/dL	Z4M	44 H
Creatinine		1.48 H	0.70-1.28	mg/dL	Z4M	1.74 H
BUN/Creatinine Ratio		24 H	6-22	calc	Z4M	25 H
Protein, Total	6.8		6.1-8.0	g/dL	Z4M	7.6

Results (Non-Cardiometabolic)

Test Name	Current Result In Range	Current Result Out of Range	Reference Range	Units	Lab	Historical Results 03/15/2021	Historical Results / /
Albumin	4.6		3.5-5.5	g/dL	Z4M	5.0	
Globulin	2.2		1.8-3.8	g/dL (calc)	Z4M	2.6	
Albumin/Globulin Ratio	2.1		1.0-2.5	calc	Z4M		
ALP (Alkaline Phosphatase)	96		<150	U/L	Z4M	118	
ALT (Alanine Amino Transferase)	17		9-46	U/L	Z4M	13	
AST (Aspartate Amino Transferase)	15		10-35	U/L	Z4M	21	
Bilirubin, Total	0.4		<1.3	mg/dL	Z4M	0.4	
eGFR		49 L	≥60	mL/min/1.73 m²	Z4M		

The eGFR is based on the CKD-EPI 2021 equation. To calculate the new eGFR from a previous Creatinine or Cystatin C result, go to https://www.kidney.org/professionals/kdoqi/gfr%5Fcalculator.

Historical eGFR						
eGFR, Non-African descent				mL/min/1.73 m²	Z4M	38 L
eGFR, African descent				mL/min/1.73 m²	Z4M	44 L

GENERAL CHEMISTRY					
Uric Acid	7.9	3.2-8.6	mg/dL	Z4M	
THYROID FUNCTION					
Thyroid Stimulating Hormone (TSH)[9]	3.00	0.40-4.50	mIU/L	Z4M	1.66
For additional information, please refer to http://education.QuestDiagnostics.com/faq/FAQ138					
Triiodothyronine (T3), Free	2.3	2.0-4.4	pg/mL	Z4M	2.2
ENZYMES					
Gamma Glutamyl Transferase (GGT)	26	8-61	U/L	Z4M	
ANEMIA/IRON METABOLISM					
Ferritin	115	18-300	ng/mL	Z4M	
For additional information, please refer to https://www.clevelandheartlab.com/biotinFAQ/ (this link is being provided for informational/educational purposes only).					
Iron	93	30-140	ug/dL	Z4M	

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Quest Diagnostics™

ClevelandHeartLab®
Know your risk.

Report Status: Final

Patient Information	Specimen Information	Client Information
DOB: AGE: Gender: Fasting: Fasting Patient ID:	Order ID: Collected: Received: Reported:	HOWARD KEITH ELKIN, M.D.

Test Name	Current Result & Relative Risk		Reference Range/Relative Risk Categories				Historical Result & Relative Risk	
	Optimal	Non-Optimal	Optimal	Moderate	High	Units	03/15/2021	//
C-peptide, LC/MS/MS[130]		3.09	≤2.16	N/A	>2.16	ng/mL	3.14	

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REDUCE CAD RISK WITH LIFESTYLE

- Smoking cessation
- Healthy diet
- Regular exercise (both resistance training and cardiovascular exercise)
- Weight loss—visceral adipose tissue more associated with heart disease
- Adequate sleep
- Stress Management
- Intermittent fasting
- **Hormones?** Estrogen protective. Testosterone does not appear to increase risk but must carefully monitor Hematocrit and Hemoglobin and do therapeutic phlebotomy to avoid blood getting too thick

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Dietary Recommendations

- **Modified Mediterranean Diet**—emphasizes olive oil, vegetables, fruits, nuts, legumes, whole grains, fish, red wine
- **Portfolio Diet**--an eating pattern that focuses on four cholesterol-lowering foods: **soy protein, plant sterols, nuts, and soluble fiber.**
- **Low carb/Ketogenic diet**
- **Vegetarian Diet**
- **Reduce visceral fat**

Dietary Recommendations

- Eating sugar and high glycemic carbohydrates increases risk of coronary heart disease as well as diabetes
- Ultra processed foods
- Poor metabolic health will see elevated fasting glucose, insulin, HgA1C, triglycerides and low HDL
- Foods that improve lipids: Nuts and seeds (flax seeds), legumes, including soy, any kind of fiber, Organic extra virgin olive oil, organic vegetables and fruits
- **Low sodium/High potassium/High magnesium**—the Functional Medicine community has become convinced that sodium is fine if from natural salt, but Dr. Houston feels strongly that salt will stiffen the arteries and raise blood pressure

What About Eating Fat?

- **Trans fats** (hydrogenated fats) increase risk
- **Omega 3** fats reduce risk
- Monounsaturated fats like **olive oil** reduce risk
- Eggs are healthy in modest amounts
- **Coconut oil** may increase risk—92% saturated fat and mostly lower chain fatty acids
- **Saturated fats** (SFAs)—longer chain saturated fats (C12 and above) like stearic acid increase risk, while medium and shorter chain (C12 and below) do not
  - **Replacing SFA with MUFAs or PUFAs decreases risk**
  - **Replacing SFA with refined carbohydrates increases risk**

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Medications

- **Fibrates** (Fenofibrate)—esp. effective for lowering triglycerides—used less frequently
- **Statins**--Water-soluble statins include rosuvastatin (Crestor) and pravastatin (Pravachol) and tend to have fewer side effects. Fat-soluble statins include atorvastatin (Lipitor), simvastatin, and lovastatin.
- **Zetia** (Ezetimibe)—blocks absorption of cholesterol by intestines
- **PCSK9 Inhibitors—**injectable—lower LDL-C by 50-60%--also lowers Lp(a) by 30%--expensive
- **Bempedoic acid** (Nexletol)—a good alternative to a statin, esp. if combined with Zetia. Expensive.
- **Aspirin—**not for everyone—reduces clotting but raises bleeding risk
- **GLP-1 Agonists--Semiglutide/Tirzepatide—the new wonder drugs**
- **Chelation—**has fallen out of favor
- Blood pressure meds

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Statins

- Statins, esp. the water soluble ones like Crestor, are effective and relatively safe, even though the perception in the Functional Medicine world is that they are very ineffective and unsafe.
- **Statins are especially effective in secondary prevention** in preventing a second heart attack and death from CVD, but recent studies have shown their benefit in primary prevention, even though such benefits are quite modest in absolute risk.
- Statins reduce LDL-C, stabilize plaques by drawing cholesterol out of the plaques and increasing their calcification, and inhibit inflammation (Jupiter trial)
- **Where is the truth about statin side effects**? A small percentage of patients have muscle pain or weakness, elevated blood sugar, cognitive problems, liver stress, etc. Studies done by big pharma show 1-2% muscle pain, whereas some doctors report 20%--where is the truth? To reduce muscle pain, use a water soluble statin, take a low dosage, don't take it every day, and take CoQ10.
- Statins do inhibit the formation of a number of nutrients, including CoQ10, vitamin E, omega-3 fatty acids, tocotrienols, carnitine, vitamin K, vitamin A, selenium.

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Medical Interventions

- **Stents VS Bypass graft surgery**—studies over the years have gone back and forth as to which is better
- **Stents** minimally invasive and quicker recovery
- **Bypass surgery** more invasive but may be needed in more complicated cases
- Neither stents nor bypass surgery reduce heart disease mortality rates if patients are stable with medications

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Nutraceuticals

1. **Red Yeast Rice**—inhibits the HMG-CoA reductase--2400-4800 mg at night—often underdosed-- A highly purified and certified RYR must be used to avoid potential renal damage induced by a mycotoxin, citrinin.
2. **Tocotrienols**—300 mg—taken with Red Yeast Rice or with a statin increases effectiveness
3. **Niacin**—500 mg—has fallen out of favor as a medication but very effective, esp. for lowering Lp(a) and raising HDL and increasing LDL particle size—unique properties
4. **Plant sterols**—inhibits the absorption of cholesterol--1-3 gm per day—lowers LDL-C by 7.5-12%
5. **Berberine**—500 mg BID or TID up to 1000 mg TID—a natural PCSK9 inhibitor--inhibits cholesterol absorption—reverses plaque by 3.2% in 4 mths (Ma, SR., Tong, Q., Lin, Y. *et al.* Berberine treats atherosclerosis via a vitamine-like effect down-regulating Choline-TMA-TMAO production pathway in gut microbiota. *Sig Transduct Target Ther* **7**, 207 (2022). https://doi.org/10.1038/s41392-022-01027-6)
6. **Citrus Bergamot**—1-2 gm/day--lowers LDL up to 36% and TG by 39%; increases HDL by 40%; reduces reactive oxygen species and oxLDL.
7. **Omega 3 fish oil**—2-8 gm/day EPA/DHA—take with Gamma tocopherol or tocotrienols to reduce oxidation of the polyunsaturated fat in the fish oil

Nutraceuticals Part II

8. **Rhamnan sulfate or Fucoidan sulfate** (Arteriosil, Endocalyx Pro, Regenevasc)
9. **Glucosamine/chondroitin sulfate—**supports glycocalyx and reduces CVD mortality. (King DE, Xiang J. Glucosamine/Chondroitin and Mortality in a US NHANES Cohort. J Am Board Fam Med. 2020 Nov-Dec;33(6):842-847. "use was associated with a 39% reduction in all-cause mortality and 65% reduction in CVD mortality."
10. **Nitric oxide stimulators** (L-Citrulline, beet root, potassium nitrate, sodium nitrite, vit C, B12, folate, Hawthorn berry)—NEO 40, Nitric Oxide Foundation, Vascanox)
11. **Aged Garlic Extract**—(2400 mg/day—may need 8 caps per day) reduces soft plaque, reduces blood pressure, reduces hardening of the arteries, reduces LDl-C and raises HDL (R. Varshney, M. J. Budoff. Garlic and Heart Disease. *Journal of Nutrition*, 2016; DOI: 10.3945/jn.114.202333)
12. **Nattokinase**—natural blood thinner to decrease risk of clots
13. **CoQ10—**supports heart muscle mitochondria, lowers Lp(a)
14. **Methylated B vitamins, TMG—**to lower homocysteine
15. **Lycopene—(20 mg)** improves HDL functionality

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Specific Nutraceutical Stategies

- **To lower Lp(a):** Niacin, L-Carnitine, CoQ10, ground flaxseeds, Linus Pawling theory about Vit C—5000 IU and 1500 mg L-Lysine protects from Lp(a) causing harm to the arteries. PCSK9 inhibitors. New drugs will be released in the next few years to lower Lp(a).
- **To reduce oxidized LDL**—Niacin, Pomegranate, Resveratrol, Citrus Bergamot, Tocotrienols, olive oil, Curcumin, Lycopene, Pantethine, EGCG
- **To raise HDL/improve HDL functionality**—Lycopene, Omega 3, Pantethine, Red Yeast Rice, olive oil
- **To lower homocysteine:** Methylated B2, B6, B12, folate, TMG
- **To lower HsCRP**—Niacin, Omega 3, Curcumin, Resveratrol, Glutathione

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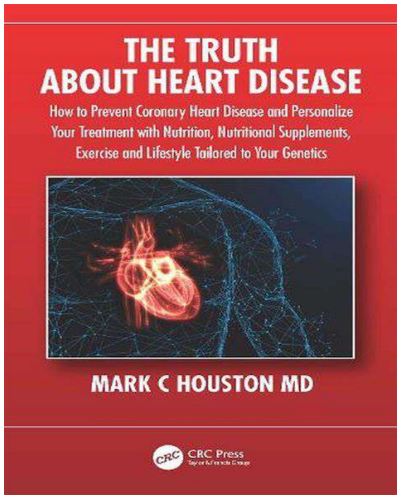
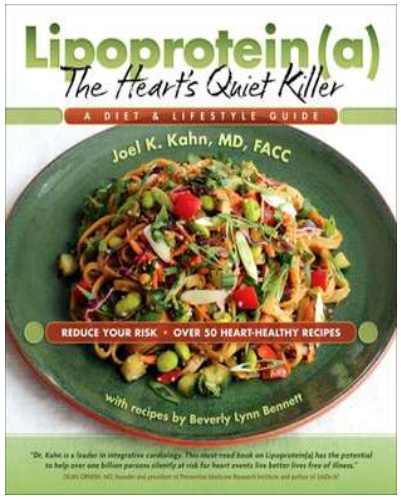
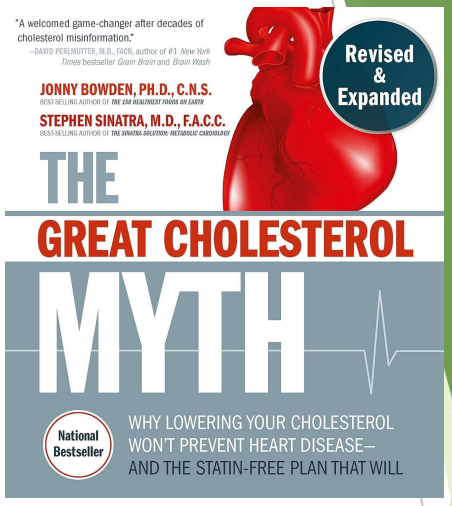
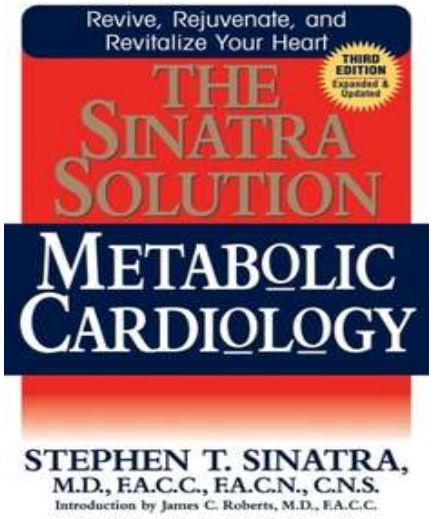
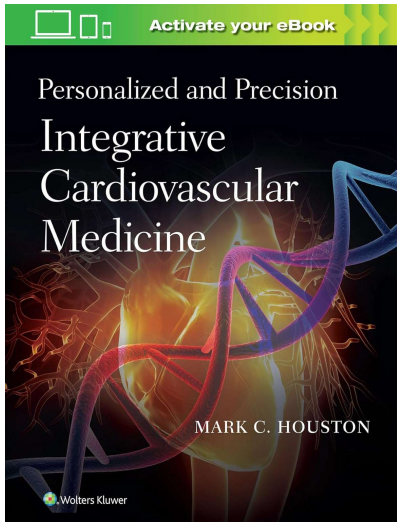
Books Recommended











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