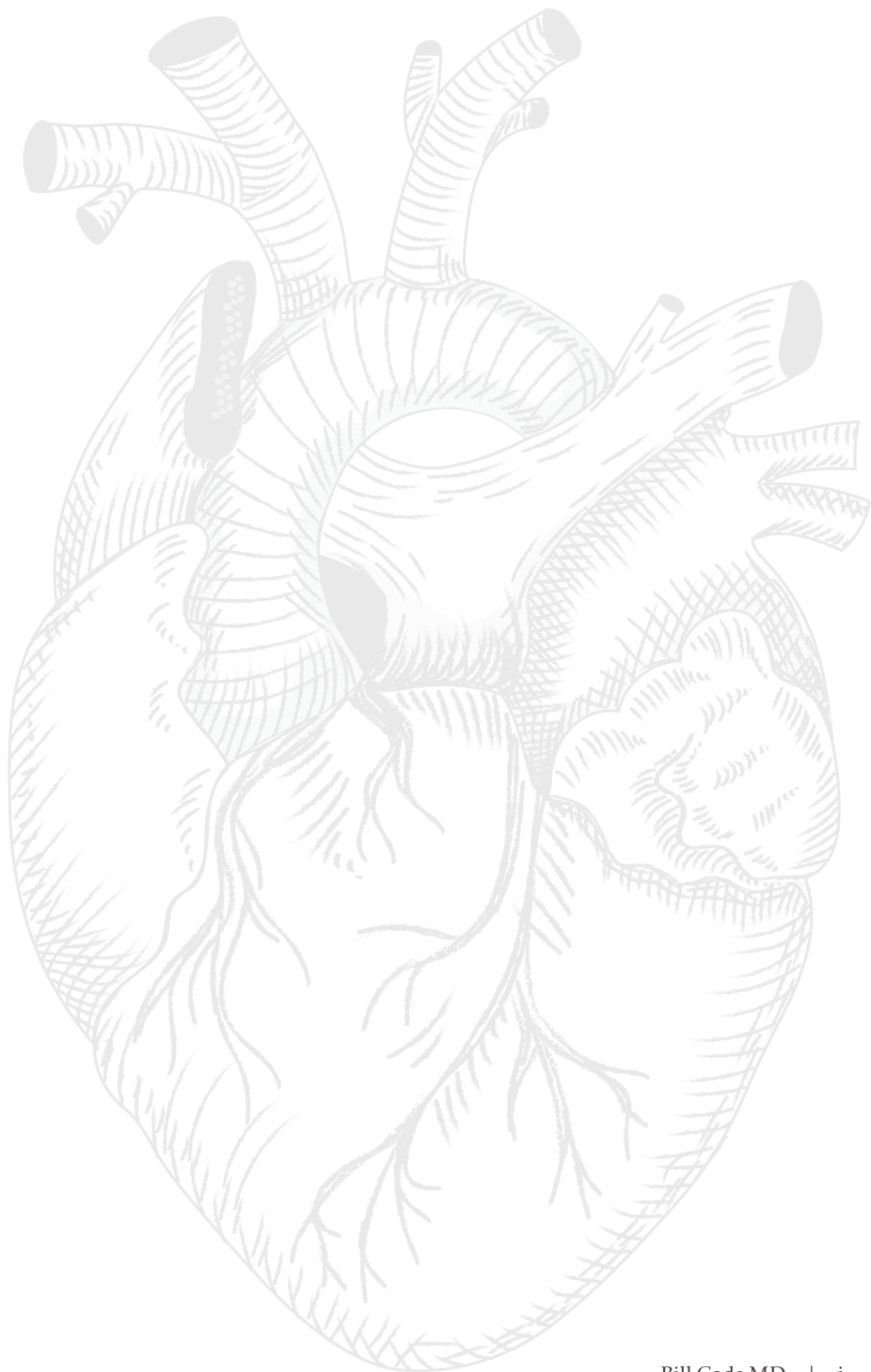




Solving the Heart Puzzle

An MD's Journey Through Oxygen, Omega-3s,
and the Science of Healing

— Bill Code MD —

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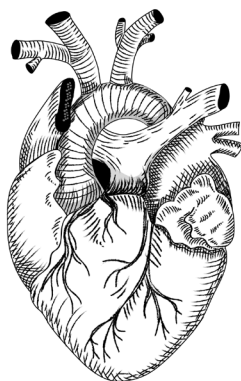
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CHAPTER 5

New Options for Cardiovascular Disease

What if I told you how to reduce your risk of heart disease by 70%? And what if you could confirm that improvement in just four months with a simple, at-home blood test? In this chapter, I will walk you through the basics of cardiovascular disease – what it is, why it kills so many people, and how the right Omega-3 fish oil, combined with high quality polyphenols from extra virgin olive oil, can dramatically lower your risk.

The Problem: Heart Disease is Still the Number One Killer

Cardiovascular disease remains the leading cause of death on the planet. A large number of these deaths happen suddenly, caused by a fatal heart rhythm called ventricular fibrillation – where the heart’s main pumping chambers start quivering chaotically instead of beating in a coordinated way. We have gotten better at responding to these emergencies by placing Automated External Defibrillators (AEDs) in schools, recreation centers and workplaces. But what if we could prevent these events from happening in the first place?

We now know that taking an optimal Omega-3 fish oil/olive oil blend can reduce the occurrence of sudden cardiac death by up to 90%. In my opinion, this fish oil works best when it is combined with high-quality polyphenols from extra virgin olive oil – and here is why.

The Solution: A Balanced Fish Oil and Olive Oil Blend

Fish oil is purified to remove heavy metals, PCBs, dioxins, and microplastics from our polluted oceans. However, this purification process also strips away the natural antioxidant polyphenols. These polyphenols originally came from algae – the base of the ocean food chain – and they serve as a protective shield around the delicate omega-3 molecules called eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). Without that shield, EPA and DHA are vulnerable to damage in both the bottle and even as they travel through your body.

The solution is to add polyphenols from extra virgin olive oil back into the fish oil immediately after purification. In fact this is done while still under nitrogen cover. Olive oil polyphenols are a land-based equivalent of the ocean algae polyphenols, and they do the same protective job. Think of them as a wetsuit lining wrapped around each omega-3 molecule, keeping it protected from oxygen and injury.

How Omega-3s Work Inside Your Heart and Blood Vessels

Every cell in our body is surrounded by a membrane – a thin wall made of fats. This wall is built as a “lipid bilayer”, meaning two layers of fat molecules stacked together with protein channels punched through them like doorways. These doorways allow nutrients, signals and waste to pass in and out of the cell.

Your heart cells and the cells lining your blood vessels strongly prefer Omega-3 fats (EPA and DHA) as their building material over Omega-6 fats, saturated fats, and especially trans fats. When EPA and DHA are present in these cell membranes, three important things improve:

1. **Fluidity and flexibility** – Cell membranes become more supple, like a well-oiled hinge rather than a rusty one.
2. **Cell signaling** – Messages traveling in and out of cells work more efficiently.
3. **Anti-inflammatory molecule production** – Cells produce more of the natural compounds (called resolvins and protectins) that calm inflammation.

In addition, DHA is especially important for building the membranes of mitochondria – the tiny energy factories inside each cell. Healthier mitochondrial membranes mean better energy (ATP) production, which translates to a stronger, more efficient heart and more energy for you throughout the day.

Electrical Stability: Preventing the Heart from Short-Circuiting

Here is where things get important. When your heart cell membranes are rich in omega-3s, they become more electrically stable. The heart relies on precise electrical signals to beat in rhythm. If those signals misfire – especially during a time when the heart is starved of oxygen (called ischemia) – the heart can go into ventricular fibrillation, which is essentially an electrical spasm.

Similarly, when an athlete is super performing and creating adrenalin this can trigger a misfiring at a vulnerable time and also precipitate ventricular fibrillation.

When enough EPA and DHA are present in and around the heart cells, those cells stay calmer and are far less likely to misfire. This is one of the most powerful protective effects of Omega-3s.

A Tale of Two Countries: Japan vs. North America

Over 300,000 Americans die of sudden death each year – that is roughly one person every two minutes. Most of these deaths are caused by ventricular fibrillation.

Studies reveal that North Americans are roughly 20 times more likely to die of sudden cardiac death than their Japanese counterparts. This is almost all due to ventricular fibrillation. The reason? The Japanese eat far more fatty fish, and as a result, their Omega-3 Index is double or even 2.5 times higher than the average North American's. Remarkably, this protection holds true even though the Japanese, on average, smoke more and drink more alcohol per person than we do.

Your Omega-3 Index: A Simple Number That Could Save Your Life

The Omega-3 Index (O3I) is a straightforward measurement: It is the amount of EPA plus DHA in your red blood cells, divided by your total fatty acids in the same red blood cells, expressed as a percentage. An optimal O3I is above 8.3%. The average Japanese person sits at 9-10%. Most North Americans, however, fall far below that. When I tested mine, it was just 3.9%. I am working on improving it! In 4 months, I had improved up to 5.4%, so I still have work to do.

The good news is that 95% of people can achieve a healthier Omega-3 Index within four months of taking quality fish oil/olive oil blend– and this has been confirmed in several thousand tests. You do not need to change your diet to see this improvement. All it takes is a daily dose of a quality fish oil/olive oil blend.

Blood Pressure: Why It Matters and How Omega-3s Help

High blood pressure affects up to one in three people. To understand it, picture a garden hose with water flowing through it. If you step on the hose or kink it, you increase the resistance and reduce the flow. Your blood vessels work the same way. Blood pressure is essentially the resistance in your blood vessels multiplied by your heart rate.

There is a principle in physics called Poiseuille's Law that makes this even more dramatic: the flow through a tube depends on the fourth power of its radius. If you cut the radius of a blood vessel in half, the flow drops to just one-sixteenth of what it was. Even a small amount of swelling or narrowing inside a blood vessel can dramatically increase resistance and raise your blood pressure. This swelling comes from inflammation.

Omega-3s help in two ways. First, they make the cells in your blood vessel walls more fluid and flexible, which reduces resistance. Second, their anti-inflammatory effects (through resolvins and protectins) reduce the swelling inside your vessels. Together, these benefits can lower your blood pressure by 2-5 points.

Three Main Causes of High Blood Pressure

There are three reasons why your blood pressure can increase:

1. **Kidney artery narrowing.** When the artery supplying a kidney becomes narrow, the kidney senses reduced blood flow and releases a hormone called renin, which tells the body to raise blood pressure.
2. **Reduced blood flow to part of the brain.** If a carotid artery (a major vessel feeding the brain) becomes narrowed, the brain – which needs enormous amounts of oxygen to function – signals the heart to pump harder. The heart can only respond by increasing pressure.
3. **Chronic stress.** Ongoing stress keeps your body in “fight or flight” mode, constantly producing adrenaline. Adrenaline constricts blood vessels, as though you are always running from a saber-toothed tiger. Over time, the blood vessel walls harden, and calcium deposits build up – this is what we call “hardening of the arteries”.

I mentioned earlier about Omega-3s reducing inflammation per their resolvins and protectins. This happens throughout the body. If you're taking regular and effective Omega-3s please be reassured the blood vessel walls will maintain or regain their flexibility and elasticity. This further assists the reduction of the peripheral vascular resistance and therefore lowers blood pressure. Of course, sooner is better than later, for both your heart and your brain function. Finally, I suggest if your fish oil or krill supplement are not blended with high polyphenol olive oil you may be wasting your money.

The sooner you change your diet and lifestyle, the better your chance of reversing these effects. In my own case, I was climbing the academic ladder at age 38, under constant stress with excess adrenaline. When I moved to Canada's West Coast and left most of my stress behind, my blood pressure improved without medication. I am now 72, and my current blood pressure is a healthy 130/70 (without medication).

Coronary Blood Flow: How Your Heart Feeds Itself

The heart muscle is fed by five blood vessels arranged in a crown-like pattern on its outer surface – which is why they are called “coronary” vessels (from the Latin word for crown). Please see the heart shown on the front book cover. It reveals two epicardial or heart surface vessels. These are some of the coronary vessels which are stented or surgically bypassed.

Their placement on the outside of the heart is important: It means they are not squeezed shut when the heart muscle contracts.

Here is a critical point that many people do not know: coronary arteries fill with blood during diastole – the relaxation phase of the heartbeat, not the contraction phase. This means two things:

1. Higher blood pressure does not help the coronary arteries much, because they do not fill during the squeeze (systolic) phase.
2. A slower heart rate is better for your heart. The contraction phase takes a constant amount of time, so a slower rate means a longer relaxation phase – and more time for your coronary arteries to fill. In my days as an anesthesiologist, I preferred a heart rate of 50-70 beats per minute in a patient. I was comfortable with 80-90, but anything higher was a concern.

Chest pain (angina) or a heart attack (myocardial infarction) occurs when the heart's demand for oxygen exceeds what the coronary arteries can supply. Arteries narrow for several reasons: turbulence in the blood flow, high pressure, injury or infections, cholesterol deposits and blood clots. Probably the greatest of these is blood clots as you will learn in the next chapter.

Heart Failure: When the Pump Cannot keep Up

Heart failure happens when the heart can no longer pump blood effectively. Usually, the left ventricle – the heart’s most powerful pumping chamber – gradually loses its ability to fully empty with each beat. Blood begins to back up: first into the left atrium (the upper chamber), and then into the lungs. The result is a cough producing white froth, shortness of breath, and the inability to lie flat. People with advanced heart failure often end up sleeping upright in a chair just to breathe comfortably.

Several events can trigger heart failure:

1. **A heart attack.** When a coronary artery is blocked, part of the heart muscle dies and turns into scar tissue. That scarred section can no longer contribute to the heart’s squeeze. Prevention is the best treatment, but procedures like stenting or coronary artery bypass surgery can help if done quickly enough.
2. **Gradual oxygen starvation of tiny vessels.** In certain cases, the underlying issue arises not within the major coronary arteries, but rather in the micro-vascular blood vessels – some of which are as small as, or even smaller than, a human hair. Stenting and surgery cannot reach these. In such cases, supplemental oxygen can help. Even small amounts delivered through nasal cannula or prongs (raising oxygen to 28-32%) may be enough to help the mitochondria function properly and improve the heart’s pumping action.
3. **An acute event requiring more aggressive oxygen therapy.** A device called a non-rebreather mask, connected to an oxygen concentrator at 5-10 litres per minute, can deliver 70-80% oxygen. This boosts dissolved oxygen in the blood by three to four times – a 300-350% increase. This mask includes a reservoir bag that fills with oxygen while you breathe out, then delivers that extra oxygen when you breathe in. After the acute crisis passes, using this mask for 30-60 minutes twice daily may assist the healing process.

The Healing Power of Extra Oxygen

This approach – called normobaric oxygenation – has real healing benefits. While it is roughly a third as effective as hyperbaric oxygenation, it requires far less hassle and expense. Intermittent higher oxygen levels can boost your body’s own stem cell production by six to eight times. A 2019 Nobel prize was awarded for describing how this worked! These stem cells travel to wherever they are needed – in this case, to the damaged heart. The body is capable of forming new tiny blood vessels within damaged heart tissue, a vital process since most heart injury happens within the microcirculation. Ideally, this oxygenation enhancement would continue for 40-60 days to optimize recovery.

Of course, beginning a quality fish oil/olive oil blend as soon as possible – ideally before any cardiac event – would both reduce inflammation and lower the risk of ventricular fibrillation by keeping heart cells calm and less irritable.

Ideally, these interventions would begin in a hospital emergency room or coronary care unit. However, in today's world of healthcare rationing, this is not always possible. Where I live in British Columbia, emergency rooms in smaller towns may be closed temporarily – or even permanently. In the United Kingdom, some older patients may be denied entry to coronary care units altogether. Cardiac rehabilitation – a supervised exercise and nutrition program – is an important follow-up step, though local resources may limit access. These are now on zoom or not at all. Minimizing the support group aspect is a step backwards, in my opinion.

I will not comment on surgical or drug treatments, as those are best discussed with your physician specialists. My suggestions here are meant as a adjunct to your healthcare provider or to buy time if you cannot access specialist care promptly.

Supplement Suggestions for Heart Failure

I recommend four key supplements:

1. **Fish oil/olive oil blend** – as described above, at 0.15 ml per kilogram of body weight per day.
2. **Coenzyme Q-10 (CoQ10)** – 200 mg, three times per day.
3. **Acetyl-L-Carnitine** – 500 mg, three times per day. This form is preferred over regular carnitine because it can cross the blood-brain barrier and benefit your brain as well.
4. **D-Ribose** – 5 grams, three times per day.

All four of these supplements support your mitochondria – the energy factories inside every cell. More energy means a stronger pump. I learned about the last three from Dr. Mark Houston, a highly respected integrative medicine cardiologist, at a seminar in Boston. He was able to use these three supplements to get four of his patients off the heart transplant list – meaning they no longer needed a new heart. Since then, I have suggested them to many people to boost energy production in the mitochondria.

Arrhythmias: When the Heart Loses Its Rhythm

An arrhythmia is any irregular heartbeat. These are critically important to understand because they are the leading cause of sudden death across North America and much of the world. There are two main types I want to discuss: atrial fibrillation and ventricular fibrillation.

1. Atrial Fibrillation

The atria are the two upper chambers of the heart. The right atrium collects blood returning from the body; the left atrium collects blood returning from the lungs. Normally, both atria are controlled by a single natural pacemaker called the SA (Sino-atrial) node, which sends a coordinated electrical signal that makes both chambers squeeze together in unison.

However, if the atrial muscle fibers become overstretched or irritated (often due to lack of oxygen), individual cells can start firing on their own, out of sync. The result is a chaotic, uncoordinated quivering instead of a smooth contraction – this is atrial fibrillation (AF). AF has increased tenfold in the past decade.

The consequences of AF are significant:

- **Loss of the “atrial kick”.** Normally, the coordinated squeeze of the atrium gives a final push of blood into the ventricle below. Without it, cardiac output – the total amount of blood the heart pumps drops by about 40%. You feel this as sudden fatigue and a reduced ability to exert yourself.
- **Increased stroke risk.** When the left atrium does not empty smoothly, blood can pool and form clots. If a clot breaks loose, it can travel to the brain and cause a stroke – not a bleeding stroke, but a clot-type (embolic) stroke.

Doctors may try to restore normal rhythm with an electrical shock (cardioversion), medications, or a procedure called cardiac ablation. If these are unsuccessful, blood-thinning medication is usually started to reduce stroke risk.

To help prevent atrial fibrillation:

- Avoid heavy episodes of alcohol use (a common trigger, especially in younger men).
- Check your pulse regularly for irregularity, and act on what you find.
- Take a quality fish oil/olive oil blend daily.

A note of an important update. Although some studies have suggested that excessive fish oil may slightly increase the risk of atrial fibrillation – by roughly 0.75-1%. This is now confirmed to be wrong.

A landmark December 2025 paper in JAMA (Journal of American Medical Association) showed that “after analyzing several hundred of thousands of the UK Biobank over 12.7 years they found:

1. Higher circulating Omega-3s blood levels were associated with significantly lower Atrial Fibrillation (AF) risk. This is the opposite of what earlier studies suggested.
2. After properly dosing for age (which previous studies had handled incorrectly) fish oil supplement showed no increase in AF at all.
3. The earlier AF concern was attributed to a statistical confounding error—older people take more supplements AND have more AF, and previous studies failed to fully account for this.”

Dr Bill Harris of Omega-3 Index origin and fame summarized it bluntly “ the only signal for increased AF risk comes from pharmacologic, prescription strength Omega-3 products used in people already at high risk for Atrial Fibrillation (AF)”

Personally, I continue taking my fish oil/olive oil blend without hesitation – especially because of the even greater benefit it provides against ventricular fibrillation, which I will discuss next.

2. Ventricular Fibrillation: The Big One

Heart disease remains the number one killer worldwide, and the vast majority of those deaths are sudden and catastrophic, caused by ventricular fibrillation. The ventricles are the heart’s main pumping chambers, normally contracting 60-80 times per minute in response to electrical signals from the pacemaker. If a misfire occurs during the most vulnerable part of the electrical cycle, the ventricles can go into fibrillation – a disorganized quivering that pumps no blood at all. Without immediate treatment, it is fatal within minutes.

Several factors can increase this irritability and risk:

- Dehydration
- Excess alcohol
- Lack of oxygen
- Electrolyte imbalances – especially low magnesium, low potassium or high calcium.

The frequency of sudden cardiac death continues to climb, which is why most public buildings now have AEDs (automated external defibrillators).

These devices can reduce death from ventricular fibrillation by 70-80% – if applied in time. But of course, you cannot always count on being in the right place at the right time.

This is where prevention becomes your most powerful tool. Taking the fish oil/olive oil blend I have described can reduce your risk of ventricular fibrillation and sudden death by up to 90%.

Measuring and Improving Your Risk

Your risk of ventricular fibrillation is measurable through your Omega-3 index (O3I), which you can test with the simple at-home Dried Blood Spot test. We know from over a million of these tests that 97% of us have an unsatisfactory O3I. However, with just four months of taking the optimal fish oil/olive oil blend, your O3I can improve dramatically – without changing your diet. In more than 25 years of integrative nutritional counselling, I have found that most people are either unwilling or unable to change their diet significantly over the long term. That is what makes this approach so powerful: it works regardless.

Oxygen and Ventricular Fibrillation

One critical thing to understand about ventricular fibrillation is that lack of oxygen dramatically increases the risk. If you experience angina (chest pain), the best immediate response is to get on extra oxygen – ideally through a non-rebreathing mask at 5-10 litres per minute for at least an hour. This is especially important if your local emergency room is closed or your ambulance is delayed. Remember: If the ER is closed, the ambulance may not come at all, because they have nowhere to take you.

The second high-risk time for ventricular fibrillation is during reperfusion – when blood flow is restored to a previously blocked area of the heart. This happens after coronary stent placement or bypass surgery. Although referred to as “reperfusion injury”, this is a well-recognized risk that medical teams monitor closely.

Two Friends, Two Stents, Zero Arrhythmias

Recently, two of my close friends experienced angina from blocked heart vessels and went to the emergency room. The first, a 66 year old had a 95% blockage of his left main coronary artery – the one nicknamed “the widow-

maker” because it so often triggers ventricular fibrillation and sudden death. He had a stent placed the same day. The second friend, who is 80, also had a stent placed two days after his angina episode.

Neither of the friends had any arrhythmias – whether during the initial event, throughout the stent procedure, or even during the potentially risky reperfusion period that followed. Both had been taking the optimal fish oil/olive oil blend for 8-10 weeks before their events. We tell each other that the Omega-3s played a role in keeping their hearts electrically stable through both of the highest risk moments: the initial oxygen deprivation and the subsequent reperfusion.

Exercise and EWOT (Exercise While Oxygen Training)

1. Exercise alone improves vessel health. This occurs independent of extra oxygen, as confirmed by multiple review studies.
2. Regular aerobic exercise:
 - improves endothelial function (better vessel dilation)
 - increases peak oxygen uptake
 - enhances microcirculation blood flow and oxygen delivery to active muscle
3. EWOT benefits include:
 - better exercise tolerance and less breathlessness at a given workload
 - improved peripheral circulation, helpful for cold hands/feet, or mild neuropathy
 - enhanced recovery after illness or deconditioning by supporting oxygen delivery while the heart and muscles are still weak.

In summary, EWOT takes the normal benefits of movement – better circulation, better vessel function—and adds an extra push of oxygen. Early research and clinical experience suggest that, for the same amount of exercise, breathing concentrated oxygen can improve blood oxygen levels, reduce breathlessness and help more oxygen reach tissues that have been under-supplied. It is not a cure-all and it is not a replacement for walking, good food and key supplements, but it is a logical extension of the same principle: moving blood plus more oxygen equals better delivery to your cells.

The Bottom Line

Getting Started: Two Simple Steps

To begin your pursuit of improved cardiovascular health, consider the following steps:

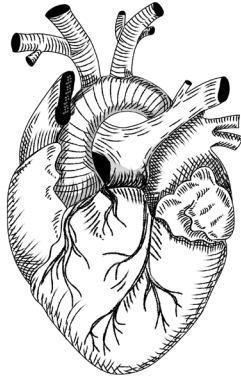
Step 1: Measure your fatty acids. Order a Dried Blood Spot test kit. Prick your finger at home, place a few drops of blood onto a special paper, and send it off. This test kit then needs to arrive at Vitas Labs, an independent laboratory in Oslo, Norway.

Step 2: Start taking a fish oil/olive oil blend. The recommended dose is 0.15 ml per kilogram of body weight per day. If pounds weight preferred 0.07 mls per pound (lb). Here is a quick guide:

- If you weigh 110 lbs (50 kg): take 7.5 ml, which is about 1 ½ teaspoons.
- If you weigh 180 lbs (80 kg): take 12 ml, which is just under 1 tablespoon.
- If you weigh 220 lbs (100 kg): take 15 ml, which is 1 tablespoon.
- Measure carefully with either shot glass or cooking measuring spoons, I was in error initially, so was taking a third less than optimal.

Cardiovascular disease does not have to be a death sentence. By understanding how Omega-3s strengthen your cell membranes, stabilize your heart's electrical system, reduce inflammation, and improve blood flow, you can take meaningful action to protect yourself. The steps are straightforward: test for your Omega-3 Index, start taking a quality fish oil/olive oil blend, and retest in four months. Add the mitochondrial support supplements if needed for fatigue or if your heart cannot keep up and is tending to fail. These are simple, affordable interventions that could save your life – and you do not even need to change your diet to begin.

I am in. You should be too.



Acknowledgements

Just as it takes a village to raise a child, I have needed a village to write this book. I am grateful to everyone who have contributed to this end result. Inevitably, I will miss someone, and I sincerely apologize for that.

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Any errors you note in this book are my responsibility. Please forgive me and let me know for the next printing.