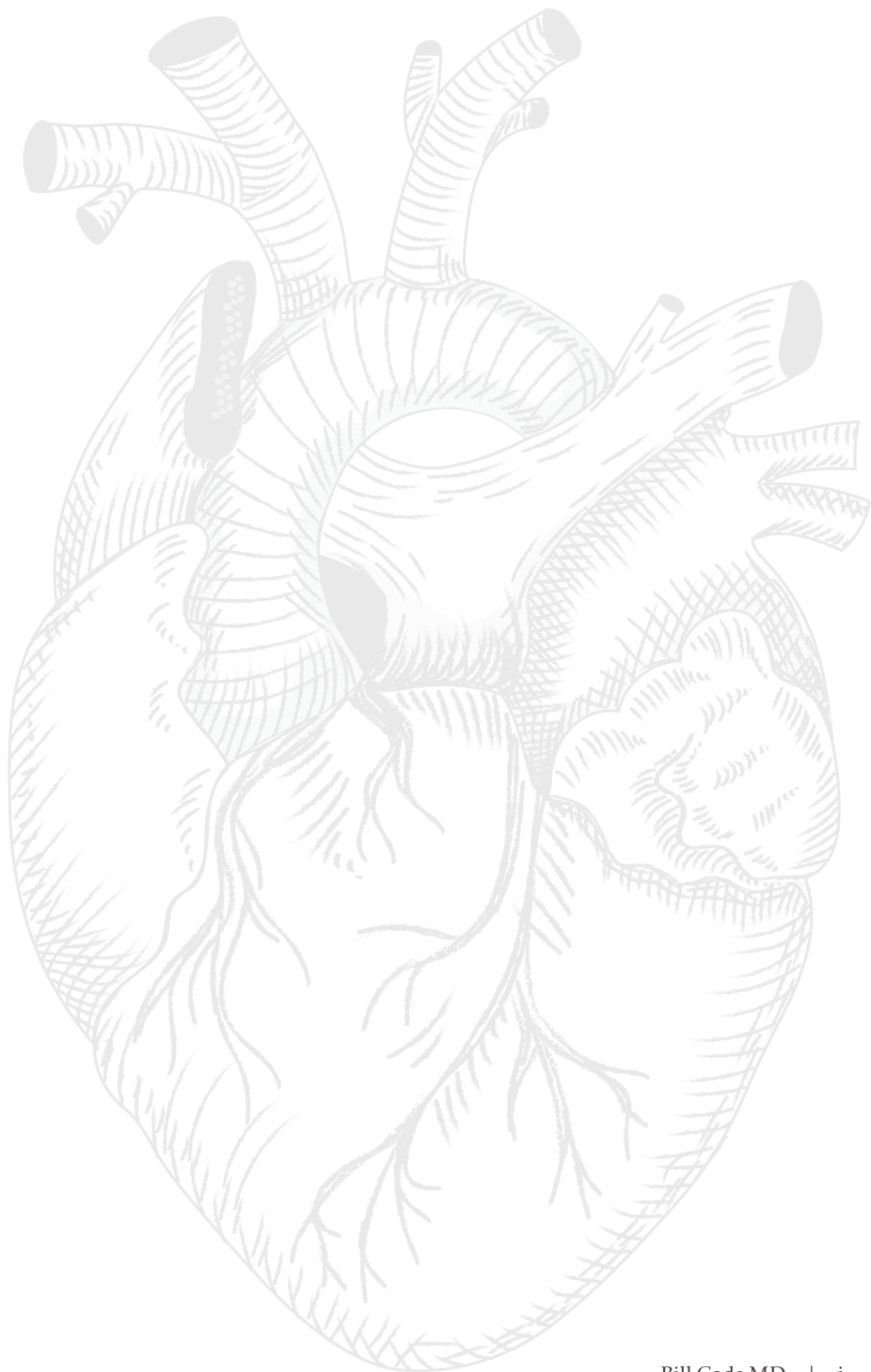




Solving the Heart Puzzle

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

— Bill Code MD —

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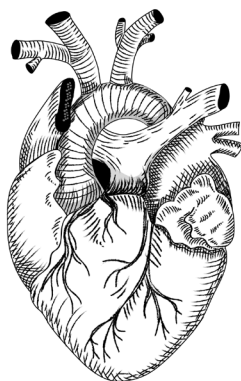
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CHAPTER 4:

Why a Fish Oil/Olive Oil Blend?

To begin I will write about olive oils and their polyphenols. Then you will understand why polyphenols are so critical in creating a blend. Tyrosol and hydroxytyrosol are closely related olive polyphenols valued mainly for their strong antioxidant and anti-inflammatory effects, especially in extra virgin, early-harvest olive oil.

What They Are

- **Hydroxytyrosol** is a small phenolic alcohol formed largely from the breakdown of oleuropein both as olives ripen and during oil storage.
- **Tyrosol** is a simpler phenolic alcohol, also naturally present in olives and extra virgin olive oil, often in both free and bound (secoiridoid) forms.
- Both belong to the same chemical family and occur together in olives, leaves, and olive oil, with higher levels typically found in high-polyphenol, early-harvest extra virgin oils.

Main Health-Related Properties

- Hydroxytyrosol is considered one of the most powerful natural antioxidants, directly scavenging free radicals and activating the body's own antioxidant defenses.
- It has anti-inflammatory, anti-plaque and anti-clotting activities and is thought to contribute to the cardiovascular benefits of the Mediterranean diet and extra virgin olive oil.
- Tyrosol also has antioxidant and anti-inflammatory effects and, in experimental and clinical work, has shown protective actions on liver metabolism and cardiometabolic risk factors.

Cardiovascular and Metabolic Value

- Extra virgin olive oil rich in polyphenols such as hydroxytyrosol and tyrosol helps protect LDL ("bad") cholesterol from oxidative damage in atherosclerosis.
- Reviews and intervention studies link these compounds with reduced cardiovascular risk, improved HDL (good cholesterol) function, better lipid profiles, and support for endothelial (blood vessel) function.
- A recent review of tyrosol highlights hepatoprotective effects (less liver fat, improved oxidative stress and inflammation) in fatty liver.

Presence in Olives and Early-Harvest Oils

- Hydroxytyrosol is abundant in olives and present as a "minor" but important component of extra virgin olive oil; mean contents are higher in olives than in oil because much stays in the fruit or processing water.
- Early-harvest, cold-extracted extra virgin olive oils tend to have higher hydroxytyrosol and related phenolics, which also contributes to a more bitter, pungent flavor.
- Table olives (especially some processed green and black styles) can reach tens of mgs of hydroxytyrosol per 100 g of fresh weight.

Practical Takeaways

- Regular use of high-quality, high-polyphenol extra virgin olive oil is a practical way to obtain physiologically meaningful amounts of hydroxytyrosol and tyrosol as part of a Mediterranean-style pattern.
- Supplements of isolated hydroxytyrosol are being studied, but current evidence and traditional dietary patterns mainly support getting these compounds from foods like extra virgin olive oil and olives.
- I prefer a quality fish oil blended with oil from either Picual olives or certified Koroneiki olives.

Trials Using High-Phenolic Olive Oil

- A 26-week pilot randomized trial in elderly patients (65–85 years) with previous myocardial infarction compared 25 mL/day of high-tyrosol/hydroxytyrosol extra virgin olive oil, standard extra virgin olive oil, or refined olive oil. The high-phenolic oil significantly increased antioxidant capacity and HDL-related enzyme activity in post-MI patients versus baseline, suggesting enhanced antioxidant defense, though no major changes in other lipid or oxidative markers were seen.
- A 2024 study found that a diet rich in tyrosol/hydroxytyrosol was associated with reduced arterial inflammation and microcalcification in people at high cardiovascular risk, consistent with anti-atherosclerotic effects.

Hydroxytyrosol's best-documented human effects on the vasculature are improvements in endothelial function, arterial stiffness, microvascular glycocalyx (lining of blood vessel) integrity, and arterial inflammation.

How Strong is the Evidence?

- We have encouraging evidence that hydroxytyrosol-rich interventions improve vascular health markers, but not yet proof that they reduce heart attacks or strokes on their own.
- An important study by Danielle Venturini et al was published in *Nutrition* 2015 June;31(6):834-40 titled: Effects of extra virgin olive oil and fish oil on lipid profile and oxidative stress in patients with metabolic syndrome. This showed that dietary Omega-3s and extra virgin oil had beneficial, synergistic effects on lipid metabolism and oxidative stress in people with metabolic syndrome.

Why the Blend of Fish Oil and Olive Oil?

Now that I've talked about the values of polyphenols from olive oil I want to address the question of why you would combine fish oil with olive oil. Firstly I must recognize the early pioneer work of this synergy by Professor Jan Osterode, of the University of Tromsø in Norway. Professor Osterode highlights that refining fish oil strips away the natural antioxidants present in the polyphenols of the algae and therefore leaving the EPA and DHA "naked" and vulnerable. Reintroducing olive polyphenols, specifically hydroxytyrosol, creates a biological mimicry of a whole fish. The source for this reference is Osterode, B., and Elveroll, E, (2002). "The combination of virgin olive oils and refined marine oils: beneficial effects".

This synergy ensures that the oil doesn't just look good in the bottle but will remain stable for the 24 or more hours that the oil spends circulating in the human bloodstream. In addition, the independent DBS testing lab of Vitas in Oslo Norway confirms this. A stable oil (35-hour window) consistently results in a higher Omega-3 Index(O3I) in blood tests compared to unstable oils. This is because the nutrients, in this case, EPA and DHA are actually absorbed by the cell membranes rather than being destroyed by oxidation in either the gut or bloodstream.

Now I will address the evidence which confirms that the fish oil/olive oil blend is incredibly stable when measured scientifically by the Oil Stability Index of the AOCS (American Oil Chemistry Society).

The Evidence Validating a Fish Oil/Olive Oil Blend for Stability:

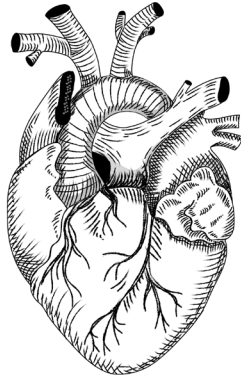
The gold standard for the degree of stability of any oil is based on testing developed by the American Oil Chemist Society (AOCS). This is called the Rancimat Method. This method measures the oxidative induction time for any oil. The oxidative induction time studies how long an oil survives treatment by heat and oxygen. Standard fish oil usually oxidizes in nine hours. Krill oil: often oxidizes in as little as one hour. Polyphenol-Omega blend oil stays stable for more than 35 hours. The takeaway from this is that the 35-hour window is your "biological insurance policy". It ensures that the EPA and DHA remain fresh and functional until they are safely integrated into your heart, brain and all cell membranes.

The references for this are as follows

1. AOCS Standard Method Cd 12b-92: Sampling and Analysis of Commercial Fats and Oils: Oxidative Stability Index (OSI).
2. Osterud, B et al (2021) "Sustainably Sourced Olive Polyphenols and Omega-3 Marine Lipids: a Synergy Fostering Public Health" in ACS Food Science and Technology.

I realize the above is very comprehensive and somewhat detailed. However, it is the rationale that I follow in suggesting a fish oil/olive oil blend. The stability of the blend is tantamount. This is why our bodies can benefit from stable Omega-3s, EPA and DHA. Now we can get the major health benefits from nature's bounty. Up until now we have been hampered by the relative fragility of the Omega-3s in both the transport and even when ingested into the body.

Therefore, I will continue my fish oil/olive oil blend as it will give me the best of two worlds, stabilized fish oil and olive oil, and with synergy between them. More on synergy in Chapter 18.



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.