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Omega-3 (Therapeutic)

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## Accurate Education

# Omega-3 Fatty Acids

Omega-3 fatty acids are polyunsaturated fats that are considered 'essential' because the body cannot manufacture them and so they must be obtained through diet or supplements. The two most important biologically active forms are eicosapentaenoic acid (**EPA**) and docosahexaenoic acid (**DHA**), found primarily in fatty fish and fish oil supplements.

There are 4 conditions, or domains, that drive chronic pain and are also responsible for the breakdown of tissues and cellular processes that promote the diseases of aging, including diabetes, heart disease, stroke, chronic kidney and liver disease, rheumatoid arthritis, cancer and Alzheimer's.

### ***Omega-3 fatty acids are important nutraceuticals that help combat these 4 domains (4-Ds):***

1. Systemic Inflammation (**SI**)
2. Neuroinflammation (**NI**)
3. Oxidative Stress (**OS**)
4. Mitochondrial Dysfunction (**MD**)

The 4-Ds drive chronic pain by creating cycles of tissue damage and immune cell activation that sustain pain. The continued cycling of these processes leads to **pain sensitization**, in which the sensation of pain becomes abnormally magnified. Pain sensitization is commonly associated with many pain conditions, including chronic neck and back pain, migraines and fibromyalgia.

1. **Systemic inflammation (SI)** is a widespread inflammatory response throughout the body, triggered by infection, injury, stress and other conditions. Systemic inflammation is widespread, and may present as **body-wide pain, including joint pain, muscle pain, gastrointestinal issues (constipation, diarrhea), and general "sickness feeling" (fatigue, loss of appetite).**
2. **Neuroinflammation (NI)** is inflammation within the nervous system, often triggered by SI which releases inflammatory compounds that cross into the brain and spinal cord. Neuroinflammation involves the brain and spinal cord specifically, in which symptoms are primarily cognitive and neurological ("brain fog" (slow/fuzzy thinking), memory loss, depression, anxiety, severe fatigue, depression, irritability, and sleep disturbances,
3. **Oxidative Stress (OS)** is an imbalance of excessive "oxidants" ("oxidizing" agents including free radicals) obtained from the diet or produced by the body that damage nerve cells and other tissues and cause and maintain pain. OS occurs when excessive "oxidants" are coupled with insufficient "antioxidants," due to insufficient dietary intake. OS. And SI co-exist and feed each other, damaging tissues in a vicious cycle that further **worsens** pain. Symptoms of OS include chronic fatigue with persistent, unexplained exhaustion and reduced exercise recovery., muscle/joint pain, headaches, and frequent infections
4. **Mitochondrial Dysfunction (MD)**. Mitochondria are organelles found in cells that function as the "power stations" of cells in that they process food into energy. In addition to providing energy, they play a major role in maintaining antioxidants to combat OS and SI. Impairment of mitochondrial function contributes to conditions including obesity, migraines, fibromyalgia. Symptoms may manifest as exercise intolerance, profound weakness, muscle cramps.

The anti-inflammatory diet (AID) is a diet that stresses foods that contain anti-inflammatory and antioxidant compounds to combat the 4-D's and avoids foods that contribute to the four days by promoting inflammation and oxidative stress.

Omega-3 fatty acids are probably the most important compounds found in foods that reduce inflammation.

However, only some omega-3 fatty acids provide the most benefit. These are the omega-3 fatty acids found in a small number of marine-based foods, Docosahexaenoic acid (DHA) and Eicosapentaenoic acid (EPA). These are the most important omega-3 fatty acids involved in physiological functions and the only omega-3's that research has demonstrated to have the most potential for health benefits. Other omega-3 fatty acids, including alpha-linolenic acid (ALA), that are found in plant foods such as nuts and seeds, are healthful and help reduce inflammation but they do not have the greater benefits compared to DHA and EPA.

These two fatty acids, DHA and EPA, when ingested in high amounts, have been shown to reduce the joint pain and stiffness of arthritis, the severity and frequency of migraine headaches and the pain associated with diabetic neuropathy. They also have shown benefits for mood and energy. They also likely reduce the risk of transitioning from acute to chronic pain as seen in traumatic injuries, including nerve injuries and they reduce the risk of having a heart attack or stroke.

To gain these benefits, however, a significantly higher intake of DHA and EPA than usually found in an otherwise healthy anti-inflammatory diet is required. It is recommended that one ingest 2000-3000 mg/day (EPA+DHA) to gain these benefits. To do so it is recommended to ingest approximately 5 servings/week of:

- Salmon, sardines, fresh anchovies, mackerel, pickled herring
- Fresh and frozen tuna, not canned (limited to 5-6 oz/week due to mercury)
- Oysters & Mussels, Crawfish tails (1/2 - 1 lb)

**Omega-3 Supplements:** Triglyceride [TG] fish oil contains the natural, more bioavailable and more stable form of omega-3 compared to the ethyl ester [EE] form of omega-3 (i.e. found in the synthetic prescription drug, **Lovaza**) which is usually covered by insurance. **Lovaza** may have somewhat more frequent side effects. For maximum benefit and easier digestion, the TG form is generally preferred, but the EE form can be acceptable for those on a budget or requiring very high concentrations of EPA and DHA.

**When purchasing OTC Omega-3 Products, including Fish or Krill Oil supplements, pay careful attention to identify the total amount of EPA + DHA per serving (not the Omega-3 amount listed on the label).**

- **The recommended total daily dose of EPA+DHA is 2000 - 3000 mg per day.**
- **The dose of Lovaza is 4 capsules per day (two capsules twice a day)**
- **Omega-3's must be ingested with a fatty meal (including at least 5 g of fat)**

For those with low diet dietary intake of Omega-3 rich foods, it is recommended to stay on the high end of this dosage range while those with moderate to high intakes of omega-3 rich foods may do well on the lower end of this dose range.

*There is limited research that suggests that the ratio of EPA to DHA may have clinical impact:*

- For those with inflammatory pain (i.e. arthritis), **the ratio of EPA:DHA = 1.2:1** is suggested (**Lovaza**)
- For neuropathic pain (e.g. neuropathy and sciatica), **the ratio of EPA:DHA = 1:5** is suggested.

To obtain the ratio of EPA:DHA = 1:5, for neuropathic pain:

**Lovaza with Protocol for Life 1000:**

- Lovaza- 1 gelcap/day (375 mg DHA+465 mg EPA/day **PLUS**)
- Protocol for Life DHA 1000 - 1 gelcap 2x/day (2000 mg DHA/day = (EPA:DHA = 1:5))

**OR**

**OmegAvail Ultra only**

- OmegAvail Ultra - 2 caps 2x/day (2400 mg/day) 2000 mg DHA+400 mg EPA (EPA:DHA = 1:5)

**However,** the research suggesting these different ratios is very weak. One may initiate treatment directed at one ratio first and if optimal improvement of symptoms is not achieved in 3 to 4 months, one may trial a rotation to the other ratio to investigate if the different ratio is more effective.

