Omega-3 Fish Oils and Diet Help Ease Depression

by Barry Sears, Ph. D.

Clinical depression is a disabling condition in which life becomes a hopeless morass where there is no joy. In the past, this condition was called melancholy. You lose pleasure for things that brought you enjoyment in the past. In fact, it becomes difficult to conjure up previously happy times. Any motivation for the future, let alone the next day, evaporates.

Depression has increased significantly in the past century, with nearly twenty million people now affected by it. The increase in its incidence correlates very well with our decreasing intake of fish and fish oil in the same time period.

Psychiatric researchers learned several decades ago that depression is often caused by lack of the neurotransmitter serotonin. In fact, drug companies have made billions from the development of drugs to boost serotonin levels, such as Prozac, Paxil, and Zoloft, all of which have become household names. More recent research has found that even non-depressed people experience an improvement in their moods when they take one of these drugs. What this indicates to me is that our nation has developed a serotonin deficiency.

Why? Researchers believe the answer lies in our reduced intake of long-chain omega-3 fatty acids. Since one of the benefits of high-dose fish oil is to increase serotonin levels, it is not unreasonable to think that the decrease in fish oil consumption in the past century led to a decrease in the natural levels of serotonin in the brain.* Furthermore, using an imaging test known as SPECT, researchers have found that blood flow within a normal brain is uniform, whereas blood flow in depressed patients is scattered with “holes” in which little or no blood flow is observed. Since high-dose fish oil can improve blood flow, we now have another potential clue to explain the molecular basis of depression.

Could it be that simply eating a greater amount of fish is the answer to this growing incidence of depression? If that is the case, then there should be a strong correlation between the amount of fish consumed and the extent of depression.

The rates of depression in Japan are just a fraction of the rates in America and the rates in other countries where low amounts of fish are eaten. In fact, New Zealanders have fifty times the rate of depression as the Japanese and eat the least amount of fish in the industrialized world. (What’s more, they eat very large amounts of harmful omega-6 fatty acids). In native Greenland, Eskimos, who consume some seven to ten grams per day of long-chain omega-3 fatty acids, have virtually no depression, even though their living conditions can be pretty depressing with only an hour or two of sunlight a day during the winter months.

Epidemiological studies, however, only indicate association, not causality. Perhaps the Japanese and Eskimos just have good genes, and the amount of fish they consume has nothing to do with it. (That’s not what researchers believe, but such confounding factors can come into play with epidemiological studies.) That possibility is unlikely since animal studies demonstrate a significant increase in the amount of serotonin in the frontal cortex of their brains if they consume high-dose fish oil, compared to animals that were given a standard diet rich in omega-6 fats.

These animal studies have been verified by recent research in humans that indicates the AA/EPA ratio (a ratio of two essential fatty acids, arachidonic acid and eicosapentaenoic acid) is highly elevated in the cerebrospinal fluid of depressed patients when compared to non-depressed patients. Likewise, Belgian studies indicate that depressed patients have lower levels of total omega-3 fatty acids in their blood. British researchers have confirmed this observation.

A blood test called the AA/EPA ratio measures the amount of omega-3 compared to omega-6 in one’s blood as the benchmark for judging Silent Inflammation in the body. AA, or arachidonic acid, is an omega-6 fat that causes a pro-inflammatory hormonal response, while EPA, or eicosapentaenoic acid, is an omega-3 fat that causes an anti-inflammatory hormonal response. By balancing this AA/EPA level in the blood, one will be able to control Silent Inflammation. The ideal marker for wellness is an AA/EPA ratio of 1.5.

One reason why increased consumption of fish oils would improve depression is because it causes a reduction in AA (arachidonic acid) levels. In addition, researchers have found that the higher the intake of fish oil, the greater the improvement in the AA/EPA ratio. This ratio has also been found to correlate strongly with the severity of the disease.

All of this research called for an intervention study to determine the impact that high-dose fish oil could actually have in
Andrew Stoll and his colleagues at Harvard Medical School used exactly this approach in tackling the most severe form of depression called bipolar depression. Bipolar patients cycle from the depths of depression to a manic high and then back again. The most common drugs prescribed for manic-depression, lithium and valproate, both block the release of arachidonic acid in the brain. Unfortunately, both drugs (especially lithium) have significant toxic side effects. So, a search for a safer alternative led Stoll to investigate the use of long-chain omega-3 fatty acids found in fish oil.

In Stoll’s experiment, one group of patients with bipolar depression took an ultra-refined fish oil containing ten grams per day of long-chain omega-3 fatty acids. The other group of patients took a placebo containing olive oil. After four months of the nine-month-long trial, the researchers ended the trial early because the divergence between the fish oil group and the control group was so great that they felt it was unethical to continue the study. (Another small complicating factor was that the supply of ultra-refined fish oil provided by the U.S. government had run out.) Even in this shortened trial, those on the high-dose fish oil experienced stabilization in their symptoms, while those on the olive oil control experienced significant worsening of their symptoms.

Now, the question is, what was happening inside the brain to help alleviate depression in the patients who took fish oil? A pretty good assumption is that serotonin levels increased in the brain’s frontal cortex, as has already been demonstrated in animal experiments. Increased EPA consumption through fish oil supplementation also probably decreased the AA/EPA ratio in both the cerebrospinal fluid that bathes the brain and the blood lipids, and this led to a corresponding decrease in depression. Such a decrease in the AA/EPA ratio would also reduce the levels of pro-inflammatory eicosanoids, which would cut off a cycle that leads to the production of “bad” eicosanoids, such as PGE2, that are known to be increased in the depressed patients. Finally, high-dose fish oil almost certainly improved blood flow to the depressed patients’ brains, providing a more uniform distribution of critical nutrients such as oxygen and glucose.

These are some complex and striking consequences for a relatively simple dietary intervention, yet, as dramatic as these result were, some believe they could have been even better if the Harvard researchers had brought these patients’ insulin levels under control while supplementing with even higher levels of fish oil. A lower level of insulin would have further decreased the production of arachidonic acid, thus enhancing the benefits of high-dose fish oil supplementation. In addition, lower insulin levels would have maintained a more constant supply of blood sugar to the brain.

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References:


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