



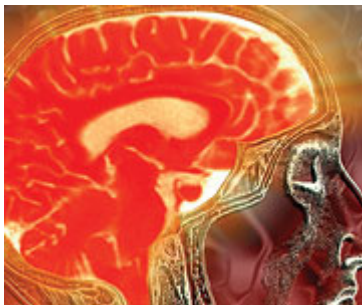
LifeExtension®

LE Magazine September 2006

REPORT

Brain Food

Safely Manage Depression with Omega-3 Fatty Acids By Mark J. Neveu, PhD



More Americans suffer from depression today than ever before. Despite the wide array of antidepressant medications on the market, conventional psychiatric medicine is clearly failing to successfully manage the mood disorders that plague millions of adults.

Compelling new findings suggest that mental health disorders such as depression, attention deficit hyperactivity disorder (ADHD), and schizophrenia may in fact reflect severe deficiencies of omega-3 fatty acids.¹⁻⁴ Although these essential

fatty acids are critical in supporting healthy brain structure and function, they are shockingly scarce in the typical American diet.

Further exacerbating the problem is that many people who restrict their calorie intake with the goal of losing weight or extending life span may actually be endangering their mental health by depriving their brains of sufficient omega-3 fats.

In this article, we examine the latest research demonstrating the various ways in which omega-3 fatty acids help support optimal mood and attention while guarding against depression and other mental health disorders.

Low-Fat Craze Fuels Depression Epidemic

In the United States, longstanding conventional wisdom suggesting that all fats are unhealthy appears to have had an untold influence on rates of depression. Research indicates that when America went on its low-fat diet craze about 25 years ago, we threw out all dietary fats, including beneficial omega-3 fats like eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). Coinciding with this low-fat movement was an ever-increasing caseload of depression, ADHD, and other mental health conditions.^{5,6} In fact, rates of depression rose in every decade of the twentieth century.⁷ The United States spends nearly \$44 billion a year on depression-related costs,⁸ and the mean out-of-pocket expense for elderly adults with depression was \$1,835 in 1999.⁹

The observation that many Americans both limit their fat intake and suffer from depressed mood has led some investigators to suggest that some forms of depression and mental illness may be associated with a dietary deficiency of omega-3 fats.

Omega-3 Fats Fight Depression, Enhance Antidepressant Meds

Scientists first suspected a link between omega-3 fats and mood when they noticed that populations that consume the most seafood have the lowest rates of depression. For example, researchers at the National Institutes of Health have found that higher fish consumption in a nation correlates with lower rates of depression in its population.¹⁰ Researchers are now observing increasing rates of depression in areas of the world that are moving away from traditional diets rich in omega-3s to modern Western diets full of processed foods that typically supply miniscule amounts of beneficial fats.¹¹

Low levels of omega-3 fatty acids may correlate with suicide, the most serious of all manifestations of depression. In fact, low blood levels of omega-3 fats have been linked to an increased risk of attempted suicide.¹² In a recent study of medication-free depressed subjects over a two-year period, low blood levels of omega-3s predicted the risk of suicidal behavior.¹³ Supplementation with fish oil could potentially prevent many of the 765,000 suicide attempts and 30,000 suicides committed each year in the US.



Growing evidence likewise suggests a role for omega-3 fatty acids in helping to relieve disabling depression. After recently reviewing the most current scientific data, researchers noted that most well-designed studies show that omega-3 fatty acids benefit people who suffer depression. Importantly, they noted that omega-3 fatty acids showed positive results in a variety of patient populations, suggesting that these fatty acids may provide relief for people of all ages and genders who are afflicted by depression.²

Furthermore, omega-3 fatty acids may even benefit people who are already using antidepressant drugs but are not achieving optimal relief. In one study, people who used prescription antidepressants and supplemented with omega-3 fatty acids experienced improvements in numerous symptoms, including depression, anxiety, sleep disturbances, and poor libido.¹⁴

Similarly, a recent study from England examined the effects of omega-3 fatty acids on medicated patients suffering from depression related to bipolar disorder, or manic depressive illness. Those who took omega-3 fatty acid supplements in addition to their prescription antidepressants showed greater benefits compared to patients who took only antidepressants.¹⁵

These impressive studies indicate that omega-3 supplementation is not only beneficial against depressive disorders, but also may enhance the effects of prescription drugs used to fight conditions such as depression and bipolar disorder.

Improving Mood and Cognition Across Diverse Populations

In addition to aiding those who suffer depression, omega-3s appear to benefit non-depressed healthy subjects while helping to relieve symptoms of disorders such as ADHD, schizophrenia, and Alzheimer's disease.

In a recent Italian study, a group of healthy volunteers who supplemented with omega-3s for just over a month demonstrated numerous benefits, including elevated mood, improved attention, and sharper cognition needed for complex information processing.¹⁶ These intriguing findings lend scientific support to the reputation of fish and its oils as "brain food."

Omega-3s may prove to be invaluable in helping to prevent and manage ADHD, which affects a

growing number of American children, adolescents, and even adults. When decreased blood levels of omega-3 fats were found in those suffering ADHD,³ researchers sought to investigate whether omega-3 supplementation could improve poor attention span and hyperactive behavior in ADHD patients. Omega-3 supplementation did in fact alleviate symptoms in children suffering from ADHD while improving academic achievement in kids with developmental coordination disorder, a condition characterized by poor coordination that sometimes occurs in concert with learning disorders.⁴

Another study suggests that omega-3 supplementation may complement prescription medications in those suffering from schizophrenia. In a study of patients with persistent, severe schizophrenia, combining omega-3 supplementation with antipsychotic drugs produced notable improvements compared to treatment with the drugs alone.¹⁷

In addition to being linked to ADHD, diminished blood levels of omega-3s are associated with Alzheimer's disease, perhaps the most dreaded of all neurodegenerative disorders.³ Consumption of fish and its oils has been correlated with a decreased risk of developing dementia and Alzheimer's, suggesting that maintaining healthy levels of omega-3 fats may help preserve cognitive function and prevent its deterioration with advancing age.¹⁸

These intriguing studies examining the effects of omega-3 fatty acids on disorders ranging from ADHD to Alzheimer's suggest that omega-3s may well play an important role in promoting optimal mental health throughout the human life span, from childhood and adolescence well into advanced age.

Omega-3s Support Healthy Brain Structure, Function

Over the last decade, neuroscientists have found that essential fatty acids such as EPA and DHA are crucial to the very structure of the brain. Indeed, over 60% of the human brain consists of fat, which insulates nerve cells to support proper electrical signaling. More than one third of the brain's fat is composed of omega-3 fatty acids such as those found in fish oil.¹⁹ Scientists believe that by upsetting the fatty make-up of the brain, deficiencies of essential fatty acids may contribute to mood disorders.

Omega-3 fats may also benefit brain health through their effects on blood flow to the brain. Omega-3 deficiency has been found to decrease normal blood flow to the brain in animals—an intriguing finding, as research shows that some patients with depression likewise suffer compromised blood flow to a number of brain regions.^{20,21} Omega-3 fatty acids may promote healthy mood by ensuring optimal blood flow to the brain.

Furthermore, omega-3 deficiency has been correlated with decreased levels of phosphatidylserine, an important brain compound that supports healthy memory and demonstrates depression-fighting effects in humans.²²⁻²⁴ Phosphatidylserine is a key nutrient for ensuring optimal brain function and may help to prevent cognitive decline with aging.^{19,25}

Shortcomings of Prescription Antidepressants

Since the most expensive clinical study ever sponsored by the US government showed that popular antidepressant medicines such as Zoloft®, Effexor®, Wellbutrin®, and Celexa® benefited only 50% of the depressed patients who used them, many scientists and medical practitioners believe that it is time to re-evaluate the standard approach to mental health treatment.⁴¹ Clearly, medications alone are not sufficient to resolve depression. Furthermore, many popular antidepressants are associated with side effects such as nausea, vomiting, dizziness, and drowsiness.⁴²

Fortunately, several reviews of the clinical evidence have concluded that omega-3 fatty acids from fish oil appear to work alone to combat depression while also enhancing the effectiveness of certain antidepressant drugs.^{2,14,29} Omega-3 fats may thus represent a crucial tool in the battle against ever-more common forms of depressive illness.

Omega-3s Aid Brain Health by Fighting Inflammation

A deficiency of omega-3s may also compromise brain health by promoting inflammation, which underlies degenerative diseases such as cancer, diabetes, arthritis, and heart disease that are commonly accompanied by clinical depression.²⁶⁻³⁰ Inflammation is associated with the production of certain cytokines that play a role in depressed mood.³¹⁻³⁴

Omega-3 fatty acids reduce the production of pro-inflammatory compounds.³⁵ By suppressing the inflammatory cascade, omega-3 fats may help reduce the incidence of depression.^{36,37} Lending support to the link between inflammation and depression, a recent study found that drugs that block inflammation show promise in managing depression.³⁸ An additional advantage of omega-3 supplements is that they may have fewer side effects than anti-inflammatory medications.³⁵

Together, these studies indicate that a deficiency in omega-3 fatty acids leads to biochemical imbalances and an increase in pro-inflammatory compounds that may contribute to the development of depression. Maintaining an optimal intake of omega-3 fatty acids may thus be crucial in supporting optimal brain health by suppressing harmful inflammation.

Optimal Omega-3 Sources and Dosages

The omega-3 fatty acid known as alpha-linolenic acid is abundant in flaxseed, canola oil, and walnuts. Unfortunately, humans convert only small amounts of alpha-linolenic acid into the EPA and DHA that are critical for inhibiting inflammation and supporting brain health. In fact, one study showed that only 5-15% of plant-derived alpha-linolenic acid was converted to DHA in the human body.³⁹ Thus, fish oil or cold-water fish provide the best sources of these omega-3 fatty acids.

The average daily intake of EPA/DHA combined in North America is 130 mg—barely 10% of the 1000 mg recommended by the American Heart Association.⁴⁰ Many health practitioners believe that doses of 1000-2000 mg a day of total omega-3 fatty acids may offer general support for health, mood, and cognition. Clinical studies suggest that 1000-4000 mg or more of omega-3s may be needed to improve mood in patients with depression.³⁹

Fish Oil Caution

Individuals who use blood-thinning medications such as Coumadin® or who have increased bleeding tendencies should consult a physician before using fish oil.

Conclusion

Optimal intake of omega-3 fatty acids may provide invaluable support for ensuring healthy mood, attention span, and mental health in people of all ages.

By providing critical fats that support the brain's very structure, omega-3 supplements promote healthy brain function. Emerging data suggest that omega-3 fatty acids not only fight depression,

ADHD, and other mental disorders, but also may enhance the efficacy of prescription medications used to manage conditions such as depression and bipolar disorder.

These healthful fats should thus be considered essential nutrients for all who seek to achieve and maintain optimal mood and feelings of well-being.

Continued on Doctors Overlook Benefits of Omega-3 Fatty Acids for Bone Health

References

1. Peet M, Stokes C. Omega-3 fatty acids in the treatment of psychiatric disorders. *Drugs*. 2005;65(8):1051-9.
2. Sontrop J, Campbell MK. Omega-3 polyunsaturated fatty acids and depression: a review of the evidence and a methodological critique. *Prev Med*. 2006 Jan;42(1):4-13.
3. Young G, Conquer J. Omega-3 fatty acids and neuropsychiatric disorders. *Reprod Nutr Dev*. 2005 Jan-Feb;45(1):1-28.
4. Richardson AJ. Omega-3 fatty acids in ADHD and related neurodevelopmental disorders. *Int Rev Psychiatry*. 2006 Apr;18(2):155-72.
5. Bruinsma KA, Taren DL. Dieting, essential fatty acid intake, and depression. *Nutr Rev*. 2000 Apr;58(4):98-108.
6. Wells AS, Read NW, Laugharne JD, Ahluwalia NS. Alterations in mood after changing to a low-fat diet. *Br J Nutr*. 1998 Jan;79(1):23-30.
7. Weissman MM, Klerman GL. Depression: current understanding and changing trends. *Annu Rev Public Health*. 1992;13:319-39.
8. Greenberg PE, Stiglin LE, Finkelstein SN, Berndt ER. The economic burden of depression in 1990. *J Clin Psychiatry*. 1993 Nov;54(11):405-18.
9. Harman JS, Kelleher KJ, Reynolds CF, Pincus HA. Out-of-pocket healthcare expenditures of older Americans with depression. *J Am Geriatr Soc*. 2004 May;52(5):809-13.
10. Hibbeln JR. Fish consumption and major depression. *Lancet*. 1998 Apr 18;351(9110):1213.
11. McGrath-Hanna NK, Greene DM, Tavernier RJ, Bult-Ito A. Diet and mental health in the Arctic: is diet an important risk factor for mental health in circumpolar peoples?—a review. *Int J Circumpolar Health*. 2003 Sep;62(3):228-41.
12. Huan M, Hamazaki K, Sun Y, et al. Suicide attempt and n-3 fatty acid levels in red blood cells: a case control study in China. *Biol Psychiatry*. 2004 Oct 1;56(7):490-6.
13. Sublette ME, Hibbeln JR, Galfalvy H, Oquendo MA, Mann JJ. Omega-3 polyunsaturated essential fatty acid status as a predictor of future suicide risk. *Am J Psychiatry*. 2006 Jun;163(6):1100-2.
14. Peet M, Horrobin DF. A dose-ranging study of the effects of ethyl-eicosapentaenoate in patients with ongoing depression despite apparently adequate treatment with standard drugs. *Arch Gen Psychiatry*. 2002 Oct;59(10):913-9.
15. Frangou S, Lewis M, McCrone P. Efficacy of ethyl-eicosapentaenoic acid in bipolar depression: randomised double-blind placebo-controlled study. *Br J Psychiatry*. 2006

16. Fontani G, Corradeschi F, Felici A, Alfatti F, Migliorini S, Lodi L. Cognitive and physiological effects of omega-3 polyunsaturated fatty acid supplementation in healthy subjects. *Eur J Clin Invest.* 2005 Nov;35(11):691-9.
17. Emsley R, Myburgh C, Oosthuizen P, van Rensburg SJ. Randomized, placebo-controlled study of ethyl-eicosapentaenoic acid as supplemental treatment in schizophrenia. *Am J Psychiatry.* 2002 Sep;159(9):1596-8.
18. Uauy R, Dangour AD. Nutrition in brain development and aging: role of essential fatty acids. *Nutr Rev.* 2006 May;64(5Pt 2):S24-33; discussion S72-91.
19. Marszalek JR, Lodish HF. Docosahexaenoic acid, fatty acid-interacting proteins, and neuronal function: breastmilk and fish are good for you. *Annu Rev Cell Dev Biol.* 2005;21:633-57.
20. Ellis EF, Police RJ, Dodson LY, McKinney JS, Holt SA. Effect of dietary n-3 fatty acids on cerebral microcirculation. *Am J Physiol.* 1992 May;262(5pt.2):H1379-86.
21. Kennedy SH, Javanmard M, Vaccarino FJ. A review of functional neuroimaging in mood disorders: positron emission tomography and depression. *Can J Psychiatry.* 1997 Jun;42(5):467-75.
22. Hamilton L, Greiner R, Salem N, Jr., Kim HY. n-3 fatty acid deficiency decreases phosphatidylserine accumulation selectively in neuronal tissues. *Lipids.* 2000 Aug;35(8):863-9.
23. Maggioni M, Picotti GB, Bondiolotti GP, et al. Effects of phosphatidylserine therapy in geriatric patients with depressive disorders. *Acta Psychiatr Scand.* 1990 Mar;81(3):265-70.
24. Cartwright IJ, Pockley AG, Galloway JH, Greaves M, Preston FE. The effects of dietary omega-3 polyunsaturated fatty acids on erythrocyte membrane phospholipids, erythrocyte deformability and blood viscosity in healthy volunteers. *Atherosclerosis.* 1985 Jun;55(3):267-81.
25. Cenacchi T, Bertoldin T, Farina C, Fiori MG, Crepaldi G. Cognitive decline in the elderly: a double-blind, placebo-controlled multicenter study on efficacy of phosphatidylserine administration. *Aging (Milano).* 1993 Apr;5(2):123-33.
26. Kiecolt-Glaser JK, Glaser R. Depression and immune function: central pathways to morbidity and mortality. *J Psychosom Res.* 2002 Oct;53(4):873-6.
27. Plante GE. Depression and cardiovascular disease: a reciprocal relationship. *Metabolism.* 2005 May;54(5 Suppl 1):45-8.
28. Frasere-Smith N, Lesperance F, Julien P. Major depression is associated with lower omega-3 fatty acid levels in patients with recent acute coronary syndromes. *Biol Psychiatry.* 2004 May 1;55(9):891-6.
29. Pouwer F, Nijpels G, Beekman AT, et al. Fat food for a bad mood. Could we treat and prevent depression in Type 2 diabetes by means of omega-3 polyunsaturated fatty acids? A review of the evidence. *Diabet Med.* 2005 Nov;22(11):1465-75.
30. Singh RB, Pella D, Mechirova V, Otsuka K. Can brain dysfunction be a predisposing factor

for metabolic syndrome? *Biomed Pharmacother.* 2004 Oct;58 Suppl :S56-68.

31. Raison CL, Capuron L, Miller AH. Cytokines sing the blues: inflammation and the pathogenesis of depression. *Trends Immunol.* 2006 Jan;27(1):24-31.
32. Wichers MC, Kenis G, Leue C, Koek G, Robaey G, Maes M. Baseline immune activation as a risk factor for the onset of depression during interferon-alpha treatment. *Biol Psychiatry.* 2006 Jul 1;60(1):77-9.
33. Schaefer M, Schwaiger M, Pich M, Lieb K, Heinz A. Neurotransmitter changes by interferon-alpha and therapeutic implications. *Pharmacopsychiatry.* 2003 Nov;36 Suppl 3:S203-6.
34. Hayley S, Poulter MO, Merali Z, Anisman H. The pathogenesis of clinical depression: stressor- and cytokine-induced alterations of neuroplasticity. *Neuroscience.* 2005;135(3):659-78.
35. Smith WL. Cyclooxygenases, peroxide tone and the allure of fish oil. *Curr Opin Cell Biol.* 2005 Apr;17(2):174-82.
36. Schiepers OJ, Wichers MC, Maes M. Cytokines and major depression. *Prog Neuropsychopharmacol Biol Psychiatry.* 2005 Feb;29(2):201-17.
37. O'Brien SM, Scott LV, Dinan TG. Cytokines: abnormalities in major depression and implications for pharmacological treatment. *Hum Psychopharmacol.* 2004 Aug;19(6):397-403.
38. Muller N, Schwarz MJ, Dehning S, et al. The cyclooxygenase-2 inhibitor celecoxib has therapeutic effects in major depression: results of a double-blind, randomized, placebo controlled, add-on pilot study to reboxetine. *Mol Psychiatry.* 2006 Jul;11(7):680-4.
39. Logan AC. Omega-3 fatty acids and major depression: a primer for the mental health professional. *Lipids Health Dis.* 2004 Nov 9;3:25.
40. Holub BJ. Clinical nutrition: 4. Omega-3 fatty acids in cardiovascular care. *CMAJ.* 2002 Mar 5;166(5):608-15.
41. Rubinow DR. Treatment strategies after SSRI failure—good news and bad news. *N Engl J Med.* 2006 Mar 23;354(12):1305-7.
42. Wilson K, Mottram P. A comparison of side effects of selective serotonin reuptake inhibitors and tricyclic antidepressants in older depressed patients: a meta-analysis. *Int J Geriatr Psychiatry.* 2004 Aug;19(8):754-62.

All Contents Copyright © 1995-2009 Life Extension Foundation All rights reserved.

LifeExtension®

These statements have not been evaluated by the FDA. These products are not intended to diagnose, treat, cure or prevent any disease. The information provided on this site is for informational purposes only and is not intended as a substitute for advice from your physician or other health care professional or any information contained on or in any product label or packaging. You should not use the information on this site for diagnosis or treatment of any health problem or for prescription of any medication or other treatment. You should consult with a healthcare professional before starting any diet, exercise or supplementation program, before taking any medication, or if you have or suspect you might have a health problem. You should not stop taking any medication without first consulting your physician.

