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Omega-3 Fats Critical to Brain Health After Traumatic Injury and Surgery

Anti-Inflammatory Substances Derived from EPA and DHA Protect Memory and Cognition

STOCKHOLM – The [omega-3 polyunsaturated fatty acids](http://www.fatsoflife.com/fats-and-health/omega-3s/) (PUFAs) found in seafood and marine oils called [EPA](http://en.wikipedia.org/wiki/Eicosapentaenoic_acid) and [DHA](http://en.wikipedia.org/wiki/Docosahexaenoic_acid) may offer a simple, affordable way to reduce the effects of traumatic brain and spinal cord injuries by decreasing inflammation and nerve cell damage. They may also protect against cognitive impairment that can follow surgery or critical illness. These encouraging findings and more are being presented at the [11th Congress of the International Society for the Study of Fatty Acids and Lipids](http://www.issfal.org/conferences/2014-stockholm) (ISSFAL) in Stockholm 29 June-1 July, 2014.

Traumatic brain injury (TBI), resulting from combat, falls, traffic accidents and sports, is a leading cause of death in children and adults 1-44 years of age. In 2010 alone, there were more than 10 million TBIs worldwide. TBI is associated with long-term complications such as epilepsy, chronic headaches and neuropsychiatric disorders. Spinal cord injury (SCI) from similar causes also results in severe disabilities, impaired sensorimotor function and chronic pain. The consequences of TBI and SCI include reduced blood flow and DHA levels, inflammation, swelling and cell death. Loss of certain types of cells impairs the ability of the brain to repair itself and can affect the nervous system. For both TBI and SCI, there are no specific treatments to protect against such damage.

However, intervention with DHA, EPA and other substances may preserve brain networks and connectivity, maintaining or improving memory, according to [Adina Michael-Titus, D.Sc.,](http://blizard.qmul.ac.uk/neuroscience-and-trauma-staff/187-michael-titus-adina.html) professor of neuroscience, Centre for Neuroscience and Trauma, Blizard Institute, Barts and The London School of Medicine and Dentistry, Queen Mary University of London, U.K.

“Research has demonstrated significant neuroprotective effects of DHA and EPA,” she observes. “These omega-3 fatty acids may protect and regenerate nerve cells as well as reduce damaging inflammation. As a result, they have significant potential for the improved treatment of brain and spinal cord injuries.”

Animal studies have shown that the administration of DHA up to two hours after SCI improves neurological function and nerve cell survival, reduces inflammation and decreases oxidative stress. DHA given prior to the injury also promotes cell survival and function. Similar neuroprotective effects have been reported in rats with mild TBI fed DHA and EPA prior to or shortly after injury. Due to these significant results, human trials are now underway.

[Niccolò Terrando, Ph.D.,](http://ki.se/en/people/niterr) assistant professor of physiology and pharmacology at the Karolinska Institutet, Sweden, showed in animals how resolvins – molecules naturally produced from omega-3 fatty acids – can protect against cognitive impairment that often occurs in people post-surgery and during critical illness. Treatment with a single dose of a DHA-derived resolvin protected the brain from memory dysfunction after surgery by “resolving” neuroinflammation.

This treatment also improved nerve cell function when given 24 hours after surgery. Major surgery affects brain function at large, contributing to inflammation and memory impairment.

“It was remarkable that the resolvin displayed such unexpected, positive effects on the central nervous system when administered at very low doses systemically,” says Terrando. “This substance, aside from reversing inflammation, may also promote healing and tissue regeneration critical to patient recovery. We hope to translate these [promising findings](http://ki.se/en/news/aspirin-triggered-resolvin-protects-against-cognitive-decline-after-surgery) into patient care.”

Even healthy people may benefit from the anti-inflammatory properties of omega-3 PUFAs. [Trevor Mori, Ph.D.,](http://www.uwa.edu.au/people/trevor.mori) research professor at the University of Western Australia, examined the effect of 2.4 grams of EPA and DHA per day for seven days and aspirin for two days on blood levels of resolvins in a trial with healthy men and women.

“Short-term dietary supplementation with moderate amounts of these omega-3 PUFAs resulted in measurable levels of potent, inflammation-resolving substances,” Mori notes. “These substances are highly effective in reducing the symptoms and damage from overactive and chronic inflammation. The increase in resolvins after EPA and DHA supplementation may, in part, explain the benefits of these omega-3s in cardiovascular disease.”

For more information, go to [www.issfal.org](http://www.issfal.org) and see ISSFAL on [Facebook](https://www.facebook.com/pages/International-Society-for-the-Study-of-Fatty-Acids-and-Lipids/461696330643293?ref=hl) and [Twitter](https://twitter.com/ISSFAL2014) (@ISSFAL2014).

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