

# Brain Function and Omega-3

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In a previous article (Brain Development - The Omega-3 Connection in Pregnancy and Early Childhood) I focused on the need for large amounts of Omega-3 Essential Fatty Acids (EFAs) for normal brain development of the foetus and new born infant. I also discussed the potential effects of Omega-3 deficiency on the incidence of learning disorders such as Dyslexia and Attention Deficit Disorder/Attention Deficit and Hyperactivity Disorder (ADD/ADHD). Also considered was the potential for post natal depression in the mother as a consequence of the baby's demand for Omega-3 from her, both *in utero* and while breast feeding. EFA function and sources were briefly explained for those not familiar with this subject. In this current article I would like to extend the discussion of the Omega-3 connection to problems with brain function in later life.

## Early Childhood

During this phase the infant brain is developing very rapidly, forming the neural connections and dendritic branches which are the foundation of its future mental ability. Breast milk is of course the best source of all the fatty acids needed for normal brain development, however if the mother's diet is low in Omega-3 then breast milk can depart from the ideal 1:1 Omega-6/Omega-3 ratio quite substantially - several surveys suggest that common values for breast milk range from 8:1, to as unbalanced as 45:1, depending on the quality of EFAs in the mother's diet. A nursing mother needs a regular intake of Omega-3 from fish (cold water fish are usually a reasonable source of Omega-3s), marine Omega-3s, freshly ground linseed or fresh flax seed oil to restore the breast milk to close to the ideal 1:1 ratio.

The most rapid growth phase for the developing brain comes in a growth spurt around the age of ten, but ensuring that children have an adequate intake of Omega-3 throughout this period is essential for optimum development of their intelligence.

## Teenage years

The brain and body's demand for high quality EFAs in the diet continue as the brain continues to build new and more powerful connections. Many scientists believe that for teenage girls, this is one of the most critical periods for them to develop the peak nutrient reserves that may one day be required to foster peak brain development in her offspring. Unfortunately this is also the time when most adolescents tend to have the worst eating patterns of their life. This tends to be due to a combination of peer pressure to eat large amounts of 'junk food', and especially for girls, social pressure to be fashionably slim and look glamorous. The former results in a high intake of saturated and damaged fats and very few EFAs, whilst the latter - often in the form of a revolt against fat in all forms and 'crash' dieting - frequently results in a diet very low in EFAs and particularly Omega-3s. Alcohol is another component that can lead to low availability of long chain EFAs for teenagers. Alcohol is one of the major factors which can disrupt the delta-6 desaturase enzyme pathway - a critical step in the formation of such EFAs. Studies have shown that EFA supplements can minimise the effects of alcohol on aggression levels, and liver function, and also reduce the craving for alcohol in addictive behavioural patterns.

## Adulthood

### Physical Intelligence

The body's ability to orientate and move in space could be termed its physical intelligence. Clinical studies have shown that conditions as diverse as Muscle Tremors and Paralysis and some aspects of Multiple Sclerosis have responded to Omega-3 supplementation.

### Emotional Intelligence

There is a rapidly growing body of evidence that a wide range of mood and behavioural problems can respond to EFA supplements - particularly the Omega-3s. Hibbeln and Salem (1995), scientists from the National Institute of Health (USA) postulated "that adequate Omega-3 fatty acids may reduce the rate of depression, just as they may reduce the risk of heart disease". Other scientists have found links to similar conditions such as aggression in children, teenagers and adults. Links that more recently have been investigated include Post Natal Depression, ADD/ADHD, Obsessive-Compulsive Disorder, the "Winter Blues", Phobias, Chronic Fatigue and Schizophrenia.

The prostaglandins (hormone like substances) which wind up the body's physiological response to stress are all made from Omega-6 fatty acids (which most people have in excess), while the prostaglandins which wind the body down after stress are nearly all made from Omega-3 fatty acids (most people have insufficient). Not surprisingly, the stress related diseases all tend to respond to Omega-3 supplementation. The Chinese have

for centuries regarded fish as an important food to eat for “balanced, happy mood and better mental performance.”

There is a strong correlation between ‘blood sludge’, resulting from low oxygen levels and elevated cholesterol and/or triglyceride levels, depression and aggression.

#### Mental Intelligence

Studies in both New Zealand and Britain have shown that breastfed babies tend to have higher IQ scores than bottle fed babies and recent studies have shown that people with Dyslexia or Learning Disorders and ADD/ADHD have lower than normal levels of Omega-3 fatty acids in their blood. Studies linking Omega-3 insufficiency to memory and other mental impairments have also been reported recently.

The risk of Brain attack (Stroke) is also related to ‘blood sludge’ - anyone who has had a Heart attack is at greater risk of having a Brain attack and the risk factors are similar. Increased intake of Omega-3s needs to be an important part of a programme to reduce the risk of such events.

#### Treatment Options

The important thing to remember is that the brain does have the ability to grow new neural connections - the basis of all learning. This means that if the brain is given the right materials to grow the new connections through correct nutrition, and the stimulation to grow new connections by correct teaching, there is potential for the brain to correct a problem with **mental**, **physical** or **emotional** intelligence.

As noted above, a wide range of neurological conditions have an EFA imbalance (usually Omega-3 deficiency) component in the disorder, however this is seldom the only factor involved. Things like allergies, irritant chemicals and multiple nutrient deficiencies are often also involved.

Of course it is important to provide all the nutrients necessary to begin to repair the neural damage which is at the heart of the problem. The primary focus usually needs to be on providing the EFAs required, although it is now possible to accurately establish this need by use of a blood test. In the absence of a blood test, a program which covers all the most likely problems involves either eating 2 - 3 meals of cold water fish per week or taking 15 - 30 mls per day of one of the *waihi bush organic farm* flax seed oil blends.

You also need to ensure that there are adequate co-factors in the diet to enable the body to make best use of any EFA supplement. The most important ones include zinc (deficiency shows as white flecks in the nails), magnesium, niacin (you will get a ‘hot flush’ if you are deficient in niacin and take a supplement dose), and other B vitamins and vitamin C. Important minerals that are required for other functions relating to brain health include calcium, magnesium, manganese and chromium.

#### Summary

During childhood and teenage years the brain is developing rapidly in size and complexity and the body needs adequate Omega-3 - from maternal nutrition onwards. Getting adequate Omega-3s into teenagers presents special problems. There are a number of problems relating to **mental**, **physical** or **emotional** intelligence which have recently been shown to have links to Omega-3 insufficiency. These range from Muscle Tremors and Paralysis to Depression, Aggression, ADD/ADHD and Schizophrenia to Dyslexia and Brain Attack. EFA imbalance (usually Omega-3 deficiency) is usually only a component of the problem and best results are usually obtained with a multi factor approach.

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