

Brain Development

The Omega-3 connection in pregnancy and early childhood

by **David Musgrave** MAgrSci, DipHortSci

The implications of a Brain made from fat

Your brain contains more than 60% fat, and scientists are now realising that for normal brain development and function the brain has to get specific fats from what you eat. In short, if the right fats are not supplied, brain structure is altered - if structure changes, brain function changes.

Of course, the fats the brain cannot make for itself are the two Essential Fatty Acids (EFAs) Omega-6 and Omega-3. Physiological and clinical research is increasingly finding that EFA deficiency is a major factor in such conditions as: mood disorders like depression, aggression and schizophrenia; neurological diseases like multiple sclerosis, brain attack (stroke) and migraine headaches; learning disorders like ADD/ADHD, dyslexia and other learning disorders, and many other mental/emotional problems. In this brief article, I will focus on the effects on the developing foetus/infant and on the mother.

There is now strong evidence that for optimum brain function the Omega-6 to Omega-3 ratio in your brain and in your food needs to be approximately 1:1. Unfortunately, most modern diets have a ratio as high as 30:1 and the breast milk of some women has been measured to contain a ratio as high as 45:1. This is because of a major shift in our fat intake over the last 100 years towards animal fats and processed foods containing Omega-6 oils.

A remarkable **70%** of the total brain cells, that will last our lifetime, have been formed before birth, and by the end of the first year brain size will have increased nearly threefold. All this translates to a very large demand for Omega-3 fats by the developing foetus and the newborn baby. This comes from the mother's own Omega-3 supply through the blood and breast milk (infant 'formulas' - i.e. breast milk substitutes - seldom contain useful amounts of Omega-3 EFAs).

How fats affect your brain's performance

What sorts of consequences can such a dietary imbalance have on the brain development of our children? The work of USA's Dr Ralph Holman on EFAs and foetal brain development sums it up very clearly. He points out that:

- The mental apparatus of the coming generation is developed *in utero* (during the foetal period)
- The time to begin supplementation with EFAs is *before* conception
- The normal brain *cannot* be made without Omega-3 fatty acids
- There may be no later opportunity to repair effects of shortage of Omega-3 once the nervous system is formed

A similar situation continues for the newborn – the “hardwiring” process in the brain for such things as vision, feelings, movement and language is a high priority during the first year. The foundation for mental, physical and emotional intelligence is formed during this period and continues for many years.

The other consequence of the baby's demand for Omega-3 fats for development is that the mother's body store of Omega-3 can become severely depleted. Such Omega-3 deficiency can then seriously affect the mother's mood and emotions in syndromes like “post natal depression”. In many instances, the mother does not get sufficient Omega-3 in her diet to replace her body stores between pregnancies, so the problem is often worse for both mother and child with later pregnancies.

What steps are needed to change this situation?

There are two critical groups of the Omega-3 Essential Fatty Acid family needed by the brain – the “Smart Fats”. Alpha linolenic acid (ALA), which the body cannot make, must come from your food, so is the true Essential Fatty Acid. The secondary (2°) Omega-3s such as those found in blackcurrant seed oil and fish oils can be made in the body from ALA by most healthy children and adults.

The best food source of ALA is cold pressed, extra virgin flax seed oil, followed by walnut or hemp seed oils, which contain over 60%, 30% and 25% ALA respectively. There are also very small amounts of ALA in unrefined Canola and Soybean oils.

You can very easily tell if an oil has been refined or not, by the taste and smell – **if it does not taste and smell of the seed from which it came, it has been refined**. Cold pressed does not necessarily mean unrefined, so there are very few unrefined oils in the New Zealand market place. Refining oils includes

washing with caustic soda and deodorizing with high pressure steam at about 250 °C for ½ to 1 hour, yet oils so treated are often **still called cold pressed**.

For a healthy adult who has been having insufficient ALA, it takes up to three to six weeks for the body's enzyme systems to work up to efficiently converting ALA into the 2° Omega-3s. There are several factors that can slow down your body's ability to produce 2° Omega-3s, such as high intake of saturated and trans fats, alcohol, elevated blood sugars from high intake or diabetes, obesity and smoking. Since 2° Omega-3s are the main fat required by the brain it is advisable to use the *waihi bush organic farm flax boost* or supplement with fish oils when beginning to add Omega-3s to your diet. Infants under a year old, diabetics and those with the factors outlined above in their lifestyle are not likely to make 2° Omega-3s very efficiently so will need to stay on *waihi bush organic farm flax boost* rather than switching to *waihi bush organic farm flax original*.

We should wonder just what damage our modern diet; high in saturated fats and low in Omega-3 oil is doing to humans as a species. Animals fed diets deficient in Omega-3 throughout infancy and adulthood, (at similar levels to people consuming a standard modern diet) had a 50% drop in the 2° Omega-3 levels in their brain. The second generation, fed on exactly the same diet had 2° Omega-3 brain levels 90% below normal. Dr Rudin estimates that in the USA the average Omega-3 intake has fallen over 80% over several generations, which leads one to the suggestion that the increasing incidence of neurological disorders may well accelerate as children are born to parents who have developed during the modern 'junk food' era.

Note: this article was prepared by David Musgrave and is based on published scientific and medical literature.

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