Impact of Iodine

A policy statement from the Council on Environmental Health and published in the American Academy of Pediatrics, urged pregnant women to take iodine supplements to boost their child’s brain development. Dietary iodine, historically derived from fish and fortified salt is no longer common in the diet since fish intake has declined and most salt now comes from processed foods prepared with unfortified salt. In addition vegans, because they don’t eat fish, likely have iodine deficiency1.

Iodine deficiency is also prevalent in the South East of the UK where in an Efamol/Wassen sponsored study, 100 pregnant women were recently tested in their first-trimester. Iodine status was significant better in those taking an iodine prenatal supplements (n=42) than in those not taking one. Based on these findings, the authors stated a national survey of iodine status in UK pregnant women is required2.

In France, a systematic literature review including 13 papers found that compared to in 1952, iodine status is better and more women are using iodine supplements before and during pregnancy. However, iodine status could stand to be improved before pregnancy and iodine supplementation prevents infant psychomotor and neuro-intellectual disorders3.

Maternal iodine deficiency also:

• impacts foetal and infant brain development and reduces their full potential4
• increases mother and child vulnerabilities to effects of environmental pollutants including tobacco smoke5
• reduces verbal IQ and reading ability of 8-9 year olds6

Maternal supplementation improves foetal and infant iodine nutrition according to a recent study of 1508 pregnant and 87 lactating women and their offspring. Iodine levels were higher in infants from mothers supplemented with 200 µg iodine daily than in those not supplemented7.

The American Thyroid Association and the National Academy of Sciences recommends1:

• 290 µg total daily iodide in breast feeding mothers, which generally requires 150 µg of supplemented iodide

DHA Needed for Optimal Development

A newly published literature review aptly showed that the docosahexaenoic acid (DHA) rich human brain requires an ample and sustained source of dietary DHA to reach its full potential8. Brain and nervous tissue is rich in DHA and DHA is required for the brain to function correctly.

DHA is scarce in terrestrial plants, but in contrast is plentiful at the shoreline where it is made by single-celled algae and ends up in marine animals including fish.

The human brain accumulates DHA up to age 18 with most being taken up half-way through gestation up to 2 years of age.

Infants fed formula containing only alpha-linolenic acid as an omega-3 source and no DHA, have lower DHA status than those given formula with DHA. Those infants receiving DHA have better vision and brain function.

Vegan mothers have much lower levels of DHA in their breast milk than non-vegans.

EnvirOmega - a good way for them to increase DHA in their milk so their babies can reach their full potential.

References:
4. Leung AM & Brent GA. Children of mothers with iodine deficiency during pregnancy are more likely to have lower verbal IQ and reading scores at 8-9 years of age. Evid Based Nurs 2013 Dec 12.
The importance of DHA during pregnancy for infant development and health continues to be supported by research. During that last six months, results of two randomized, double-blind, placebo controlled trials were published that included supplemented mothers and their infants who were monitored and tested in subsequent months.

One included 270 women given either placebo or 400 mg/day of DHA from 16 weeks gestation to delivery. At 2 months of age, the infants in the DHA group had better visual acuity. By 18 months, they could talk and communicate better because they understood and produced more words, talked more in sentences, were more receptive to speech and expressed themselves better.

The second included 1094 pregnant women aged 18-35 years with a history of atopy who took either a placebo or 400 mg/day of algal DHA from 18-22 weeks of gestation through delivery. At 18 months of age, the infants from DHA supplemented mothers had fewer respiratory symptoms typical of the atopic condition including less phlegm with nasal discharge or nasal congestion and less fever with phlegm and nasal discharge or nasal congestion.

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**Active Memory Improves Memory, Reduces Anxiety & Depression**

A recent randomised trial showed that regular use of Active Memory improves age related memory loss or delays its progression in elderly people. It included 60 patients aged 60 years and older with diagnosed age related memory loss who were either untreated (control group) or took 3 capsules per day of Active Memory for 24 weeks. Before and after treatment, the patients were assessed by researchers who did not know which of them were taking the Active Memory with the:

- **MMSE** - Mini Mental State Exam which assesses mental status using eleven questions that test five areas of cognitive function: orientation, registration, attention and calculation, recall, and language.
- **ABT** - Abbreviated Barc- lona Test Battery which is a brief neuropsychological test for Spanish people older than 49 years.
- **QOL** - Quality of Life Scale which provides a simple descriptive profile and a score for quality of life status

Patient improvements were greater in the Active Memory treated patients for 5 of the memory tests with the results being significantly greater for delayed free text recall. In addition, there was no or less deterioration in the Active Memory treated patients for 5 of the QOL tests with the results for anxiety and depression being significantly less. (See graphs below)


**PS Improves Memory**

A randomised, double-blind, trial including 131 non-demented people with memory complaints taking either placebo or 100 mg daily of phosphatidylserine (PS) for 15 weeks found significant improvements in immediate verbal recall. In a subset of them with good cognitive performance, immediate and delayed verbal recall, learning ability and time to copy complex figures also improved. A 15 week treatment extension in 122 participants significantly improved Clinical Global Impression of Change while 9 untreated patients maintained their attention and memory.


**Mother & Baby provides 400 mg of DHA daily, enough to:**

- Enhance vision at 2 months of age
- Improve language development at age 18 months including:
  - number of words understood and produced
  - number of sentences used
  - language reception and expression
- Decrease respiratory symptoms at 18 months of age including:
  - phlegm with nasal discharge or nasal congestion
  - fever with phlegm and nasal discharge or nasal congestion

**Pioneer Discoveries on How DHA Reaches the Brain**

We know that DHA is abundant in the brain and is critical for its function throughout life, but little was known about how DHA gets in the brain until now. One study showed it passes into the cerebrospinal fluid (CSF) while another discovered a protein that carries it from the blood into the brain.

In a 6 month, randomized, double-blind trial including 204 Alzheimer’s Disease (AD) patients taking either placebo or 2.3 g of high-DHA oil daily, 33 of them were tested for blood and CSF DHA status. DHA levels increased in both while inflammatory and AD biomarkers decreased. These results suggest that DHA is transferred across the blood-brain barrier. But how does that take place?

Researchers at Duke-NUS Graduate Medical School in Singapore helped answer that question when they discovered a transporter protein called Mfad2a.

Mice that did not have Mfad2a had brains a third smaller than those with the transporter, had memory and learning deficits and high anxiety, and were deficient in DHA.

Mfad2a is only found in the inside lining of tiny blood vessels between the blood and the brain and so it is part of the blood-brain barrier. It is necessary to enable incorporation of DHA into a phospholipid called phosphatidylcholine that is a main membrane fatty acid within the brain. Inability to incorporate DHA into this phospholipid reduces DHA transfer to and ultimately its levels within the brain. That has major implications for brain development and function.

We know that the brain does not produce DHA on its own. Instead, it is transferred from the mother during fetal development, or after birth and throughout life it is synthesized in the liver or comes directly from food. Now we know how DHA from those three sources manages to find its way into brain tissue where it can do its job!

Knowing how this process occurs will enable future discoveries to further enhance brain absorption of this essential nutrient and facilitate improvements in therapeutic formulations.

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**Drug Treatments for ADHD Enhanced by LC-PUFAs**

Combinations of Fish oil/EPO and methylphenidate are more effective to reduce ADHD symptoms than either alone according to a randomized trial including 90 children aged 6-12 years with newly diagnosed ADHD. They took either Fish oil (FO)/EPO, methylphenidate (MPH) or a combination of the two for 12 months.

Although MPH worked faster than FO/EPO, it had more side effects including headache, irritability, tension, pallor, palpitation, insomnia, tics, tremor, and nausea that were completely absent in the FO/EPO group. These side effects were reduced by FO/EPO. In addition, 93% of children improved taking the combination compared to 80% taking MPH and 60% taking FO/EPO. The graph below shows the percent improvement of ADHD symptoms and parent and clinician perceived improvements from baseline.

**DHA is delivered to the brain by Mfsd2a transport protein. It is seen in red coating the walls of these mouse brain capillaries.**

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**Drug Side Effects Reduced by LC-PUFAs**

- **On Drugs**
  - 100% of children had up to 11 side effects

- **On Drugs+FO/EPO**
  - 63.3% of children had up to 6 side effects

- **On FO/EPO**
  - 60% of children had up to 4 side effects
Different types of dietary fatty acids may influence cancer growth in different ways. In addition, the same types of fatty acids under different conditions can have opposing effects. For example, PUFAs are known to be involved in several mechanisms that counteract cancer formation. At the same time, these same fatty acids can degrade (become rancid) and produce cancer causing agents including free oxygen radicals and lipid peroxides. Hence the answer to the question, ‘Does EPO/GLA contribute to breast cancer growth?’, is not easy to answer. However, a recent prospective case-control study has helped to clarify the relationship between plasma saturated (SFAs), monounsaturated (MUFA)s and PUFAs and overall cancer and breast cancer risk and the potential influence of anti-oxidants on these relationships.

The study included 250 participants within the ‘Supplementation en Vitamines et Mineraux Antioxydants’ (SU.VI.MAX) study who were initially diagnosed with cancer between 1994 and 2002 and an age/sex/treatment matched control for each case. Between 1994-95 they had been part of 13,017 people enrolled in the randomised, double-blind trial and treated with either placebo or antioxidants, people with higher dihomo-gammalinolenic acid (DGLA) and a higher proportion of DGLA to linoleic acid (LA) in their blood had a lower risk. On the other hand, higher proportion of arachidonic acid (AA) to DGLA and higher LA was associated with increased risk in both groups as was total PUFA in the placebo group.

Within the body, DGLA can be made from GLA. Studies have shown that DGLA can inhibit cancer growth through a number of mechanisms that prevent transformation of normal mammary cells to malignant forms. In addition, DGLA reduces motility, invasiveness and adhesion of cancer cells thereby preventing spread of primary tumours.

The salient finding within this study was that anti-oxidant treatment decreased cancer risk when blood PUFA levels were high. That’s because, when antioxidant status is low PUFAs can form peroxides that may cause cancer whereas high antioxidant levels protect PUFAs from degradation and thereby cancel the cancer causing effects.


EPO Supplementation increases blood levels of DGLA without increasing LA and while only modestly increasing AA levels.

<table>
<thead>
<tr>
<th>Percent of Total Blood Plasma Fatty Acids</th>
<th>Normal Control</th>
<th>Baseline Atopic Eczema Patients</th>
<th>After 3 months EPO in Atopic Eczema Patients</th>
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<tbody>
<tr>
<td>LA</td>
<td>21.45</td>
<td>24.5</td>
<td>24.38</td>
</tr>
<tr>
<td>GLA</td>
<td>0.16</td>
<td>Not Detected</td>
<td>Not Detected</td>
</tr>
<tr>
<td>DGLA</td>
<td>3.06</td>
<td>2.63</td>
<td>3.13</td>
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<tr>
<td>AA</td>
<td>11.36</td>
<td>6.75</td>
<td>7.45</td>
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References: