

## Exciting news for DHA!

A special role for brain and visual development...

We bring you this Special Edition of the DHA Update to let you know of three new developments.

Firstly, Australian researchers have published the results of a huge study on over 600 pre-term infants who were either given additional HiDHA<sup>®</sup> tuna oil or not. The two groups were compared over time to measure any differences related to:

- their uptake of DHA,
- their visual function, and
- their mental development

We have included an overview of the study and its results as well an interview with one of the lead researchers: Professor Maria Makrides from the Women's & Children's Health Research Institute, Adelaide.

Secondly, world experts on dietary fats have reviewed the evidence for the requirement of DHA in the diet. They have clearly stated that the long chain Omega-3, DHA, is necessary in the diet. Our bodies simply can't make enough from the shorter chain Omega-3, ALA, found in plant foods such as canola and linseed. Whilst ALA and the other long chain Omega-3, eicosapentaenoic acid (EPA), are both important, DHA is critical due to its vital functions in the body.

The other important development is that the importance of DHA for visual development in infants has been officially recognised by the European Food Safety Authority as part of its work on developing scientifically substantiated health claims for foods and drinks – see page 4.

We look forward to bringing you further DHA Updates in the future. Email us at [info@nu-mega.com](mailto:info@nu-mega.com) with your contact details and request inclusion on our DHA Update mailing list.



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## Hot off the press

World's Experts Agree – All Omega-3s not created equal.

Terrestrial plant-based Omega-3s are no substitute for seafood-based Omega-3 sources – especially the long chain Omega-3 DHA.

The world's experts on dietary fats have released a statement detailing the importance of specific types of Omega-3s – and their health contributions. This is important because in general, consumption of the essential nutrients, Omega-3s, is usually lower than recommended for optimal health. Members of the International Society for the Study of Fatty Acids and Lipids (ISSFAL) presented the latest data concerning Omega-3s, a subset of polyunsaturated fatty acids. Their report's key finding is that among Omega-3s, not all are equal.

“Each type of Omega-3 has distinct nutritional functions. Nevertheless, seafood/algal Omega-3s – also known as long-chain Omega-3s – are more potent than terrestrial plant sources of Omega-3s (alpha-linolenic acid or ALA) and boast certain critical functions that terrestrial plant-based Omega-3s simply cannot perform,” noted Tom Brenna, Professor of Nutritional Sciences at Cornell University in Ithaca, New York, and chair of the ISSFAL Committee which drafted the statement.

Brenna explained that seafood, especially oily fish, offers two critical Omega-3s, EPA and DHA.

DHA, in particular, is critical for brain development and function, and it's an essential part of every brain cell. The brain produces very little of its own DHA and, instead, must rely on dietary supplies or body stores of these Omega-3s.

The researchers concluded that for adults consuming diets that are typical of those found in developed Western economies, conversion of ALA to EPA is very low, and to DHA is even less – essentially negligible. These very low conversion rates mean that ALA cannot meet the body's need for DHA.

While ALA has little effect on raising the body's DHA levels, consumption of DHA-containing foods and supplements significantly raises those levels. And, the statement emphasized, because DHA is vital for infant brain development, DHA from human breast milk and supplemented infant formula contributes critical amounts of DHA to infants. Finally, DHA levels in infants and adults who consume seafood or fish/algal oil supplements are greater than those in people who do not consume such sources.

For the full statement, see [www.issfal.org.uk/pufa-recommendations.html](http://www.issfal.org.uk/pufa-recommendations.html)

## New study using HiDHA® tuna oil - pre-term infants and brain development

In a landmark study, Professors Maria Makrides, Robert Gibson and colleagues have uncovered more on the benefits of dietary DHA on the brain development of pre-term infants.

### Pre-term babies at risk

Infants born before 33 weeks gestation are at high risk of developmental disorders and learning disabilities. The usual length of pregnancy is 38 weeks. The uptake of DHA into the developing brain is greatest during the last trimester of pregnancy – and so pre-term infants have missed out on much of the DHA they would have received in the womb.

### Increased DHA versus usual amounts

This well-designed study was a randomised, double-blind controlled trial of over 600 infants born at less than 33 weeks gestation. These babies were divided into two groups. One group was fed either breast milk from mothers who were given HiDHA® tuna oil supplements or DHA supplemented formula. The other group received breast milk or formula not supplemented with DHA. The babies were fed in this way from shortly after they were born until they reached the time when the pregnancy would have reached full term.

The high DHA feeds contained approximately 1% of total fatty acids as DHA and the standard feed around 0.3% DHA. Almost all the infants were breast-fed initially and many continued to be exclusively breast-fed throughout the study. The mothers who breast fed their infants in the high DHA group were provided with capsules of HiDHA® tuna oil from Nu-Mega. The daily dose was around 900 mg of DHA to increase the DHA levels of their milk.

### Key findings of the study

- The concentration of DHA in the breast milk of mothers taking additional DHA was over 3 times higher than the milk of mothers not taking additional DHA.
- By the time the pre-term infants reached their estimated due date, their body level of DHA was elevated in the high DHA group compared with the other group (6.8% of fatty acids versus 5.2%). The additional DHA came from either high DHA breast milk from their mothers or high DHA formula.
- At 4 months, the babies in the high DHA group exhibited better visual acuity than the control group. In other words their visual development was better.
- After 18 months of follow up the trial detected a benefit of the high DHA diet in girls but not boys using a Mental Development Index which evaluates memory, habituation, problem solving, early number concepts and language. Fewer girls had mental delay in the high DHA group.
- Post hoc analyses demonstrated that the frequency of mild mental delay in smaller infants was reduced by about 45% in the high DHA group. Planned follow up at 7 years will be important with this group.

### What does this tell us?

**This study demonstrates that the levels of DHA in breast milk can be raised through mothers' supplementation with tuna oil and that this DHA can reach the baby affecting their levels of DHA.**

Because of the changes seen, the DHA requirement of pre-term infants may be higher than currently provided by pre-term formula or the breast milk of Australian women. In fact supplementation of mothers' diets may be necessary to raise the level of DHA in their milk so that their pre-term infants can increase their DHA status to levels seen in full-term infants.

A DHA dose of 3 times the usual level in breast milk improves the mental development of infant girls born earlier than 33 weeks gestation.

We wait with interest for the results for the children when they are 7 years old – the final part of this study.



#### References:

Smithers LG, Gibson RA, McPhee A, Makrides M. Higher dose of docosahexaenoic acid in the neonatal period improves visual acuity of preterm infants: results of a randomized controlled trial. *Am J Clin Nutr.* 2008 Oct;88(4):1049-56.

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Makrides M, Gibson RA, McPhee AJ, Collins CT, Davis PG, Doyle LW, Simmer K, Colditz PB, Morris S, Smithers LG, Willson K, Ryan P. Neurodevelopmental outcomes of preterm infants fed high-dose docosahexaenoic acid: a randomized controlled trial. *JAMA.* 2009 Jan 14;301(2):175-82.

## Interview with Professor Maria Makrides



Professor Maria Makrides is the Deputy Director of The Women's & Children's Health Research Institute (WCHRI) in Adelaide, Australia. The Institute was founded in 1989 to carry out research aimed at the prevention and treatment of childhood disease.



### When did you first become interested in omega-3s?

This was in the early 90s as part of PhD. There was some very exciting work coming out of US with the first published trial from Ricardo Uauy and Eileen Birch showing that pre-term infants were not getting enough long chain omega-3s. My PhD was the first randomised trial of long chain omega-3s for term infants which was published in the Lancet. It showed that supplementation of infant formula with omega-3s improved visual acuity and the association was with DHA.

### Your recent study has gained considerable publicity and has been complimented on its design. What were the most significant outcomes of this study from your perspective?

I think that the significance of the study comes from its design. It was inclusive of pre-term infants whatever they were feeding - either breast milk or infant formula. Previously studies have focussed only on formula-fed infants but pre-term babies are predominantly fed expressed breast milk. By the time they go home about half the babies are still breast-fed. So this was the first study designed on reality of what happens in a neonatal unit. The most significant finding was that we

do need to refine the dose of DHA given to these little babies and they probably need even more than given in the trial.

### How difficult was it to recruit the 600+ pre-term infants who were enrolled in your study?

Recruitment was surprisingly straight forward once the trial started. The mothers liked the concept that they were able to contribute to the care of their baby too. It's pretty daunting having a baby born at less than 33 weeks - it's a very medicalised environment and mothers lose any sense of control. This offered the women an opportunity to do something for their babies, to contribute to the care of their babies. The study was seen as very positive by parents and neonatal staff. In fact we finished our recruitment ahead of schedule!

### How did the women feel about taking the capsules - containing either HiDHA tuna oil or placebo?

Women taking the HiDHA® tuna oil and Placebo capsules (supplied by Clover Corporation Limited) were about 83% compliant. This high level of compliance was evident from the breast milk DHA concentration - most women took most of their capsules most of the time. They were a very motivated group which probably helped.

### What are your plans now?

We have already started doing the 7 year follow up. The first babies turned 7 last month and we have funding from NHMRC to follow up all the babies at 7 years. This will really nail the long term effects of a neonatal period intervention.

What needs to be done now is to implement new practices in neonatal units to increase DHA intakes of pre-term babies. There is a lot of interest from neonatal units on how to change their practice and we will write a guidelines paper for them in the near future.



The science community has been excited about this study which has received considerable publicity including these headlines:

Fish Oil for Premies May Boost Cognition

Pre-term omega-3 may boost brain development for girls...

DHA hailed as breakthrough treatment for lowering risk of developmental disorders in premature infants

Application of tuna fish oil can help in premature babies' mental

## EFSA approval: DHA and visual development in infants

A cause and effect relationship between the intake of infant and follow-on formula supplemented with DHA and visual function at 12 months has recently been endorsed by the European Food Safety Authority (EFSA). The relationship applies to formula-fed infants born at term from birth up to 12 months and in breastfed infants after weaning up to 12 months.

The acceptance of this relationship by EFSA is an indication of the strong scientific evidence in its support. EFSA has previously rejected many other diet/health relationships submitted as part of the move towards food-related health claims in Europe.

Mead Johnson Nutritionals made the application to EFSA, and the Panel on Dietetic Products, Nutrition and Allergies was asked to deliver an opinion on the scientific substantiation of a health claim related to DHA and arachidonic acid and visual development.

Omega-3 DHA (or docosahexaenoic acid)

was found to contribute to the optimal visual development of infants and young children with insufficient evidence for the link with arachidonic acid (an omega-6).

It is important to note that none of the studies presented showed an additional benefit of DHA on visual development when compared to the breast fed infants – so breast is still best!

The evidence indicated that the consumption of infant formulae supplemented with DHA at around 0.36% of total fatty acids from birth up to 12 months is associated with better visual function in term infants as compared to the consumption of unsupplemented formulae.

In breast fed infants there was better visual acuity up to 12 months in those fed DHA supplemented formulae/weaning foods as compared to the unsupplemented group, with direct associations between markers of DHA status and visual outcomes.

The Panel concluded that a cause and effect relationship has been established between the intake of infant and follow-on formula supplemented with DHA at levels around 0.3% of total fatty acids and visual function at 12 months in formula-fed infants born at term from birth up to 12 months and in breastfed infants after weaning up to 12 months.

The following wording reflects the scientific evidence: "DHA contributes to the visual development of infants".

In order to bear the claim a formula should contain at least 0.3% of the total fatty acids as DHA. The target population is infants (formula-fed infants born at term from birth up to 12 months and breastfed infants after weaning up to 12 months).

Information sourced from:  
[www.efsa.europa.eu](http://www.efsa.europa.eu)



### What is HiDHA<sup>®</sup> tuna oil?

Nu-Mega Ingredients Pty Ltd provides HiDHA<sup>®</sup> tuna oil, which is naturally high in DHA, to the food and pharmaceutical industry. It is available as liquid oil or in a microencapsulated form to protect the oil during food manufacture.

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