

Understanding fish oil benefits during pregnancy

31 March 2015, by Rob Payne



"We hypothesised that maternal fish oil may affect developing systems by modifying offspring DNA methylation that initiate a cascade of cellular events, resulting in favourable health outcomes," Prof Prescott says. Credit: exoimperator

A study by University of Western Australia has advanced understanding of why children whose mothers take fish oil supplements during pregnancy have greater health benefits.

Supplementing polyunsaturated fatty acids during pregnancy and early development has shown to be potentially beneficial in preventing allergic, cardiovascular and metabolic disorders in children.

Professor Susan Prescott says while researchers know diet can affect many biochemical and physiological properties of cells and organs, the exact molecular mechanism that explains [fish oil's](#) health power is not well understood.

For this reason, she and her team examined the epigenetic mechanism of DNA methylation, an enzyme process that helps dictate gene

expression by acting as a signalling tool to cells to silence certain genes.

Basically, the idea is fish oil could alert the body to insert methyl groups in place of various DNA sequences, altering certain cell types and growth patterns.

"A large body of data suggests that epigenetic mechanisms such as DNA methylation mediate the effects of diet and nutrients in biological systems," Prof Prescott says.

"We hypothesised that maternal fish oil may affect developing systems by modifying offspring DNA methylation that initiate a cascade of cellular events, resulting in favourable health outcomes."

Fish oil effects on cord blood examined

Specifically, the researchers wanted to see whether taking fish [oil supplements](#) in pregnancy had any effect on cord blood T-cell responses—targeting CD4+ T-cells, which are immune cells at the centre of allergic inflammation.

To do so, they compared 36 mother-infant pairs who had taken [fish oil supplements](#) from 20 weeks of pregnancy until delivery and 34 who had not, isolating DNA from CD4+ T-cells and screening for methylation status across the whole genome at individual sites (CpG sites).

Methylation of cytosine at CpG sites can turn the gene off, so differences in activity in the test group would suggest this is the key mechanism behind fish oil health benefits.

"Basically we did not see any major differences when we compared the two groups,"

Prof Prescott says.

"For this reason we concluded that, while fish oil

does appear to have beneficial effects on immune function, this does not appear to be mediated by major epigenetic changes at least in this population.

"It points to other mechanisms underpinning the beneficial effects of maternal fish oil intake on the offspring."

Prof Prescott says future research should examine how maternal fish oil intake influences the gut microbiome of their progeny and other anti-inflammatory pathways.

More information: "Epigenome-wide analysis of neonatal CD4(+) T-cell DNA methylation sites potentially affected by maternal fish oil supplementation." *Epigenetics*. 2014 Dec 2;9(12):1570-6. [DOI: 10.4161/15592294.2014.983366](https://doi.org/10.4161/15592294.2014.983366)

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