

PERSISTENT EFFECT OF PRENATAL DOCOSAHEXAENOIC ACID ON HEART RATE VARIABILITY AND COGNITIVE DEVELOPMENT IN CANADIAN INUIT CHILDREN

Natalia Poliakova, *CHUQ Research Center, Laval University, Canada*

Gina Muckle, *CHUQ Research Center, Laval University, Canada*

Eric Dewailly, *CHUQ Research Center, Laval University, Canada*

Pierre Ayotte, *CHUQ Research Center, Laval University, Canada*

Paul Poirier, *IUCPQ Research Center, Laval University, Canada*

Beatriz Valera, *CHUQ Research Center, Laval University, Canada*

Sandra Jacobson, *Wayne State University School of Medicine, USA*

Joseph Jacobson, *Wayne State University School of Medicine, USA*

Background and Aims: Docosahexaenoic acid (DHA), an *n*-3 polyunsaturated fatty acid (PUFA), has been shown to be beneficial for the development of the central nervous system and cognitive functioning in adults and youth. This effect may be mediated by influences of DHA on cardiac autonomic function (CAF), which is a physiological substrate of numerous cognitive processes. Beneficial impact of DHA on cardiovascular function is well documented in adults, but information on the association between pre- and postnatal PUFA and CAF in youth is scarce. Aims: (a) to evaluate the effect of prenatal DHA on child CAF, estimated by heart rate variability (HRV); (b) to test the hypothesis that the effect of DHA on child cognition is mediated by its effect on HRV.

Methods: A sample of 278 Inuit children (138 boys, 140 girls) from Nunavik (Arctic Canada) was assessed at birth and at school age. Prenatal DHA (3.7 ± 1.2 % phospholipids, $M \pm SD$) was obtained from cord blood at birth. HRV, estimated from 2-hour electrocardiograms, assessing high and low frequencies (HF, LF), and a vocabulary test (Boston Naming Test, BNT) were obtained at age 11 years. Direct and mediation effects were tested using path analyses.

Results: Cord DHA was positively associated with BNT scores ($r = .14$, $p = .009$) as well as with HF HRV ($r = .12$, $p = .03$) and the effect on LF HRV fell short of statistical significance ($r = .11$, $p = .06$). No HRV measures were significantly associated with BNT scores ($r = .01$, $p = .81$ and $r = .05$, $p = .40$ for HF and LF, respectively). Thus, the effect of DHA on the BNT was not mediated by either of the HRV measures.

Conclusions: Prenatal DHA provided lasting beneficial effects on HRV and cognitive function later in childhood. Although the effect of DHA on the BNT was not mediated by HRV, effects on other cognitive processes might be partially mediated by CAF.