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Plasma phospholipid fatty acid status of 5-year-old children in the Seychelles Child Development Nutrition Study

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The long-chain *n*-3 PUFA (LCn-3PUFA), eicosapentaenoic (C_{20:5}) and DHA (C_{22:6}), supplied by dietary intake of fish, exert a range of benefits to human health, with DHA having an important role in infant visual and brain development⁽¹⁾. We have previously reported that prenatal status of LCn-3PUFA, as measured by the geometric mean of the 28-week and delivery values during pregnancy, was positively associated with a measure of infant development at 9 months of age⁽²⁾. In the present study, the plasma phospholipid fatty acid status of children at 5 years old was investigated within the Seychelles Child Development Study.

In this longitudinal cohort of mother child pairs recruited from the Republic of Seychelles, blood samples were collected from the children (*n* 227), with mothers providing informed consent. From plasma aliquots previously stored at -80°C , total lipid was extracted according to a modified method of Folch *et al.*⁽³⁾ and the technique of solid phase extraction was used to obtain plasma phospholipids. Fatty acid methyl esters were prepared with boron trifluoride (Sigma-Aldrich Co. Ltd) and analysed using an Agilent 5975C GC-MS (Agilent, UK). Summary statistics were generated for fatty acid status and an independent samples *t*-test was used to compare means of boys and girls (SPSS v. 17.0).

Table 1. Plasma phospholipid fatty acid (presented as mg/ml) status of 5-year-old Seychellois children

	ALL (<i>n</i> 227)		Boys (<i>n</i> 117)		Girls (<i>n</i> 110)		<i>P</i> *
Myristic acid	0.008	(0.004, 0.020)	0.006	(0.004, 0.018)	0.008	(0.004, 0.021)	NS
Palmitic acid	0.250	(0.189, 0.336)	0.250	(0.192, 0.331)	0.255	(0.186, 0.3490)	NS
Stearic acid	0.112	(0.084, 0.151)	0.112	(0.086, 0.146)	0.113	(0.083, 0.152)	NS
Oleic acid	0.044	(0.029, 0.067)	0.044	(0.028, 0.068)	0.045	(0.030, 0.067)	NS
Linoleic acid	0.106	(0.078, 0.147)	0.106	(0.079, 0.144)	0.106	(0.076, 0.154)	NS
AA	0.044	(0.030, 0.061)	0.044	(0.029, 0.062)	0.046	(0.030, 0.061)	NS
EPA	0.004	(0.002, 0.008)	0.004	(0.002, 0.008)	0.004	(0.002, 0.008)	NS
DHA	0.030	(0.020, 0.044)	0.030	(0.020, 0.044)	0.030	(0.020, 0.044)	NS

Results are median (5th, 95th percentiles) and are presented as mg/ml plasma.

**P* values refer to differences between boys and girls, where NS is non significant.

AA, arachidonic acid.

The mean age of the children at this time-point was 5.6 years old and there was no significant difference between boys and girls (data not shown). Table 1 shows the plasma phospholipid status of the total number of children (*n* 227) and of the boys (*n* 117) and girls (*n* 110). The median EPA and DHA concentrations of the children were 0.004 and 0.03 mg/ml, respectively. Sex differences in LCn-3 PUFA status have previously been reported in adults, with women having significantly higher DHA status⁽⁴⁾; however, in this study, no significant differences in fatty acid status were found between boys and girls aged 5 years.

In conclusion, concentrations of LCn-3PUFA as measured in plasma phospholipids within a group of children residing in Seychelles are similar to concentrations reported for adults from a different population⁽⁵⁾; however, this is the first time that data on fatty acid status in this age group and from this region have been reported. No sex differences were found for fatty acid status in this group. These data will be used as potential modifiers of the relationship between maternal methylmercury exposure from fish consumption and developmental outcomes in the offspring.

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