Proceedings of the Nutrition Society (2011), **70 (OCE4)**, E164 doi:10.1017/S0029665111002151

Summer Meeting, 4–6 July 2011, 70th Anniversary: From plough through practice to policy

Increased intake of oily fish during pregnancy increases both maternal and neonatal *n* − 3 PUFA status: results from the Salmon in Pregnancy Study

E. A. Miles[1], L.-S. Kremmyda[1], M. Vlachava[1], N. D. Diaper[1], P. S. Noakes[1], K. M. Godfrey[1,2,3] and P. C. Calder[1]

[1]*Developmental Origins of Health and Disease Division, School of Medicine, University of Southampton, Southampton General Hospital, Tremona Road, Southampton SO16 6YD, UK,* [2]*MRC Epidemiology Resource Unit, University of Southampton, and* [3]*NIHR Nutrition, Diet and Lifestyle Biomedical Research Unit, Southampton University Hospitals NHS Trust, Southampton General Hospital, Tremona Road, Southampton SO16 6YD, UK*

The aim of the Salmon in Pregnancy Study (SiPS) was to increase maternal intake of oily fish during pregnancy, with the aim of increasing maternal and infant *n* − 3 polyunsaturated fatty acid (PUFA) status, so impacting on the health of the offspring. The intervention was based on the current UK government recommendation for oily fish intake for pregnant women (1–2 portions/week)[(1)]. The main outcomes of SiPS are maternal and infant *n* − 3 PUFA status (EPA and DHA), infant growth, maternal and infant immune responses, and signs and symptoms of allergy in the infants. Here, maternal and infant *n* − 3 PUFA status is reported.

Pregnant women (*n* 123) with high risk of having atopic offspring and with low habitual intake of oily fish (≤ 2 portions/month) were recruited. They were randomised to either continue with their habitual diet low in oily fish or to consume two portions of farmed salmon per week from week 20 of pregnancy until the birth. The salmon provided 3.45 g EPA + DHA per week. Blood samples were collected from the mothers in the fasted state at 20, 34 and 38 weeks of pregnancy. Neonatal blood was collected at birth from the umbilical cord. Plasma phospholipid fatty acid composition was determined using gas chromatography; an internal standard was used and fatty acids are reported as mean (SEM) μg/ml plasma.

	Maternal 20 weeks		Maternal 34 weeks		Neonatal	
	Control group (*n* 61)	Salmon group (*n* 62)	Control group (*n* 55)	Salmon group (*n* 56)	Control group (*n* 46)	Salmon group (*n* 47)
EPA	16.3 (1.6)	18.7 (1.8)	16.1 (1.2)	29.4 (2.2)*	1.8 (0.1)	3.5 (0.3)*
DHA	104 (7)	115 (7)	135 (5)	167 (8)*	36 (2)	41 (2)
Total *n* − 3 PUFA	145 (10)	159 (11)	184 (7)	233 (11)*	41 (2)	48 (3)*

* Value significantly different from control group ($P < 0.05$).

Maternal plasma phospholipid EPA and DHA were not different between groups at study entry (week 20). Maternal plasma phospholipid EPA ($P < 0.001$), DHA ($P = 0.022$) and total *n* − 3 PUFA ($P = 0.016$) were significantly higher in the salmon group than in the control group at week 34 of pregnancy. Neonatal plasma phospholipid EPA ($P < 0.001$) and total *n* − 3 PUFA ($P = 0.031$) were significantly higher in the salmon group. Neonatal phospholipid DHA was also higher in the salmon group but not significantly so. When the fatty acids were expressed as relative proportions, EPA, DHA and total *n* − 3 PUFA were all significantly higher (all $P \leq 0.001$) in maternal plasma phospholipids at week 34 and in neonatal plasma phospholipids in the salmon group than in the control group.

Consumption of two portions of oily fish per week by pregnant women, so meeting the UK recommendation, increases *n* − 3 PUFA status in both the maternal and the fetal/neonatal circulation. The increase in *n* − 3 PUFA status through oily fish intake may improve pregnancy outcomes and may improve the health of the offspring.

This work is supported by the European Commission under Framework 6 as part of the AquaMax project (FOOD-CT-2006–016249-2). The authors thank the volunteers, and staff at the Princess Anne Hospital, Southampton, and the Medical Research Council Lifecourse Epidemiology Unit.

1. SACN/COT (2004) Advice on fish consumption: benefits and risks. TSO: London.