Proceedings of the Nutrition Society (2018), **77 (OCE3)**, E55 doi:10.1017/S0029665118000599

Irish Section Meeting, 20–22 June 2018, Targeted approaches to tackling current nutritional issues

The influence of fish consumption on polyunsaturated fatty acid status

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Polyunsaturated fatty acids (PUFA) have an important role in immune function[(1)], cardiovascular health[(2)] and foetal development[(3)]. Fish consumption is a major determinant of improved long chain (LC) n-3 PUFA status[(4)]. Genetic variation in the fatty acid desaturase (FADS) genotype also has an influence on PUFA status[(5)]. The aim of the current study was to investigate whether fish consumption influences PUFA status in women of childbearing age.

Female participants of childbearing age (n = 49) were recruited to take part in an 8-week intervention trial. Participants provided a buccal swab, which was analysed for FADS genotype, on which participants were stratified (SNP rs3834458) and randomised to consume zero (control), one, or two portions (140 g/portion) of oily fish (tuna or sardines) per week. Blood samples were taken pre- and post-intervention and analysed for serum total PUFA status using GC-MS. Statistical analysis was completed using IBM SPSS Statistics v24.

The median (IQR) age of participants was 23 (20, 30) years. ANCOVA with post-hoc comparison was used to assess the effect of intervention on PUFA status (Table 1). Participants consuming two portions of fish per week had significantly higher concentrations of eicosapentaenoic acid (EPA), docosahexaenoic acid (DHA) and total n-3 PUFA than those consuming one portion or zero portions. The n-6:n-3 ratio was also significantly influenced by fish intake with consumption of two portions of fish per week resulting in a significantly lower n-6:n-3 ratio when compared to the other intervention groups. The median (IQR) n-6:n-3 ratio for those consuming 2 portions of fish per week was lower for those with the homozygous TT genotype (5·394 (4·822, 6·026) compared to those with genetic variation of Tdel, or del genotype (6·617 (4·720, 7·085).

Table 1. The effect of intervention on PUFA status (mg/ml) at post intervention expressed as Median (IQR)

PUFA	Median (IQR)			*P*	Partial eta squared
	Control (n = 18)	1 portion (n = 14)	2 portions (n = 17)		
LA	0·275 (0·229, 0·301)	0·260 (0·245, 0·300)	0·291 (0·255, 0·322)	0·597	0·026
ALA	0·013 (0·012, 0·014)	0·012 (0·012, 0·0130	0·013 (0·012, 0·016)	0·912	0·005
AA	0·064 (0·055, 0·075)	0·068 (0·055, 0·083)	0·069 (0·059, 0·078)	0·532	0·032
EPA	0·013 (0·012, 0·013)[a]	0·014 (0·013, 0·015)[a]	0·015 (0·013, 0·025)[b]	**0·001**	0·327
DHA	0·021 (0·016, 0·023)[a]	0·022 (0·020, 0·027)[a]	0·028 (0·024, 0·034)[b]	**<0·001**	0·346
Total n-6	0·347 (0·294, 0·364)	0·327 (0·312, 0·376)	0·367 (0·316, 0·392)	0·640	0·023
Total n-3	0·045 (0·041, 0·052)[a]	0·046 (0·037, 0·054)[a]	0·059 (0·051, 0·070)[b]	**<0·001**	0·359
n6:n3 ratio	7·293 (6·860, 8·173)[a]	7·340 (6·699, 7·855)[a]	6·026 (4·809, 6·969)[b]	**0·001**	0·289

LA, linoleic acid; ALA, alpha-linolenic acid; AA, arachidonic acid; EPA, eicosapentaenoic acid; DHA, docosahexaenoic acid; all variables log transformed, *P* value is for between intervention group change from baseline (ANCOVA, adjusting for age, weight, BMI and baseline PUFA); different letters represent significant difference from each other $p < 0{\cdot}05$; IQR expressed as 25th, 75th percentile

In conclusion, consumption of two portions of fish per week was shown to have beneficial effects on n-3 PUFA status and the n-6:n-3 ratio. The n-6:n-3 ratio was lower in those with the TT compared to those with Tdel or del genotype, indicating genetic variation may also influence PUFA status.

1. Calder (2015) *J Parenter Enteral Nutr* **39**, (1 Suppl): 18S–32S.
2. Manuelli *et al.* (2017) *Int J Mol Sci* **18**(7).
3. Coletta *et al.* (2010) *Rev Obstet Gynecol* **3**(4), 163–171.
4. Weichselbaum E *et al.* (2013) *Nutr Bull* **38**, 128–177.
5. Minihane (2016) *Nutrients* **8**, 123.