

Scottish Section of The Nutrition Society, 7–8 April 2009

## Relative validity of fatty acid intakes from an FFQ compared with subcutaneous adipose tissue fatty acids

L. C. A. Craig, F. Thies, J. Brittenden, J. Kyle and G. McNeill  
 School of Medicine & Dentistry, University of Aberdeen, Aberdeen AB25 2ZP, UK

The aim of the study was to assess the relative validity of fatty acid intakes from an FFQ for adults with fatty acid composition of subcutaneous adipose tissue samples.

Adults attending the Aberdeen Royal Infirmary for varicose-vein surgery were invited to take part in the study. Healthy volunteers were asked to complete a 170-item semi-quantitative FFQ (Scottish Collaborative Group version 6.5; University of Aberdeen, Aberdeen, UK)<sup>(1)</sup> before their operation and a small sample (approximately 5 g) of subcutaneous adipose tissue was removed during surgery and stored at –80°C. Fatty acid composition of the tissue was determined by GC. Thirty-five completed FFQ with corresponding adipose tissue samples were received. FFQ with extreme energy intakes were excluded from analysis (*n* 2). Relative agreement was assessed using Spearman rank correlation coefficients, shown in the Table and cross-classification of the percentage of subjects in the same and opposite thirds of tissue fatty acids and fatty acid intake (*n* 33; nine males, twenty-four females).

Fatty acid	Adipose tissue (% total fatty acids)		Fatty acid intake from FFQ							
	Median	IQR	Energy adjusted (g/d)				% energy			
			Median	IQR	<i>r<sub>s</sub></i>	<i>P</i>	Median	IQR	<i>r<sub>s</sub></i>	<i>P</i>
SFA	29.4	27.2–31.4	33.6	23.8–45.2	0.05	0.766	13.7	11.4–14.9	0.02	0.922
12:0	0.5	0.4–0.6	1.2	0.8–2.0	0.11	0.548	0.5	0.4–0.7	0.14	0.426
14:0	2.8	2.3–3.2	3.6	2.4–5.4	0.25	0.161	1.5	1.1–1.8	0.31	0.078
16:0	22.2	20.6–22.9	16.0	11.9–23.6	–0.13	0.466	6.8	5.8–7.2	–0.28	0.113
18:0	3.7	2.6–4.5	8.0	5.1–10.5	0.10	0.600	3.0	2.5–3.5	0.14	0.426
MUFA	56.7	54.2–59.3	28.5	21.9–37.3	0.14	0.438	11.9	10.6–12.9	0.19	0.290
16:1	6.4	5.2–7.6	1.3	1.0–1.6	–0.11	0.560	0.5	0.5–0.6	–0.14	0.443
18:1 <i>n</i> -9	50.4	47.3–51.8	22.9	16.1–29.6	0.34	0.051	9.5	8.1–10.2	0.38	0.029
PUFA	13.9	12.9–14.8	14.8	10.6–17.9	0.03	0.887	6.1	4.7–6.9	–0.04	0.825
<i>n</i> -6	12.4	11.2–13.6	10.9	8.2–13.9	0.14	0.437	4.9	3.5–5.5	0.10	0.597
<i>n</i> -3	1.4	1.1–1.7	2.3	1.7–2.8	0.14	0.450	0.8	0.7–1.0	0.22	0.212
18:2 <i>n</i> -6	11.9	10.8–13.0	10.4	7.8–13.2	0.11	0.544	4.6	3.3–5.4	0.08	0.659
18:3 <i>n</i> -6	0.02	0.01–0.03	0.01	0.01–0.01	0.24	0.179	0.003	0.002–0.004	0.21	0.252
20:3 <i>n</i> -6	0.17	0.10–0.21	0.06	0.04–0.08	0.003	0.987	0.02	0.02–0.03	0.03	0.862
20:4 <i>n</i> -6	0.30	0.23–0.39	0.27	0.21–0.35	0.03	0.862	0.11	0.09–0.13	0.06	0.756
18:3 <i>n</i> -3	1.1	1.0–1.3	1.2	1.0–1.7	–0.12	0.498	0.5	0.4–0.6	–0.13	0.474
20:5 <i>n</i> -3	0.02	0.02–0.07	0.26	0.17–0.34	0.46	0.008	0.09	0.07–0.13	0.54	0.001
22:6 <i>n</i> -3	0.09	0.05–0.20	0.37	0.25–0.48	0.36	0.041	0.14	0.11–0.18	0.45	0.009
<i>n</i> -3 <i>n</i> -6	0.10	0.09–0.14	0.19	0.17–0.25	0.04	0.842	0.18	0.15–0.24	0.10	0.590

IQR, interquartile range.

Significant correlations were found between adipose tissue levels and dietary intakes of EPA (20:5*n*-3; g/d and % energy), DHA (22:6*n*-3; g/d and % energy) and oleic acid (18:1*n*-9; % energy). Significant correlations were also found between adipose tissue levels and dietary intakes of EPA and DHA as % total fatty acids (*r<sub>s</sub>* 0.41 *P* = 0.018 and *r<sub>s</sub>* 0.36 *P* = 0.037 respectively). It has been recommended that for good relative agreement >50% of subjects should be correctly classified and <10% grossly misclassified into thirds<sup>(2)</sup>. The percentage of subjects classified in the same thirds was >50 for oleic acid (% energy) and DHA (% total fatty acids) and the percentage of subjects classified in opposite thirds was <10 for EPA (g/d, % energy and % total fatty acids) and DHA (% energy). Similar results were found when the analyses were re-run only for those subjects who had not reported consuming supplements containing fatty acids (*n* 24).

The FFQ can be used with confidence to assess intakes of EPA, DHA and oleic acid but should be used with caution for intakes of other fatty acids.

1. Scottish Collaborative Group Food Frequency Questionnaire (2002) www.foodfrequency.org.uk
2. Masson LF, McNeill G, Tomamy JO *et al.* (2003) *Public Health Nutr* 6, 313–321.