Proceedings of the Nutrition Society (2016), **75 (OCE3)**, E121 doi:10.1017/S0029665116001361

Summer Meeting, 11–14 July 2016, New technology in nutrition research and practice

Within-person stability and responsiveness to dietary change of C15:0 and C17:0 concentrations in dry blood spots in the Food4Me Study

V. Albani[1], M. C. Walsh[2], M. J. Gibney[2], J. C. Mathers[1], A. Adamson[1], C. Celis-Morales[1] and L. Brennan[1,2]on behalf of the Food4Me Study

[1]*Human Nutrition Research Centre and Institute of Health and Society, Newcastle University, Newcastle upon Tyne, UK and* [2]*Institute of Food and Health, University College Dublin (UCD), Belfield, Dublin, Ireland*

There is increasing evidence that concentrations in blood of the odd-chain length saturated fatty acids pentadecanoic acid (C15:0) and heptadecanoic acid (C17:0) are biomarkers of dairy intake, and their use in epidemiological studies is growing as more cost-effective methods for collecting biological samples become available (1, 2). The aim of this study was to assess the reliability of these biomarkers for estimates of dietary exposure in large epidemiological studies by exploring their stability over time in a population with relatively stable dairy intakes (Control group), and their sensitivity to changes in dairy intake in a population with changing diets (personalised nutrition Intervention group).

Dry blood spot (DBS) samples were collected and dietary intakes from FFQs measured three times over six months (t0, t3 and t6) in both Control and Intervention groups in the Food4Me Study (2). Stability was explored using data from the Control group through Spearman correlation coefficients, ICCs and within person CVs (WCVs) from one-way random effects models of the log-transformed fatty acid concentrations. Sensitivity to changes in diet was explored using differenced regression of log-transformed fatty acid concentrations over daily portions of dairy from the Intervention group.

For the Control group (N = 760), C15:0 concentrations showed high correlation over time (ICC: 0·62, 95 % CI: 0·57,0·68), but the ICC for C17:0 was much lower (ICC: 0·32, 95 % CI: 0·28,0·46). The WCV for C15:0 was 16·6 % (95 % CI: 14·9,18·3) and that for C17:0 was 14·6 % (95 % CI: 13·3,16·0). The highest Spearman correlations were observed for t0-t3 measurements. As with the ICCs, higher values were observed for C15:0 (t0-t3: 0·69, 95 % CI: 0·61, 0·78) than for C17:0 (t0-t3: 0·47, 95 % CI: 0·36, 0·59).

For the Intervention group, there were significant ($p < 0·05$) changes (measured as percentage change in fatty acid concentrations) for C15:0 in DBS and in intakes of total dairy, high-fat dairy, cheese and butter; and for C17:0 in DBS and change in intakes of high-fat dairy and cream.

	Total dairy	High-fat dairy	Low-fat dairy
C15:0	1·0* (0·2, 1·9)	0·3* (0·1, 0·7)	0·2 (−0·4, 0·8)
C17:0	0·1 (−0·7, 0·9)	0·3** (0·1, 0·5)	0·2 (−0·3, 0·7)

	Cream	Cheese	Butter	Milk	Yoghurt
C15:0	0·4 (−0·1, 0·8)	1·8** (0·6, 3·1)	1·0** (0·4, 1·7)	0·4 (−1·3, 2·1)	0·5 (−1·5, 2·4)
C17:0	0·7** (0·3, 1·1)	0·7 (−0·4, 1·8)	0·4 (−0·3, 1·1)	−0·3 (−1·7, 1·2)	−0·8 (−2·6, 1·1)

% change in DBS fatty acid concentration per 1 portion change in dairy intake. *$p < 0·05$, **$p < 0·01$. 95 % confidence intervals in parenthesis. All regressions adjusted for total energy intake, age, BMI, smoking status; and intake of alcohol, meat, oily fish, savoury pastries and sweet pastries. Intervention group only (N = 1247).

Results provide evidence of reliability for C15:0 concentrations as measured by stability over time and sensitivity to change in intake of high-fat dairy products. Results for C17:0 are less definitive and merit further investigation.

1. Abdullah MMH, Cyr A, Lépine M-C, Labonté M-E, *et al.* (2015) *Br J Nutr* **113**, 435–44.
2. Celis-Morales C, Livingstone KM, Marsaux CFM, *et al.* (2014) *Genes & Nutrition* **10**, 1–13.