Erythrocyte biomarker-based validation of a diet history method used in a dietary intervention trial

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Erythrocyte biomarker-based validation of a diet history method used in a dietary intervention trial

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Background
Intervention trials provide the evidence for potential health benefits of dietary manipulations. The quality of the dietary data is critical for relating benefits to nutrient intakes. Although diet histories are often used to assess dietary intake in intervention trials, they have seldom been validated with objective measures.

Objective
To determine, in a dietary intervention trial, the validity of the diet history method using erythrocyte fatty acid composition as a gold standard indicator of fatty acid intakes.

Design
Overweight volunteers with mild cardiovascular risk factors and consuming less than one serve of fish per week were randomly assigned to either the intervention group (n=43) or the control group (n=48). Subjects where asked to choose at least eight serves per day from a selection of either omega-3 fatty acid enriched foods (~125 mg very long chain omega-3 (VLC n3) per serve) or matched control foods. Dietary intake was assessed using a diet history method and analysed using Foodworks (Australian Fatty Acids Rev 0.6 (Royal Melbourne Institute of Technology, 2002) with analytical data for the test foods added to the database. Erythrocyte fatty acid fractions were extracted from blood collected at baseline, three-months and six-months and was quantified by gas chromatography.

Outcomes
Dietary intakes of docosahexaenoic acid (22:6 n3), eicosapentaenoic acid (20:5 n3), VLC n3 and total n3 were related to levels of the same parameter seen in the erythrocyte membranes at three-months (Pearson’s correlation; r=0.463, 0.418, 0.421, 0.341 respectively; P<0.001) and six-months (r=0.743, 0.663, 0.641, 0.515 respectively; P<0.05), but not at baseline.

Conclusions
The VLC n3 accumulated in erythrocytes after three-months of dietary supplementation reflect habitual dietary intakes assessed from diet histories. However, at customary lower rates of consumption (~200mg/day), they do not accurately reflect the n3 intakes of individuals.

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