Proceedings of the Nutrition Society (2016), **75 (OCE3)**, E159 doi:10.1017/S0029665116001749

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

Intakes of folate and vitamin B12 from total diets and from specific food groups and biomarkers of status in the very old

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Very old adults are at increased risk of folate and vitamin B12 deficiencies due to reduced food intake and gastrointestinal absorption. This study aimed to determine whether higher intakes of folate and vitamin B12 from total diets and top contributing food groups were associated with reduced risk of inadequate vitamin status among 85 year-olds from the Newcastle 85+ Study. Two 24hr multiple pass recalls were conducted by a research nurse at the participants' usual residence and dietary intake estimated with the McCance and Widdowson's 6th edition food composition tables(1). Red blood cell folate (RBC folate) and plasma B12 were analysed by chemi-luminescent immunoassays(2). Complete dietary intake data and B-vitamin biomarkers were available for 732 participants. Binary logistic models were used to estimate the risk of inadequate RBC folate (only 3·4 % of individuals were <340 nmol/L, therefore a threshold of <600 nmol/L, was used) and plasma B12 (<148 pmol/L) concentrations according to quartiles of folate and vitamin B12 intake from total diets and from specific food groups.

Folate		Vitamin B12	
Intake Quartiles	RBC Folate	Intake Quartiles	Plasma B12
Total diets (µg/d)	<600 nmol/L (n = 170) OR (95 % CI)	Total diets (µg/d)	<148 pmol/L (n = 125) OR (95 % CI)
<157	1·00 (ref)	<1·87	1·00 (ref)
157–208	0·65 (0·38, 1·09)	1·87–2·88	0·57 (0·32, 1·01)
209–264	0·58 (0·34, 1·02)	2·88–4·40	0·50 (0·28, 0·92)*
>264	0·43 (0·23, 0·82)*	>4·40	0·40 (0·21, 0·76)**
Cereals and Cereal Products (µg/d)	<600 nmol/L (n = 170)	Meat and Meat Products (µg/d)	<148 pmol/L (n = 118)
<36	1·00 (ref)	<0·35	1·00 (ref)
36–59	0·84 (0·51, 1·38)	0·35–1·03	0·69 (0·38, 1·25)
59–92	0·32 (0·18, 0·57)***	1·03–2·10	0·78 (0·43, 1·42)
>92	0·33 (0·18, 0·61)***	>2·10	0·41 (0·20, 0·81)*
Vegetables (µg/d)	<600 nmol/L (n = 154)	Fish and Fish Products (µg/d)	<148 pmol/L (n = 43)
<15	1·00 (ref)	<0·46	1·00 (ref)
15–30	0·49 (0·25, 0·95)*	0·46–1·06	0·66 (0·23, 1·91)
30–51	0·59 (0·32, 1·08)	1·06–2·45	0·66 (0·23, 1·86)
>51	0·52 (0·28, 0·99)*	>2·45	0·70 (0·25, 1·97)
Fruit and Fruit Juice (µg/d)	<600 nmol/L (n = 127)	Milk and Milk Products (µg/d)	<148 pmol/L (n = 102)
<7·3	1·00 (ref)	<0·27	1·00 (ref)
7·3–16	1·01 (0·56, 1·83)	0·27–0·53	0·88 (0·46, 1·71)
16–34	0·67 (0·36, 1·25)	0·53–0·88	1·28 (0·70, 2·37)
>34	0·79 (0·43, 1·44)	>0·88	0·49 (0·24, 1·01)

All models were adjusted for gender, dietary energy intake, *MTHFR* (folate) or *FUT2* (vitamin B12) genotype, intake of folate or vitamin B12 from the other top contributing food groups (except total diets), folic acid/vitamin B12 containing supplement users and H_2 antagonists, biguanides and proton pump inhibitors users in the vitamin B12 model. *p<0·05 **p < 0·01 ***p < 0·001.

Individuals with higher folate intakes from total diets, cereals and cereal products and vegetables but not fruit and fruit juice were less likely to have low RBC folate concentrations. Those with higher vitamin B12 intakes from whole diets and meat and meat products but not from fish and dairy were also at lower risk of deficient plasma B12 concentrations.

1. Mendonça N, Hill TR, Granic A, *et al.* (2016) Macronutrient intake and food sources in the very old: Analysis of the Newcastle 85+ Study. *Br J Nutr*. In Press.
2. Martin-Ruiz C, Jagger C, Kingston A, *et al.* (2011) Assessment of a large panel of candidate biomarkers of ageing in the Newcastle 85+ study. *Mech Ageing Dev* **132**(10): 496–502.