

Irish Section Meeting, 16–18 June 2010, Nutrition – Getting the Balance Right in 2010

Age and sex differences in plasma homocysteine, choline and betaine status in Seychellois children and young adults

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Homocysteine is an amino acid that is converted to Met via the remethylation pathway which requires betaine and choline⁽¹⁾. Elevated total homocysteine (tHcy) concentrations may be an independent predictor of CVD and studies have shown that serum betaine and choline concentrations are inversely correlated with tHcy concentrations⁽²⁾.

We have previously reported tHcy concentrations of pregnant Seychellois women⁽³⁾; however, tHcy concentrations in other sub-groups from this population have not been investigated. Therefore, the aim of this study was to assess tHcy and plasma concentrations of related metabolites in children and young adults living in the Republic of Seychelles.

A total of 237 children aged 5 years and 512 young adults aged 19–20 years were recruited as part of the Seychelles Child Development Studies. Plasma tHcy, Met, free choline and betaine concentrations were assessed using liquid chromatography mass spectrometry/mass spectrometry by BeVital Laboratories, Bergen, Norway. Differences between the two age groups and between sexes were determined by independent samples *t*-test using logarithmically transformed values.

Plasma tHcy and Met concentrations were significantly higher and choline and betaine concentrations were significantly lower in young adults compared to 5-year-old children (all $P < 0.0001$). Significant sex differences were observed: males had significantly higher concentrations of all metabolites than females; albeit these sex differences were only evident in the 19–20-year-old age group.

	ALL	Males	Females	<i>P</i> -value
5 year olds	(<i>n</i> 237)	(<i>n</i> 123)	(<i>n</i> 114)	
tHcy	6.03 (4.18, 8.81)	6.05 (4.27, 8.85)	5.98 (3.70, 8.83)	0.755
Met	23.20 (15.09, 39.42)	22.70 (14.92, 40.88)	23.60 (15.25, 38.58)	0.821
Free choline	9.05 (6.25, 13.16)	9.00 (6.26, 12.08)	9.08 (6.15, 13.98)	0.847
Betaine	44.00 (30.50, 63.44)	41.90 (29.86, 59.66)	46.45 (31.70, 64.78)	0.001
19–20-year olds	(<i>n</i> 512)	(<i>n</i> 240)	(<i>n</i> 272)	
tHcy	10.30 (6.75, 17.84)	11.50 (8.07, 21.49)	9.42 (6.22, 14.91)	<0.0001
Met	30.20 (21.57, 39.94)	33.20 (26.11, 42.39)	26.70 (20.20, 35.24)	<0.0001
Free choline	7.36 (5.36, 10.20)	7.97 (5.68, 10.30)	6.75 (5.18, 9.71)	<0.0001
Betaine	34.00 (17.40, 53.20)	38.60 (27.24, 55.59)	30.30 (15.20, 45.11)	<0.0001

Results are median (5th, 95th percentiles) and are presented as $\mu\text{mol/l}$.

In conclusion, age and sex differences in plasma tHcy concentrations and related metabolites were evident in a group of children and young adults from Seychelles. These results concur with findings from previous studies which have observed significant sex differences in homocysteine metabolism but only in children older than 15 years^(4,5). It is thought that increases in oestrogen protect against the accumulation of tHcy, possibly through different homocysteine remethylation rates⁽⁶⁾.

This work was supported by grants nos. PO1 ES01248, RO1 ES008442, 2 T 32 ES007271, PO ES01247, 5-R01-ES010219 and 2-T32-ES007271 from the US National Institute of Environmental Health Sciences, National Institutes of Health, the Government of Seychelles and by the EU through its Sixth Framework Programme for RTD (contract no FOOD-CT-2006-016253).

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