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Blood loss a stronger predictor of iron status in UK men than C282Y heterozygosity or diet

A-LM Heath[1], MA Roe[2], AR Gray[3], SM Williams[3], SJ Fairweather-Tait[2]
[1]*Department of Human Nutrition, University of Otago, Dunedin, New Zealand*
[2]*Institute of Food Research, Norwich, United Kingdom*
[3]*Department of Preventive and Social Medicine, University of Otago, Dunedin, New Zealand*

Background – Approximately 12% of people of Northern European descent are heterozygous for the C282Y mutation of the *HFE* gene (homozygosity for which mutation is associated with hereditary haemochromatosis). Improved phenotypic characterization is needed to assess health risks for the heterozygote genotype.
Objective – To determine the relative importance of *HFE* genotype, diet, lifestyle, and blood loss for predicting iron status in a sample of UK men aged 40 years or over.
Design – Iron status (serum ferritin (SF), transferrin saturation (TS), soluble transferrin receptor (sTfR)) was measured in 44 C282Y heterozygote and 85 age- and BMI-matched wildtype men. Dietary intake of iron (total, haem and non-haem), and components that influence iron bioavailability, was determined using a validated Meal-Based Intake Assessment Tool. Lifestyle and blood loss data were obtained by questionnaire, and height and weight measured. Linear mixed models were used to determine the predictors of iron status controlling for matching.
Outcomes – C282Y heterozygosity was associated with 18% higher TS (95% CI: 7%, 31%) but no difference in SF or sTfR concentrations. Blood donation was negatively associated with TS (-13% (-3%, -22%)) and SF (-58% (-44%, -68%)), and had a marginally significant positive association with sTfR concentration. Self-reported faecal blood loss was negatively associated with SF concentration (-35% (-54%, -7%)). Alcohol was the only dietary variable associated with iron status and was associated with all three of the iron status indices. Serum ferritin concentration was positively associated with BMI (10% increase per BMI unit increase (6%, 15%)).
Conclusions – Blood loss was a stronger predictor of iron status than either C282Y heterozygosity or diet in this population of UK men.

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Validity of segmental bioelectrical impedance analysis in estimating body composition

J LaForgia[1], SM Gunn[2], RT Withers[2]
[1]*School of Pharmacy and Med Sciences, Uni of South Aust, &* [2]*Exercise Physiology Lab, Flinders Uni, SA 5001*

Bioelectrical impedance analysis (BIA) measures the impedance and resistance associated with passage of an alternating current through the body. The aforementioned are proportional to total body water (TBW) and therefore can be used to provide expedient estimates of body composition. However, little validity information is available for popular commercially available bathroom scale type devices which perform segmental measurements (lower limbs). The aim of this study was therefore to compare body composition estimates between a commercially available easy to use segmental BIA device (Tanita BC-532, Tanita Corp, Tokyo, Japan) and criterion values in a group (n = 9) of healthy males (mean ± SD: 48.6 ± 18.8 yr; 173.8 ± 4.5 cm; 72.8 ± 8.9 kg). Criterion four compartment body composition determinations involved measures of body density, TBW and bone mineral mass. The results (mean ± SD) are summarised below:

Measures	BIA	Four compartment	Four compartment - BIA	P
% Body fat	20.8 ± 5.5	21.0 ± 6.2	0.2 ± 2.5	0.785
Fat free mass (kg)	57.4 ± 4.9	57.0 ± 4.2	-0.4 ± 1.8	0.543
TBW (kg)	39.3 ± 3.5	41.1 ± 3.2	1.8 ± 1.2	0.002

While the mean %BF and fat free mass values for both methods were not significantly different, considerable intra-individual differences were observed. BIA values varied from the four compartment values by -3.0 to 4.4% BF and -3.3 to 1.9 kg fat free mass. The BIA estimates of TBW were significantly different from the criterion measures and intra-individual differences displayed a large range of -0.6 to 3.6 kg. Significant underestimations of TBW via BIA are concerning given that this is the parameter initially established by this method. Furthermore, the BIA data resulted in a FFM hydration value of 68.5% which was significantly ($P<0.001$) lower than the four compartment value of 72.0%. Presumably the BIA algorithms use an assumed FFM hydration value to determine body composition. In conclusion, the BIA device tested displayed poor individual accuracy for the estimation of body composition compared with a criterion method.