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The impact of dietary meat intake reduction on haematological parameters in healthy adults

M. Ali[1], E.J. Simpson[2], M. Clark[3], A. Razak[2] and A. Salter[3]
University College Dublin [1]School of Agriculture and Food Sciences, Dublin4, Ireland, University of Nottingham Schools of,
[2]Life Sciences, Medical School, Queens Medical Centre, Nottingham, NG72UH, UK and
[3]Biosciences, Sutton Bonington Campus, Loughborough, LE12 5RD UK

Meat is a rich source of dietary protein, fatty acids and micronutrients[(1)] many of which are involved in the process of blood cell production. In the UK, meat and meat products contribute up to 40 % and 37 % of average daily protein consumed by males and females respectively[(2)]. However, epidemiological studies have indicated an association between red and processed meat intake and an increased risk of developing cardiovascular disease[(3)] and certain cancers[(4)], and people are being advised to reduce their consumption of these foodstuffs.

This report, concerning the impact of dietary meat reduction on haematological parameters, is a sub-study of a wider intervention investigating the physiological effects of reducing red/processed meat intake. Twenty-four adults (15 F:9M, age 21–47y) participated in the sub-study. All were healthy, non-obese (18–28 kg/m^2) omnivores with a habitual consumption of ⩾4 portions of red and/or processed meat per week, (with ⩾3 of these being consumed as main meals). The study was conducted using a single group, non-randomised design. Participants were asked to reduce their red/processed meat intake by 50 % over a 12-week period. Nutrient intake was assessed via 4-day diet diaries, and haematological parameters (including white cell (WCC), red cell (RCC) and neutrophil count, and haemoglobin (Hb)) were obtained via an antecubital venous blood sample, at recruitment, and weeks 6 and 12 of the intervention.

Red/processed meat intake was lower during the intervention (partial eta^2 0·271; $P < 0·005$), but dietary folate, cobalamin, iron, zinc, copper and magnesium intakes were similar ($P > 0·05$ in each case). Over the intervention, a significant reduction in neutrophil count was noted ($P < 0·001$), with median count being $3·6[2·95–4·3] \times 10^9$/l at recruitment, $2·25[1·83–2·88] \times 10^9$/l at week 6 and 2·65 [2·13–3·08] l at week 12. This was accompanied by a decrease in WCC (partial eta^2 0·352; $P < 0·001$). Forty-eight percent of volunteers (8 F:4M) were neutropenic ($<2 \times 10^9$/l) with 54 % (9 F:5M) showing a neutrophil reduction $\geqslant 1 \times 10^9$/l (range $1–4 \times 10^9$/l; Gp 1). Mean reduction in protein intake from red/processed meat of this group (−19·9 (17·9)g/d) was no different ($P = 0·294$) to those whose neutrophil count did not reduce by $\geqslant 1 \times 10^9$/l (Gp2; −12·8 (13·0)g/d). There was no difference in reported total energy and macronutrient intake between groups, and folate, cobalamin, iron, zinc, copper and magnesium intakes were also comparable. In the whole cohort, a reduction in Hb and RCC occurred over the intervention (partial eta^2 0·283; $P < 0·001$ and partial eta^2 0·263; $P = 0·001$ respectively). However, there was no association between a change in RCC and WCC ($r = −0·002$, $P = 0·994$), nor between a decrease in total dietary iron intake and Hb levels ($r = 0·166$, $P = 0·437$). Participants did not report any symptoms during the intervention suggestive of anaemia or neutropenia.

Reducing red/processed meat intake in healthy omnivores resulted in a decrease in Hb, RCC, WCC and neutrophils, although the clinical significance of these findings is unclear. Dietary intake records did not indicate a nutritional cause for these changes. However, it is likely that these records are insufficiently accurate to determine habitual micronutrient intake.

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