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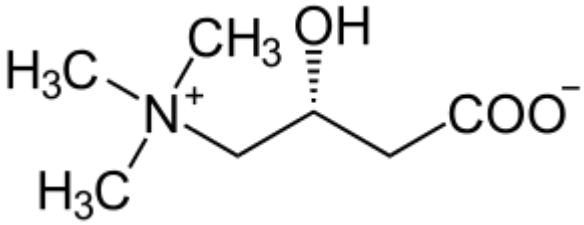
Application note 012

Assessing the effect of L-Carnitine on fat oxidation, protein turnover and body composition on slightly overweight people

L-Carnitine is a naturally occurring substance necessary for energy metabolism in mammals, as it transports fatty acids across the mitochondrial membrane for subsequent fat degradation and energy production. Investigations have previously been carried out into whether L-Carnitine supplements influence metabolism and therefore aid weight loss. This study sheds more light on the role of such supplements on fat oxidation, protein turnover and therefore body composition and weight development.

Twelve slightly overweight subjects received a regular diet with and without L-Carnitine supplementation of 3g/day for 10 days. Protein turnover and fat oxidation were investigated after administration of [^{15}N]glycine and [U-^{13}C] algal lipid mixture. The enrichment of ^{15}N and ^{13}C were measured via IRMS, body fat mass (BFM), total body water (TBW) and lean body mass (LBM) were also measured.



Before the supplementation phase of the study began, baseline breath and urine samples were collected to determine the baseline abundance of ^{15}N and ^{13}C. Isotopically labelled substances were given to the patients, urine samples were collected at 2 4 and 6 hour intervals over 36 hours and breath samples were collected at 30 min intervals over 14 hours. During the supplementation phase, the same 12 subjects who had previously been on a 10 day regular diet regime maintained this diet with the addition of L-Carnitine, urine and breath sampled as before and ^{15}N and ^{13}C measured via IRMS.

BFM, TBW and LBM were measured via bioelectric impedance analysis after an overnight fast before and after the 10 day regular diet phase and after the subsequent 10 day supplemented diet phase. L-Carnitine supplementation led to a significant increase in ^{13}C-fat oxidation whereas protein synthesis and breakdown rates remained unchanged, indicating that the increased dietary fat oxidation in slightly overweight subjects was not accompanied by protein catabolism. BFM, TBW and LBM remained unchanged, however 10 days is a short period of supplementation; prolonged supplementation may reduce beneficially influence body weight.

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