

ABSTRACT

THESIS: THE EFFECT OF CYP1A2 GENE VARIANTS AND CAFFEINE
ON RATINGS OF PERCEIVED EXERTION

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The purpose of the present study was to elucidate if caffeine ingestion reduced perception of effort at submaximal intensities during a maximal exercise test. A secondary purpose of this study was to examine the role of a single nucleotide polymorphism (SNP) at intron 1 of cytochrome P-450 gene in modulating caffeine's influence on ratings of perceived exertion (RPE) at the same submaximal exercise intensities.

Twelve healthy men (age: 24 ± 1 yr., BMI: 23.9 ± 1.2 kg.m²) volunteered to participate in the present study. Subjects consumed 6 mg.kg⁻¹ of USP grade caffeine in 200ml of non-caloric, coloured and flavoured water, or a placebo-matched drink in a single-blind, randomised and

crossover style design. Subjects remained seated for 1 hour after consuming the assigned drink, and subsequently completed an incremental maximal exercise test on a bicycle ergometer, which started at 0 Watts for 1 minute and increased by 25 Watts per minute until volitional exhaustion. RPE was reported every third minute during the test. DNA was obtained from whole blood samples and genotypes were determined using previously described methods. Similar to previous studies looking at this SNP, subjects were categorised into groups of AA homozygotes and C allele carriers for statistical analyses between genotypes. Two-way repeated measures ANOVA's were performed (Treatment \times Genotype) for RPE responses at submaximal workloads up to 300 Watts. Significant results were followed up using the bonferroni post-hoc method.

There were no significant differences between individuals homozygous for the A variant and C allele carriers for age, height, weight, body mass index (BMI), and VO₂max. A significant Time \times Treatment interaction was observed (F=5.804, p<0.05) for the rate of increase in RPE between trials. A significant Treatment \times Genotype interaction was also found (F=5.714, p<0.05), by which C allele carriers exhibited greater reductions in RPE during the caffeine trial compared to AA homozygotes.

The findings of the present study indicate that perception of effort is reduced in individuals who metabolise caffeine at a slower rate (i.e. in C allele carriers). It is postulated that AA homozygotes do not experience reductions in RPE due to a greater cardiovascular workload and enhanced CNS excitability following caffeine ingestion