

## **The Effects of a Polymorphism in the CYP1A2 Gene on Serum Caffeine Concentrations during Exercise**

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Research has demonstrated that a polymorphism in the cytochrome P450 (CYP1A2) gene impacts caffeine metabolism. Further, one recent study reported that performance enhancement with caffeine treatment differs across genotypes. **PURPOSE:** The purpose of the present study was to examine the effects of a polymorphism in the cytochrome P450 (CYP1A2) gene on circulating caffeine concentrations during exercise. **METHODS:** Twenty young ( $27 \pm 3$  years), novice cyclists ( $VO_{2max} = 31.7 \pm 6.8$ ) participated in three separate laboratory sessions. During the first visit, subjects underwent a graded exercise test on a Lode Corival cycle ergometer to determine  $VO_{2max}$ . Venous blood samples were collected and immediately analyzed for genotype (AA genotype vs. C variant) via polymerase chain reaction and gel electrophoresis. For the next two visits, 3 pieces of chewing gum (CAFF vs. PLA) was administered in a counterbalanced, double blind manner. Subjects remained resting for 10 min then completed a standard warm up on the cycle ergometer. Following the warm up, subjects cycled at 70%  $VO_{2max}$  (constant Wattage) for 15 min, rested for 10 min, then completed a 15 min performance ride. Venous blood samples were collected at baseline (Base), during the warm-up (+25), and immediately before (+50) and after (+65) the performance ride. Serum samples were analyzed for caffeine concentrations via High Performance Liquid Chromatography. **RESULTS:** Ten subjects possessed the AA genotype and 10 subjects possessed the C allele variant. Serum caffeine data were analyzed using a 2 (Genotype) by 4 (Time) analysis of variance (ANOVA). The ANOVA demonstrated a main effect of time ( $p < 0.001$ ) across both genotypes. Post hoc comparisons demonstrated that caffeine concentrations increased from Base to +25 ( $1.4 \pm .64$  vs.  $2.4 \pm 1.1$  mg · L<sup>-1</sup> respectively,  $P < 0.01$ ) and from +25 to +50 ( $2.4 \pm 1.1$  vs.  $3.2 \pm 1.5$  mg · L<sup>-1</sup>, respectively,  $P = 0.012$ ) then remained stable from +50 to +65 ( $3.2 \pm 1.5$  vs.  $2.6 \pm 1.2$  mg · L<sup>-1</sup>, respectively,  $P = 0.380$ ). No main effect of group was evident ( $p = 0.970$ ). Further, no genotype x time interaction was evident ( $p = 0.380$ ). **CONCLUSION:** These data suggest that the cytochrome P450 (CYP1A2) gene polymorphism did not impact circulating caffeine concentrations during acute exercise.