

Phenotyping of P450 1A2 in Korean Persons by Analyzing Urinary Metabolites of Caffeine

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Metabolic oxidation of caffeine(1,3,7-trimethyl-xanthine), included in the coffee and catalyzed by various isoforms of cytochrome P450 and flavin-containing monooxygenase, is known to produce both N-demethylated and 8-hydroxylated metabolites. Upon analyzing the human urines collected from 60 healthy medical student volunteers of Inha Medical School, who are composed of both male and female as well as smokers and non-smokers, we determined the activity of P450 1A2 in each individual by comparing the molar ratio of (1,7-dimethylxanthine+1,7-dimethylurate)/(unmetabolized caffeine). The frequency distribution of P450 1A2 activity showed that they were distributed in a bimodal fashion, and that 85% of volunteers could be classified as extensive metabolizers and 15% as poor metabolizers. Furthermore, the P450 1A2 activities were, in general, higher for the males and cigarette smokers than the females and non-smokers, respectively.

As the P450 1A2 isoform is known to activate arylamines and cause cancers, we suggested to those people with high P450 1A2 activity that they should refrain from smoking and consuming extensively broiled fish and meat, known to be containing large amounts of arylamines, to reduce the chances of suffering from bladder or colorectal cancers. We also advised those people who have low P450 1A2 activity that they should use lower doses of medicines like acetaminophen, known to be metabolized and deactivated by P450 1A2, to reduce the chances of over-dose related toxic side effects.