

Non-caffeine di-Cinnamoylquinide Constituents of Roasted Coffee Inhibit the Human Adenosine Transporter

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ABSTRACT

Preliminary screening of a non-xanthine constituent of roasted coffee, 3,4-diferuloyl-1,5-quinide (DIFEQ), a derivative of the chlorogenic acids, i.e. isomeric mono- and di-substituted coumaroyl-, caffeoyl-, and feruloyl- esters of quinic acid, showed inhibition of the adenosine transporter at low micromolar concentration. Displacement of [³H]NBTI binding by DIFEQ in cultured U-937 cell preparations, expressing the human adenosine transporter protein, showed a K_i of $0.96 \pm 0.13 \mu\text{M}$. 3,4-Dicaffeoyl-1,5-quinide and 3,4-dicoumaroyl-1,5-quinide had similar affinities, indicating that all dicinnamoylquinides formed in the roasting process of coffee are adenosine uptake inhibitors. Inhibition of the adenosine transporter results in increased extracellular levels of adenosine. This could protect cells from various tissue insults, and possibly counteract the effects of adenosine antagonists, such as caffeine. This is supported by the fact that acute administration of DIFEQ, at 30-300 mg/kg i.p., dose dependently reduced locomotion in mice. This suggests that DIFEQ-like compounds in coffee are able to modulate the stimulant effect of caffeine, and may contribute to health-related effects of coffee.