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Effect of adenosine receptors modulation on neurological actions of Theophylline in rats

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Aim of the study: Theophylline, a methylxanthine derivative which was widely used in the treatment of asthma and bronchopulmonary obstructive diseases, is known to produce seizures which might be due to non-selective antagonistic effect on central adenosine receptors. This study provides an insight on the importance of how modulation of adenosine receptors might affect the neurological actions of theophylline and consequently might clarify a possible mechanistic approach to theophylline.

Methods: This was carried out by studying the effect of pretreatment of rats with adenosine and its analogs on theophylline-induced seizures. Acute toxicity of theophylline in rats was studied by determination of median convulsive dose (CD50) of theophylline alone and after pretreatment of rats with adenosine and its analogs. The marginal dose of theophylline that elicits convulsions (i.e the least convulsive dose) and the serum level of theophylline at this dose were determined.

Results: Pretreatment of rats with adenosine, 2-CADO, CPA and CPCA did not significantly offer protection against convulsions induced by acute challenge with theophylline in a dose of 200 mg/kg.

Conclusion: Significant elevation of CD50 of theophylline after pretreatment of rats with adenosine and CPA is not conforming with the observation that adenosine and its analogs didn't significantly offer protection against theophylline-induced seizures and this indicates that further investigations are needed to study role of adenosinergic system in theophylline-induced seizures.

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