

ROPINIROLE MEDICATION FOR PARKINSON'S DISEASE INCREASES GAMBLING BEHAVIOUR IN RATS

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Introduction

Parkinson's disease (PD) is characterised by a progressive loss of dopamine producing neurons. Thus levodopa (L-DOPA), a precursor for the metabolism of dopamine is commonly used to treat PD. However, L-DOPA has shown over time to produce debilitating side-effects such as dyskinesia. For this reason, alternative medications such as the dopamine agonists pramipexole and ropinirole are increasingly used to treat PD. Although these newer drugs successfully treat the motor symptoms of PD, they may also lead to a variety of Impulse Control Disorders (ICD) including pathological gambling. Estimates suggest approximately 16% of patients taking dopamine agonists develop ICDs, although this rate may be underestimated by the fact that patients may be reluctant to discuss such issues with their physician. The sudden development of pathological gambling symptoms in PD patients may be extremely detrimental. For example, it has been reported that some patients have lost their properties and life savings, and seriously affected their family relationships. Although these impulse control disorders have been well documented in PD patients, their exact etiology is unclear. A better understanding of the effects of dopaminergic medication on decision making may help clarify these effects.

The goal of this study was to investigate the effect of chronic administration of ropinirole in a model of gambling behaviour in the rat, to mimic the effects observed in patients with PD.

Methods

Subjects were 24 adult male long-evans rats performing the Betting task. In this task, rats earn rewards by choosing between a safe option, which guarantees delivery of a small number of sugar pellets, or an uncertain option, which delivers twice the number of sugar pellets or nothing, with a 50:50 probability. Following learning of the task, rats were implanted subcutaneously with an osmotic mini-pump distributing either ropinirole hydrochloride 5mg/kg/day or saline solution.

Results and Conclusion

Chronic ropinirole administration produced a general increase in preference for uncertain outcomes.

Bias towards uncertainty may explain why some PD patients treated with selective dopamine medication develop gambling and other risky and maladaptive behaviours. Knowledge of the mechanisms underlying these behaviours may result in development of better treatments for PD. Further studies may also determine whether it may be possible to reverse or block the development of ICDs following dopamine agonist administration.