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Evaluation of Microglial Action in a JSK Treated Paraquat Rat Model of Parkinson's Disease

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INTRODUCTION

Parkinson’s Disease (PD) is the second most common neurodegenerative disorder, affecting 7 to 10 million individuals worldwide.[1] This chronic, progressive disease is associated with the degeneration of dopaminergic neurons in the substantia nigra pars compacta region of the basal ganglia. This structure gives rise to motor, associative and limbic circuits, which incorporate the thalamus and cortices.[2]

PD impacts all three aforementioned circuits leading to symptoms such as resting tremors on one side of the body, hypokinesia (reduced ability to smell), muscle rigidity, bradykinesia which is slowed motion and a limited range of movement, as well as mood and REM behaviour disorders.[3] Approximately 90% of PD cases are sporadic[3] and oxidative stress has been implicated as a key player in these situations. However, other known and unknown factors are assumed to be involved and the overall pathophysiology of the disease is not well understood. Hence our lab began to consider the idea of a more holistic and natural approach to treating PD.

METHODOLOGY

18 male rats were divided into three groups and subjected to a prophylactic methodology. Prophylactic studies aim to quantify the maximum neuroprotective capacity of the compounds of interest, by starting treatment prior to inducing disease. Neurotoxin-induced PD is commonly used in laboratory rat models and the four most frequently used parkinsonian neurotoxins are 6-OHDA, MPTP, rotenone and paraquat (used in this study).

GROUP 1
The first group received regular jello (no JSK added) and saline injections. This group allowed any effects of regular jello to be determined and functioned as a control for the stress of injections.

GROUP 2
This second group received regular jello and paraquat injections, acting as a control to assess maximum damage due to the neurotoxin.

GROUP 3
The third group to which JSK supplemented jello and paraquat injections were administered, functioned as the primary experimental group for which JSK neuroprotection was evaluated.

18 weeks

1. Strawberry jello is used as a vehicle to administer 0.15g of JSK daily to Group 1
   • 22mL of jello are added to each well of the icecube tray, followed by JSK addition
   • Groups 2 and 3 receive jello without JSK supplementation

2. 1 intraperitoneal paraquat or saline injection every 5 days
   • Dose is 10mg/kg
   • Total of 5 injections are given and treatment continues throughout the injection period

3. Rats are sacrificed in the perfusion process %> brains obtained
   • Brains are preserved in formaldehyde

4. Enzyme-based staining
   • Goat anti-rabbit
   • Rabbit anti-α

5. We wish to extend our heartfelt thanks to Mr. Joseph Scroice and his family for their generous support of this research

REFERENCES


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