Catalytic Metalloporphyrin Protects Against Paraquat Neurotoxicity *in vivo*

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Objective To examine the neuroprotective effects of a novel manganese porphyrin, manganese (III) meso-tetrakis (N,N′-diethylimidazolium-2-yl) porphyrin (MnTDM), in the mouse model of Parkinson's disease (PD) induced by paraquat (PQ). **Methods** Male C57BL / 6 mice were subcutaneously injected with either saline or PQ at 2-day intervals for a total of 10 doses, MnTDM was subcutaneously injected with the PQ 2 h before treatment. Performance on the pole and swim test were measured 7 days after the last injection and animals were sacrificed one day later. Levels of dopamine (DA) and its metabolites in the striatum were measured by high-performance liquid chromatography with an electrochemical detector (HPLC-ECD). Thiobarbituric acid (TBA) method was used to assay the lipid peroxidation product, malondialdehyde (MDA), and the number of tyrosine hydroxylase (TH) positive neurons was estimated using immunohistochemistry. **Results** Pretreatment with MnTDM significantly attenuated PQ-impaired behavioral performance, depleted dopamine content in striata, increased MDA, and dopaminergic neuron loss in the substantia nigra. **Conclusions** Oxidative stress plays an important role in PQ-induced neurotoxicity which can be potentially prevented by manganese porphyrin. These findings also propose a possible therapeutical strategy for neurodegenerative disorders associated with oxidative stress such as PD.

Key words: Parkinson's disease; Paraquat; Dopamine transporter; Superoxide dismutase mimetics; Neuroprotection

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