# Neuroprotection of Midbrain Dopaminergic Cells in MPTP-Treated Mice after Near-infrared Light Treatment

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## ABSTRACT

This study explores whether near-infrared (NIr) light treatment neuroprotects dopaminergic cells in the substantia nigra pars compacta (SNc) and the zona incertahypothalamus (ZI-Hyp) from degeneration in 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP)-treated mice. BALB/c albino mice were divided into four groups: 1) Saline, 2) Saline-NIr, 3) MPTP, 4) MPTP-NIr. The injections were intraperitoneal and they were followed immediately by NIr light treatment (or not). Two doses of MPTP, mild (50 mg/kg) and strong (100 mg/kg), were used. Mice were perfused transcardially with aldehyde fixative 6 days after their MPTP treatment. Brains were processed for tyrosine hydroxylase (TH) immunochemistry. The number of TH_cells was estimated using the optical fractionator method. Our major finding was that in the SNc there were significantly more dopaminergic cells in the MPTP-NIr compared to the MPTP group (35%–45%). By contrast, in the ZI-Hyp there was no significant difference in the numbers of cells in these two groups. In addition, our results indicated that survival in the two regions after MPTP insult was dosedependent. In the stronger MPTP regime, the magnitude of loss was similar in the two regions (_60%), while in the milder regime cell loss was greater in the SNc (45%) than ZI-Hyp (_30%). In summary, our results indicate that NIr light treatment offers neuroprotection against MPTP toxicity for dopaminergic cells in the SNc, but not in the ZI-Hyp.