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Nigral mesenchymal stem cell graft and/or *GDNF* gene transfer promotes functional recovery in hemiparkinsonian rats

May-Jywan Tsai¹, Kang-Du Liu¹, Su-Fen Fan¹, Dann-Ying Liou¹, Ching-Feng Weng², Shih-Chieh Hung³ and Henrich Cheng^{1,3}

¹Taipei Veterans General Hospital, Taiwan

²National Dong-Hwa University, Taiwan

³National Yang-Ming University, Taiwan

Parkinson's disease (PD) is a neurological disorder characterized by the progressive loss of midbrain dopamine (DA) neurons. GDNF is known to exert neuroprotective and trophic effects on DA neurons. Bone marrow mesenchymal stem cells (MSC) represent potential cell sources for treating CNS injury. The present study aimed to evaluate the efficacy of nigral graft of human MSC and/or adenoviral (Ad) GDNF gene transfer in 6-OHDA-lesioned hemiparkinsonian rats. We used the immortalized human MSCs that retain their potential for neuronal differentiation. Pre-induced hMSC and/or Ad-GDNF were infused to the rat substantia nigra at 2 weeks after middle forebrain bundle infusion of 6-OHDA. Hemiparkinsonian rats receiving grafts of pre-induced hMSC or Ad-GDNF showed significant recovery in apomorphine- induced rotational behavior as well as numbers of nigral DA neurons. The result suggests that hMSC and GDNF have great potential in clinical cell therapy in Parkinsonian patients.

mjtsai2@vghtpe.gov.tw