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Genetically Modified Human Embryonic Stem Cells Relieve Symptomatic Motor Behavior in a Rat Model of Parkinson's Disease

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Embryonic stem cells have several characteristics suitable for cell replacement therapy. To investigate a possibility of using human embryonic stem cell (hESC) as a carrier of therapeutic gene(s), hESC (MB03) was co-transfected with cDNAs coding for tyrosine hydroxylase (TH) and GTP cyclohydrolase I (GTPCH I) and bulk-selected using neomycin and hygromycin-B. Successful transfection was confirmed by western immunoblotting and RT-PCR. The genetically modified hESC (bk-THGC) relieved apomorphine-induced asymmetric motor behavior by approximately 54% when grafted into striatum of 6-OHDA-denervated rat brain. The number of rotation, however, increased up to 176+18% in 6 weeks when sham-grafted compared with number of rotation before graft. Immunohistochemical staining revealed that the grafted hESC survived and expressed TH for at least 6 weeks while the experiment was continued.

Key words) ***Human embryonic stem cell, Parkinson's disease, Cell replacement therapy***