Human striatal neuroblasts develop and build a striatal-like structure into the brain of Huntington's disease patients after transplantation.


Source

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Abstract

Rebuilding brain structure and neural circuitries by transplantation of fetal tissue is a strategy to repair the damaged nervous system and is currently being investigated using striatal primordium in Huntington's disease (HD) patients. Four HD patients underwent bilateral transplantation with human fetal striatal tissues (9-12 week gestation). Small blocks of whole ganglionic eminencies were processed to obtain cell suspension and then stereotactically grafted in the caudate head and in the putamen. Follow-up period ranged between 18 and 34 months (mean, 24.7 months). Surgery was uneventful. Starting from the fourth month after grafting, neo-generation of metabolically active tissue with striatal-like MRI features was observed in 6 out of 8 grafts. The increase in D2 receptor binding suggested striatal differentiation of the neo-generated tissue in 3 patients. New tissue, connecting the developing grafts with the frontal cortex and, in one case, with the ventral striatum, was also observed. The new tissue growth halted after the ninth month post transplantation. All patients showed stabilization or improvement in some neurological indices. No clinical and imaging signs, suggestive of graft uncontrolled growth, were seen. This study provides the first evidence in humans that neuroblasts of a striatal primordium can develop and move into the brain after neurotransplantation. Primordium development resulted in the building of a new structure with the same imaging features as the corresponding mature structure, combined with short- and long-distance targeted migration of neuroblasts. The results of this study support both the reconstructive potential of fetal tissue and the remarkably retained plasticity of adult brain. Further studies are necessary to assess the clinical efficacy of the human fetal striatal transplantation.