Investigation of Human Fetal Dopaminergic (DA) Neuron transplantation to Parkinsonian Rat Brain
Wu Yi Ming, Xu Hui Jun, Shi Bi Tao, Huang Zhen
Department of Neurobiology, Nan Tong Medical College, Nan Tong, 226001

There had been clinical reports in this country on the transplantation of mesencephalon to Parkinsonian patients, but the transplant fetal age was mostly 4-5 month old. The best fetal age for transplant of human fetal mesencephalon substantia nigra was 10-12 weeks as reported abroad. The purpose of this investigation was to investigate the functional effect of transplanting human embryonic substantia nigra dopaminergic neuron of various fetal age into the striatum and substantia nigra. 60H-DA injured mesencephalon substantia nigra was used to establish Parkinson's disease animal models in the rat. Some transplants were taken from 4 months human embryonic mesencephalon substantia nigra, some transplants were from 10-12 weeks human embryo mesencephalon substantia nigra. After two weeks post-transplantation, some animals were given orally an immuno-inhibitory dose of cyclosporin A, 5mg/kg/day. In the following months, dehydrated morphine induction rotation test was carried out every month. It was found in the result that the Parkinsonian rat, with transplant of 10-12 week human fetal mesencephalon DA neuron and received cyclosporin A, had marked functional improvement one month after transplant. At two months time the was a rise. After 4 months, human fetal mesencephalon DA neuron rats also showed improvement in the rotation test, however it was not obvious. Animals of that group were sacrificed after survived for 8 months. Tyrosine hydroxylase (TH) antibody and anti-human neurofilament (NF) antibody were used for immunohistochemical examination, it was proved there were survived TH positive neurons and anti-human NF positive fibers in the transplant zone. In 8 weeks, 12 weeks and 17 weeks human fetal mesencephalon sections indicated that, at 8-12 weeks ventral part of the mesencephalon already had obvious TH positive neurons, cells near the ependyma were round in shape, its peripheral had differentiated into processes, while in 15 weeks and 17 weeks fetal mesencephalon substantia nigra the cells mostly were differentiated with long processes, but in some parts the round cell group had not or had not began differentiated to form process. The experiment indicated the human fetal mesencephalon DA neurons transplanted into the brain of Parkinson Disease rat, could survive even without giving cyclosporin A. 10-12 weeks human embryo brain DA neurons were in their early differentiation stage, therefore its transplantation effect will be better than the 4 months old human embryo. Human fetal brain transplanted to Parkinsonian Disease rat belong to class genus cross-transplant, human fetal DA neuron survival and production of functional effect provided the feasibility of clinically transplant human fetal brain in treatment of disease and after transplantation fetal brain cells could survive.