HEMIPARKINSONIAN MARMORSET (CALLITHRIX JACCHUS) MODEL DUE TO STEREOTACTIC SUBTHALAMIC NUCLEUS LESIONING WITH 6-HYDROXYDOPAMINE (6-OHDA)

Panagiotis Nomikos (B. Czeh, M. Buchfelder, E. Fuchs)
Neurochirurgische Klinik der Universität Göttingen,
Deutsches Privatzentrum Göttingen

Purpose
To establish a suitable animal model of profound nigral dopamine depletion with behavioural and anatomical features characteristic of human Parkinson’s disease.

Methods
Six young adult marmosets (3 female, 3 male) ranging in weight from 320-480 g were used. All were in good health and housed in pairs. Surgery was carried out under Saffan anaesthesia. Unilateral 6-OHDA lesions were made to the medial forebrain bundle in all of the marmosets according to the method and coordinates detailed by Annett et al. [1] and were based on the marmoset brain atlas of Stephan et al. [2] The total dose received was 11µl of 18mg/ml 6-OHDA distributed over five sites using a custom stereotactic device. The lesions were made to the side of the brain contralateral to the preferred hand. Behavioural tests conducted preoperatively and at regular intervals during the observation period following surgery was associated with a contralateral motor impairment, which so far was irreversible after a time period of 4 months.

Discussion
This preliminary study showed (i) that the resulting deficits were reproducible and stable over time enabling intensive objective testing; (ii) the animals remain in good health and (iii) due to unilateral lesions, when carrying out tests of limb function, the unaffected side of the body may serve as control. The described lesion model in the common marmoset monkey fulfils the criteria for use for evaluating transplantation strategies for striatal repair, such as implantation of genetically modified dopamine-producing cells. (Supported by the BMBF Program Dopamine Producing Cells in Experimental Models of Parkinson’s Disease (01GN0104) and the DFG Research Center Molecular Physiology of the Brain (CMPB)).

References