FC12-03

# DTI-BASED IN VIVO MAPPING OF SUBREGIONS WITHIN THE HUMAN HYPOTHALAMUS

P. Schoenknecht[1], A. Anwander[2], F. Petzold[1], S. Schindler[1], T. Knoesche[2], U. Hegerl[1], R. Turner[2], S. Geyer[2]
[1]University of Leipzig, Dept. of Psychiatry, [2]Max Planck Institute, Leipzig, Germany

Introduction: The hypothalamus is involved in many aspects of behavioral responses but parcellations of hypothalamic subnuclei have only been feasible in post-mortem brains. Thus it would be - from a clinical point of view - highly desirable if hypothalamic subnuclei could be delineated also noninvasively in living subjects. This study is a first step in this direction: We exploited the directionality information inherent in high-resolution DTI data to map subregions of the hypothalamus in healthy volunteers.

directionality information using DTI data to map subregions of the hypothalamus.

Methods: We scanned 10 subjects with a Siemens 3 T scanner, acquired DTI and T1 scans. We computed the similarity of fiber orientations between all voxels and subjects, and clustered the similarity matrix in 3 regions using a k-means algorithm.

Results: The diffusion images showed anisotropic tissue orientation within the hypothalamus which was consistent across subjects. The clustering in 3 regions resulted in an anatomically coherent arrangement of clusters across hemispheres and subjects. In each ROI, we found an anterior, a posteromedial, and a lateral subdivision with consistent microscopic tissue orientations across subjects.

Conclusion: This is to our best knowledge the first study that demonstrates the fine-grained microstructural organization within the human hypothalamus noninvasively in living subjects.

https://doi.org/10.1016/S0924-9338(11)73582-9 Published online by Cambridge University Press