Basal Ganglias

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The basal ganglia are responsible for motor control, motor learning, executive functions, behaviour and emotions. DTI-based tractography allows us to visualise neural tracts and see specific connections to the cortex and other structures in the brain. This will help us to better understand the function of the basal ganglia and see differences between the sides of the brain. The aim of this study was to visualise neural tracts in basal ganglia in healthy participants and to compare statistical parameters of neural tracts from left and right side of the brain to determine laterality. Subject underwent MRI examinations on a 3T MR scanner (Siemens Magnetom Trio, Erlangen, Germany) at IKEM (Institute of Clinical and Experimental Medicine). DTI data were reconstructed in DSI Studio software. We selected to reconstruct neural tracts in the caudate nucleus, the putamen and the Globus pallidus. We chose to study structures of the left hemisphere and right hemisphere separately for further analysis. Regions representing the selected basal ganglia were loaded from a provided atlas (Harvard Oxford Sub) and afterwards manually corrected according to its proper anatomical position specified by a neuroanatomist in all dimensions on T1 weighted images. Fiber tracking was performed and reconstructed neural tracts were analysed. Following statistical parameters were obtained: number of tracts, tract length, tract volume, quantitative anisotropy, generalised fractional anisotropy and normalised quantitative anisotropy. We found laterality in the basal ganglia with higher statistical parameters in the left side of the brain. These results indicate that the dominance of the left basal ganglia might be connected with the patients being right-handed. Results of this study will be used as a preliminary study in further research of basal ganglia for pathology (Parkinson disease).

Biography

Jana Mrzilkova is neuroanatomist working at the Institute of Anatomy, Third Faculty of Medicine in Charles University, Czechia. She is focused on micro CT imaging of soft tissues, especially brain, vasculate and blood supply of visceral organs.

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