

Immunocytochemical characterization of the human subthalamic nucleus

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Research question and background

The subthalamic nucleus (STN) is involved in motor, cognitive and limbic functions. Since the discovery of the STN as a target for deep brain stimulation in the treatment of movement and a number of other disorders it has received a lot of attention. However, the functional neuroanatomy of the human STN is largely unknown. So far, only few studies have investigated protein expression patterns within the human STN. The objective of the present study was to study protein distribution patterns to investigate whether evidence exists in support of anatomical segregation in the nucleus consistent with the observed functional segregation.

Methods and tissues used

We investigated the distribution of proteins over the rostral-caudal axis of five human post-mortem STNs by means of immunocytochemistry. Among others, we included stainings for proteins involved in GABA-ergic, serotonergic, dopaminergic as well as glutamatergic signaling. We observed distinct staining patterns for individual proteins within the nucleus, which were in support of anatomical zonation within the nucleus, although we did not observe strict anatomical segregation of neuronal populations.

Results and conclusion

Even though we find clearly distinct distribution patterns for a number of proteins, our data are not in support of anatomical segregation within the human STN.