

Deep brain stimulation of the subthalamic nucleus (STN) is an effective treatment of advanced Parkinson's disease. However, it can be linked with adverse side-effects of altered perception and processing of emotions. To investigate the involvement of the STN in motivational and emotional processes, we searched for single STN neurons whose activity was related to emotional stimuli. We recruited 13 patients with Parkinson's disease treated with deep brain stimulation of the STN. We analyzed the relationship between the intraoperative firing of STN neurons and the ratings of emotional valence and arousal of affective pictures presented simultaneously.

Fifteen out of 90 neurons (17%) responded to emotional pictures. The activity of some neurons was related to emotional valence, whereas different neurons responded to arousal. Our results not only suggest the existence of neurons involved in processing of emotional information in the human STN, but also provide evidence of separate processing of the affective dimensions of valence and arousal at the level of single neurons.

These results will help to shape future treatment of Parkinson's disease. In order to eliminate the adverse side effects of the STN stimulation, we may wish to stimulate only neurons connected with the symptoms of the disease, not those associated with emotional processes.

Sieger T, Serranová T, Růžička F, Vostatek P, Wild J, Štastná D, Bonnet C, Novák D, Růžička E, Urgošík D, Jech R. Distinct populations of neurons respond to emotional valence and arousal in the human subthalamic nucleus. Proc Natl Acad Sci U S A. 2015 Mar 10;112(10):3116-21. PubMed PMID: [25713375](https://pubmed.ncbi.nlm.nih.gov/25713375/)