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Parkinson: Weight gain after deep brain stimulation

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It was already known that people affected by Parkinson's disease, when subjected to deep brain stimulation, gained weight, but it was less clear why that was so. Thanks to new research by the International School for Advanced Studies - SISSA in Trieste (Italy), it has been realized that the weight gain after implant has a multifactorial origin. The study, published on the scientific journal *Cortex*, monitored for the first time a group of patients before and after the intervention, assessing cognitive, psychological and behavioural aspects. The results show that weight gain is associated with an increased desire for food and level of impulsiveness, as well as with the duration of the disease and the reduction of pharmacological treatment, thereby providing important elements for preventative purposes.

"The alteration of body weight is one of the potential complications of deep brain stimulation as a treatment of Parkinson's disease", explains Marilena Aiello, SISSA researcher and first author of the research. "The origin was initially traced to the substantial reduction in motor symptoms, overlooking the role of the brain stimulation area—the subthalamic nucleus—in the reward system. Our intention was to assess the overall picture before and after the operation, from a clinical as well as a cognitive, psychological and behavioural viewpoint".

The study—conducted in collaboration with the Santa Maria della Misericordia University Hospital in Udine, under the leadership of Raffella Rumiati, in charge of SISSA neuroscience and society lab—has involved 18 Parkinsonian patients who underwent deep brain stimulation

and 18 healthy volunteers.

"The patients have been assessed in three distinct phases: prior to the operation, 5 days after the operation, and 3 months thereafter. They were always under pharmacological treatment, gradually reduced, whereas, at the time of the latest survey, the stimulator, too, was active" Aiello went on to state.

Participants were subjected to some questionnaires used at clinical level to assess their levels of depression, anhedonia—i.e. the inability to experience pleasure—and impulsiveness. In addition, they undertook some tasks assessing food reward sensitivity and impulsive reactions to food.

"Our results have confirmed a significant weight gain during the months following the operation. In line with an alteration of the reward system, the weight variation has proved more consistent in those patients who, after the operation, have displayed an increased desire for food. However, we have also noted the importance of individual characteristics, such as attentional impulsiveness - i.e. the tendency to take sudden decisions—and of characteristics related to the disease, such as its duration and the reduction in the pharmacological load".

The researcher concludes thus: "Our results have proved the multifactorial nature of the post-operation weight gain, and offer important tools to identify the patients under greatest risk and accordingly prevent an excessive or anyway debilitating weight gain".

More information: Marilena Aiello et al, Weight gain after STN-DBS: The role of reward sensitivity and impulsivity, *Cortex* (2017). DOI: 10.1016/j.cortex.2017.04.005