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# Can inactivation of the subthalamic nucleus help treating alcoholism?

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## Résumé

The subthalamic nucleus (STN) is the current target for the High Frequency Stimulation (HFS) treatment of Parkinson's Disease or Obsessive Compulsive Disorders. Studying the impact of STN inactivation by either lesions or HFS in intact rats, we observed decreased motivation for cocaine with increased motivation for food reward (Baunez et al., 2005, Rouaud, Lardeux et al., 2010). STN lesions were also shown to increase motivation for alcohol in rats showing a high consumption in a forced consumption test, while decreasing the motivation for alcohol in the low drinker group (Lardeux and Baunez, 2008). The present study aimed to assess the effect of inactivating STN on diagnostic criteria for alcoholism i.e. 1) loss of control over alcohol intake, 2) alcohol use at the expense of other rewards and 3) despite adverse consequences (punishment) and 4) on the motivational modification observed after extended alcohol use. We developed a model evidencing after the loss of control over alcohol intake, a preference for the substance over non addictive reward (such as saccharine) in some vulnerable animals. Preliminary data show that STN lesion tends to prevent the loss of control over alcohol intake. Ongoing experiments are assessing the ability of STN lesion 1) to restore the control over alcohol intake of rats having previously lost it and 2) to reallocate alcohol related behaviors towards alternative natural rewards. After having controlled that STN lesion leaves the memory for aversive event unaffected, 3) further studies are also currently assessing its ability to reduce alcohol use in face of punishment. These results should validate the pertinence of targeting the STN against alcoholism.

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