# Association of functional connectivity of accumbens nuclei with adherence to exergaming in multiple sclerosis

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## *Background*

Exergaming is an emerging issue in neurorehabilitation [1]. Video games contain elaborate reinforcement and rewards schedules that have the potential to maximize motivation [2]. The accumbens nuclei (NAcc) are part of the dopaminergic pathways and are associated with reward processing, motivation and avoidance attitude [3].

*Objective:to investigate whether NAcc connectivity predicts adherence to exergaming in multiple sclerosis (MS) by using resting-state functional magnetic resonance imaging (RS-fMRI).*

## *Methods*

We acquired MRI data from a group of patients participating to a rehabilitation program and from a group of healthy subjects (HS). Patients underwent a 12-week period of home-based rehabilitation on the Nintendo ® Wii balance board (WBB). Adherence to treatment (ADH) was defined as the percentage of time a patient accessed the gaming compared to time prescribed. The RS-fMRI was acquired with a 3 Tesla scanner soon before the beginning of the training. Neuroimaging data were analyzed with the FSL using a seed-based method to identify the functional connectivity (FC) of the NAcc [4] . Differences in the FC between the two groups were assessed with a two-sample T test (cluster level $p<0.05$, FWE corrected). We used a one-sample model to calculate correlations between FC of the NAcc and ADH (cluster level $p<0.05$,

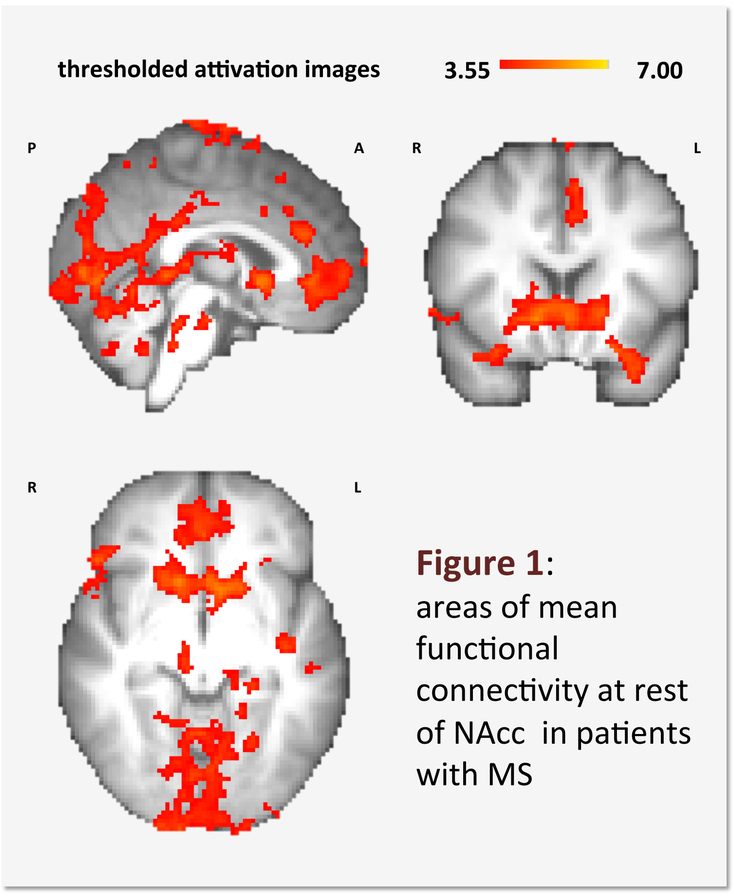


**Figure 1**: areas of mean functional connectivity at rest of NAcc in patients with MS

## *Results*

After the exclusion of the low quality images (artefacts in the fronto-basal regions), data from 18 patients and 10 HS were included. Functional connectivity at rest of NAcc included the orbito-frontal, fronto-mesial and fronto-parietal associative cortices, basal ganglia, and cerebellum bilaterally. We did not find significant differences between groups in FC of NAcc (figure1). We found a negative correlation between ADH and NAcc connectivity with the cerebellum bilaterally, right posterior precuneus, right lateral occipital cortex and left frontal pole in patient group (figure2).

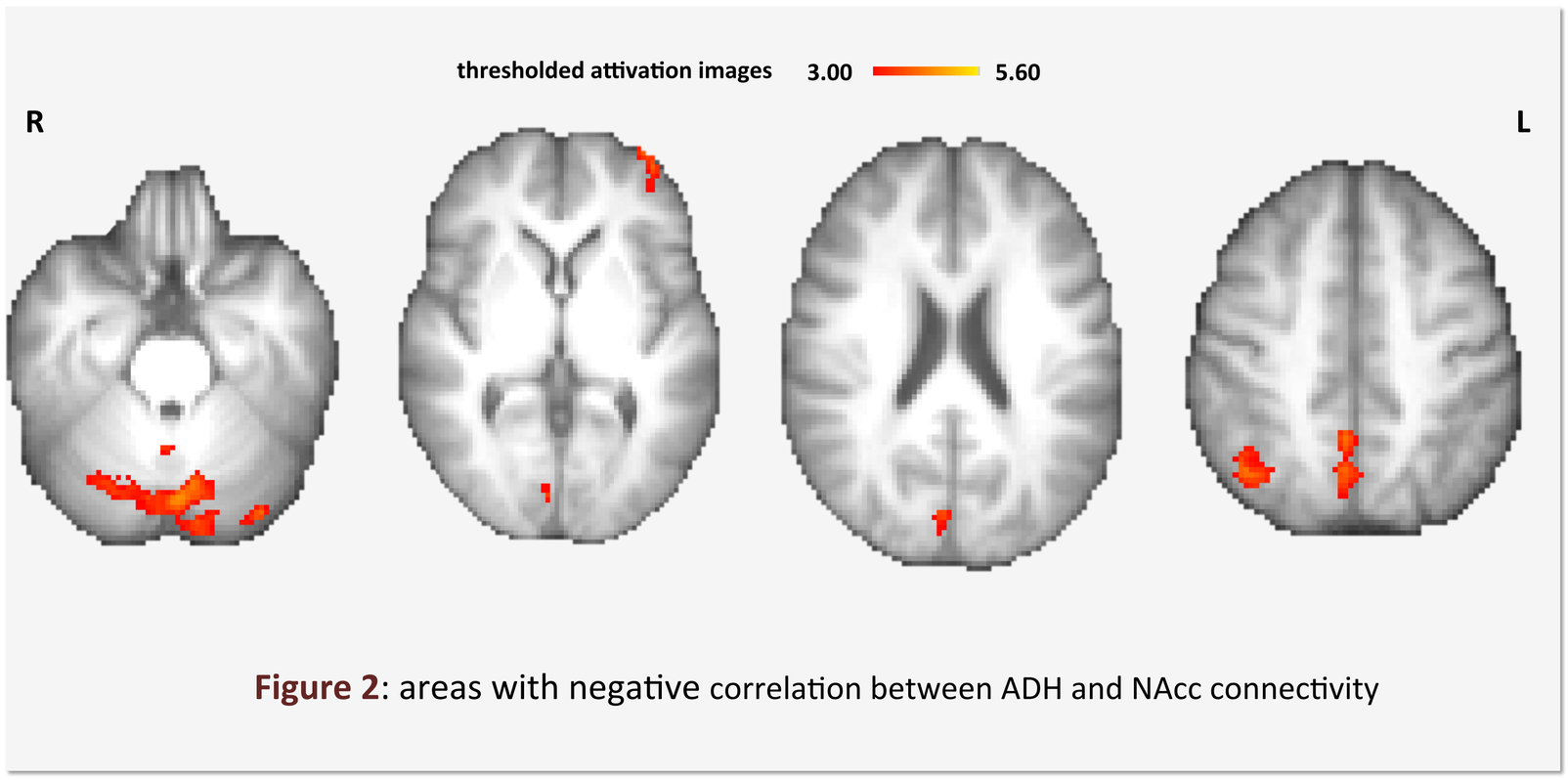


**Figure 2**: areas with negative correlation between ADH and NAcc connectivity

## *Conclusions*

Our findings suggest that high FC of NAcc with those areas may be deleterious in motivational processes related to exergaming. Further studies are required to confirm our observations.

### *Bibliography*

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### *Disclosures*

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