Improving function in Huntington's disease through neurofeedback: using real-time fMRI to enhance cortical plasticity in early stages of the disease

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Country

United Kingdom

Title of project or programme

Improving function in Huntington's disease through neurofeedback: using real-time fMRI to enhance cortical plasticity in early stages of the disease

Source of funding information

MRC

Total sum awarded (Euro)

€ 1,431,827

Start date of award

17/03/2014

Total duration of award in years

3.3

The project/programme is most relevant to:

Huntington's disease

Keywords
Research Abstract

Huntington's disease (HD) is a genetic, neurodegenerative condition that leads to extensive brain atrophy, starting from the striatum and gradually spreading throughout the brain. Clinically it is characterized by progressive motor impairment, e.g. chorea, cognitive decline and neuropsychiatric symptoms. There is currently no known cure for HD and treatments prescribed for symptom management have significant side-effects. This project will deliver "proof of concept" testing of a novel, non-invasive intervention: neurofeedback training using real-time functional MRI (rt-fMRI), which will induce neuroplasticity and could help patients better manage the disease symptoms. Patients will be scanned using fMRI and will be trained to regulate the activity of specific brain regions through receiving in-scanner real-time feedback about the activity of these regions. We hypothesise that training patients to regulate the activation of brain regions whose activity has been disrupted by the disease (e.g. premotor cortex and striatum), will lead to improvements in behaviour and slowed disease progression. Such rt-fMRI has already been used for the treatment of other clinical conditions (e.g. Parkinson's disease, chronic pain, depression) with positive results on behaviour and symptom management without any side-effects. The proposed study will be the first "proof of concept" for HD and will provide preliminary evidence on the feasibility and efficacy of the intervention in early stage HD. If the results are positive, then these data will support further development with a large scale, randomized controlled trial in both early stage and premanifest HD. HD is an excellent model of neurodegenerative diseases as there is a precise genetic test, which allows prospective study of disease progression particularly in the premanifest phase. Our results may therefore have broad applicability and be extrapolated to other more common neurodegenerative diseases such as Alzheimer's disease.

Lay Summary
Further information available at:

Types:
Investments > €500k

Member States:
United Kingdom

Diseases:
Huntington's disease

Years:
2016

Database Categories:
N/A

Database Tags:
N/A