

# ACA5: Action decisions in health and neurodegenerative disease

<https://neurodegenerationresearch.eu/survey/aca5-action-decisions-in-health-and-neurodegenerative-disease/>

## Principal Investigators

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## Institution

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### Country

United Kingdom

## Title of project or programme

ACA5: Action decisions in health and neurodegenerative disease

## Source of funding information

MRC

## Total sum awarded (Euro)

€ 1,731,942

## Start date of award

01/04/2011

## Total duration of award in years

5.0

## The project/programme is most relevant to:

Parkinson's disease & PD-related disorders

## Keywords

### Research Abstract

The functions of the prefrontal cortex and its subcortical connections are central to many aspects of human cognition and voluntary action. Consistent features of frontal lobe disorders are changes in goal-oriented behaviours, attention and decision making resulting in difficulty with selecting or inhibiting actions appropriately. Neurodegenerative disorders such as PD also have a significant impact on the cognitive functions of the frontal lobes, which is not well

alleviated by current therapies. We use behavioural and neuroimaging studies (fMRI), linked through computational models of decision making in the motor system, to examine the role of the prefrontal cortex. We focus on selecting actions, and selecting the rules which govern future actions. Previous work has shown similarities between the action selection and rule selection, while parallel research by the PI in the University is comparing the inhibition of rules with inhibition of actions. This link between action and rules is motivated in part by the coincidence of impulsive action selections and violations of contextual norms in patients with structural or degenerative disease of the frontal lobe. With the participation of patients with focal frontal brain lesions, we will examine the necessity for prefrontal cortex for the control of action. In particular, we will assess the effects of frontal lesions on the components of an integrated model of action selection and inhibition. In addition to separate studies of the neuroBiology of selection and inhibition, we will examine the interactions between them, in health and Parkinsons disease (PD). We use this approach to understand also the effects of PD and dopaminergic therapy. We collaborate internally with Prof John Duncan, Dr Michael Anderson and Dr AndYes Calder, and externally with the Cambridge PD research clinic, led by Dr Roger Barker, Professor Trevor Robbins (Cambridge University, Experimental psychology). This broader Cambridge PD research collaboration focuses on the cognitive disorder of PD, translating between in both directions between basic and clinical neuroscience. This program links directly to the Cambridge Centre for Ageing and Neuroscience (CamCAN: Action control and learning theme). Through the study of the effects of healthy ageing on the learning, selection and inhibition of action, the CamCAN provides a vital link between methodological and normative studies in this program and the context of ageing within with PD occurs. Through my Wellcome Trust Research Fellowship and the NIHR Biomedical Research Centre's Neurodegeneration and dementia theme within the Department of Clinical Neurosciences, I examine pharmacological interventions to optimise inhibition and goal-directed behaviours in PD and frontotemporal dementia. Through study design, analysis and training, there is crossover between these programs, and the prospect of direct translation from the ACA5 to clinical populations in the next 3-5 years.

### **Lay Summary**

**Further information available at:**

#### **Types:**

Investments > €500k

#### **Member States:**

United Kingdom

#### **Diseases:**

Parkinson's disease & PD-related disorders

#### **Years:**

2016

#### **Database Categories:**

N/A

#### **Database Tags:**

N/A