Novel MRI Techniques for Brain Banking and Motor Neuron Disease Research

https://neurodegenerationresearch.eu/survey/novel-mri-techniques-for-brain-banking-and-motor-neuron-disease-research/

Principal Investigators

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Country

United Kingdom

Title of project or programme

Novel MRI Techniques for Brain Banking and Motor Neuron Disease Research

Source of funding information

MRC

Total sum awarded (Euro)

€ 800,957

Start date of award

01/09/2013

Total duration of award in years

3.0

The project/programme is most relevant to:

Motor neurone diseases|Alzheimer's disease & other dementias

Keywords
Research Abstract

Magnetic resonance imaging (MRI) has enormous potential as a biomarker in neurodegenerative disease, in particular techniques that are sensitive to microstructure show great promise for phenotyping and monitoring disease progression. However, these measures currently lack specificity. We propose to combine post-mortem MRI with histopathology in the same tissue to aid in the interpretation of in-vivo MRI measures. We will focus on motor neuron

disease (MND), an area of expertise in Oxford for which MRI has considerable potential as a biomarker. MRI can provide various types of “contrast” (analogous to different tissue stains) with complementary information about anatomy and tissue composition. We will acquire images with a broad range of contrasts, with particular focus on diffusion MRI, a powerful method that presents particular challenges in post-mortem tissue. We will build on our recent advances in MRI software and cutting-edge hardware to improve signal strength by a factor of 5-6 and enable unprecedented spatial detail. We will also explore recent MRI techniques that aim to provide more biologically-meaningful information. We will conduct a proof-of-concept study in MND, which provides an ideal testbed for these methods as a relatively “clean” pathology in which pre- and post-mortem MRI scans are available. A range of MRI scans will be acquired in MND and control brains, the latter being a crucial resource for future expansion into other diseases and conditions. We will demonstrate the potential of MRI-to-histology comparisons in neurodegenerative disease. Specifically, we will investigate whether histological staining supports the use of MRI as an early marker of MND and the related condition frontotemporal dementia. Finally, we will develop a basic prototype database for on-line data exploration and distribution, linked in to the Oxford Brain Bank and freely accessible to the neuroscience community.

Lay Summary
Further information available at:

Types:
Investments > €500k

Member States:
United Kingdom

Diseases:
Alzheimer's disease & other dementias, Motor neurone diseases

Years:
2016

Database Categories:
N/A

Database Tags:
N/A