

Impairments of Neuro-muscular Communication in Motor-Neuron Disease: A Bio-Marker for Early and Personalised Diagnosis

<https://neurodegenerationresearch.eu/survey/impairments-of-neuro-muscular-communication-in-motor-neuron-disease-a-bio-marker-for-early-and-personalised-diagnosis/>

Principal Investigators

Bahman Nasserroleslami

Institution

Trinity College, Dublin

Contact information of lead PI

Country

Ireland

Title of project or programme

Impairments of Neuro-muscular Communication in Motor-Neuron Disease: A Bio-Marker for Early and Personalised Diagnosis

Source of funding information

Irish Research Council

Total sum awarded (Euro)

€ 91,790

Start date of award

10/01/2015

Total duration of award in years

2

Keywords

Research Abstract

Amyotrophic Lateral Sclerosis (ALS) or Motor Neuron Disease (MND) is a terminal neurodegenerative disease, leading to progressive loss of movement. The quality of care and the chance for finding treatment can be enhanced by early diagnosis at the level of individual

patients, in line with EU's Horizon 2020 research roadmap for "personalising health and care". Previous reports have explored the use of non-invasive diagnostic biomarkers based on imaging, electrical muscle (EMG) or brain (EEG) activity signals. However, the diagnostic utility of inexpensive recordings as biomarkers is limited as they are not strongly linked to the neurophysiological mechanisms affected in ALS. Therefore, the clinical diagnosis remains the main diagnosis criterion. In humans 2 neural systems co-activate to control movements. In ALS there is a degeneration of the motor system which distorts the patterns of neuromuscular communication in movements. The overall aim of this proposed study is to test the hypothesis that neuromuscular communication measures based on the activity of both brain (EEG) and muscle (EMG) (indicators of patho-physiological change) are better markers for ALS onset and subtypes than measures based on either EEG or EMG in isolation (indicators of structural change).

This hypothesis will be tested by: 1) finding combined EEG-EMG -based measures reflecting the specific activity of motor sub-systems, and 2) testing the utility of these measures to design biomarkers that differentiate healthy controls and ALS patient (sub-)groups better than conventional methods, for future longitudinal studies. These objectives will be achieved by selection of healthy volunteers and patient groups to perform experimental motor tasks; recording EEG and EMG; exploiting state-of-the-art and new signal processing techniques for identifying the network communication characteristics in the neuromotor system; interpreting the findings pertaining to each neural control sub-system; and finally designing and validating biomarkers based on maximum between-group differences.

Further information available at:

Types:

Investments < €500k

Member States:

Ireland

Diseases:

N/A

Years:

2016

Database Categories:

N/A

Database Tags:

N/A