

## **BRACCO FELLOWSHIPS - EDUCATION IN RESEARCH**

### **Project 17:**

#### **Cross sectional and longitudinal cervical spinal cord global / grey matter atrophy in multiple sclerosis, and its value in predicting disability worsening**

**NAME OF INSTITUTION:** Hospital Universitari Vall d'Hebrón, Section of Neuroradiology, Department of Radiology, Barcelona/SPAIN

#### **RESEARCH GROUP AND ITS MISSION:**

Neuroradiology Research Group. Vall d'Hebron Reserach Institute (VHIR)

Principal Investigator: Alex Rovira

The main characteristic of our group is its multidisciplinary nature, as it is comprised of neuroradiologists, technologists, and a physicist, an engineer, and a biochemist. The main objectives of our projects are to gain knowledge about the pathophysiologic mechanisms implicated in several diseases and to evaluate new biomarkers and therapies through the use of qualitative and quantitative magnetic resonance (MR) and computed tomography (CT) techniques. Our focus is on the study of diseases such as multiple sclerosis, epilepsy, neuro-oncology, and stroke. In addition, because of the experience we have acquired along the years in performing MR studies, we can act as a platform for designing MR-based projects, processing images, and conducting quantitative data analysis.

Our group has a strong scientific activity, with more than 300 articles published in peer review journals.

The group is one of the core members of MAGNIMS (MAGnetic resonance Imaging in Multiple Sclerosis) (<https://www.magnims.eu/>), which is a European network of academics that share a common interest in the research and study of MS using magnetic resonance imaging techniques. This group has collaborated since 1990 and made major contributions to define the role of MRI in diagnosis and monitoring treatments.

This group also participates in the MSPATH project (Multiple Sclerosis Partners Advancing Technology and Health Solutions), which has the main objective of collecting data across multiple MS centres in a standardized format. The aim is to form a technology-enabled network of MS centres through which researchers have access to patient data generated from a broad MS population. Ultimately, MS PATHS aims to better quantify the value of treatment and improve patient outcomes in MS.

Finally, we also participate in the SUMMIT network (Serially Unified Multicenter Multiple Sclerosis Investigation), whose aim is to build a cohort repository to capture the variability of disability accumulation, and to provide the depth of characterization (clinical, radiologic, genetic, biospecimens) required to adequately model and ultimately predict a patient's course. The Summit consortium is formed by two large North American academic MS Centers: Brigham and Women's Hospital and University of California, San Francisco, and four international MS Centers: Universitätsspital Basel (UHB), VU University Medical Center MS Center Amsterdam (MSCA), Multiple Sclerosis Center of Catalonia-Vall d'Hebron Hospital and American University of Beirut Medical Center.

**OBJECTIVES:**

- To correlate global/grey matter spinal cord atrophy with disability and disability worsening
- To establish the role of spinal cord areas to predict disability worsening compared to traditional brain measures
- To assess global/grey matter cervical cord atrophy changes over time (2-3 years)
- To assess the type and extension of cervical focal lesions on PSIR and their correlation with multiple sclerosis phenotypes

The applicant should have some knowledge on informatics and statistics (SPSS), but the local researches will teach him/her on the use of post-processing tools for assessing different MRI based measures.

**APPLICANT'S DUTIES:**

From MRI existing data the applicant will:

- Analyse global and grey matter volume within the proximal segment of the cervical cord using automated tools (Jim, Spinal cord toolbox)
- Assess global and regional brain volume: BPF, WMF, GMF (Siena, Sienax, SPM)
- Brain T2 lesion load measures (Lesion Segmentation Tool)
- Statistical analysis of the results (statistical support from our group)

**APPLICANT'S BENEFITS:**

- Participation on scientific outcomes of the project, including presentations to congresses and publications of papers

- Learn the use of automated tools for the assessment of brain and spinal cord volume/lesion for research purposes
- Integration within a consolidated research group in neuroradiology

Project Leader: Alex Rovira (neuroradiologist)

Members: Jaume Sastre-Garriga (neurologist), Deborah Pareto (physicist), Juli Alonso (Chemist), Cristina Auger (neuroradiologist), Elena Huerga (research technician), Manel Alberich (research technician)