

EADC Resident and Research Fellow Section (RRFS)

Exchange through internship programs

Name and location EADC hosting center:

Hospital Clinic Barcelona
Alzheimer's Disease and Other cognitive disorders unit
C Villaroel 170, 08036, Barcelona, Spain

Link to center's website:

<https://www.clinicbarcelona.org/en/idibaps/research-organization/clinical-and-experimental-neuroscience/alzheimers-disease-and-other-cognitive-disorders>

PI of the EADC hosting center: Mircea Balasa / Albert Lladó

Contact person of the EADC hosting center

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Description of the center

Alzheimer's Disease and other cognitive disorders unit - Hospital Clinic Barcelona provides care for patients with cognitive impairment in its catchment area in Barcelona (around 500.000 inhabitants) and carries out a tertiary referral activity focused on rare diseases associated with cognitive decline, for which it is a recognized referral center. As a result, it receives referrals from many patients and healthcare professionals outside its own catchment area. It realizes approximately 1,000 new clinical evaluations for cognitive impairment per year. The unit currently offers dedicated subspecialty clinics for rare neurodegenerative dementias, including genetic dementias, early-onset dementias, frontotemporal dementia, and prion diseases. Besides teaching, it also realizes translational research in neurodegenerative dementias.

Research lines

* **Autosomal dominant forms of neurodegenerative dementias and rare dementias**

Directed by Raquel Sánchez-Valle

Focuses on characterizing the earliest stages of autosomal dominant dementia, including autosomal dominant Alzheimer's disease, genetic frontotemporal dementia, and genetic prion disorders. Her work also addresses rare sporadic forms of dementia—such as frontotemporal lobar degeneration, primary progressive aphasia, and sporadic prion diseases—and explores innovative therapeutic strategies for these conditions.

* **Sporadic Alzheimer's disease**

Directed by Albert Lladó

Explores the epidemiology, biomarkers, therapies, and social factors in sporadic Alzheimer's disease. The main aims include understanding early-onset and atypical forms, validating diagnostic and prognostic biomarkers, and studying real-world outcomes of amyloid-targeting therapies and clinical trials.

*** Dementia with lewy bodies and concomitant pathologies in Alzheimer's disease**

Directed by Mircea Balasa

Focuses on validating fluid and imaging biomarkers for earlier and more accurate diagnosis of Dementia with Lewy Bodies (DLB) and Alzheimer's disease with concomitant pathologies, assessing biomarker-based predictions of disease progression, and identifying predictors of therapy response for personalised treatment strategies.

*** The role of microglia and neuroinflammation in neurodegeneration**

Directed by Anna Martinez-Muriana

Investigates how microglia and neuroinflammation drive neurodegeneration, with a particular focus on Alzheimer's disease. Using humanized models coupled with integrated functional genomics and multi-omics approaches, her team profiles human microglial states across health and disease to uncover causal pathways and identify actionable therapeutic targets.

*** Development and validation of cognitive assessment tools across the healthy aging–Alzheimer's disease continuum**

Directed by Lorena Rami

Aims to define the neuropsychological features of the main neurodegenerative dementias. Her team develops new questionnaires and cognitive tools to better evaluate early stages of Alzheimer's disease and other neurological disorders. In addition, they use MRI techniques to link cognitive performance with changes in brain structure and function.

*** Investigation of pathophysiological mechanisms in neurodegenerative dementias**

Directed by Raquel Sánchez-Valle and Anna Antonell

The research aims are to identify and validate key proteins involved in neurodegenerative diseases. Using omics and targeted approaches, their team examines gene expression, DNA methylation, and protein levels in biofluids and brain tissue to propose new therapeutic targets and biomarkers.

*** Role of the locus coeruleus and sleep disturbances in neurodegenerative dementias**

Directed by Neus Falgàs

Investigates how early degeneration of the locus coeruleus and associated noradrenergic dysfunction contribute to sleep disturbances, neuropsychiatric symptoms, and other clinical manifestations in neurodegenerative dementias, particularly Alzheimer's disease. We integrate neuroimaging, fluid biomarkers, and polysomnography to better understand neurophysiological changes, improve early diagnosis, and identify novel therapeutic targets.

Internship program

Clinicians (up to 4 weeks):

- **Clinical training**, conducted in our center's specialized outpatient cognitive impairment clinics, as well as in the Day Hospital for Neurodegenerative Diseases. The trainee will gain in-depth knowledge of the clinical assessment of patients with cognitive impairment, the symptomatology and clinical features of the different phenotypes of neurodegenerative dementias (Alzheimer's disease, frontotemporal dementia, dementia with Lewy bodies, and prion diseases), and the most commonly used diagnostic neuropsychological assessment scales.
- **Training in diagnostic techniques**, providing a solid understanding of the main diagnostic tools used in neurodegenerative dementias, including cerebrospinal fluid (CSF) and blood biomarkers, neuroimaging biomarkers (structural imaging and PET), and genetic testing.

- **Training in pharmacological and non-pharmacological approaches** for the management of Alzheimer's disease and other neurodegenerative dementias.
- **Weekly educational sessions**, including clinical case discussions (1 hour) and scientific lectures (1 hour).

Researchers (2-4 weeks):

Customized participation (prior to attending the site) in research projects and data analysis on the specific topic that is of interest for the visiting fellow.