2. PROTOCOL SYNOPSIS

Project title	Joint brain imaging and clinical markers of prodromal Alzheimer's disease
Background	Alzheimer's disease (AD) is currently the leading cause of dementia. Individuals clinically characterized by Mild Cognitive Impairment(s) (MCI) are especially at risk to develop AD within the following years. However, as not all of them will develop AD, reliable biomarkers of prodromal AD need to be identified, in order to distinguish between individuals with stable MCI, and those who will eventually convert to AD. In this quest, the recent development of multivariate pattern analysis (MVPA) methods applied to brain imaging bring new perspectives. They offer the possibility of making predictions about the clinical outcome of a single individual, a feature that has high clinical value. We have developed a task for brain imaging that is sensitive to the deficits encountered in MCI. We now seek to extend our current database to perform MVPA on longitudinal data. This will enable us to identify discriminative features between stable and converter MCI individuals, using non-invasive magnetic resonance imaging (MRI) and clinical data.
Primary Objective	To predict the future clinical status of MCI individuals, using joint information from structural/functional MRI and neuropsychological follow-up data.
Inclusion/exclusion criteria	General inclusion criteria: age>60 years Inclusion criteria for patients: 1. Diagnosis of MCI 2. Free will to participate General exclusion criteria: 1. Criteria for dementia 2. Psychiatric disorder / drug addiction/ Treatment with antiepileptic/antipsychotic drug 3. Major illness impacting the CNS 4. Others: general anesthesia within the last three months, chronic pain 5. Contra-indication for Magnetic Resonance Imaging
Study design	Follow-up study including: 1. a neurological/neuropsychological testing and MRI session at inclusion 2. a neurological/neuropsychological testing every year
Sample size calculation	At least 140 participants: 70 controls, 70 MCI patients (108 participants currently enrolled)
Endpoints	We will combine multiple measures obtained by MRI (functional and structural) and clinical assessment (neuropsychological tests) into a composite feature. We will use MVPA in 3 groups of participants (healthy controls, stable and converter MCIs) at inclusion, + 3 years and + 5 years.
Statistical Analysis	MVPA on cross-sectional and follow-up data
Time Schedule/Study duration	2 additional years