

## **Brainstorm Scientific Abstract:**

Alzheimer's disease (AD) is the leading cause of dementia, affecting in excess of 43.8 million people. The changes of AD in the brain occur gradually over 20-30 years before the onset of symptoms and therapies for AD are increasingly aimed at the preclinical stages of the disease, before significant neurodegeneration has occurred. Yet current methods to identify individuals with presymptomatic AD are expensive, invasive and not scalable at a population level. Accordingly, there is an urgent need for low cost, minimally invasive and widely available screening and diagnostic tests. Retinal imaging offers the ideal solution. The retina is a part of the central nervous system and it manifests many of the changes that occur in the brain in AD. The retina can be imaged non-invasively at high resolution and numerous studies have highlighted the potential of different retinal imaging biomarkers of AD. Though promising, these retinal imaging methods have not yet been clinically validated and analysed concomitantly for the detection of preclinical AD.

The BRAINSTORM consortium is the first of its kind to unite leading clinicians and scientists with diverse expertise to evaluate multimodal retinal imaging biomarkers of AD. The project leverages established cohorts of deeply phenotyped individuals at risk of AD and draws on unique expertise in retinal imaging, artificial intelligence, neuropathology and preclinical disease modelling. A unique scientific asset is the opportunity to correlate imaging findings with post-mortem human tissue samples. BRAINSTORM is directly aligned with the JPND focus on the development of novel imaging technologies and improvement of existing cutting-edge technologies. It addresses national dementia research priorities of all partner countries in the consortium. This program seeks to transform the management of AD through improved detection of the disease in the preclinical stages in a non-invasive, rapid and cost-effective manner.