FIGARO

Finding Alzheimer's disease progression markers

The rate of cognitive decline (e.g. of memory and thinking) experienced by people with Alzheimer's disease varies from one person to the next. The precise mechanisms (or underlying reasons) for such differences are not well understood, but until recently, these mechanisms were difficult to measure. Using the latest techniques, we recently discovered five biological subtypes of Alzheimer's disease based on large-scale protein measurements in cerebrospinal fluid (a clear, colourless fluid found within the brain and spinal cord). These subtypes were associated with different rates of cognitive decline. This means that treatments will probably need to be tailored to each subtype.

In this collaborative project, we will test our working hypothesis that each AD subtype differs with regard to the specific biological processes that affect cognitive decline. We will combine data from two large-scale studies in which 700 people already provided samples of their cerebrospinal fluid at several timepoints. We will use the latest techniques to measure more than 2000 proteins in 2100 of these cerebrospinal fluid samples from 700 participants. We will then test whether the levels of specific proteins change over time as cognitive function declines. We will also test if there are specific genetic drivers for these protein levels. Furthermore, we will investigate whether specific lifestyle factors can explain changes over time, which would provide insight into potential prevention strategies. We will develop new markers that can be used in clinical trials and eventually in the healthcare setting. Finally, we will develop a strategy for the ethical stratification of people in the very early stages of Alzheimer's disease (i.e. before the onset of dementia), which will include how best to communicate results of these new markers to patients.

This project will provide the first necessary step towards precision/tailored medicine and develop tools that can be used in everyday practice

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