sFIDA – A Novel Platform Technology for Early Diagnosis of Alzheimer’s Disease

Innovation
Currently, clinical diagnosis of Alzheimer’s disease (AD) is largely based on the assessment of symptoms through psychological and cognitive tests. However, this approach offers only limited accuracy and reliability. It also does not allow for early diagnosis in the presymptomatic stage. At the Institute of Complex Systems: Structural Biochemistry (ICS-6), the biomarker-based laboratory test sFIDA (surface-based fluorescence intensity distribution analysis) has been developed to diagnose the disease earlier and more reliably. In samples of body fluids, sFIDA can detect and quantify Aβ oligomers. These small protein aggregates are highly neurotoxic and believed to be key players in Alzheimer’s pathology. Using sFIDA measurements, it is possible to differentiate between AD patient and control samples. The assay is amenable to high-throughput screening for routine diagnostics and biomarker-based therapy monitoring.

Technology
The highly specific and sensitive sFIDA assay uses a combination of aggregate-binding antibodies and fluorescence microscopy imaging. Body fluid samples, e. g. cerebrospinal fluid (CSF) or blood plasma, are applied to a glass surface coated with anti-Aβ antibodies. Aβ is immobilized on the surface and detection antibodies carrying two different fluorescent dyes are applied. Aβ oligomers bind many of these fluorescent antibodies and can subsequently be detected by fluorescence microscopy imaging.

Potential use
Clinical diagnostics
Biomarker for clinical trials

IP
Developmental Status and Next Steps

First proof-of-principle studies based on sFIDA measurements have demonstrated that cerebrospinal fluid samples of AD patients can be clearly distinguished from healthy controls. The sFIDA readout also reflects the severity of cognitive deficits of patients.

sFIDA is currently in the process of optimization and validation for potential clinical use. Furthermore, the assay has recently been adapted for diagnostics of Parkinson’s Disease.

Forschungszentrum Jülich is seeking partners in the context of clinical research on neurodegenerative diseases. Additionally a potential cooperation with producers of antibodies is desirable.

Keywords
Alzheimer’s Disease, Parkinson’s Disease, Diagnostics, Biomarker

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