Evaluation of a novel tool to diagnose and treat Alzheimer’s disease

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Evaluation of a novel tool to diagnose and treat Alzheimer’s disease
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More than 5 million Americans are currently suffering from Alzheimer’s disease, an incurable form of dementia characterized by cell brain death. Symptoms are memory loss, behavior changes as well as speech impediment which interfere with daily life. To this date, no efficient diagnostic or therapeutic tools have been successfully developed. Indeed, accurate detection is still challenging with up to 20% misdiagnoses of Alzheimer’s cases. Additionally, the lack of efficient treatment causes one of the highest cost of patient care in the United States ($259 billion for dementia care in 2017). This information highlights the urgent need to develop diagnostic and therapeutic tools. Abnormal protein aggregation accumulating into large amyloid plaques and tangles in the brain is the main suspect causing neuronal cell death. It was shown that protein aggregation occurs decades before the onset of clinical symptoms and that early aggregates displayed toxicity by disrupting the integrity of cell membrane which ultimately causes cell death. The key role of amyloid aggregates in Alzheimer’s disease makes them ideal candidates for early disease detection and therapeutic intervention. This research focuses on evaluating a single compound for the detection and alteration of amyloid aggregates into non-toxic species; more specifically how a fluorescence molecule that glows once bound to protein can be used to detect early aggregates and can modify the molecular structure of toxic aggregates through oxidation. This molecule, assuring both diagnosis and early treatment of neurodegenerative disorders, would be an invaluable tool for the medical field.