Experimental Detection System for Senile Dementia- A Novel, Systematic Approach Using Metabolomics, Bioinformatics, and Circuitry to Develop a Biosensor Through Metabolomic Electrical Resistance Analysis for Detection of Early Onset Alzheimer's

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Due to technological advancements in artificial intelligence, computers can charter the path/course for a multitude of proteins/enzymes and their metabolites in order to diagnose and/or cure complex diseases. Digital models and simulations can determine bio-molecular patterns during normal and diseased conditions. Alzheimer's disease (AD), a neurodegenerative condition, is the most common form of dementia among older patients. Almost 1 in 10 adults over the age of 65 have AD. Worldwide, around 30 million people have AD and 5.8 million American are living with this disease, where by 2050, it is projected to reach almost 14 million. In 2019, AD/other dementia costed the U.S. around $250 billion and by 2050, it is expected to reach $1.1 trillion. The ultimate goal of this project is to develop a metabolomics-based biochip to detect an early onset of AD. The theorization is that a metabolomics-based biochip having a set of biosensor microarrays arranged on a solid substrate will permit integrated tests based on validated metabolic patterns to detect early onset of AD. Using bioinformatics-based AD-associated protein folding, sequence alignment, functional commonality predictions, and metabolomics-based data mining, the project extracted pattern in human blood and cerebrospinal fluid of AD patients and differentiated from mild cognitively impaired (MCI) and cognitively normal subjects. Using the differentiated metabolite, an electrical micro-resistance-based prototype solid-phase biochip system developed & used to detect signals from differential metabolite between normal, MCI, and AD patients.

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