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ENHANCED DNA CONSTRUCTS FOR THE EARLY DIAGNOSIS OF ALZHEIMER'S IN BLOOD OR DIABETES IN SALIVA USING PHOTONICITY

BIOGRAPHY

R Cuero did his PhD in Microbiology from University of Strathclyde, UK and MSc in Plant Pathology from Ohio State University, USA and BSc from Heidelberg University, USA and Biology Degree from Universidad del Valle, Colombia. He is a former Distinguished Professor and Research Scientist of Texas A&M University system on the Campus of Prairie View, Texas. Currently, he is Chief Scientific Advisor of BioCapital Holdings LLC., USA and he is Founder/Scientist/Mentor of the International Park of Creativity, which main aim is invention/discovery. He is former Research Associate for USDA. He has many scientific inventions, patents and publications in different scientific and technological fields including biotechnology, microbiology, molecular biology, synthetic and integrated biology, environmental and energy biotechnology, microbiology and astrobiology. His most recent inventions are production of light without electrical cord or battery and also development of DNA sensor for early detection of Alzheimer's in blood as well as DNA sensor for early detection of diabetes in saliva. He has received numerous scientific recognitions such as the Hispanic Scientist of the year 2013, USA and he has received several honorary doctor degrees. He has received the NASA Brief Technology award for his inventions to NASA.

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Unpredictability is the major limitation to the diagnosis and/or cure of degenerative diseases such as Alzheimer's and diabetes. In most of the cases these diseases are only detected after the onset of the disease has occurred. The combination of very sensitive methods with high expression of inherent molecules will offset these limitations. Molecules such as DNA, proteins, and other compounds can be ideal markers for detecting diseases such as Alzheimer's and diabetes by non-invasive techniques because of the inherent biophotonic characteristics. Therefore, researchers have developed two different DNA sensors using synthetic biology to detect Alzheimer's and diabetes prior to the onset of these diseases. The DNA sensor was constructed in bacteria or yeast using natural and/or synthetic sequences. The efficacy of the DNA sensor was tested based on fluorescence intensity when mixed with human blood plasma using a fluorescence detector at different wavelengths. The level of fluorescence intensity determines the degree of the disease; thus, they were able to enhance the photon expression of the detection by conjugation using a natural dye at a wavelength similar to the amyloid protein. The intensity of the fluorescence was correlated to clinical parameters, tomographic images and glycaemia results from patient blood samples. The expression of amyloid protein was confirmed using standard techniques including biochemical assays such as ELISA and Western Blot. The results of these correlations allowed us to establish three different groups of patients. In the case of Alzheimer's, patients were divided into the following groups: Alzheimer's diagnosed, pre-Alzheimer's and normal groups. For diabetes, patients were divided into the following groups: diabetic, pre-diabetic and normal groups. Results were analyzed through statistical methods as well as using neuronal network computational modeling. This investigation provides a much needed non-invasive diagnostic approach for developing proper therapy and treatment for these diseases.