

DNA sensors for predicting diabetes: A synthetic biology approach

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Sensors are useful sensitive tools that can detect wide range of biological molecules including proteins, peptides, carbohydrates, and other important molecules which can function as markers. There are many different sensors, physical, chemical, and/or biological such as DNA sensor. DNA sensors can be used for predicting, diagnosis and prevention of diseases such as diabetes. This is a degenerative disease, which is caused by abnormal levels of glucose on the cell, and it is not easily predictable and/or measurable by conventional techniques and/or approaches. Most existing methods to diagnose diabetes are able to only detect glucose or insulin outside the levels of predictability of the disease. Therefore, we have developed two effective sensitive DNA sensors, for detecting glucose or for insulin in blood, instantly (US patent pending, 2011). (<1 minute), and capable of detecting levels of glucose (< 20 mg/dL) and up to 500 mg/dL, and insulin (0-250 uIU/ml). Thus, these DNA sensors are more sensitive than those conventional methods existing in the market. Therefore, they can detect any physiological abnormality related to glucose or insulin in patients much earlier than conventional methods, consequently, reducing the potential diabetic population. The DNA sensors were constructed using a synthetic biology approach. Our genetic building blocks, including glucose promoters, proteins, glucose transporter, insulin promoter, and other specific genetic parts, along with sequences of different reporter proteins, and ribosomal binding sites, were constructed within two different yeast (*Saccharomyces cerevisiae*) biobricks, thus obtaining a two yeast sensor devices. The DNA sensors were tested in vitro and in vivo in blood samples from patients. The results were comparable with commercially available methods such as gold standard or clinical methods currently.

Biography

Raul Cuero, Ph.D. in Microbiology from Strathclyde University, UK, M.Sc. in Plant Pathology from Ohio State University, USA, and a B.Sc. from Heidelberg University, USA. 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 founder, scientist and Director of the International Parks of creativity, which aims in invention/discovery (www.parkofcreativity.org). He is a former research associate for the USDA. He has many scientific inventions and publications. He has received numerous scientific recognitions, and he has received several Honorary doctor degrees. He has received the NASA Brief Technology Award for his inventions to NASA. He has written a book on creativity.

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