Alpha synuclein oligomers detection through aptamers by using a bacterial two hybrid system using Nanoluciferase as a reporter gene

Neurodegenerative diseases diagnosis needs to be early, sensitive and specific. They can be tricky, notably because of the insufficient amount of biomarker or the technique's invasiveness.

The purpose of this work is to investigate a new tear-based diagnosis method for a wide range of biomarkers.This project registers in the international iGEM student competition context. As a proof of concept, the detection of alpha synuclein oligomers - a relevant biomarker of synucleinopathies such as Parkinson’s disease - was chosen.

Genetically modified E.Coli strain constitute the biosensor. Aptamers allow a high specific and sensitive biomarker recognition. A Bacterial Two-Hybrid system is triggered with the use of the Promega NanoLuciferase as a reporter gene. The signal is thus strongly amplified and false positives avoided. In addition, the system is flexible enough to enable changes at convenience.

The detection process could be easily adapted to the detection of other pathologies in tears: allergies, vitamin deficiencies… The accomplishment of all those goals would likely lead to a major breakthrough in the field of diseases diagnosis.

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