

# *Development of an ELISA to accurately measure the solubility of the amyloid beta 42 molecule*

## **Popular Science Summary**

In this project, an analytical method was developed that can be used in research to gain more understanding into proteins that are linked to Alzheimer's disease.

The cause of Alzheimer's disease is not entirely known, but it has been proposed that a group of proteins called amyloid beta (A $\beta$ ) proteins are to blame. They are naturally found in the brain. These proteins are able to stick together and form clumps. This ability has been linked to the neurodegenerative effects of the disease. To understand more about the disease, it is important to understand how and why these A $\beta$  proteins stick together. To do that, there must be analytical methods that can be used to analyse these proteins.

ELISA stands for enzyme-linked immunosorbent assay, and is a common analytical method. It is used for detecting the presence and determining the concentration of different compounds. An ELISA is specific for one compound. In this project, the goal was to develop an ELISA that could be used to specifically analyse one type of A $\beta$  protein, called A $\beta$ -42. The method is made up of several steps and requires different types of materials, which need to be decided on. For this project, the design of the ELISA was based on a previously described ELISA, with a few changes. After deciding on the design, the first step was to test if it was suitable and how well it worked with A $\beta$ -42. Once the ELISA was determined to work well for A $\beta$ -42, the method was used for other experiments. One experiment was to see how well it worked for A $\beta$ -42 in the environment of cerebrospinal fluid, where it can be naturally found in the body. Previously in the development stage, it was in a buffer environment. The experiment showed that the ELISA did not work as well in cerebrospinal fluid. Future experiments could be done to investigate why. A second experiment was also done. The second experiment was a recreation of an experiment done with the original ELISA that this project was based on. The experiment was regarding the solubility of the A $\beta$ -42 protein. A successful recreation of the experiment was done, but the results were a bit different.

Three main conclusions from the results of the project was that, firstly, the method worked as intended for A $\beta$ -42. Secondly, that cerebrospinal fluid interferes with the method. Lastly, that it can be used to study characteristics such as solubility of the protein.