New molecule could slow Parkinson's

February 26 2015, by Vicky Just

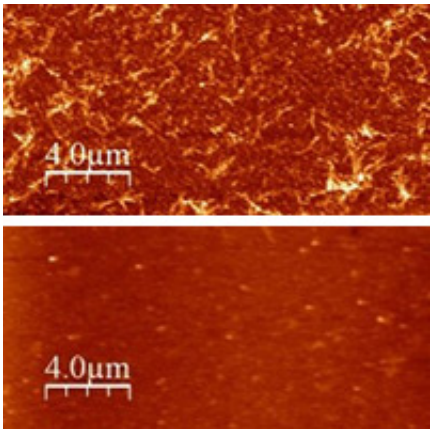

Image on the top show toxic amyloid fibrils formed by the a-synuclein protein. Below the same protein mixed with our newly derived peptide. The peptide binds to the sticky parts within the protein and almost completely prevents the fibril from forming.

Researchers have designed a molecule that, if developed into a drug, could slow the progression of Parkinson's Disease.

In Parkinson's, a protein called α-synuclein changes shape and stacks with other misshapen proteins. The new molecule binds to the sticky part of α-synuclein, stopping it from clumping and killing brain cells.

Dr Jody Mason, from our Department of Biology & Biochemistry, explained: "If you think of the misshapen α-synuclein proteins as Lego bricks which stack to form a tower; our peptide acts like a smooth brick

that sticks to the α-synuclein and stops the tower from growing any bigger.

"This research is in the early stages, but the results so far are very encouraging. We still need to overcome many obstacles before this can be developed into a drug treatment, but these findings could herald a new approach to treating Parkinson's."

An incurable disease

Parkinson's affects around 1 in 500 people in the UK. It's a progressive neurological condition where brain cells die causing a lack of the chemical dopamine, which acts as a messenger that coordinates movement. Parkinson's causes symptoms of tremor, rigidity and slowness of movement.

The research team led by Bath designed the 10 amino-acid peptide molecule by screening a library of peptides based on the region of α-synuclein that is mutated in patients with early onset Parkinson's. This is the first time that this part of the α-synuclein protein has been explored as a potential drug target.

The study, published in the *Journal of Biological Chemistry*, showed that the molecule stopped α-synuclein clumping in living cells in the lab. The team anticipates that if developed into a treatment, the peptide could help slow the progression of this degenerative disease.

The researchers next hope to test the peptide in mammalian neurone cells and then develop it into a drug that is effective in humans.

Co-author Dr Neil Kad, from the University of Kent, added: "This Parkinson's UK funded work shows how investment in basic science can open up new ways of studying and ultimately treating neurodegenerative

disease."

Dr Arthur Roach, Director of Research and Development at Parkinson's UK, which funded the study, said: "It's a difficult task to develop treatments that can stop the toxic build-up of proteins in the brains of people with Parkinson's. Supporting this kind of innovative research approach is starting to make imaginable today what seemed impossible a decade ago.

"We need more successes like this one, if we are to develop drugs that could actually slow or stop the progression of Parkinson's. At the moment no drugs are capable of doing this."

More information: "Intracellular screening of a peptide library to derive a potent peptide inhibitor of α-synuclein aggregation." *J. Biol. Chem*. jbc.M114.620484. First Published on January 23, 2015, DOI: 10.1074/jbc.M114.620484

Provided by University of Bath