

# Antibody key to treating variant CJD, scientists find

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Scientists at the University of Liverpool have determined the atomic structure of the 'binding' between a brain protein and an antibody that could be key to treating patients with diseases such as variant CJD.

Variant Creutzfeldt-Jakob Disease (vCJD) is part of a family of rare progressive neurodegenerative disorders, called prion diseases, which affect both animals and humans. It is thought that those who have developed vCJD became infected through the consumption of cattle products contaminated with Bovine Spongiform Encephalopathy (BSE) - a brain disorder in cows, commonly known as Mad Cow Disease.

Prion diseases can develop when a naturally occurring brain prion protein called, PrP, comes into contact with infectious prions. This converts PrP into a form that has a different shape, and eventually leads to a build-up of protein in the brain, causing brain cells to die. It is thought that immunisation with antibodies that can 'stick' to PrP could treat and even prevent the development of the disease.

To understand the 'connection' between the antibody and the protein, scientists at Liverpool used X-ray crystallography technology to build a three-dimensional picture of the binding between an antibody called ICSM18 - designed to 'stick' effectively to prion proteins - and PrP cells.

Samar Hasnain, Professor of Molecular Biophysics at the University, explains: "To pin-point where the antibody 'sticks' to the protein we used X-ray crystallography, pioneered by Nobel Prize winner Max Perutz.

Significantly we found that the point at which the protein and antibody came together was also where scientists at the Medical Research Council (MRC) Prion Unit had identified a single amino acid, which we now know has a significant impact on a patient's susceptibility to prion disease."

Scientists at the MRC Prion Unit, University College London, who collaborated on the research, have found that ICSM18 could help prevent brain cells from becoming infected as well as reverse early damage caused by the disease.

Professor John Collinge, Director of the MRC Prion Unit, added: "We have shown that ICSM18 has the highest therapeutic potential in animal and cell based studies, but we have yet to establish its impact on people who have vCJD or other prion diseases. We are currently working, however, to make human versions of the antibodies for future trials in people."

## **Variant Creutzfeldt-Jakob Disease (vCJD)**

- Variant CJD was first reported in 1996 and more than 200 patients from 11 countries have now been diagnosed with the disease.
- The incubation period for vCJD is unknown because it is a new disease, but it is likely that a person who has consumed a BSE-contaminated product will develop the disease a decade or more later.
- The median age at death of patients with vCJD in the UK is 28 years.

Source: University of Liverpool

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