Diabetes may be spread through toxic meat and blood transfusions

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Diabetes may be spread through meat or blood transfusions by means of misshapen protein "seeds" like those that carry BSE from cattle to humans, a scientist has suggested.

Experiments in genetically modified mice show that injecting them with the toxic clusters led to their developing all the symptoms of type 2 diabetes within weeks.

While experts said it was far from clear that the same mechanisms would work in humans and there is as yet no good evidence that the disease is contagious, the senior author of the study said that the findings "could open an entirely new area of research with profound implications for public health".

Claudio Soto, director of the University of Texas's Centre for Alzheimer's Disease and Other Brain-Related Illnesses, said his team was investigating the possibility that type 2 diabetes could be acquired by ingesting the "rogue" proteins in animal products, much as patients caught variant Creutzfeldt-Jakob (CJD) disease after eating BSE-infected beef.

"I don't want to scare anyone, but I can see this happening in diabetes more easily than it happens in brain diseases, because in brain diseases the spread is limited by the blood-brain barrier," Professor Soto told *The Times*. "If one disease has the potential to be transmitted in this manner, it is diabetes."

However, other researchers said the work was still at a very early stage. "This conclusion needs to be treated with a great deal of caution," said David Allsop, professor of neuroscience at Lancaster University. "This type of mechanism could explain the spread of pathology to areas of adjacent tissue, but it is a big jump to suggest that diabetes is an infectious disease."

The roots of type 2 diabetes, which affects more than 3 million people in the UK, are not fully understood. The condition is strongly linked to obesity and insulin resistance — where the body becomes progressively less sensitive to a hormone that is supposed to curb blood sugar levels — but is also associated with the loss of insulin-producing beta cells in the pancreas.

Since the 1970s scientists have noticed that more than 90 per cent of type 2 diabetics have deposits of a misfolded protein called islet amyloid polypeptide (IAPP). Studies in large mammals that get diabetes-like diseases have also shown that IAPP begins to accumulate in the pancreas before the first symptoms become apparent.

Professor Soto and his colleagues believe the malfunctioning IAPP can bend other proteins out of shape, much like the prion proteins that cause BSE and CJD, or the amyloid-beta proteins that play a big role in Alzheimer's disease. This chain reaction would then spread through the pancreas. The scientists found that injecting these warped proteins into the abdominal cavities of two-month-old mice genetically engineered to make the human form of IAPP gave them full-blown diabetes within three months. Similar chemical signatures were seen when the proteins were added to healthy human pancreatic tissue in a dish, according to a paper published in the *Journal of Experimental Medicine*.

Professor Soto said that the IAPP in cattle and other large animals was structurally very similar to that in humans, suggesting that the rogue proteins might be able to spread between the species, although he stressed that this was speculation.

Ines Cebola, a diabetes researcher at Imperial College London, said the study was an "intriguing observation" but its consequences needed to be considered very carefully. "We are still far from making the point that it can be transmitted similarly to CJD," she said.