

# A protein that protects against Alzheimer's?

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Research on the mechanisms involved in neurodegenerative diseases such as Alzheimer's, stroke, dementia, Parkinson's and multiple sclerosis, to name a few, has taken a step forward thanks to the work of biological sciences Ph.D. student Sonia Do Carmo, supervised by Professor Éric Rassart of the Université du Québec à Montreal (UQAM) Biological Sciences Department, in collaboration with researchers at the Armand-Frappier Institute and the University of Valladolid in Spain.

Do Carmo and her collaborators have successfully demonstrated the protective and reparative role of apolipoprotein D, or ApoD, in neurodegenerative diseases. Their discovery suggests interesting avenues for preventing and slowing the progression of this type of illness.

These studies were inspired by work done ten years ago by Professor Rassart's team, who then discovered increased levels of ApoD in the brains of people with several types of neurodegenerative disorders, including Alzheimer's. The team hypothesized that this protein might play a protective and restorative role but were unable to demonstrate this at the time.

## The experiments

To establish the protective and reparative role of ApoD, the researchers used two types of genetically modified mice: one type with increased levels of ApoD in the brain and a second type with no ApoD. The mice were then exposed to neurodegenerative agents. A group of the modified mice and a control group (unmodified) were exposed to paraquat, a

widely used herbicide that has been shown to increase the risk of Parkinson's. Then the same type of experiment was performed by injecting two groups with a virus that causes encephalitis. In both cases, the mice modified for increased levels of ApoD had the best outcomes, with a better ability to combat the diseases and a higher survival rate than the unmodified mice. The knockout mice with no ApoD displayed the poorest outcomes. These experiments serve to illustrate the protective and reparative role of this protein.

## **When can we expect medication?**

A number of steps remain before this research can translate into effective drugs against neurodegenerative conditions. The original investigator, Professor Éric Rassart, explains, "You cannot simply inject ApoD, as it has to enter the brain in order for it to be active. We have successfully demonstrated the role of ApoD, but now we need to understand the action of this protein. Only then will we be able to think about creating a drug to prevent these types of diseases and to slow their progression. All the same, this discovery by Sonia Do Carmo and her collaborators is a significant breakthrough, as we know very little about the mechanisms of neurodegenerative diseases."

The discovery has aroused considerable interest among the molecular biology community. Two major scientific journals have already published the research findings: *Aging Cell* (Vol. 7: 506-515, 2008) and *Journal of Neuroscience* (Vol. 28: 10330-10338, 2008).

Source: Université du Québec à Montréal

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