

Treatment approach used in cancer holds promise for Alzheimer's disease

October 21 2016



Prof. David Allsop. Credit: Lancaster University

Researchers have developed a novel treatment that could block the development of Alzheimer's disease using microscopic droplets of fat to carry drugs into the brain. This treatment approach, which is used to

target drugs to cancer cells, has been successfully applied to Alzheimer's disease for the first time, restoring memory loss in mice.

The study, which was led by researchers at Lancaster University and funded by Alzheimer's Society, is published in the journal *Nanomedicine: Nanotechnology, Biology and Medicine*.

The treatment uses tiny droplets of fat, called nanoliposomes, which are coated in protein fragments that are able to stop [amyloid protein](#) accumulating into plaques, even at low concentrations. Amyloid plaques are the toxic clumps of protein that cause damage to cells in the brains of people with Alzheimer's disease.

Mice that were genetically altered to develop Alzheimer's disease were injected with the nanoliposomes for three weeks. Those which received the drug recovered their long-term memory and could recognise familiar objects after a 24-hour period. In comparison, mice which received a placebo injection had no memory of objects seen the day before.

Lead researcher, Professor David Allsop, commented: "Following results this summer, there is renewed optimism for antibody drugs – treatments that harness the body's immune system to target amyloid plaques. However if these prove successful, treatments will have to be administered in a clinic by an IV drip and could have some potentially harmful side effects.

"Using nanoliposomes offers an alternative way to inhibit the toxic build-up of [amyloid plaques](#) without activating an immune response in the brain. Our hope is that this could one day be administered by something as simple and non-invasive as a [nasal spray](#), which patients could use in the comfort of their own home."

Nanoliposomes are already used to better target toxic chemotherapy

drugs to [cancer cells](#). Recent studies have also shown that the fat droplets can pass directly into the brain through the nose, opening up the possibility of using a nasal spray to administer treatments for brain diseases, such as Alzheimer's.

Commenting on the need for innovative approaches to dementia treatments, Dr Doug Brown, Director of Research and Development at Alzheimer's Society, said: "With no new dementia drugs in nearly 15 years, we're at a critical time for dementia research. It's absolutely vital we continue to sniff-out new approaches to getting drugs into the brain. While we wait in anticipation for the results of ongoing clinical trials, Alzheimer's Society will continue to fund innovative research to tackle dementia head-on."

"Nanotechnology is promising great benefits to people with many different types of cancer, and it's exciting that it could one day offer the same hope to people with the most common form of dementia."

There are 850,000 people in the UK living with dementia, and currently available drugs are only able to treat the symptoms of dementia, rather than slowing its progression. The research team at Lancaster University are now seeking investment from industry to take their novel treatment forward to be tested in people.

More information: Maria Gregori et al. Retro-inverso peptide inhibitor nanoparticles as potent inhibitors of aggregation of the Alzheimer's A β peptide, *Nanomedicine: Nanotechnology, Biology and Medicine* (2016). [DOI: 10.1016/j.nano.2016.10.006](https://doi.org/10.1016/j.nano.2016.10.006)

Provided by Lancaster University

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