

Alzheimer's 'in a dish' breakthrough could be the beginning of the end for poor-performing animal models

October 13 2014

A breakthrough in Alzheimer's disease research based on state-of-the-art human-relevant research techniques that replace scientifically unsatisfactory animal tests has been welcomed by the science team at Humane Society International. The research was published in *Nature*.

Dr Gill Langley, senior science adviser to Humane Society International, said: "The Alzheimer's in a dish breakthrough is a very exciting development that could transform neurodegenerative disease research and be the beginning of the end for poor-performing animal models. For decades, Alzheimer's research has been dominated by artificially creating symptoms in monkeys and, more recently, genetically modified mice. But fundamental species differences make these animal models poor replicas of this uniquely [human](#) disease and consequently, despite years of animal experiments, researchers have failed to find a single cure that works in human patients.

"Tens of millions of people have dementia worldwide, and continuing to focus on failing animal models is a waste of time and resources. So, human biology-based tools such as this are a huge leap forward, and could vastly improve our chances of cracking this debilitating brain disease. With research outcomes so poor in so many neurodegenerative areas, it's vital we embark on a new research roadmap that dispenses with poor quality animal tests and utilises instead state-of-the-art tools. From patient-derived human brain cells in culture, to powerful

neuroimaging machines, and super-computers combining multiple data to reconstruct the disease pathways, we could map true human Alzheimer's in all its complexity that is simply impossible using animal models."

The scientists at Massachusetts General Hospital in Boston used human stem cells that can be turned into any cell of the body. Using a chemical-infused gel they were able to develop the stem cells into neurons or other brain cells, which were altered with genes associated with Alzheimer's. The cells went on to form networks as happened in the brain. Unlike animal models, the cells developed the signature plaques and tangles seen in the brains of human Alzheimer's patients. This breakthrough is a major step forward in Alzheimer's disease research and could significantly improve chances of discovering a drug that is effective in people.

A number of different animal species have featured in Alzheimer's research, including rabbits, dogs and monkeys. But for the last two decades, the dominant animal 'model' has been transgenic mice – mice with inserted faulty human genes that produce a few symptoms similar to the real disease. The problem is simply that the condition developed in these mice differs from the human disease in how causation, how the [disease](#) progresses, and the sequence and complexity of symptoms that occur. Despite basic similarities in all mammalian brains, the different evolutionary paths of mice and humans mean that our brains differ in genetics, proteins, chemistry and physiology.

More information: *Nature* (2014) [DOI: 10.1038/nature13800](https://doi.org/10.1038/nature13800)

Provided by Humane Society International

Citation: Alzheimer's 'in a dish' breakthrough could be the beginning of the end for poor-performing animal models (2014, October 13) retrieved 26 April 2024 from <https://medicalxpress.com/news/2014-10-alzheimer-dish-breakthrough-poor-performing-animal.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.