

Scientists grow human 'mini brains'

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Aston University is leading the MESO BRAIN research project. Credit: Aston University

Birmingham scientists who are growing human brain cells in the laboratory say their work could one day help combat the damage caused by Alzheimer's and other brain traumas.

The "miniature brains" start out as [human skin cells](#), before a team at Aston University turns them into stem cells and then [brain](#) cells. At the moment, these "mini-brains" are less than 2mm across but the multi-disciplinary MESO-BRAIN team, led by Professor Edik Rafailov, is also researching how to create bigger, 3-D brain cell clusters using tiny scaffold-like structures and nanoprinting.

Professor Rafailov, from the Aston Institute of Photonic Technologies, said: "This is kind of science fiction. We're trying to help neurons to connect and to grow together so that, ultimately, we can build 3-D models of the brain. We're also trying to find the right materials and shapes with which we can create 3-D scaffolds, to help create the ideal conditions for neurons to grow in."

Dementia is now the leading cause of death in England and Wales, and it is estimated that 1.2million people in England and Wales alone will be battling dementia by 2040. It's a similar story elsewhere. In the US, for example, Alzheimer's is one of the biggest killers and an estimated 5.4million people have the disease.

Dr Eric Hill, the Programme Director for MSc Stem [cells](#) and Regenerative Medicine at Aston University, said: "This work is incredibly exciting – what we're attempting to build is something that will act like real brain tissue. But we face some real challenges, beyond the difficulties of creating human brain tissue.

"Conditions such as Alzheimer's present themselves in older patients – so we need to find a way of accelerating the ageing process in our laboratory brains so that we can understand how the diseases work. However, these models will allow us to better understand how these disease develop and allow us to screen new drugs that could target disease."

Experiments using [stem cells](#) in the fight against brain diseases are still at a very early stage and, of course, it is far too soon to say whether this approach could help dementia patients. But the hope is that such experiments will, at the very least, grant scientists new insights into how diseases such as Alzheimer's function.

The MESO-BRAIN initiative has received €3.3million of funding from the European Commission, and Aston University is leading the project, with partners from industry and higher education throughout Europe.

Scientists from a broad range of disciplines are involved – this project is a great example of interdisciplinary research in action – including stem cell biologists, neuroscientists, photonics experts and physicists. Two groups of experts come from Aston University – one from the Aston Institute of Photonic Technologies, and one from Aston Research Centre for Healthy Ageing.

Professor Rafailov said: "It's no exaggeration to say the MESO-BRAIN project could improve and prolong hundreds of thousands of lives."

Provided by Aston University

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