

TOOLBOX

Spinning system turns stem cells into mini-brains

BY JESSICA WRIGHT

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Researchers have coaxed human stem cells to develop into simplified mini-brains, with regions resembling discrete brain structures, they reported 19 September in *Nature*¹.

Studying mutations that affect neurons isn't an easy task. Researchers often **test the mutations in mice**, but mouse behavior is an imperfect substitute for the complex human behaviors seen in disorders such as autism. **Postmortem brain tissue** allows researchers a glimpse into the workings of the brain, but **this resource is rare** and the neurons may be compromised.

One of the more promising approaches to studying brain disorders has been to derive neurons from skin or other cells taken from people with a given disorder. These so-called **induced pluripotent stem (iPS) cells** can be cultured a dish. However, in a live brain, neurons form complex three-dimensional structures in combinations that make up diverse brain regions.

To address this, researchers have begun to differentiate neuronal stem cells in suspension cultures, allowing the cells to grow in three dimensions. A 2012 study used this technique to **generate clusters of neurons** that resemble the forebrain.

In the new study, researchers optimized this technique, creating mini-brains patterned into zones that resemble distinct brain regions.

Already, the researchers have shown that these artificial brains may model human disorders better than real mouse brains do. A mutation that leads to small brains in people, but does not

significantly affect mice, leads to smaller mini-brains with fewer neurons, for example.

REFERENCES:

1. Lancaster M.A. *et al. Nature* **501**, 373-379 (2013) [PubMed](#)