

Quest for new medicines could be helped by cell discovery

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Scientists have made a key discovery that could speed up the production of cells in the lab for studying diseases such as multiple sclerosis and Parkinson's disease.

Experts say it could also help to boost supplies of cells for use in drug discovery research and could eventually aid production of cells for use as therapies.

Researchers at the University of Edinburgh have pinpointed two molecules that boost reprogramming of cells - a process through which cells of one type can be converted to another.

The molecules - called SMAD2 and SMAD3 - can enhance the efficiency of converting [mature cells](#) into induced [pluripotent stem cells](#), which have the distinctive ability to become any type of cell found in the body.

The team at the University's Medical Research Council Centre for Regenerative Medicine were surprised to find the molecules can also boost direct conversions from one type of mature cell to another - including transforming skin cells into brain cells.

Usually, converting human [skin cells](#) to functional brain cells in a dish takes around 50 days. The team found that adding either of the two molecules into a dish with the cells cuts the time taken to just 25 days.

Scientists use cell reprogramming techniques to produce cells in the lab so that they can study diseases. Such cells are also used for [drug discovery](#) and for screening new medicines for potential toxic effects.

The approach is particularly helpful for producing cells that cannot be obtained from patient samples, such as [brain cells](#).

The study was published in the journal *Cell Stem Cell*.

Professor Keisuke Kaji, a Medical Research Council Senior Fellow at the University of Edinburgh, said: "We have shown it is possible to boost reprogramming of diverse cell types using a single molecule. We hope this will stimulate further research to find other molecules that could have a similar - or even better - effect."

Dr Rob Buckle, Chief Science Officer at the Medical Research Council said: "Regenerative medicine is one of the most promising fields in biomedicine and a priority for the MRC. Pluripotent stem cells offer great potential for developing new treatments for a wide range of currently untreatable diseases so the discovery of the role these two molecules can play in improving the way we can make these [cells](#), and how they can enhance the direct conversion of one mature cell-type to another of quite different function, represents real progress for the field."

More information: Tyson Ruetz et al, Constitutively Active SMAD2/3 Are Broad-Scope Potentiators of Transcription-Factor-Mediated Cellular Reprogramming, *Cell Stem Cell* (2017). [DOI: 10.1016/j.stem.2017.10.013](https://doi.org/10.1016/j.stem.2017.10.013)

Provided by University of Edinburgh

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