

Using low-dose irradiation, researchers can now edit human genes

July 22 2015

For the first time, researchers have employed a gene-editing technique involving low-dose irradiation to repair patient cells, according to a study published in the journal *Stem Cells Translational Medicine*. This method, developed by researchers in the Cedars-Sinai Board of Governors Regenerative Medicine Institute, is 10 times more effective than techniques currently in use.

"This novel technique allows for far more efficient gene editing of stem cells and will increase the speed of new discoveries in the field," said co-senior author Clive Svendsen, PhD, director of the Board of Governors Regenerative Medicine Institute.

The irradiation method could prove effective in learning more about diseases such as [spinal muscular atrophy](#), muscular dystrophy and Huntington's disease. Gene editing allows scientists to correct irregular mutations and, theoretically, cure the disease in the petri dish. Additionally, gene-editing technology allows scientists to create disease mutations in normal cells, thus modeling [human disease](#).

When using this form of gene editing, Cedars-Sinai scientists can more efficiently insert reporter genes that glow when a stem cell turns into a specific cell of the body. For example, stem cells would turn green when converted into a heart cell and red when turned into a neuron.

"The combination of low-dose irradiation and correct gene copy will accelerate our ability to model human disease using stem cells from

patients with many different disorders," said co-senior author Vaithilingaraja Arumugaswami, MVSc, PhD, director of the Pancreas and Liver Program in the Cedars-Sinai Board of Governors Regenerative Medicine Institute.

Over the past few years, the field of creating human diseases in the dish using [stem cells](#) has expanded rapidly. This work allows scientists to test novel drugs on human cells that carry disease-causing genes.

"This new technique will help us establish far more accurate models and accelerate the discovery process," said Svendsen.

More information: Hatada, S., Subramanian, A., Mandefro, B., Ren, S., Kim, H. W., Tang, J., Svendsen, C. N. (2015). Low-Dose Irradiation Enhances Gene Targeting in Human Pluripotent Stem Cells. *Stem Cells Translational Medicine*. [DOI: 10.5966/sctm.2015-0050](https://doi.org/10.5966/sctm.2015-0050)

Provided by Cedars-Sinai Medical Center

Citation: Using low-dose irradiation, researchers can now edit human genes (2015, July 22) retrieved 5 April 2024 from

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