

# **Direct Conversion of Somatic Cells Into Neurons**

A team of Stanford scientists have developed a technique to rapidly convert adult somatic cells directly into functional neuronal cells without the intermediate step of generating iPS cells (induced pluripotent stem cells). This method uses a group of neural-lineage specific transcription factors to create induced neuronal (iN) cells. The technology avoids many complications of iPS cells and represents a much simpler and faster method to generate neurons. This cell culture system has potential applications for research, drug discovery, and regenerative medicine.

## **Stage of Research**

The inventors have successfully converted mouse embryonic and postnatal fibroblasts into functional neurons in vitro. These iN cells express multiple neuron-specific proteins, generate action potentials, and form functional synapses.

## **Ongoing Research**

The inventors are expanding this approach to generate iN cells from other mouse cell types and from human cells. They are also modifying the technique to produce specific neuronal subtypes.

## **Applications**

- **Research**
  - basic studies of neuronal development and pathogenesis
  - cell culture models of neurological diseases
- **Regenerative medicine** - culture system for autologous cell transplantation therapies
- **Drug screening** for therapeutic agents that convert somatic cells to neuronal cells

## Advantages

- **Fast and efficient** - direct conversion of somatic cells to iN cells avoids iPS cell complications regarding efficiency, safety, and timing

## Publications

- Vierbuchen T, Ostermeier A, Pang ZP, Kokubu Y, Südhof TC, Wernig M., "[Direct conversion of fibroblasts to functional neurons by defined factors](#)". *Nature*. 2010 Jan 27.

## Patents

- Published Application: [WO2011091048](#)
- Published Application: [20130022583](#)
- Published Application: [20150284681](#)
- Published Application: [20170369840](#)
- Published Application: [20180057789](#)
- Issued: [9,057,053 \(USA\)](#)
- Issued: [9,822,338 \(USA\)](#)

## Innovators

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