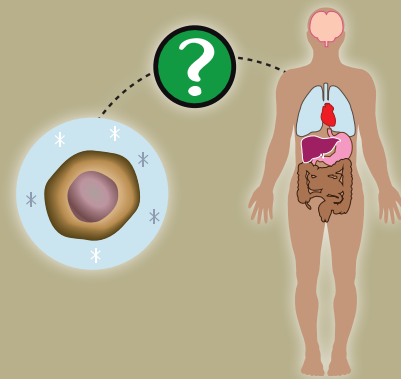


# The Amazing Stem Cell...

## Stem cells.

Since their discovery, scientists have asked:

How do stem cells give rise to all of the different types of cells—from blood and skin to heart, brain, and bones—that make up the human body?



## Why?

Because the answer could save lives. The cells provide fundamental insights into how some of our most vexing diseases develop and wreak their havoc—from diseases that afflict young children to those that appear late in life.

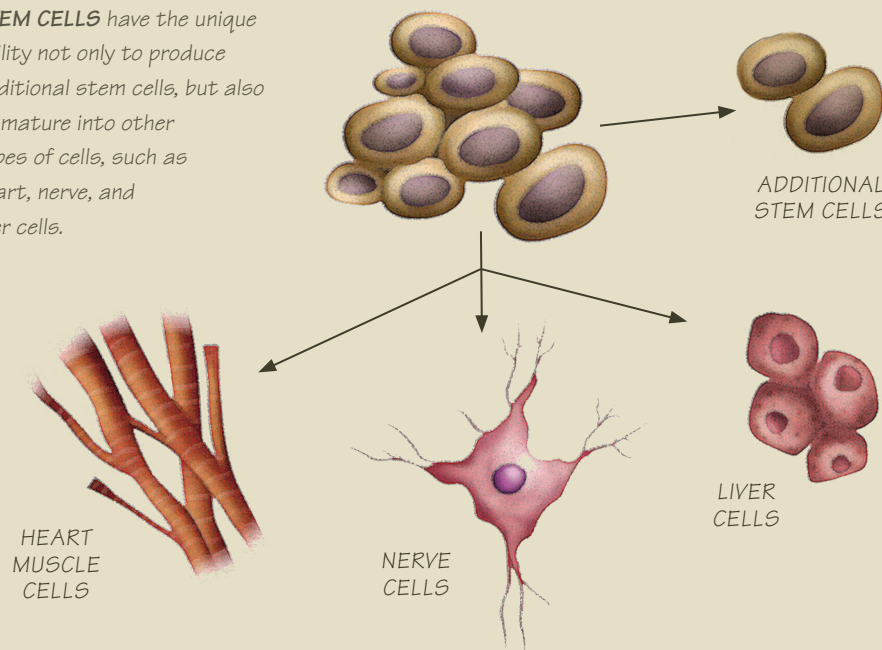


Scientists are harnessing knowledge gained from stem cells to develop new therapies. Some are already being tested in human clinical trials.

Now a new breakthrough promises to speed that research by creating a resource that could be made available to stem cell scientists worldwide.

## A Stem Cell Primer:

STEM CELLS have the unique ability not only to produce additional stem cells, but also to mature into other types of cells, such as heart, nerve, and liver cells.



# Induced The Pluripotent Stem Cell (iPSC) Initiative

## An investment in the health of Californians



The **iPSC Initiative** is a major effort of California's stem cell agency, the **California Institute for Regenerative Medicine (CIRM)**. **THE GOAL:** to create a collection of stem cells developed from thousands of individuals like you.

Collected into a **cell bank**, the stem cells will represent a wide range of diseases and conditions, and will be made available to researchers around the world. Such a resource will spur large-scale research that cannot be accomplished by a single laboratory working in isolation.

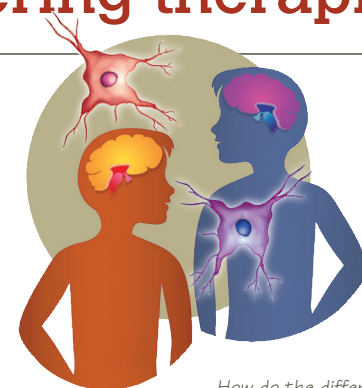
## A tool for discovering therapies

### Take the case of autism:

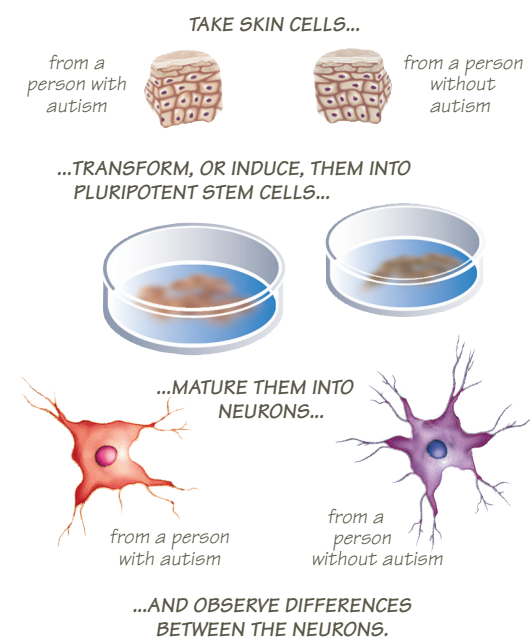
People with autism have behaviors that are quite different from people without autism. But observing those differences can't tell us how these differences come about.

### Using iPS cells, scientists can now:

- \* generate iPS cells from someone with autism and then mature those cells into brain cells called neurons
- \* observe how the neuron function differs in those neurons compared to those from people without autism.
- \* potentially pinpoint where, how, and why, the normal development path is disrupted
- \* discover drugs or other treatments that could lead the way to new therapies.



How do the differences in neuron and brain structure between people with autism and those without autism come about?



# An Opportunity to Participate

As part of the iPSC Initiative, CIRM is asking for people like you to contribute blood or skin samples that can be used to make induced pluripotent stem cells. These cells would then be made available to researchers throughout California and the rest of the world.

## How does the donation process work?

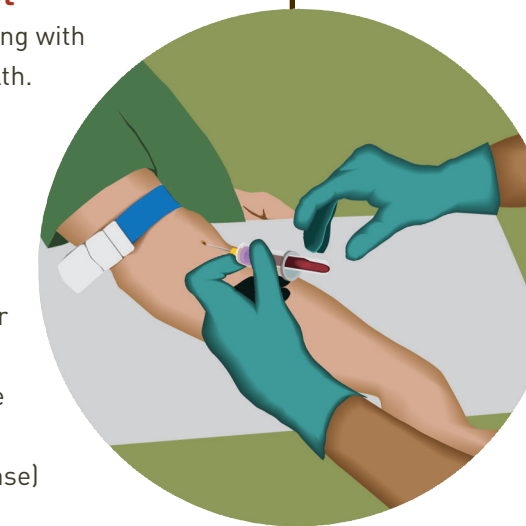
### 1. Researchers will ask

their patients for permission to use their cells and health information for the stem cell bank. This process of getting permission is called **informed consent**, during which patients and/or their guardians will receive detailed information about the research.



### 2. A clinic will collect

a blood (or skin) sample along with information about your health. All information identifying the sample as yours will be removed and replaced by a code to protect your privacy. Information about the sample (such as whether it comes from a healthy individual, or from someone with a condition such as autism or Alzheimer's disease) will be used to describe the eventual iPS cells. This information allows researchers using these iPS cells to design effective experiments.



## What happens to my donated sample?



**3. The blood or skin** sample will be transferred to a laboratory in Marin County, California, where it will be transformed into stem cells. The resulting stem cells will be placed in the stem cell bank along with their descriptive health information, and made available to scientists.

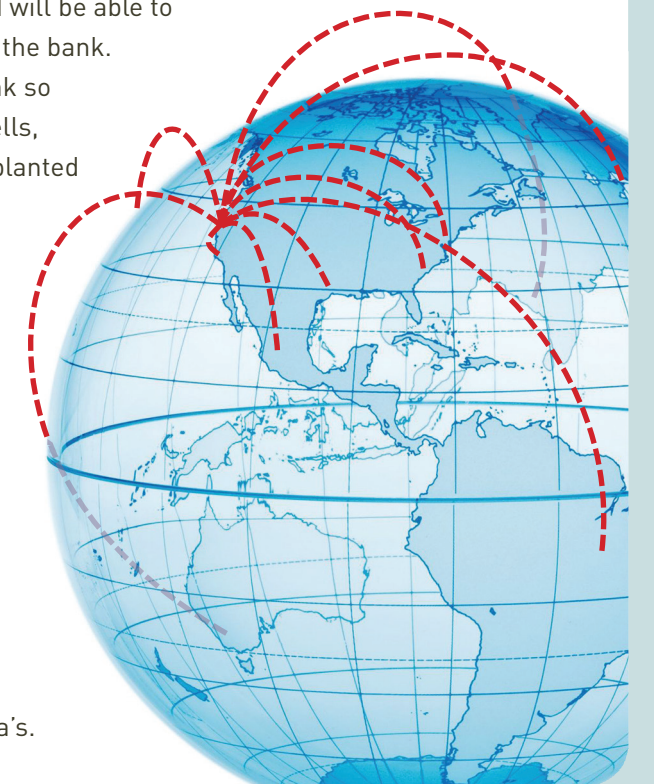
## How will the stem cell lines be used?

### 4. Qualified researchers in California

and the rest of the world will be able to request stem cells from the bank. CIRM is creating the bank so scientists can use the cells, either in a dish or transplanted into animals, to:

- \* Study how disease develops and progresses, and
- \* Test new drugs or other treatments.

The large size of the collection is designed to help scientists understand how disease and treatment may vary in a diverse population like California's.





## The CIRM iPSC Initiative

— is Designed to —

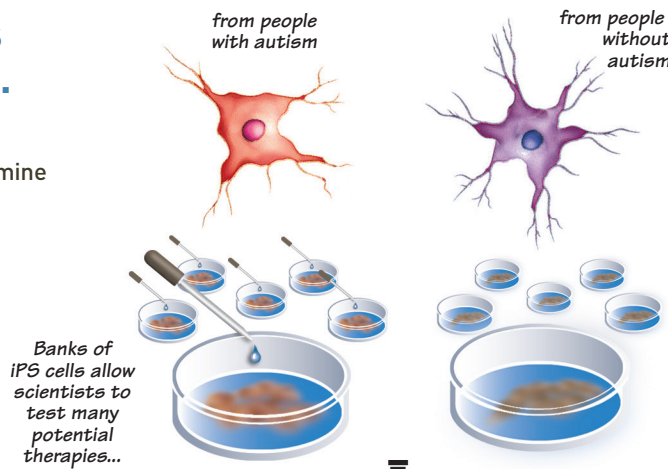
Give scientists new tools to understand and develop treatments for:

- \* Heart disease
- \* Lung disease
- \* Liver disease
- \* Blinding eye disease
- \* Childhood neurological disorders
- \* Neurodegenerative disorders

## The potential to reverse disease

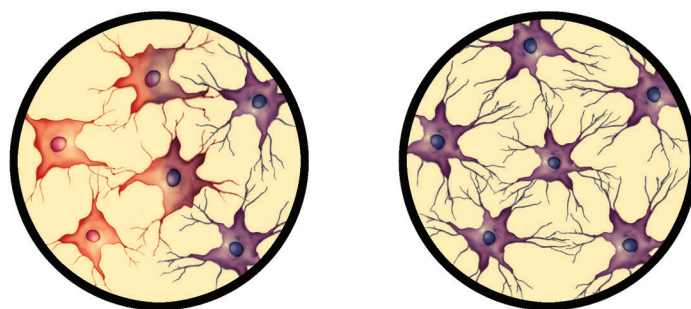
### With syndromes such as autism...

As scientists use iPSC cells to learn what factors determine the differences in neuron development between people with autism and those without, their new knowledge may point to potential treatments or even cures.



But this research cannot happen without a library of cells donated by individuals like you.

...enabling them to measure the effectiveness of a variety of experimental drugs



...the Nobel Prize-Winning  
— Breakthrough: —

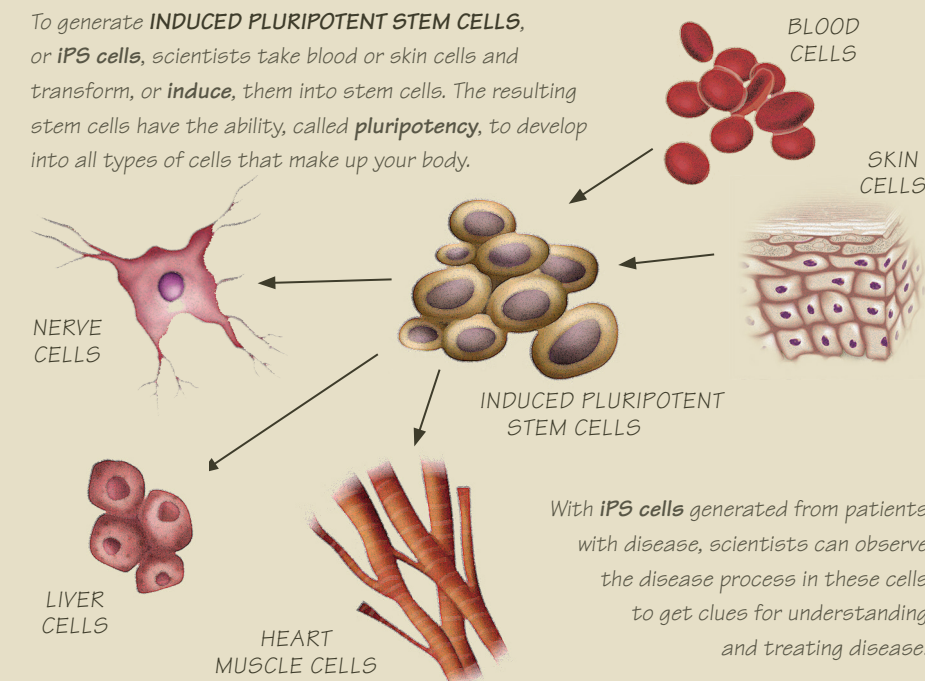
## Induced The Pluripotent Stem Cell:

Mature cells from skin or blood can be transformed, or *induced*, into *pluripotent* stem cells.

And those induced pluripotent stem cells can transform the search for therapies.

### What is an Induced Pluripotent Stem Cell?

To generate **INDUCED PLURIPOTENT STEM CELLS**, or **iPS cells**, scientists take blood or skin cells and transform, or **induce**, them into stem cells. The resulting stem cells have the ability, called **pluripotency**, to develop into all types of cells that make up your body.



With **iPS cells** generated from patients with disease, scientists can observe the disease process in these cells to get clues for understanding and treating disease.

...the Promise of  
— Discovery: —

**CIRM:** The State Stem Cell Agency

## California Institute for Regenerative Medicine

California's stem cell agency was created in 2004 when the state's voters passed Proposition 71. Voters authorized \$3 billion to fund research in California designed to use stem cells to create new therapies to treat disease. Stem cell agency funding has placed California at the center of a worldwide effort to develop new therapies and has strengthened the biotechnology industry in the state.

A Stem Cell Breakthrough

A Promise of Discovery

An Opportunity to Participate

## Induced The Pluripotent Stem Cell Initiative

**CIRM**  
CALIFORNIA'S STEM CELL AGENCY

CALIFORNIA INSTITUTE FOR REGENERATIVE MEDICINE

[www.cirm.ca.gov](http://www.cirm.ca.gov)