

WINNING SCIENCE



The 2012 Nobel prize for physiology or medicine has been won by John B. Gurdon and Shinya Yamanaka for their work on stem cells. They discovered that mature cells can be reprogrammed to become pluripotent stem cells.

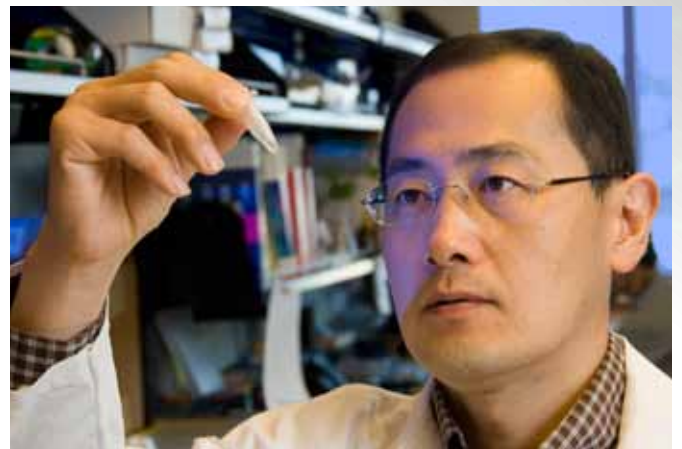


◀ The Nobel medal shows the Genius of Medicine collecting water for a sick girl.

John B. Gurdon in his lab in 1960 ▼



In 1962, John B. Gurdon challenged the dogma that cell specialisation is irreversible. He suggested that a cell's genome might still contain all the information for it to develop into all the different cell types. To test his hypothesis, he replaced the cell nucleus of a frog's egg cell with a nucleus from a mature, specialised cell from the intestine of a tadpole. The egg developed into a normal tadpole. The nucleus of the mature cell had not lost its capacity to drive development to a fully functional organism.



In a slightly later experiment, the nucleus used was carrying the albino (no-pigment) gene. This made it easy to see that the experiment had worked.

Shinya Yamanaka studied genes important for the functioning of stem cells in mice. Four such genes (1) were transplanted into skin cells (2) which became reprogrammed into stem cells (3). These cells were then able to develop into all the cells of the adult mouse. He named them induced pluripotent stem cells (iPS). These can also be generated from human cells. This is allowing new ways of studying disease mechanisms.

In 1997, a team led by Ian Wilmut succeeded in cloning a mammal for the first time. This was Dolly the sheep. Wilmut was knighted in 2007 and has since given up nuclear cloning, largely because of the advances made by Yamanaka.

