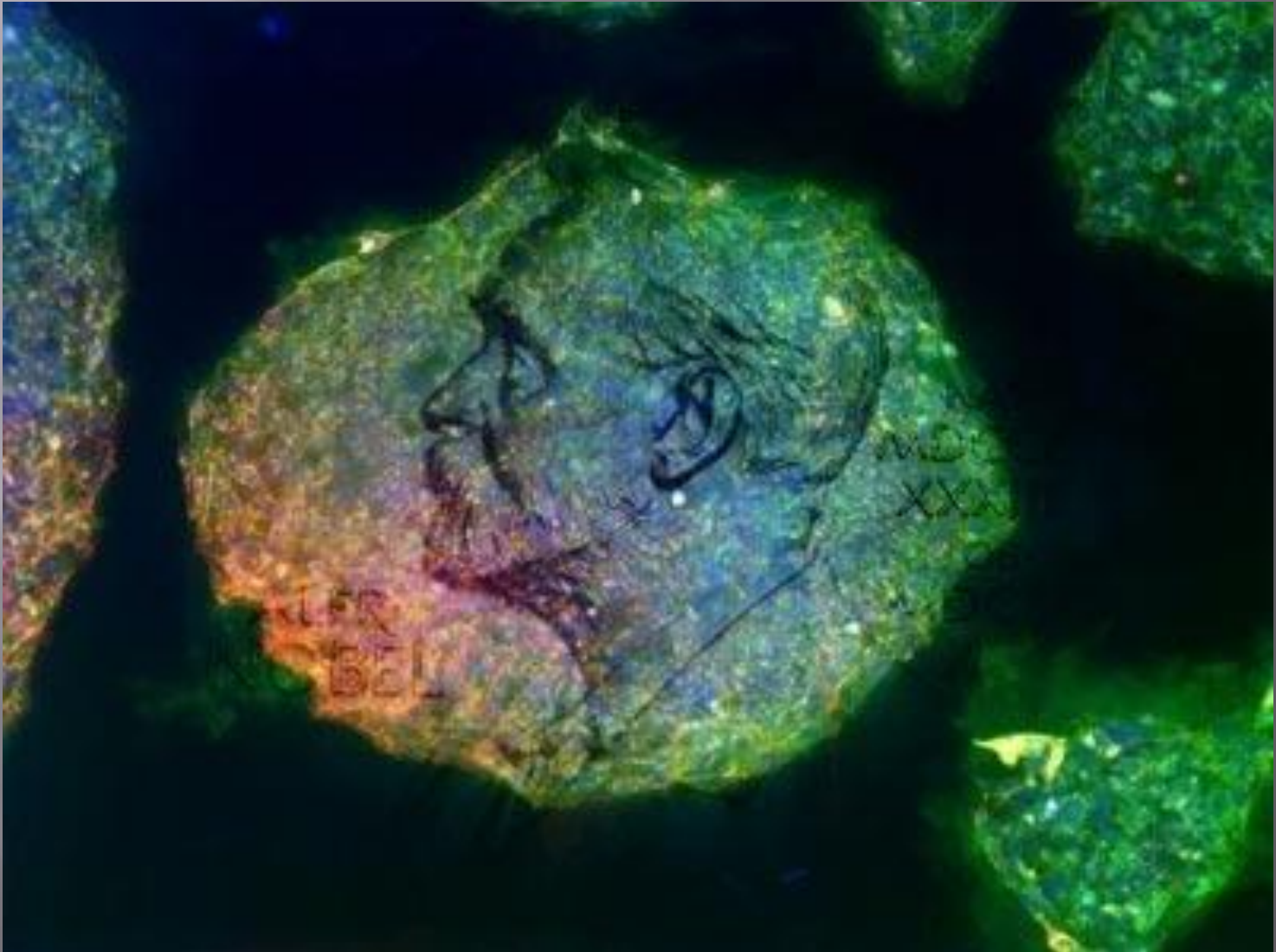


# Nobel Prize in Medicine and Physiology in 2009

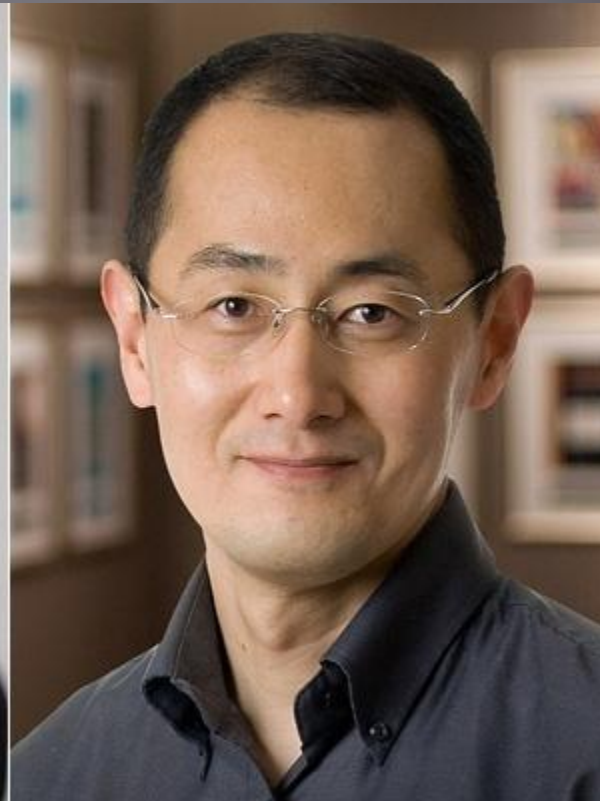


# Nobel laureates in Physiology or Medicine

JOHN BERTRAND  
GURDON



SHINYA  
YAMANAKA



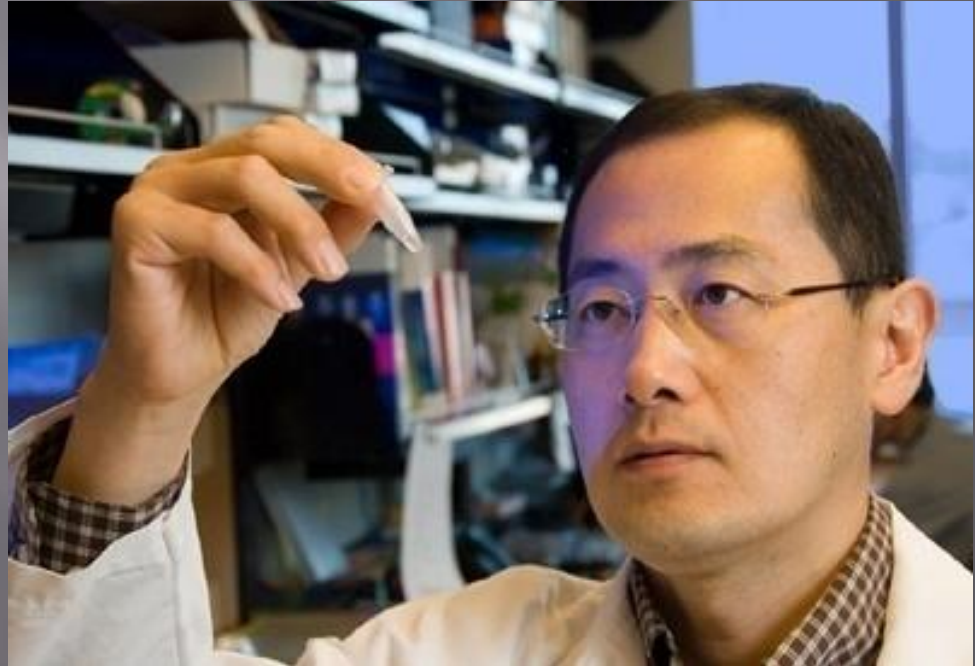
## John Bertrand Gurdon

A sir John Гурдон is the British biologist, nobel laureate on medicine for 2012 "for works in area of biology of development and receipt of the induced barrel cages".



## Shinya Yamanaka

the Japanese scientist, professor of Institute of front-rank medical sciences, is in University of Kyoto, director of Center on research and application of iPS- cates of University of Kyoto, leading researcher of Institute of cardiovascular diseases





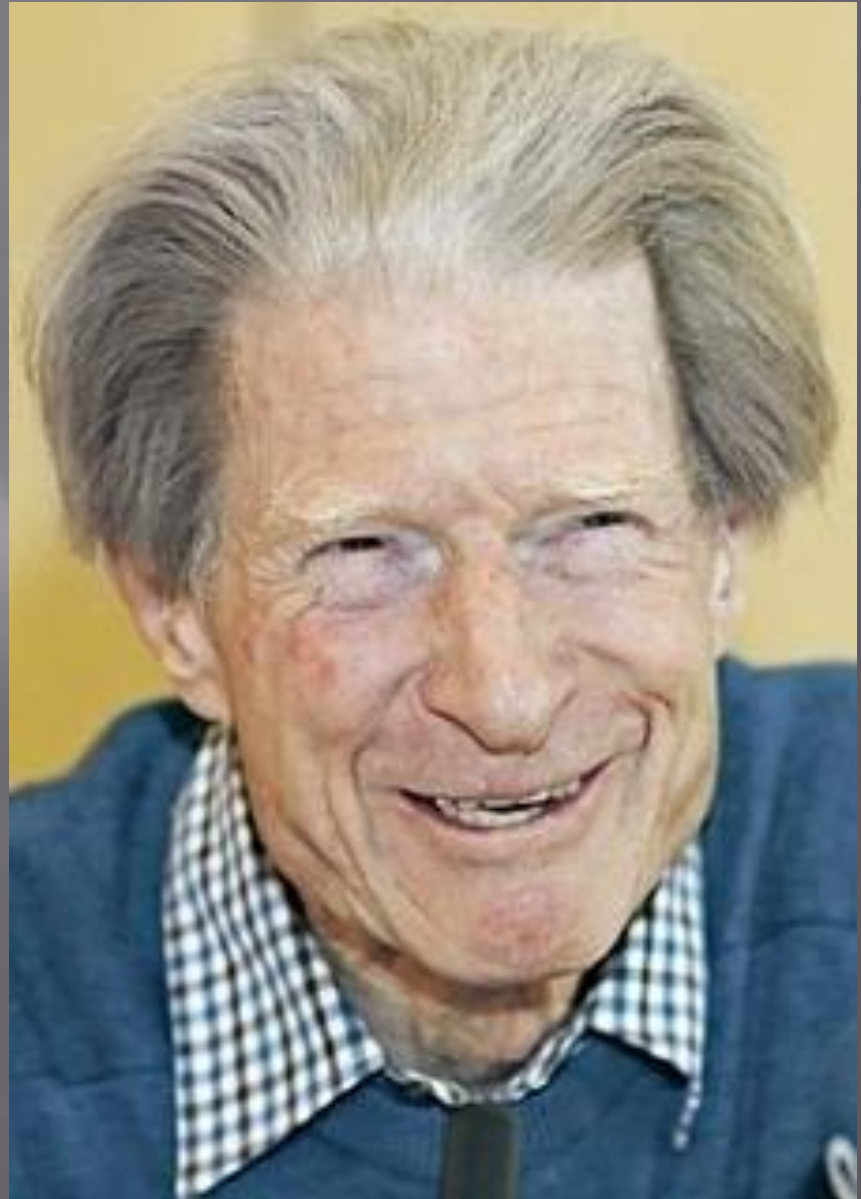
**As stated in the official wording of the Nobel prize Committee awarded for "opening the possibility of reprogramming differentiated cells into pluripotent"**



"the Nobel prize" - this is not the first award that Gurdon and Yamanaka get together. In 2009 they were awarded the prestigious Albert Lasker Prize ("second American Nobel prize in medicine" - as it is called) in the category Basic. By the way, almost half of the winners of this category then you will get a Nobel prize. But prominent Israeli Wolf Prize in Medicine they have received both, but separately - Gurdon in 1989, and Yamanaka in 2011), among many other awards, received two scientists, Yamanaka also the winner of the prestigious "technology" award of the Millennium.



"Senior" is the winner of the marked and honorary awards. In June 1995, John Bertrand Gurdon received the title of knight bachelor and the right to add his name to the title of "sir", and in 2004 received even greater recognition: Cambridge Institute for cell biology and cancer charities Wellcome Trust and Cancer Research UK was renamed Germanoski Institute.



Stem cells - undifferentiated (immature) cells found in all multicellular organisms. Stem cells can renew themselves, forming new stem cells to divide through mitosis and differentiate into specialized cells, that is, to turn into cells of various organs and tissues.

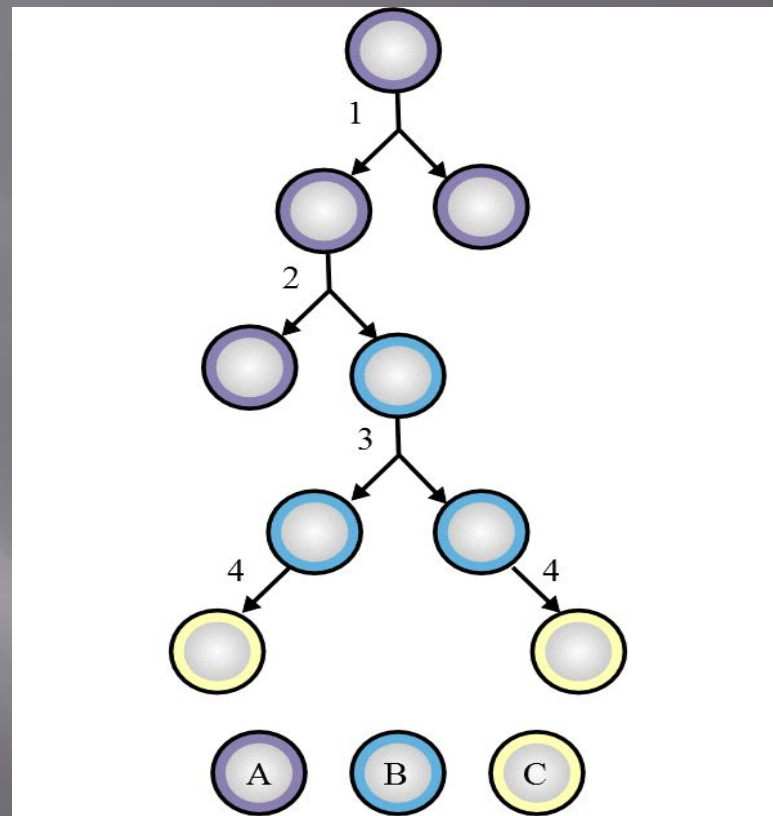
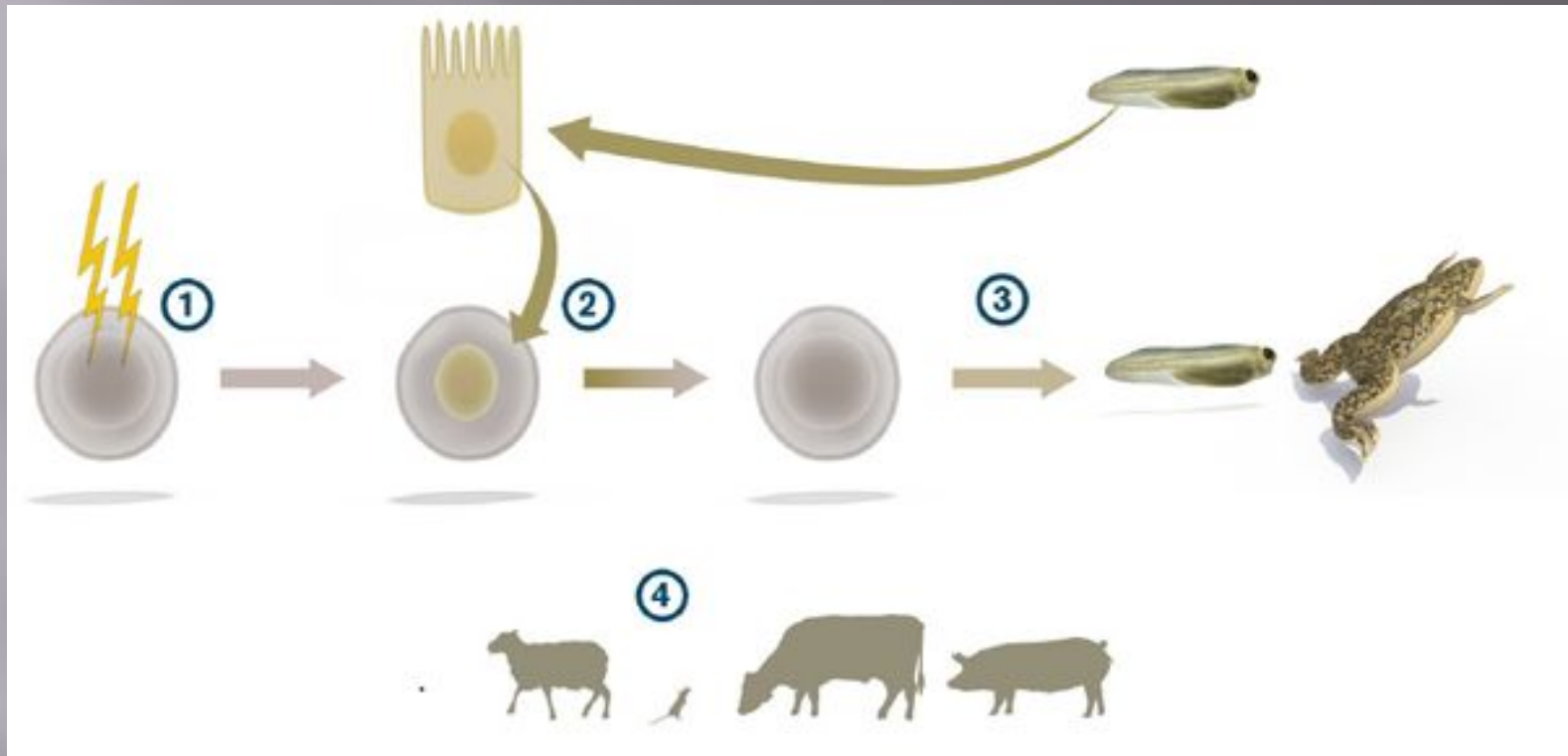


Схема делений и дифференцировок стволовых клеток. А — стволовая клетка. В — клетка-предшественник. С — дифференцированная клетка. Каждая стволовая клетка может поделиться либо симметрично, дав две такие же стволовые клетки (1), либо несимметрично, дав одну стволовую клетку и одну клетку-предшественницу (2). Клетка-предшественница тоже делится (3); ее дочерние клетки дифференцируются (4) и занимают свое место в той или иной ткани организма.



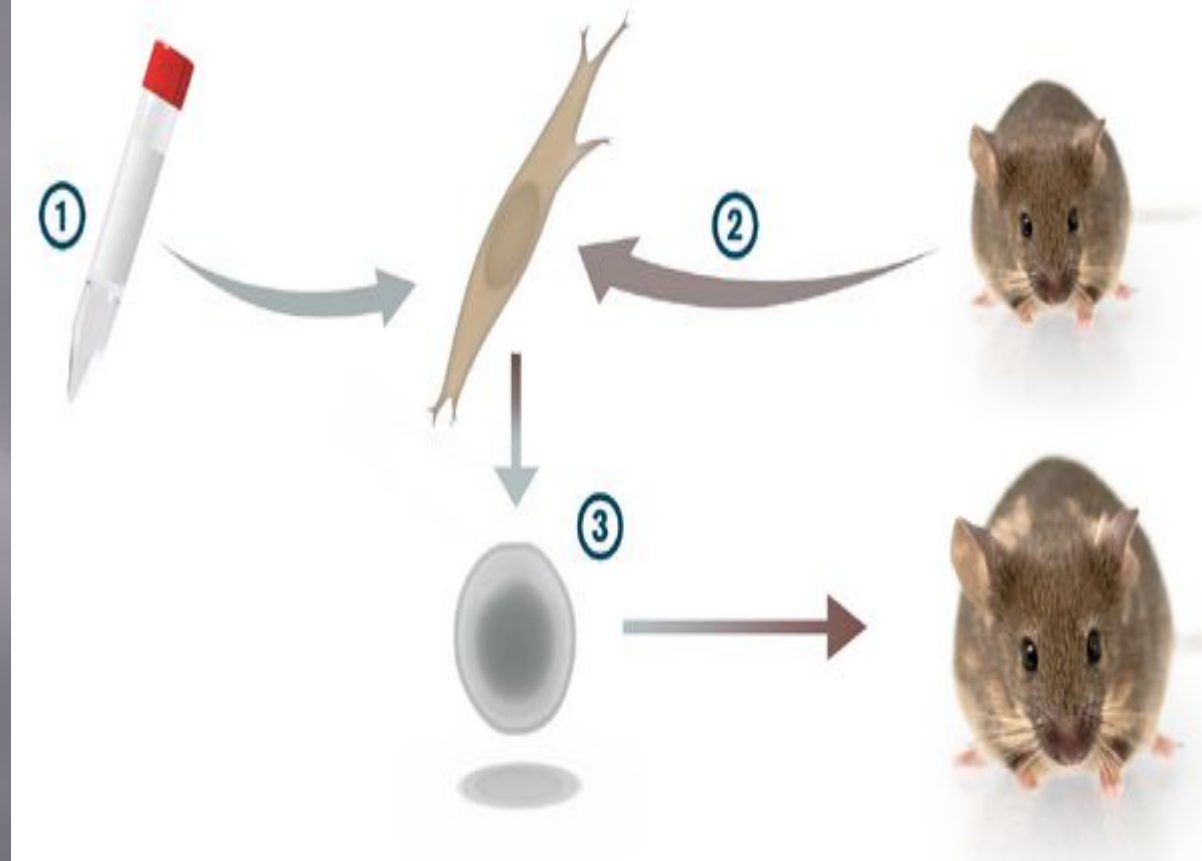
# the work of Gordon

- ▣ He did his Nobel experiments in 1962, in those half-forgotten time when nobody thought about genome sequencing, knowledge about stem cells were placed in the annual course of lectures, and the famous cell line HeLa was only ten years old.
- ▣ Gordon tried to find the answer to the question, does the nucleus of a differentiated cell with enough information to give rise to a new organism.
- ▣ And Gordon did a very simple thing - took it, and put it into the egg clawed frogs (*Xenopus laevis*) destroyed the core of the core of differentiated cells (cells of the intestinal epithelium) of the tadpole of the same species. It took quite a lot of experiments, but the researcher was able to obtain from such "chimeric" egg healthy tadpole.



- Схема экспериментов Гёрдона. Он уничтожил ультрафиолетом ядро в икринке шпорцевой лягушки *Xenopus laevis* (1), пересадил туда ядро, взятое из дифференцированной клетки кишечника головастика того же вида (2), в результате чего из икринки развился головастик, а затем и взрослая лягушка (3).

And what did the Yamanaka? In 2006 he managed without any nuclear transfer is to turn quite differentiated murine fibroblast (skin cell) into pluripotent stem cells (these cells are called induced pluripotent stem cells, IPSC or iPSC)



- Схема экспериментов Яманаки. Гены четырех белков (1) засовываются в дифференцированный фибробласт, полученный от мыши (2). Этот фибробласт превращается в плюрипотентную стволовую клетку (3), из которой можно потом получить взрослый мышинный