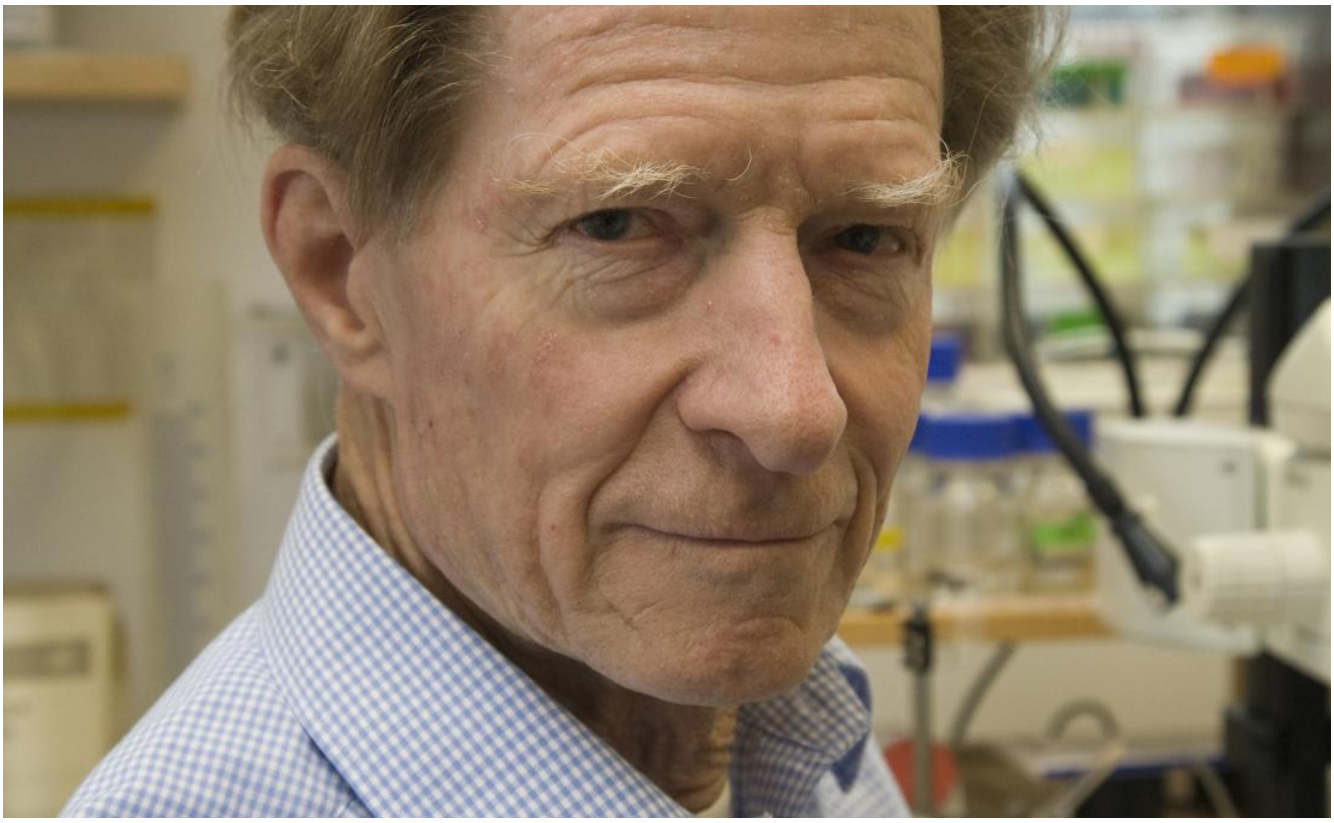
Horizon
The EU Research & Innovation Magazine

European Commission



Nobel Prize winner who nearly flunked science advises perseverance

‘You will never become a scientist!’ For his teachers, a science career for John Gurdon, was no more than hypothetical. But the British professor who won the 2012 Nobel Prize for Medicine has only one piece of advice for aspiring researchers: ‘Don’t give up!’

18 March 2013 - By SEÁN DUKE

At the age of 15, Professor John Gurdon was told by his teacher that his aspirations of becoming a scientist were ‘ridiculous’, yet he went on win the Nobel Prize in 2012 with the discovery that mature cells can be reprogrammed to become pluripotent.

‘I got this crippling report which said that the teacher had heard that I had some interest in becoming a scientist – and that this was completely ridiculous because it would be a total waste of time on the teacher’s part, and on mine, for me to do any more science,’ said University of Cambridge-based Prof. Gurdon.

This life experience might explain his advice for any aspiring scientists: ‘If experiments – or other things – do not succeed at once, don’t give up!’

Prof. Gurdon’s interest in biology began when he was about eight years old, when his mother and aunt encouraged him to collect insects. Throughout his childhood he devoured books about insects and his interest

in science grew.

Then came the hammer blow from his teacher, yet he did not give up on his passion. His parents paid for private tuition which helped him reach his goal of studying at university.

The university system, where it was more important to understand concepts, proved to be much more positive for Prof. Gurdon, compared to the system of rote learning of facts at school, which he recalled was ‘a pretty disastrous experience’.

Developing brilliance

The undergraduate years proved to Prof. Gurdon that he had what it took to become a scientist, and that his teacher’s opinion of him was mistaken. His career really began to take off when he started post-graduate studies in 1956.

This was a time of great excitement in science as three years earlier James Watson and Francis Crick had famously discovered the spiral structure of DNA, the material holding the ‘code for life’. This put genetics and people interested in human development into the limelight.

Prof. Gurdon was one such scientist interested in developmental biology – how organs and species are pre-programmed by DNA to develop in a particular way. ‘The major problem, I should say that preoccupied me, at that early stage, was whether all cells of the body have the same genes, or not,’ he said.

This ‘big question’ had interested biologists for a century, and it was one that Prof. Gurdon answered, earning him the title ‘the godfather of cloning’.

He discovered that the specialisation of cells is reversible, replacing the immature cell nucleus in an egg cell of a frog with the nucleus from a mature intestinal cell.

The modified egg cell developed into a normal tadpole, showing that the DNA of the mature cell still had all the information needed to develop all cells in the frog. The technique used to clone Dolly the sheep in 1996 was similar to that of nuclear transplantation that Prof. Gurdon used to clone a frog

It earned him a joint Nobel Prize alongside Professor Shinya Yamanaka, who discovered how intact mature cells in mice could be reprogrammed to become immature stem cells that are versatile, like the ones taken from embryos.

The discovery meant that versatile stem cells could be created without the need to destroy human embryos.

Supporting stem cells

Stem cells can serve many useful purposes, said Prof. Gurdon. For example, he said, they can be used to grow cultures of human disease to test new drugs, or to grow replacement cells for cells in the body – such as the heart, brain or liver – that are not working properly. These uses mean that stem cells could revolutionise biological science in the future.

Europe ranks highly in stem cell research, the Nobel Laureate asserted, while warning that the best researchers could be lost if funding were to fall off here.

It is also important to reach out to the next generation, added Prof. Gurdon. ‘It would be good if the benefits of stem cell research can be made more clear to younger people, probably by ensuring that school teachers are aware of the benefits of this field,’ he said.

More info

Gurdon Institute

The Nobel Prize in Physiology or Medicine 2012