

This is the third edition of the Frontiers awards, with 3.2 million prize money distributed across eight categories

Yamanaka wins the BBVA Foundation Frontiers of Knowledge Award in Biomedicine for the achievement of cell reprogramming

- His work “has accelerated the possibility of translating regenerative medicine from the bench to the clinic” in the words of the prize jury.
- Yamanaka is confident that stem cells obtained from specialized ‘reprogrammed’ cells will become “a therapeutic reality” and that “the technical obstacles can be overcome in a short period of time”.
- The BBVA Foundation Frontiers of Knowledge Awards, established in 2008, recognize world-class research and artistic creation. Their eight categories reflect the main scientific, technological, social and economic challenges of the present day.

February 4, 2011.- The BBVA Foundation Frontiers of Knowledge Award in the Biomedicine category goes in this third edition to Shinya Yamanaka for “showing that it is possible to reprogram differentiated cells back into a state that is characteristic of pluripotent cells”, said the jury in its citation.

Shinya Yamanaka, who originally trained as an orthopedic surgeon, made his breakthrough discovery in 2006 when he succeeded in generating ‘induced pluripotent stem cells’ or iPS cells with the ability to differentiate into virtually any kind of tissue. Until Yamanaka proved differently, scientists believed that this could only be achieved with embryonic stem cells. iPS cells, however, are obtained from already specialized adult cells that have been reprogrammed to pluripotency, so

they are once again able to differentiate into other tissues. And this represents a paradigm shift in developmental biology.

The jury emphasized the exciting new vistas these cells open up for both basic and clinical research, with personalized therapies and more precisely targeted drugs. The possibility of working with iPS cells derived from patients themselves will avoid “treating patients as guineas pigs”, the citation continues. “It will allow novel cell-based screening methods to be used to search for small molecule drugs to treat a wide range of diseases. And, ultimately, it may also allow novel and even patient-specific cell-based treatments, in particular for degenerative disease”.

Yamanaka's work, the jury concludes, “has accelerated the possibility of translating regenerative medicine from the bench to the clinic”.

The example of Dolly

“It is a great honor to receive this award” said Yamanaka on the phone yesterday. “I am deeply grateful to the many scientists whose insights I have drawn on in my own work”.

Yamanaka explained that the idea of reversing the fate of already specialized cells, then a ‘no-can-do’ in biology, came to him when studying the experiments that produced the first cloned frogs, back in the 1970s, and Dolly the sheep in 1996. “From their work I learned that we should be able to convert somatic cells back into their embryonic state. That is what inspired me to start my project”.

What he couldn't imagine was how quickly the results would arrive: “At first I thought it would be very difficult, it would take 20 years, 30 years or more. But it took less than 10 years. We were pleased but at the same time surprised by our own results.” He declares himself “hugely impressed by the progress of the field in these past few years”.

A key motivation in his work was to find a way to circumvent using embryos in research. “I understand there are many people who are against the use of human embryos, but I also understand how important embryonic stem cells are for medicine. That is why I started my project to convert somatic cells into stem cells without using embryos”.

New drugs “a few years from now”

Asked about the applications of iPS cells, Yamanaka mentions both drug discovery and cell therapy. Pharmacology, he believes, will be the first to benefit from this use of adult pluripotent cells: “Many people are trying to identify new drugs by using iPS cells from patients, so we hope that we will see some new treatments within a few years from now”.

However the use of reprogrammed cells in cell therapy – with cells that are the patient's own ‘offspring’ and therefore do not cause immune rejection – will be longer in coming: “We really have to double check the safeness of iPS cells”, he cautions, “to be sure that they don't produce cancer and other types of tumors”.

“Finding the best way to generate safe and healthy iPS cells”, is the next challenge along the way. But Yamanaka is confident that iPS cells “will become a therapeutic reality” and that “the technical obstacles can be overcome in a short period of time”.

Shinya Yamanaka (1962, Osaka) is currently Director of the Center for iPS Cell Research and Application at Kyoto University (Japan), and a professor in the Institute for Frontier Medical Sciences at the same institution. He is also an investigator at the J. David Gladstone Institutes in San Francisco and Professor of Anatomy at the University of California in San Francisco.

Yamanaka studied medicine at Kobe University, before completing his residency in orthopedic surgery at Osaka National Hospital in 1993. That same year he took up a postdoctoral fellowship at the Gladstone Institute of Cardiovascular Disease in San Francisco, where he became a staff research investigator in 1995. The following year he returned to Japan where he has been associated since 2004 with the Institute for Frontier Medical Sciences.

The jury chair, Nobel prizewinner Werner Arber, unveiled the name of the new laureate at an announcement event in the Marqués de Salamanca Palace, the Madrid headquarters of the BBVA Foundation, where he was accompanied by the Foundation's Director, Rafael Pardo, and Juan José Damborenea, Assistant Vice-President of Scientific and Technical Areas at the Spanish National Research Council (CSIC).

Shinya Yamanaka's nomination was put forward by Robert W. Mahley, President Emeritus of The J. David Gladstone Institutes at the University of California, San Francisco (United States) and Inder Verma, Director of the Laboratory of Genetics at the Salk Institute (California, United States).

International jury

The jury in this category was chaired by **Werner Arber**, holder of a Nobel Prize in Medicine and Emeritus Professor of Molecular Microbiology at Biozentrum, the interdisciplinary research institute of the University of Basel (Switzerland), with **Robin Lovell-Badge**, Head of the Division of Stem Cell Biology and Developmental Genetics at the MRC National Institute for Medical Research (United Kingdom) acting as secretary.

Remaining members were **Dario Alessi**, Deputy Director of the Protein Phosphorylation Unit at the College of Life Sciences, Dundee University (United Kingdom); **Mariano Barbacid**, founding Director of the Spanish National Cancer Research Center (CNIO); **José Baselga**, Chief of the Division of Hematology/Oncology of the Massachusetts General Hospital, Professor of Medicine at Harvard Medical School and Director of the Institute of Oncology at the Vall d'Hebron University Hospital in Barcelona (Spain); **Angelika Schnieke**, Chair of Livestock Technology in the Department of Animal Science of the Technical University of Munich (Germany); and **Bruce Whitelaw**, Head of the Developmental Biology Division at The Roslin Institute, University of Edinburgh (United Kingdom).

The awards in the two previous editions of the Frontiers of Knowledge Awards in the Biomedicine category went to Joan Massagué i Solé, in 2009, and Robert Lefkowitz, in 2010.

The BBVA Foundation Frontiers of Knowledge Awards honor world-class research and artistic creation across eight prize categories. Their uniqueness lies in their close alignment with the scientific, technological, social and economic challenges of the present century. Each category carries a cash prize of 400,000 euros.

UPCOMING AWARD ANNOUNCEMENTS

CATEGORY	DATE
Ecology and Conservation Biology	Tuesday, February 8, 2011
Contemporary Music	Tuesday, February 15, 2011
Economics, Finance and Management	Wednesday, February 16, 2011

The BBVA Foundation supports knowledge generation, scientific research and the promotion of culture, relaying the results of its work to society at large. This effort materializes in research projects; human capital investment; and specialization courses, grants and awards. Among the BBVA Foundation's preferred areas of activity are basic sciences, biomedicine, ecology and conservation biology, the social sciences and literary and musical creation.

A video recording of the new laureate's first impressions on receiving news of the award is available from the Atlas FTP with the following coordinates:

Server: **213.0.38.61**
Username: **agenciaatlas1**
Password: **amapola**

The name of the video is:
Premio Fronteras Biomedicina

Fundación **BBVA**

For more information, contact the BBVA Foundation Communication Department (+34 91 374 5210/comunicacion@fbbva.es) or visit the Foundation website www.fbbva.es