

2007 Award

Mending the human body

The theme

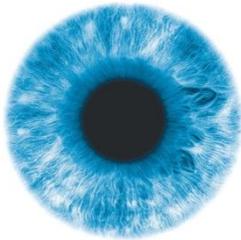
Improving quality of life is one of the priorities. Promoting and protecting health are essential elements. That is why, for its 2007 prize, the Altran Foundation has chosen “Mending the human body through technological innovation” as its theme.

The laureates

First Prize

Professor José-Alain SAHEL – France
Vision Institute – Quinze-Vingts
National Ophthalmology Hospital Centre

The Artificial Retina



Today, 1.5 million people suffer from degenerative retinal diseases. The gravity of the situation prompted Professor José Sahel and his team at the Quinze-Vingts National Ophthalmology Hospital Centre to develop an artificial retina that restores hope to affected patients. Placed under the existing retina, it directly stimulates the neurons, replacing defective cells. These implants should eventually allow patients to recognize faces, read large print and move independently in a restricted environment.

The idea of stimulating the retina of blind people is not just a question of science fiction. Various clinical trials have permitted to validate this approach. Matrixes

composed of 16 to 20 electrodes showed that stimulating patients' retina in order to detect light and see contrasted objects is now possible. As a consequence, these prostheses help the patients to move, find directions and accomplish some tasks in their everyday environment. The next clinical trials will focus on evaluating matrixes made up of 50 to 60 electrodes. These trials are scheduled in France in Prof. Sahel's department at the Quinze-Vingts National Ophthalmology Hospital Centre and at the Ophthalmology Rothschild Foundation.

Altran Support

The challenge for the Altran teams was to find solutions to produce artificial retina in series, in order to bring solutions to the widest number of patients. To reach this goal, about 10

Altran consultants have worked on the project.

After an initial diagnosis of the project and a contextual analysis, Altran consultants worked on the creation of a simulation tool enabling to study the implant / neuron link and to define optimal implant shape. They also proceeded to the modelling of the complete electrodes / neurons system and to the experimentation on ex-vivo retina.

“Altran supported the project by providing its expertise throughout the process – from prototype design to the creation of the industrial product. This collaboration increased the project's competitive edge worldwide and fostered the development of a high-performing retinal prosthesis for the blind.” José Sahel

Results

Hand in hand with Professor Sahel's team, Altran consultants have succeeded in launching the realisation of first implants for test and in decreasing from three months to fifteen days the time necessary to obtain experience results.

More about the theme

Scientists and doctors are increasingly working on finding solutions and techniques to repair the human body:

- Restoring the human functions altered since birth or by an accident, a disease or old age,
- Improving diagnosis, detecting and preventing risks,
- Improving and developing tools necessary to these actions.



The union of medicine and technology permitted to realize considerable progresses in terms of new techniques development, restoration, improvement of existing solutions with decreasing costs, improving reliability and results.

The Altran Foundation for Innovation wanted to help efficiently these projects and thus facilitate mobility, independence and freedom for affected people.

The Finalists

Serge BISCHOFF - France

Rhenovia Pharma, Mulhouse

Biocomputer platform of the modelling of the action of therapeutic agents

The project of Mr. Serge Bischoff and his team aims at building and setting up biocomputer platforms permitting to numerically model and simulate physiological functions of the central nervous system in order to optimize R&D processes helping identifying new medications and discovering more efficient treatments for brain diseases and other diseases (eye, spinal cord, neuromuscular junctions).

Christophe DROUET - France

Institut Carnot CIRIMAT, Toulouse

New therapeutic drivers to release active molecules directly in diseased cells

The project supported by Christophe Drouet develops a new cheap therapeutic tool for treatment of diseases such as cancer. New drug-delivery systems (vectors) will be developed for the targeted release of active molecules inside the diseased cells. These new vectors will be perfectly biocompatible, with a chemical composition close to that of bone mineral, and will exhibit an infinitely small size thanks to the setup of a colloidal innovative formulation.

Cécile LEGALLAIS – France

Université de Compiègne (UTC)

A fluidized bed for a bioartificial liver

Thus the team of Mrs Cécile Legallais from Université de Technologie de Compiègne (UTC) in collaboration with the team of C. Selden in Royal Free Hospital of London developed the biological component of an artificial liver, using human hepatic cell lines cultured in a 3-D configuration. It allows providing externally liver's key functions to a patient. Now the team needs to develop a sterilizable human-sized bioreactor to house sufficient cells encapsulated in alginate beads to provide liver function for 6–12 hour periods.

Josué BRUGINSKI DE PAULA – Brazil

Catholic University of Parana, Curitiba

The artificial sphincter – for a better life

Josué Bruginski de Paula from the Catholic University of Paraná in Brazil presents a project using an existing prototype: AICO I – an artificial sphincter based on physiological principles of the anal sphincter and on a feasibility study in vitro, in order to determine if it would be possible to replace the sphincter muscle's power by an electric motor, and the muscle's mechanic action by a band pulled by the motor and placed around the stoma (an opening of the intestine trough the abdominal wall).

The conclusion was positive and the final aspect was a triangular shape, 9.85 cm max length, 3.3 cm max height and 194 g weight. A second prototype AICO II has been planned.

Latif RACHDI – France

INSERM/ Necker Faculty, Paris

Survey model of pancreatic development for the treatment of diabetes

Nowadays, more than 200 million people in the world suffer from diabetes. Diabetes type 1 and 2 result from an insufficient production of insulin by pancreatic beta cells. Transplantation of beta cells represents a promising therapy for all diabetic patients who have to follow a daily insulin treatment. Thus, M. Latif RACHDI and his partners Bertrand Blondeau and Frank Yates, researchers at INSERM propose to use and differentiate human embryonic stem cells in functional beta cells. They will then develop a protocol of long-lasting graft of these cells to diabetic patients.



The jury

President of the jury

Pierre TAMBOURIN – Chief Executive of Genopole.

“The Altran Foundation Award has now gained a prestigious reputation in the realm of innovative technologies. As Genopole director and vice President of Medicen, it is important for me to contribute to the development of biotechnology companies, and this initiative by the Altran Foundation can only spur the best talents. This is why I agreed to be the President of the Jury for the 2007 Altran Foundation Award.”

Luc d'AURIOL – France

Genset's co-founder and Consultant at Genopole

Falko BUSSE – Germany

Vice President of Philips Research

Antonio COUTINHO – Portugal

Director of the Gulbenkian Science Institute, member of the Board of Trustees of the Champalimaud Foundation, Professor of Immunology at Lisbon Medical School

Andrew DUNDON – United Kingdom

Director Device Technology at GSK

André GOUAZE – France

President of the French speaking Health Faculties Deans' Conference (CIDMEF)

Klaus-Peter HOFFMANN – Germany

Head of the Department Medical Engineering & Neuroprostheses at the Fraunhofer Institut für Biomedizinische Technik (Fraunhofer Institute for Biomedical Engineering) in St. Ingbert

Renato LAURO – Italy

Dean of Faculty and Full Professor of Internal Medicine at the University of Rome “Tor Vergata” Medical School

Rafael MATESANZ – Spain

Director of the National Transplant Commission and President of the Spanish American Transplant and Donation Council

Jacques MATHIEU – Belgium

Chief of radiology department in Brugmann University Hospital

Philippe PAILLARD – France

Orthopaedic surgeon at the Clinic des Lilas – Practitioner at the Pitié Salpêtrière Hospital

Alexandre QUINTANILHA – Portugal

Director of Molecular and Cell Biology Institute; President of Board of Directors of Instituto de Engenharia Biomédica and Professor at ICBAS

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Permanent Members

Edith ACKERMANN – United States of America

Honorary Professor of Developmental Psychology at the University of Aix-Marseille 1 and Visiting Scientist at the MIT, School of Architecture

Jean AUDOUZE – France

Research Director at CNRS and President of the Scientific Committee of the European Innovation&Research Exhibition

Wolf Peter FEHLHAMMER – Germany

President of ECSITE-D and former General Director of the Deutsches Museum in Munich

Marc VAINSEL – Belgium

PhD in paediatrics and General Administrator of the Foundation for disadvantaged Children of the ONE.