"La Caixa" Foundation promotes a CIC biomaGUNE project to restore motor functions of patients with spinal cord injuries

The innovative project led by CIC biomaGUNE's Ikerbasque research professor Maurizio Prato aims to create a solution based on carbon nanotubes

The CaixaImpulse Innovation 2023 call is helping to transfer the results of biomedical research to the general public and the market

Donostia-San Sebastian (Basque Country). 17 October, 2023. A project led by Ikerbasque research professor and AXA chair Maurizio Prato of CIC biomaGUNE has been selected in the CaixaImpulse 2023 call for proposals by a panel of international experts and professionals in the field of life sciences and health from among over 300 pioneering projects submitted to the call. The project, one of 29 innovative biomedical research projects with the potential to reach the market and the general public, will receive 50,000 euros from the program to boost its research, and also to provide support through individualized mentoring and training. "La Caixa" Foundation is thus seeking to assist innovative biomedical projects in validating their assets and specifying their exploitation and valorization strategy, in order to bring them closer to the market.

The project, led by one of the world's leading experts in graphene and carbon nanotubes, is proposing a novel solution for restoring motor functions in patients suffering from spinal cord injuries. CIC biomaGUNE's Carbon Bionanotechnology research team is seeking fresh evidence supporting the potential of small carbon nanotube implants to promote electrical reconnection at the site of injury and, consequently, the recovery of lost functions. Previously, "we have shown that carbon nanotube implants in small mammals allow them to regain activity soon after a paralyzing injury", said Prato. It has been possible to observe that providing a nanotube scaffold promotes the growth and synaptic/electrical reconnection of newly sprouted nerve fibers, leading to the recovery of lost functions, including motor functions, as well as strength and the sense of touch.

With their unique combination of morphology, strength, flexibility, biocompatibility and electrical conductivity, carbon nanotubes form a matrix that, according to Prof Prato, "constitutes the ideal artificial implant to induce neuronal growth, maturation, reconnection and repopulation of damaged tissue". The team is aiming to demonstrate the technical and economic feasibility of the proposed solution by improving the design of the implants and their production process, and by testing the restoration of motor function in small mammals in order to move on, in later stages, firstly to larger animals, and then to clinical trials.

About Maurizio Prato

A researcher since 1983 in the Department of Organic Chemistry at the University of Padua, Maurizio Prato was appointed associate lecturer in Organic Chemistry at the Faculty of Pharmacy of the University of Trieste in 1992, becoming a tenured lecturer in February 2000. Since 2015 he has been an Ikerbasque research professor and AXA chair at the cooperative research center CIC biomaGUNE. He received prestigious ERC grants in 2008 and 2020.

He was made a member of the following societies: the Accademia Nazionale dei Lincei in 2010, the European Academy of Sciences in 2013, the European Academy in 2015 and the Istituto Veneto di Scienze, Lettere ed Arti in 2018. In 2013 he was appointed honorary professor at Jiao Tong University in Xi'an, China. He has done research at the following universities: Texas Tech University, Lubbock, USA (1980); University College Dublin, Ireland (1983); University of Yale, (1986-87); and University of California, Santa Barbara, (1991-92). He was visiting professor in the Departments of Chemistry at the École Normale Supérieure in Paris in 2001, the University of Namur (Belgium) in 2010, the University of Strasbourg in 2014, and the University of Mons (Belgium) in 2018 within the framework of a Francqui Chair. The University of Salento recently conferred on him an honorary degree in "Medical Biotechnology and Nanobiotechnology". In 2021 Maurizio Prato was also accorded the NAI Fellow distinction by the National Academy of Inventors (NAI) for his contributions toward the advancement of science in various fields, and in 2022 he was appointed foreign academician by the Royal Academy of Exact, Physical and Natural Sciences of Spain (RAC). Prato was recently awarded the prestigious "E-MRS 5-Year Materials Impact Prize" (the highest award given by the European Materials Research Society E-MRS).

About CaixaImpulse Health Innovation 2023

"La Caixa" Foundation will be devoting 3.3 million euros to support 29 innovative biomedical projects with the potential to reach the market and the general public. These are projects being developed at 20 research centers, hospitals and universities in Spain and Portugal, and selected within the framework of the 2023 call of the new program CaixaImpulse Health Innovation. The initiative aims to encourage research to move out of the laboratory and reach patients in the form of solutions that can help to improve their health.

CaixaImpulse Innovation supports biomedical projects in the field of innovation and transfer by helping researchers validate their assets and specify their exploitation and valorization strategies so they can bring their projects closer to the market; so in addition to financial support they will also have access to mentoring, consultancy and guidance from international experts in various areas of the innovation ecosystem.

About CIC biomaGUNE

The Center for Cooperative Research in Biomaterials CIC biomaGUNE, member of the Basque Research and Technology Alliance (BRTA), conducts state-of-the-art research at the interface between Chemistry, Biology and Physics, devoting particular attention to studying the properties of biological nanostructures at the molecular scale and their biomedical applications. It was

recognized in 2018 as a “María de Maeztu” Unit of Excellence for meeting requirements of excellence, which are characterized by a high impact and degree of competitiveness in its field of activity on the global scientific stage.

Photo caption: Professor Maurizio Prato (in the centre) with part of his CIC biomaGUNE Carbon Bionanotechnology research group.