Press Release

”la Caixa” Foundation supports three innovative biomedical projects to help them transfer from the lab to the market and society

- **The CaixaResearch Consolidate 2022 call for proposals resulted in the selection of three promising innovative biomedical projects. Each will receive funding of 300,000 euros to help their innovations reach the market and society as a whole.**

- **The projects receiving this support focus on: the development of a new medical device to improve the monitoring of electrical brain signals in newborns and adults; new drugs to reduce pain; and a monoclonal antibody to treat cancer.**

- **Besides financial support, the researchers whose projects are selected in this call, aimed at promoting knowledge and technology transfer in the field of biomedicine and health, will also receive personalised mentoring and expert support.**

- **”la Caixa” Foundation promotes this support programme in cooperation with Caixa Capital Risc.**

Barcelona, 14 November 2022. In the framework of the CaixaResearch Consolidate call for proposals, ”la Caixa” Foundation has awarded three new grants to cutting-edge innovative biomedical projects. The ultimate goal of CaixaResearch Consolidate is to support mature projects such as the three now selected to enable them to take the step from the laboratory to the market and society, and to encourage the creation of new companies or solutions based on research with a view to improving people's health and quality of life.

The winners of this year's call are projects by: Rovira i Virgili University (URV), in consortium with researchers from the Pere Virgili Health Research Institute (IISPV), aimed at creating new medical devices to improve the monitoring of electrical brain signals in newborns and adults; the Bosch i Gimpera Foundation, of the University of Barcelona, in consortium with researchers from the University of Granada and the University of Catania, to develop new drugs

to reduce pain; and the Germans Trias i Pujol Research Institute (IGTP), to develop a new immunotherapy based on a monoclonal antibody to treat cancer.

These projects will each receive funding of 300,000 euros to assist in their development over the next two years. The support will be devoted to such areas as the technological development of the asset, studies for regulatory approval, recruitment of personnel and intellectual property management, among others.

The researchers will also receive personalised mentoring and other support, such as expert advice in drawing up development and marketing plans.

Since 2015, "la Caixa" Foundation has devoted 18 million euros to 173 innovative projects via CaixaResearch Validate – a call for proposals for innovations at their earlier stages – and CaixaResearch Consolidate. These projects have generated additional investment of more than 10 million euros and the establishment of 29 spin-offs.

*** The Annex below contains details on the objectives of the selected projects and the researchers leading them.**

Further information:

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ANNEX OF SELECTED PROJECTS IN THE CAIXARESEARCH CONSOLIDATE CALL 2022

Project: New medical devices to improve monitoring of electrical brain signals in newborns and adults

- Principal investigator: Albert Fabregat, Universitat Rovira i Virgili (URV)
- Consortium with: Vicenç Pascual Rubio, coordinator of the Clinical Neurophysiology Service of the Hospital Universitari Sant Joan de Reus and researcher at the Pere Virgili Health Research Institute (IISPV)
- Funding: 300.000 euros

Birth and the first hours of a newborn's life are considered a period of risk. A premature birth, a reduction in blood flow during birth or an infection can cause brain damage to the newborn that can result in varying degrees of disability. That is why early detection is essential, so that the appropriate therapies can be applied with the aim of minimising any harmful effects.

The technique most frequently used to study brain function in newborns placed in neonatal intensive care units (NICUs) is amplitude-integrated electroencephalography (aEEG), which consists of amplifying and recording the electrical activity of neurons in the brain. aEEG is used to detect the onset of brain damage, such as hypoxic encephalopathy or epilepsy. However, the recording devices used to capture the brain's electrical signal, electrodes, are not specifically designed for newborns. Electrodes for adults are often used, but these are not so suitable for newborns' small, sensitive heads. Moreover, recordings often take place over prolonged periods – from days to weeks – as it is necessary to monitor the newborn's brain function throughout their time in the NICU, and the electrodes do not adhere properly to such a small head. This lack of adherence leads to the appearance of artifacts in the aEEG recording that may hinder or prevent the correct interpretation of the signal obtained by the neonatologist, and this can result in inaccurate or even erroneous treatment of the newborn.

The researchers in this project have designed a new electrode specifically for newborns (aCUP-E), with the capacity to replace the electroconductive gel for prolonged recordings. The electrode is adapted to the cephalic characteristics of newborns, and is flexible and transparent, enabling better recording of brain activity, enabling early diagnosis of lesions and making it easier to monitor newborns. The electrode is already being tested in a clinical trial. The researchers have also developed an advanced system that enables these

electrodes to be positioned at specific anatomical points, individualised for each patient. The system, known as EPlacement, eliminates the potential errors that can occur during the positioning of electrodes on the head in clinical practice.

This new cranial point positioning system can be applied in both paediatric and adult patients and could also be useful for other diagnostic tests or electrophysiological treatments that require specific electrode positioning on the cranial surface, such as intraoperative neurophysiological monitoring or non-invasive brain stimulation.

Project: Developing new drugs to reduce pain

- Principal investigator: María del Carmen Ruiz Cantero, Universidad de Barcelona, Fundació Bosch i Gimpera
- Project leadered by the group of Santiago Vázquez and Eugènia Pujol, from Universidad de Barcelona, in consortium with Enrique J. Cobos del Moral, from Universidad de Granada, and Emanuele Amata and Agostino Marrazzo, from Universidad de Catania (Italy).
- Funding: 300.000 euros

Pain is a major public health problem. One in five people in Europe live with some form of chronic pain that impairs their quality of life and has considerable socio-economic impact, as well as high associated medical costs. Acute pain can also be relevant. Following surgery, more than half of all patients experience moderate or severe pain in the immediate postoperative period, despite receiving analgesic treatment (mainly opioid-based). Generally speaking, existing analgesics have very limited efficacy and significant side effects in more than half of patients. Clearly, then, safer, more effective and non-addictive therapies are needed.

In recent studies, the researchers found that interaction with two biological targets -two proteins involved in the onset and maintenance of pain – produces a very potent analgesic effect in several animal models of pain. The strength of these results led the researchers Dr. Santiago Vázquez Cruz and Dr. Eugènia Pujol Bech, from Pharmacy faculty of the Universidad de Barcelona, to develop new dual molecules capable of interacting with both targets, obtaining very promising results in pathological models of pain.

The aim of the project is to find a new treatment that can significantly reduce pain and so improve patients' lives.

Project: A monoclonal antibody to treat cancer

- Principal investigator: Maria Rosa Sarrias, Germans Trias i Pujol Research Institute (IGTP)
- Funding: 300.000 euros

The World Health Organisation names cancer as a leading cause of death worldwide: nearly 10 million people died from tumours in 2020 alone. Although multiple treatment options are available, few offer curative solutions.

The immune system acts as a sentinel for the appearance and growth of tumours. However, some tumour cells manage to “manipulate” this sentinel, “educating” it so that it does not recognise them as malignant and works in their favour, by producing blood vessels to supply them with nutrients and oxygen, for example. In response to this, therapies aimed at “re-educating” and boosting the immune system's reaction have been developed in recent decades, leading to a major breakthrough in the treatment of tumours for which there was previously no cure.

Immune cells known as macrophages play a key role in these treatments. These cells are also the most prevalent in tumours, making them a promising target for immune therapies.

In this project, the researchers aim to develop a new immunotherapy based on a molecule (monoclonal antibody) directed against tumour macrophages that could become a first-in-class treatment for cancer patients. The monoclonal antibody targets a critical checkpoint protein and reprogrammes macrophages for anti-tumour activity. In preclinical trials, administration of the antibody prevented lung tumour growth.

The project will enable the researchers to advance in studies of the effects of the antibody in cancer treatment and in its development as a preliminary step towards potential use in patients.