

Communication 2022 call results

Daniel Bravo Andreu Private Foundation awards grants to researchers at Sant Pau, Bellvitge and UPF to continue cutting-edge research in cardiology



Sant Just Desvern (Barcelona), 16 May 2022. The Daniel Bravo Andreu Private Foundation has awarded its grants for biomedical research stays at benchmark centres abroad to **Dr Verónica Jiménez** of the CIBERCV of Sant Pau Hospital–Sant Pau Research Institute (IIB Sant Pau)–Institute of Biomedical Research of Barcelona (IIBB-CSIC), PhD candidate **Carles Diez** of Bellvitge University Hospital–Bellvitge Biomedical Research Institute (IDIBELL) and PhD candidate **Pablo-Miki Martí** of Pompeu Fabra University (UPF).

Since 2013, the Daniel Bravo Andreu Private Foundation has supported scientific talent and promoted biomedical research with a high impact on academia, clinical practice and society in Catalonia through the Daniel Bravo Grants.

These grants allow researchers at public hospitals and research centres in Catalonia working in cardiology and non-invasive diagnostic techniques to do a three-to-nine month research stay, with a €3,000 stipend per month.

Finding genetic variants that cause atrial fibrillation

Dr Verónica Jiménez has been doing research since 2021 with the Cardiac Rhythm and Contraction Group at IIB Sant Pau and IIBB-CSIC, led by **Dr Leif Hove-Madsen**. Jiménez has

chosen to do a nine-month stay at the **BC Children's Hospital Research Institute** Cellular and Regenerative Medicine Centre in Vancouver to carry out the project *Functional impact of the 1q21 risk variant rs13376333 on calcium homeostasis and electrical stability in human stem cell derived atrial myocytes*. Her mentor there will be **Dr Glen F Tibbits**, co-director of the prestigious Canadian centre.

Recent studies have associated certain genetic variations with an increased risk of atrial fibrillation, the most common type of arrhythmia that affects between 1% and 2% of the population. The presence of atrial fibrillation doubles a patient's mortality rate. In many cases, the molecular mechanism responsible for this disease is unknown.

Dr Verónica Jiménez's research with the Daniel Bravo Grant aims to discover the mechanisms behind these genetic variants and any possible interactions. "This research can have a significant clinical impact, as it could be used for genetic analyses as a biomarker to identify people with a higher risk of developing atrial fibrillation and prevent the disease through personalised treatment of the patient," explains Dr Leif Hove-Madsen.

"The Daniel Bravo Grant is a great opportunity to continue my post-doc career in science. I think it will be an inspiring experience and allow me to acquire new skills and learn new advanced-research techniques that are very important in the field of cardiology," explains Jiménez.

The BC Children's Hospital Research Institute has one of the most advanced research facilities in the world for induced pluripotent stem cells to study cardiopathies and arrhythmias.

Improving clinical management of advanced heart failure

Carles Diez joined the Cardiology Unit at Bellvitge Hospital and the BioHeart research group at IDIBELL led by **Dr Josep Comin-Colet** in 2016. Diez is currently doing his PhD in medicine at the University of Barcelona.

Through several collaborations between the BioHeart research group and **Dr Ulrich Jorde**, a renowned expert in heart failure, and after getting the news of the Daniel Bravo Grant, Carles Diez set his sights on conducting a research project at the **Montefiore Medical Centre** in New York over nine months in order to improve clinical understanding and optimise management of advanced heart failure.

With the ageing population in developed countries, heart failure has become one of the main public health issues, despite the fact that treatments have improved patients' prognosis and quality of life. In the advanced stages of the disease, however, there is a persistent deterioration of patients' condition and the only therapeutic options are a transplant or mechanical circulatory support from a left ventricular assist device (LVAD).

"We know that anaemia and iron deficiencies are some of the factors associated with a faster progression of heart failure and patients' serious clinical deterioration," notes Dr Josep Comin-Colet. Through the project *Clinical impact and determinants of gastrointestinal angiodysplasia, anaemia and iron deficiency in patients with advanced heart failure*, awarded a grant from the

Daniel Bravo Andreu Private Foundation, they hope to determine the elements that favour anaemia and iron deficiency to optimise therapeutic strategies.

“The Daniel Bravo Grant is a unique opportunity to expand on existing synergies and share knowledge with healthcare and research professionals. It will undoubtedly help us improve clinical management of patients with advanced heart failure at our hospitals and, as a result, throughout the country,” highlights Diez.

Creating AI tools to identify optimum treatment

Biomedical engineer Pablo-Miki Martí, who is doing his PhD with the BCNMedtech research group in the UPF Department of Information and Communications Technologies with **Dr Bart Bijmens** as his mentor, will join the **Brigham and Women’s Hospital and Harvard Medical School** in Boston for nine months.

Martí will take part in the project *Machine learning insights on heterogeneous treatment effects in cardiovascular syndromes* led by **Dr Scott Solomon**. The goal of the study is to use unsupervised artificial intelligence (AI) to create tools that can identify the best treatment for each patient based on their echocardiograms.

In supervised AI, an algorithm is trained with data that has already been categorised in order to predict new data. With unsupervised AI, the algorithm itself is responsible for finding the best way to represent the data without any prior knowledge.

The project will look for groups of similar patients based on heart function, called phenogroups. Based on these phenogroups, it will establish different phases of the disease, find underlying mechanisms and analyse which therapy has been most effective in each patient.

“The tools we develop will be able to categorise new patients and have the potential to help doctors make decisions in a clinical setting with a large amount of highly diverse data,” explains Dr Bart Bijmens.

Additionally, the phenogroups they find may help regulatory bodies establish clinical guidelines.

“The Daniel Bravo Grant will allow me to do a stay at one of the most prestigious universities in the world and be in contact with elite scientists in this field of AI,” concludes Pablo-Miki Martí. Pablo-Miki Martí, Verónica Jiménez and Carles Diez all hope to apply this learning when they return to their home institutions in Catalonia.