

**PhD Position: Program INPhINIT Fundació La Caixa**

**“Molecular mechanisms connecting cardiac and metabolic dysfunction. Diagnostic and therapeutic opportunities”**

**(Dr. Vicenta Llorente-Cortés)**

**CENTRE: IIB SANT PAU - Fundació Institut de Recerca de l’Hospital de la Santa Creu i Sant Pau**

ADDRESS: C/ Sant Quintí 77- 79, 08041 Barcelona / [www.recercasantpau.cat](http://www.recercasantpau.cat)

**CENTRE DESCRIPTION**

The Research Institute of the Hospital de la Santa Creu i Sant Pau (HSCSP-IR) was created on 4 June 1992 as a private scientific foundation. Its mission is to promote basic, clinical, epidemiological and healthcare research in the health science and biomedical fields, with the ultimate aim of improving the health of the population. On 10 December 2003, the Autonomous Government of Catalonia approved affiliation of the HSCSP-IR as a University Research Institute attached to the Autonomous University of Barcelona (UAB).

The HSCSP-IR has as its mission to improve the health and quality of life of the population through the production and dissemination of scientific knowledge, the training of researchers to an international standard, innovation in health and the incorporation of medical advances in clinical practice and in healthcare policies.

The HSCSP-IR is currently one of the most active research centres in Catalonia, especially in relation to translational research and the application of new discoveries to clinical practice. Since 2011 it has been part of the Catalan System of Research Centres (CERCA).

On 17 May 2009, the HSCSP-IR and nine other organizations created the Sant Pau Biomedical Research Institute (IIB Sant Pau), with the aim of strengthening collaborative translational research and bridging the gap between basic research and clinical practice so as to ultimately improve patient care.

AREA OF KNOWLEDGE: Life Sciences Panel

**GROUP LEADER: Dr. Concepción Vicenta Llorente-Cortés / [cllorente@santpau.cat](mailto:cllorente@santpau.cat)**

## RESEARCH PROJECT/RESEARCH GROUP

Web page that describes the member composition and main challenges of each research group of Sant Pau Biomedical Research Institute

<http://www.recercasantpau.cat/es/grupo/lipidos-y-patologia-cardiovascular/>

## POSITION DESCRIPTION

-Research Project / Research Group Description:

Given the morbidity and mortality of type 2 diabetes mellitus (DM2), it is urgent to find biomarkers reflecting mechanisms connecting cardiovascular and metabolic alterations. Our aims are to know whether cardiac LRP1-mechanisms play a role in cardio-metabolic alterations and the potential of mechanism-related circulating biomarkers to stratify cardio-metabolic risk in DM2 patients. To achieve these aims, we have a diabetic mice with inactivation of cardiac LRP1 and a DM2 patient group without previous hypoglycemic treatment. Imaging-based characterization (echocardiography, CT, NMR) of cardio-metabolic functions will give parameters of cardiac function, cardiac remodeling, epicardial fat volume and hepatic steatosis in patients and mice. Fatty acid (FA) bio-distribution and FA oxidation activity will be analyzed through biochemical, molecular, radioactive FA labeling and enzymatic methods in mice. Identification of circulating biomarkers in plasma will be performed through proteomics and high-throughput sequencing (HTS). By the end of the project, we expect to have a proof of concept that cardiac LRP1 plays a pivotal role in the progression of DM2, and to have new clinically useful biomarkers.

The group searches new molecular mechanisms underlying pathological alterations in the cardiovascular system to find innovative treatments and new biomarkers with prognostic and diagnostic value in atherosclerosis and cardiomyopathies. Our translationality is based on a fruitful collaboration with clinicians which are updated about the main non-covered needs of patients. The group has actually 80 international publications and 3 patents, and we have been recently granted with two projects characterized by their high potential to be incorporated to the productive sector, one of them coordinated by a biotech. We have active national and international collaborations with experts in exclusive technologies, and with companies able to translate findings into new clinical tools.

**-Job position description:**

Dear applicant,

The group is pleased to offer you the possibility to develop a PhD project in Biomedical Research in an exceptional and unique clinical environment, Hospital de la Santa Creu I Sant Pau. This project fits into the European priorities of the Health challenge since it will contribute to improve the diagnosis and prevention of cardio-metabolic complications in type 2 diabetes

(DM2). IIB-SantPau have technology platforms including cell culture and animal facilities, genomic and transcriptomics, bioinformatics, microscopy and Bio-banc that will facilitate the successful development of the project. Our expertise will contribute to improve your skills in experimental design, technical processing of samples, and analysis and interpretation of results. You will manage cellular and molecular biology, biochemical determinations, development of new experimental models, imaging-based measurements and immunohistochemistry and confocal microscopy experiments. Our active collaboration with biophysics will increase your knowledge on biophysical techniques useful to characterize the cardiovascular system from a complementary technical perspective. Our collaboration with experts in metabolism will allow you to handle metabolic-specific in vivo measurements such as fatty acid bio-distribution, determination of fatty acid  $\beta$ -oxidation (FAO) activity, oxygen consumption (VO<sub>2</sub>) and CO<sub>2</sub> production (VCO<sub>2</sub>). The wide variety of sources for experimental data will be a challenge for you to learn how to manage and integrate all parameters to obtain the maximum performance in each study. Face-to-face meetings with basic researchers and clinicians will be key to interpret and extrapolate the findings to the clinical context. Our collaboration with biotechs will help you to be familiar with standardization processes required to prove the efficacy of new developed diagnostics and therapeutic tools. We invite you to become part of the team to participate in this translational project.

#### **OTHER RELEVANT WEBSITES**

Web site of CIBERCV, center for biomedical research in the network of cardiovascular diseases <https://www.cibercv.es/grupos/grupo-de-investigacion/ficha-personal?id=22819>

