

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

**Liquid Biopsies in cardiovascular disease prediction: Circulating extracellular vesicles and non-coding RNAs**

**(Dr. Teresa Padró Capmany)**

**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. Teresa Padró Capmany / [tpadro@santpau.cat](mailto:tpadro@santpau.cat)**



## RESEARCH PROJECT/RESEARCH GROUP

It includes a brief description of the main lines and challenges of research of the group as well as information about the team and the scientific output

<http://www.recercasantpau.cat/es/grupo/biomarcadores-de-la-evolucion-de-la-enfermedad-cardiovascular/>

## POSITION DESCRIPTION

-Research Project / Research Group Description:

The research group led by Dr. Teresa Padro at the Research-Institute -Hospital Santa Creu i Sant Pau focuses on the study of novel biomarkers on the cardiovascular field. Scientists with a multidisciplinary background are part of the team that has as objective to identify and characterize key molecular and cellular markers in atherosclerosis progression, vascular remodelling and atherothrombosis as well as to validate their value as biomarkers to improve diagnosis and prognosis of cardiovascular and ischemic disease. Research activity is supported by competitive public funding and results are published in scientific journals of high impact factor in the field, being transference of the obtained results to practice a major issue for the research group. In addition, the research group is highly involved in the formation and training of graduated students.

Regarding the research project, availability of specific biomarkers to identify changes in cardiovascular disease (CVD) progression that end up in an event presentation is still an unmet clinical need. Until now, classical biomarkers in combination with conventional risk estimation algorithms have led to only slight improvement in CVD event prediction. Circulating extracellular vesicles (exosomes and microvesicles) due to their specific feature as carriers of RNAs (miRNA, lncRNAs and mRNAs) and proteins derived from the parental cells provide precise bioprints of defined pathophysiological scenarios and consequently have turned as ideal biomarker candidates of disease evolution.

The current proof-of-concept research project, using flow cytometry and post-genomic approaches, aims to investigate whether circulating exosomes and microvesicles, in well controlled subjects at high cardiovascular risk, are loaded with a differential pattern of miRNAs, lncRNAs and/or proteins that could serve to identify patients with active atherosclerotic plaque progression and incident cardiovascular events

**-Job position description:**

The predoctoral position refers to the study of extracellular vesicles, miRNAs and lncRNAs in liquid biopsies of subjects at high risk of cardiovascular disease.

The research group is participating since more than 10 years in the national network SAFEHEART, a long-term prospective cohort study of a well-defined familial

hypercholesterolemia (FH) population. The research group is in charge of the cohort sample repository, with liquid biopsies from more than 4000 subjects including patients with genetic diagnostic of FH and non-FH relatives.

The research activities carried out by the predoctoral fellow will aim to:

- (1) Identify and characterize differential pattern of miRNAs and lncRNA in liquid biopsies of patients with genetic diagnostic of FH and progressing atherosclerosis ending in clinical CVD events.
- (2) Characterize the phenotype and cell-marker profile of the circulating extracellular vesicle fraction (liquid biopsies) and investigate the association with the differential pattern of miRNAs / lncRNA.
- (3) Use systems biology analysis to combine the high throughput data sets derived from “omic” studies and identify regulatory pathways related to disease progression in FH patients.
- (4) Statistical studies for validation of selected miRNAs and lncRNAs as molecular biomarkers of disease progression according imaging studies (TC, MNR) and CVD risk stratification and presentation of hard-ischemic events.
- (5) Documenting and writing the research work and results is a crucial part of the predoctoral position. The Fellow will be responsible of writing the manuscripts and presenting the study results in national and international congresses.

Due to the study design and the objectives to be achieved, the candidate should have a bachelor/master degree in biological sciences or similar, experience working in molecular biology techniques, good computational aptitudes and knowledge in the use of statistical tools and database

#### **OTHER RELEVANT WEBSITES**

Red CIBERCV: <https://www.ciberisciii.es/areas-tematicas/grupo-de-investigacion?id=22840>

