

Lipids and Cardiovascular Pathology

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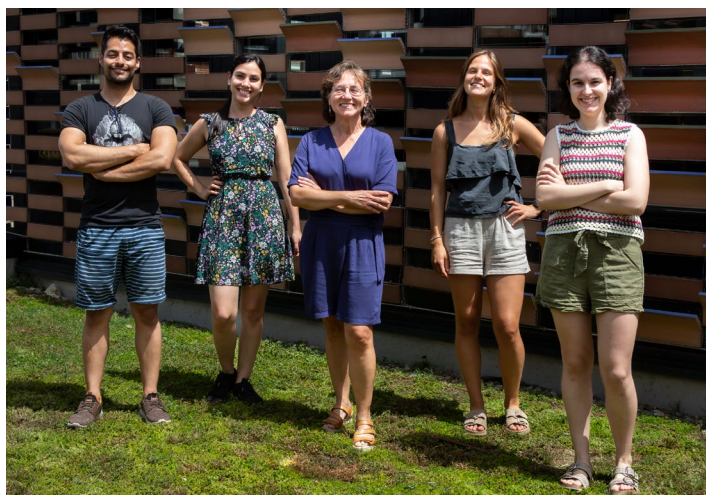
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DESCRIPTION

Our group focuses its activity on the cardiovascular area, and on the study of the mechanisms related to the impact of modified lipoproteins on the functional alterations of vascular and cardiac cells. We have identified new molecular mechanisms underlying the abnormal cholesteryl ester accumulation in intracellular suborganelle, as well as the pathological consequences for cardiac function. We have identified new peptide and omics biomarkers with diagnostic and prognostic value in cardiovascular diseases, and we are currently developing innovative treatments potentially transferable to humans.

MAIN LINES OF RESEARCH

- Identification of new connecting axes of cardiac and hepatic functionality and their consequences in the regulation of metabolism and body weight.
- Applicability of LRP1-based assets for the treatment of pancreatic cancer.
- Development of innovative LRP1-based peptides against Tau fibrillation.
- Development of humanized anti-LRP1 monoclonal antibodies to comprehensively block atherosclerosis and heart failure.
- Integration of clinical, and experimental data (in vitro and in vivo models) and modeling to improve the prediction of atherosclerotic plaque progression towards clinical events.

SCIENTIFIC CHALLENGES

- To develop new peptides with efficiency against Tau fibrillation in the brain.



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- To develop a monoclonal antibody with efficacy to block heart failure onset and progression.
- To find new circulating biomarkers with predictive value for atherosclerotic plaque progression towards clinical events.
- To identify new dyslipidemia-related mechanisms involved in pancreatic cancer progression.

ACTIVE GRANTS

- Llorente Cortés, Concepción Vicenta. The role of ABCB10 posttranslational modifications in cardiovascular disease. Proyectos BBQ-CSIC 2022. Duration: 2022-2023. 10.000,00 € (IIBB-CSIC).
- Llorente Cortés, Concepción Vicenta. Differential LRP1 interactome in Foam Vascular Smooth Muscle cells as a source of coronary risk biomarkers in liquid biopsy. PI21/01523. Instituto de Salud Carlos III (ISCIII). Duration: 2022-2024. 214.170,00 € (IIBB-CSIC).
- Llorente Cortés, Concepción Vicenta. Translational Molecular Imaging for Detection of Cholesterol Entrapment in the Vasculature with ⁶⁸Ga-labeled LRP1-derived Peptides (PlaqueCHOL). BBVA 2019. Fundación BBVA. Duration: 2020-2023. 125.000,70 €.

GRANTS AWARDED

- Llorente Cortés, Concepción Vicenta i Belbin, Olivia. LRP1-based peptides as an anti-Tau therapeutic strategy for neurodegenerative diseases (PepTau). INN00061. Fundació Privada HSCP (INNOPAU). Duration: 2024-2026. 50.000,00 €.

SCIENTIFIC PRODUCTION

- Dato VA, Paz MC, Rey FE, Sánchez MC, Llorente V, Chiabrando GA, Ceschin DG. Transcriptional analysis reveals that intracellular lipid accumulation impairs gene expression profiles involved in insulin response-associated cardiac functionality. *Scientific Reports*. 2023; 13(1):8761. DOI:10.1038/s41598-023-35951-6. PMID:37253991. IF:4,600 (Q2/4D). Document type: Article.
- García E, Camps P, Puig N, Fernández A, Aguilera A, Benitez A, Solé A, Vilades D, Sánchez JL, Martí J, Jiménez E, Benitez S, Llorente V. Soluble low-density lipoprotein receptor-related protein 1 as a surrogate marker of carotid plaque inflammation assessed by ¹⁸F-FDG PET in patients with

a recent ischemic stroke. *Journal of Translational Medicine*. 2023; 21(1):131. DOI:10.1186/s12967-022-03867-w. PMID:36805772. IF:7,400 (Q1/3D). Document type: Article.

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- Lee M, Canyelles M, Tondo M, Rotllan N, Kovanen PT, Llorente V, Escola JC. Obesity-induced changes in cancer cells and their microenvironment: Mechanisms and therapeutic perspectives to manage dysregulated lipid metabolism. *SEMINARS IN CANCER BIOLOGY*. 2023; 93DOI:10.1016/j.semcancer.2023.05.002. PMID:37156344. IF:14,500 (Q1/1D). Document type: Article.
- Rossi G, Belmonte T, Rivas A, Benitez S, Rotllan N, Crespo J, Llorente V, Sánchez JL, de Gonzalo D. Circulating lipoprotein-carried miRNome analysis reveals novel VLDL-enriched microRNAs that strongly correlate with the HDL-microRNA profile. *BIOMEDICINE & PHARMACOTHERAPY*. 2023; 162:114623. DOI:10.1016/j.biopha.2023.114623. PMID:37023624. IF:7,500 (Q1/1D). Document type: Article.
- Samouillan V, García E, Benitez A, Lhoest MTL, Dandurand J, Dato VA, Guerra JM, Escola JC, Chiabrando G, Enrich C, Llorente V. Inhibitory Effects of LRP1-Based Immunotherapy on Cardiac Extracellular Matrix Biophysical Alterations Induced by Hypercholesterolemia. *JOURNAL OF MEDICINAL CHEMISTRY*. 2023; 66(9)DOI:10.1021/acs.jmedchem.2c02103. PMID:37116069. IF:7,300 (Q1/1D). Document type: Article.
- Soler MC, Romero MD, Todorovic M, Delgado K, Calatayud C, Benitez A, Lhoest MTL, Mera P, Zagmutt S, Bastias M, Ibeas K, Casals N, Escola JC, Llorente V, Consiglio A, Serra D, Herrero L. Implantation of CPT1AM-expressing adipocytes reduces obesity and glucose intolerance in mice. *METABOLIC ENGINEERING*.



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