Lipids and Cardiovascular Pathology

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DESCRIPTION

Our group focuses its activities on the cardiovascular area, and novel molecular mechanisms involved in vascular and myocardial cholesterol accumulation and new circulating biomarkers of cardiovascular risk. We have designed new compounds that inhibit deregulated cholesterol uptake by vascular cells and cardiomyocytes. We have available humanised models of atherosclerosis and heart failure, helpful in conducting proof-of-concept studies on the efficacy of new monoclonal antibodies and peptides, as well as an innovative artificial vessel system, which will enable the assessment of the pro-atherogenic potential of sera and LDLs from patients.

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. (Llorente Cortes, Concepción Vicenta).
- Applicability of LRP1-based assets for the treatment of pancreatic càncer. (Llorente Cortes, Concepción Vicenta).
- Development of innovative LRP1-based peptides against Tau fibrillation. (Llorente Cortes, Concepción Vicenta).
- Development of humanized anti-LRP1 monoclonal antibodies to comprehensively block atherosclerosis and heart failure. (Llorente Cortes, Concepción Vicenta).

- Integration of clinical, experimental data (in vitro and in vivo models) and modeling to improve the prediction of atherosclerotic plaque progression towards clinical events. (Llorente Cortes, Concepción Vicenta).

SCIENTIFIC CHALLENGES

- To develop new therapeutic tools targeting intracellular cholesteryl ester accumulation in vascular, cardiac, and tumor cells to improve the treatment of patients with cardiovascular and metabolic alterations.
- To identify new circulating biomarkers of cardiovascular and metabolic risk to improve the diagnosis and prognosis of cardiovascular and metabolic diseases.

ACTIVE & AWARDED GRANTS

- Llorente Cortes, 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: 2020-2024. 125.000,70 €
- 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 Cortes, 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 €
- Llorente Cortés, Concepción Vicenta. Mitochondrial dysfunction caused by lipoproteins as a new therapeutic target in heart failure. PI24/00618. Instituto de Salud Carlos III (ISCIII). Duration: 2024-2029. 202.500,00 € (IIBB-CSIC)
- Llorente Cortés, Concepción Vicenta. Development of anti-Tau aggregation peptides as a new therapy for neurodegenerative diseases. 2024 LLAV 00002. Agència de Gestió d'Ajuts Universitaris i de Recerca (AGAUR). Duration: 2024-2025. 25.000,00 € (IIBB-CSIC)

SCIENTIFIC PRODUCTION

- La Lhoëst MTL, Martínez A, Claudi L, García E, Benítez A, Polishchuk A, Piñero J, Vilades D, Guerra JM, Sanz F, Rotllan N, Escolà JC, Llorente V. Mechanisms modulating foam cell formation in the arterial intima: exploring new therapeutic opportunities in atherosclerosis. Frontiers in Cardiovascular Medicine. 2024; 11:1381520. DOI:10.3389/fcvm.2024.1381520. PMID:38952543. IF:2,800 (Q2/4D). Document type: Review.
- Borràs C, Canyelles M, Girona J, Ibarretxe D, Santos D, Revilla G, Llorente-Cortes V, Rotllan N, Kovanen PT, Jauhiainen M, Lee-Rueckert M, Masana L, Arrieta F, Martínez-Botas J, Gómez-Coronado D, Ribalta J, Tondo M, Blanco-Vaca F, Escolà-Gil JC. PCSK9 Antibodies Treatment Specifically Enhances the Macrophage-specific Reverse Cholesterol Transport Pathway in Heterozygous Familial Hypercholesterolemia. JACC Basic Transl Sci. 2024 Aug 28;9(10):1195-1210. doi: 10.1016/j.jacbts.2024.06.008. PMID: 39534644; IF:8,400 (Q1/1D). Document type: Article.