Regulatory Mechanisms of Cardiovascular Remodelling

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DESCRIPTION

Our group addresses different aspects of vascular biology, thrombosis and myocardial pathophysiology aimed at studying the mechanisms underlying the onset, progression and complications of cardiovascular diseases (CVDs) with high morbidity and mortality, such as atherosclerosis, aortic aneurysms, cardiac hypertrophy and myocardial infarction. Our ultimate goal is to develop tools for early diagnosis and new therapeutic strategies for these diseases.

MAIN LINES OF RESEARCH

- L1. Extracellular matrix (ECM) integrating and modifies proteins in CVDs (Rodríguez Sinovas, Cristina).
- L2.The nuclear receptor NOR-1 in coronary artery disease, abdominal aortic aneurysm (AAA) and cardiac function and remodeling after myocardial infarction (Martínez González, José).

SCIENTIFIC CHALLENGES

- Analysis of the molecular basis of abdominal aortic aneurysm: Identification of new therapeutic targets.
- Physiopathological mechanisms underlying the development of thoracic aortic aneurysm in syndromic patients.
- Identification of new biomarkers and therapeutic targets in hypertensive cardiac hypertrophy and myocardial infarction.

- Analysis of the molecular mechanisms underlying cardiovascular calcification.
- Identification and validation of novel pharmacological tools in cardiovascular diseases.
- Development and characterisation of new animal models in cardiovascular diseases

ACTIVE & AWARDED GRANTS

- Martínez González, José. El enzima lisil oxidasa (LOX) en la aterosclerosis y la calcificación: estudio en un modelo de aterosclerosis experimental y en válvulas aórticas humanas calcificadas. Fundación Española de ArteRíosclerosis (FEA)- Sociedad Española de ArteRíosclerosis (SEA). Duration: 2022-2025. 15.000,00 €
- Martínez González, José. RESolution of inflammation after myocardial injury through Targeting novel regulatory moleculEs. Fundació La Marató de TV3. Duration: 2024-2027. 150.000,00 € (CSIC-IIBB)
- Martínez González, José. Deciphering the role of NOR-1 in abdominal aortic aneurysm progression, cardiac arrhythmogenesis, and cardiac function and remodeling after myocardial infarction (NORemolCar) (PID2021-122509OB-I00). MICIN. Duration: 2022-2025. 242.000,00 € (CSIC-IIBB)
- Martínez González, José. Inflammation and Cardiovascular Damage in Lung Cancer: Studying the Role of Immunomodulatory Therapies in Reducing Cardiotoxicity and Vascular Injury. InCaRe Intramural project CIBERONC/CIBERCV called 2023. Duration: 2024-2025. 65.000,00 € (CIBER)
- Martínez González, José. CIBER de Enfermedades Cardiovasculares (CIBERCV). CB16/11/00257. 61.000,00 €/year (CIBER)
- Rodríguez Sinovas, Cristina. Descifrando el potencial de LOX y de la proteína matricelular TSP4 como nuevas dianas terapéuticas en la aterosclerosis y el aneurisma de aorta abdominal. PI21/01048. Instituto de Salud Carlos III (ISCIII). Duration: 2022-2024. 226.270,00 €
- Rodríguez Sinovas, Cristina. Impacto del ácido bempedoico sobre la inflamación y el remodelado vascular en el aneurisma aórtico abdominal. Un estudio de reposicionamiento terapéutico. F. EUGENIO Rodríguez PASCUAL 2022. Fundación Eugenio Rodríguez Pascual. Duration: 2023-2024. 24.990,00 €
- Rodríguez Sinovas, Cristina. Impacto de la inhibición de la ATP citrato liasa (ACLY) sobre la respuesta inflamatoria y la huella epigenética en la hipercolesterolemia y el aneurisma de aorta abdominal. Fundación Española de Arterioesclerosis. FEA 2024. Duration: 2024-2026. 15.000,00 €
- Rodríguez Sinovas, Cristina. La ATP citrato liasa como diana farmacológica en enfermedades cardiovasculares: aproximaciones preclínicas, clínicas y ómicas. PI24/00613. Instituto de Salud Carlos III (ISCIII). Duration: 2025-2027. 227.500,00 €
- Rodríguez Sinovas, Cristina. La ATP citrato liasa (ACLY) como nueva diana terapéutica en la hipertrofia cardiaca y el aneurisma de aorta abdominal. Sociedad Española de Cardiologia (SEC). SEC 2024-1. Duration: 2024-2028. 15.000,00 €

DOCTORAL THESES DEFENDED

- Puertas Umbert, Lídia. Investigating abdominal aortic aneurysm mechanisms: searching for new therapeutic targets to restrain inflammation and vascular remodeling. 21/06/2024. Universitat de Barcelona. Supervisors: Rodríguez Sinovas, Cristina; Martínez González, José.

SCIENTIFIC PRODUCTION

- Ballester C, Alonso J, Cañes L, Vázquez P, García AB, Rodríguez C, Martínez J. Lysyl Oxidase in Ectopic Cardiovascular Calcification: Role of Oxidative Stress. Antioxidants. 2024; 13(5):523. DOI:10.3390/antiox13050523. PMID:38790628. IF:6,000 (Q1/2D). Document type: Article.
- Ballester C, Alonso J, Taurón M, Rotllán N, Rodríguez C, Martínez J. Lysyl oxidase expression in smooth muscle cells

determines the level of intima calcification in hypercholesterolemia-induced atherosclerosis. Clinica E Investigacion En ArteRíosclerosis. 2024; 36(5). DOI:10.1016/j.arteri.2024.01.003. PMID:38402026. Document type: Article.

- Ballester C, Cañes L, Alonso J, Puertas L, Vázquez P, Taurón M, Roselló E, Marín F, Rodríguez C, Martínez J. Upregulation of NOR-1 in calcified human vascular tissues: impact on osteogenic differentiation and calcification. Translational Research. 2024; 264DOI:10.1016/j.trsl.2023.09.004. PMID:37690706. IF:6,400 (Q1/1D). Document type: Article.
- Consegal M, Miró E, Barba I, Ruiz M, Inserte J, Benito B, Rodríguez C, Ganse FG, Rubío L, Llorens C, Ferreira I, Rodríguez A. Connexin 43 modulates reverse electron transfer in cardiac mitochondria from inducible knock-out Cx43^{Cre-ER(T)/fl} mice by altering the coenzyme Q pool. BASIC RESEARCH IN CARDIOLOGY. 2024; 119(4). DOI:10.1007/s00395-024-01052-2. PMID:38724619. IF:7,500 (Q1/1D). Document type: Article.
- Díaz A, Lope S, Pérez B, Vázquez P, Rodríguez M, Briones AM, Navarro X, Penas C, Jiménez F. Transient cerebral ischaemia alters mesenteric arteries in hypertensive rats: Limited reversal despite suberoylanilide hydroxamic acid cerebroprotection. LIFE SCIENCES. 2024; 359:123247. DOI:10.1016/j.lfs.2024.123247. PMID:39547431. IF:5,200 (Q1/2D). Document type: Article.
- Lozano M, Gamero A, Nava EJ, García MR, Fernández T, Pérez A, Pérez P, Kouiti M, Pérez E, Almendra R. Analysis of the inclusion of study design in the titles of articles published in the Spanish Journal of Human Nutrition and Dietetics during the period 2022-2024. Revista Espanola De Nutricion Humana Y Dietetica. 2024; 28(3). DOI:10.14306/renhyd.28.3.2317. Document type: Article.
- Marqués J, Ainzúa E, Orbe J, Martínez M, Martínez J, Zalba G. NADPH Oxidase 5 (NOX5) Upregulates MMP-10 Production and Cell Migration in Human Endothelial Cells. Antioxidants. 2024; 13(10):1199. DOI:10.3390/antiox13101199. PMID:39456453. IF:6,000 (Q1/2D). Document type: Article.
- Puertas L, Puig N, Camacho M, Dantas AP, Marín R, Martí J, Jiménez E, Benítez S, Camps P, Jiménez F. Serum from Stroke Patients with High-Grade Carotid Stenosis Promotes Cyclooxygenase-Dependent Endothelial Dysfunction in Non-ischemic Mice Carotid Arteries. Translational Stroke Research. 2024; 15(1). DOI:10.1007/s12975-022-01117-1. PMID:36536168. IF:3,800 (Q1/3D). Document type: Article.
- Puertas-Umbert L, Alonso J, Roselló-Díez E, Santamaría-Orleans A, Martínez-González J, Rodríguez C. Rolipram impacts on redox homeostasis and cellular signaling in an experimental model of abdominal aortic aneurysm. CLINICA E INVESTIGACION EN ARTERíosCLEROSIS. 2024; 36(3):108-117. DOI:10.1016/j.arteri.2023.11.004. PMID:38061958. IF: 1,900 (Q3/6D). Document type: Article.