

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 complication 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 modifying proteins in CVDs (PI: Dr. C. Rodríguez).
- L2. The nuclear receptor NOR-1 in coronary artery disease, abdominal aortic aneurysm (AAA) and cardiac function, and remodeling after myocardial infarction (PI: Dr. J. Martínez-González).

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.



05.1.1 Cardiovascular Diseases Area

- Development and characterization of new animal models in cardiovascular diseases.

ACTIVE GRANTS

- Ballester Servera, Carme. Ayuda de formación de profesorado Universitario. FPU19/05257. Ministerio de Educación Cultura Y Deporte. Duration: 2020-2024. 89.286,00 € (CSIC).
- Martinez Gonzalez, Jose. El receptor nuclear NOR-1 en la homeostasis del calcio, el estrés oxidativo y la arritmogénesis cardíaca. Fundación Española del Corazón (FEC)-Sociedad Española de Cardiología (SEC). Duration: 2022-2026. 15.000,00 € (CIBER).
- Martinez Gonzalez, Jose. 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 Arteriosclerosis (FEA)- Sociedad Española de Arteriosclerosis (SEA). Duration: 2022-2025. 15.000,00 €.
- Martinez Gonzalez, Jose. 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).
- Puertas Umbert, Lidia. Contractes PFIS: Contractes Predoctorals de Formació en Recerca en Salut 2019. FI19/00331. Instituto de Salud Carlos III (ISCIII). Duration: 2020-2023. 82.400,00 €.
- 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 €.

GRANTS AWARDED

- Martinez Gonzalez, Jose. RESolution of inflammation after myocardial injury through Targeting

novel regulatory molecules. Fundació La Marató de TV3. Duration: 2024-2027. 150.000,00 € (CSIC).

- Martinez Gonzalez, Jose. 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. 65.000,00 € (CIBER).

DOCTORAL THESES DEFENDED

- Ballester Servera, Carme. Mecanismos de remodelado y calcificación cardiovascular: papel del receptor nuclear NOR-1 y la LOX. 16/10/2023. Universitat de Barcelona. Supervisors: Martínez González, José; Rodríguez Sinovas, Cristina; Tauler Girona, Albert. <http://hdl.handle.net/10803/689493>.

SCIENTIFIC PRODUCTION

- Ballester C, Alonso J, Cañes L, Vázquez P, Puertas L, Fernández A, Taurón M, Rodríguez A, López N, Rodríguez C, Martínez J. Lysyl oxidase-dependent extracellular matrix crosslinking modulates calcification in atherosclerosis and aortic valve disease. *BIOMEDICINE & PHARMACOTHERAPY*. 2023; 167:115469. DOI:10.1016/j.biopha.2023.115469. PMID:37729730. IF:7,500 (Q1/1D). Document type: Article.
- Bonilla DA, Daga R, Gamero A, Pérez A, Pérez E, Pérez P, Petermann F, Lozano M, García MR, Kouiti M, Carrillo E, Fernández T, Apolinar E, Nava EJ, Benítez N, Almendra R. Applications of artificial intelligence in nutrition and dietetics: Beyond virtual assistants. *Revista Española De Nutrición Humana Y Dietética*. 2023; 27(4). DOI:10.14306/renhyd.27.4.2054. Document type: Editorial Material.
- Consegal M, Barba I, del Blanco BG, Otaegui I, Rodríguez JF, Martí G, Serra B, Bellera N, Ojeda M, Valente F, Carmona MA, Miro E, Sambola A, Lidon RM, Baneras J, Barrabes JA, Rodríguez C, Benito B, Ruiz M, Inserte J, Ferreira I, Rodríguez A. Spontaneous reperfusion enhances succinate concentration in peripheral blood from stemi patients but its levels does not correlate with myocardial infarct size or area at risk. *Scientific Reports*. 2023; 13(1):6907. DOI:10.1038/s41598-



05.1.1 Cardiovascular Diseases Area

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 - Kelly L, Sharp MM, Thomas I, Brown C, Schrag M, Antunes LV, Solopova E, Martinez J, Rodríguez C, Carare RO. Targeting lysyl-oxidase (LOX) may facilitate intramural periarterial drainage for the treatment of Alzheimer's disease. *Cerebral Circulation - Cognition And Behavior*. 2023; 5:100171. DOI:10.1016/j.cccb.2023.100171. PMID:37457664. Document type: Article.
 - Munoz E, Pérez A, Apolinar E, Fernández T, Brito NB, Petermann F, Gamero A, Pérez P, Lozano M, Bonilla DA, Pérez É, Nava EJ, Troncoso C, Almendra R. Balance of the year 2022 and new Strategic Plan 2023-2026 of the Spanish Journal of Human Nutrition and Dietetics. *Revista Española De Nutricion Humana Y Dietetica*. 2023; 27(1). DOI:10.14306/renhyd.27.1.1903. Document type: Editorial Material.
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 - Navas M, Almendra R, Puertas L, Jimenez F, Julve J, Perez B, Consegal M, Kassan M, Martinez J, Rodríguez C, Galan M. Targeting mitochondrial stress with Szeto-Schiller 31 prevents experimental abdominal aortic aneurysm: Crosstalk with endoplasmic reticulum stress. *BRITISH JOURNAL OF PHARMACOLOGY*. 2023; 180(17). DOI:10.1111/bph.16077. PMID:36964990. IF:7,300 (Q1/1D). Document type: Article.
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 - Puertas L, Almendra R, Jimenez F, Sirvent M, Galan M, Martinez J, Rodríguez C. Novel pharmacological approaches in abdominal aortic aneurysm. *CLINICAL SCIENCE*. 2023; 137(15). DOI:10.1042/CS20220795. PMID:37559446. IF:6,000 (Q1/3D). Document typer: Review.
 - Puertas L, Alonso J, Hove L, Martínez J, Rodríguez C. PDE4 Phosphodiesterases in Cardiovascular Diseases: Key Pathophysiological Players and Potential Therapeutic Targets. *INTERNATIONAL JOURNAL OF MOLECULAR SCIENCES*. 2023; 24(23):17017. DOI:10.3390/ijms242317017. PMID:38069339. IF:5,600 (Q1/3D). Document type: Review.
 - Puertas L, Varona S, Ballester C, Alonso J, Aguiló S, Orriols M, Martínez E, Rodríguez A, Martínez J, Rodríguez C. Activation of Wnt/ β -catenin signaling in abdominal aortic aneurysm: A potential therapeutic opportunity?. *Genes And Diseases*. 2023; 10(3). DOI:10.1016/j.gendis.2022.05.017. PMID:37396504. IF:6,800 (Q1/2D). Document type: Article.
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