

Molecular Pathology and Therapeutic of Ischaemic and Atherothrombotic Diseases

Group leader

Vilahur García, Gemma (IR)

Badimón Maestro, Lina (IR) (until 08/11/2024)

Researchers

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Gerbolés Freixas, Esther (IR)

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DESCRIPTION

Our research group is dedicated to investigating the mechanisms underlying myocardial damage in the setting of infarction. We aim to identify novel targets and develop innovative cardioprotective strategies to prevent adverse cardiac remodelling and heart failure. Additionally, we explore the regulation of angiogenesis, the role of lipid metabolism and inflammation in ischemic artery disease, and the pathophysiological functions of LRP family proteins within the heart-brain axis. Ultimately, we identify biomarkers with diagnostic and prognostic value for use in personalised medicine.

MAIN LINES OF RESEARCH

- Detection of new targets and study of novel therapeutic approaches to prevent ischemic damage and lessen post-infarction left ventricular remodelling and heart failure. (Vilahur García, Gemma).
- The role of lipid metabolism and inflammation in atherosclerotic coronary artery disease. (Vilahur García, Gemma).
- Identification of biomarkers with diagnostic and prognostic potential for personalized medicine. (Vilahur García, Gemma; Suades Soler, Rosa).
- Vascular impact of ischemia and regulation of angiogenesis within the framework of cardiovascular diseases. (Arderiu Marqués, Gemma).
- Pathophysiological role of LRP family proteins in the heart-brain axis. (Borrell Pagès, Maria).

ACTIVE & AWARDED GRANTS

- Arderiu Marqués, Gemma. Nueva estrategia terapéutica mediante vesículas extracelulares derivadas de células madre derivadas de tejido adiposo como medicina regenerativa en enfermedades vasculares periféricas. PI23/01136. Instituto de Salud Carlos III. Duration: 2024-2026. 152.500,00 €
- Arderiu Marqués, Gemma. Repairing early endothelial cell damage to promote cardiovascular health: interplay between endothelial cells and monocytes as a primary strategy in ischemic diseases. MARATO 202303-30. Fundacio La Marato de TV3. Duration: 2024-2027. 149.785,00 €
- Arderiu Marqués, Gemma. Repairing early endothelial cell damage to promote cardiovascular health: interplay between endothelial cells and monocytes as a primary strategy in ischemic diseases. MARATO 202303-30. Fundacio La Marato de TV3. Duration: 2024-2027. 149.785,00 €
- Badimon Maestro, Lina. Prevención del deterioro cognitivo de origen vascular (VCI) mediante la activación del tráfico de colesterol y la reducción de la oxidación celular. AC20/00054. Instituto de Salud Carlos III (ISCIII). Duration: 2021-2023. 174.978,10 €
- Badimon Maestro, Lina. CARDIATEAM: Cardiomyopathy in type 2 diabetes mellitus. CARDIATEAM AMD-821508-11. H2020-JTI-IMI2-2017-13-two-stage. Unión Europea. Duration: 2019-2026. 50.000,00 €
- Badimon Maestro, Lina. Medicina de Precisión en Hipercolesterolemia Familiar y enfermedad cardiovascular prematura mediante la integración de tecnologías ómicas y de imagen (MedPreHF). PMP22/00108. Instituto de Salud Carlos III (ISCIII). Duration: 2023-2025. 1.469.930,00 €
- Badimon Maestro, Lina. Nuevas terapias avanzadas para mejorar la disfunción microvascular y regenerar tejido isquémico. PID2019-107160RB-I00. Ministerio de Ciencia e Innovación (MICINN). Duration: 2020-2024. 484.000,00 €
- Badimon Maestro, Lina. Patologia Molecular i Terapeutica de les Malalties Aterotrombòtiques. INV-1 00048. Agència de Gestió d'Ajuts Universitaris i de Recerca (AGAUR). Duration: 2022-2024. 66.217,84 €
- Badimon Maestro, Lina. Patologia Molecular i Terapèutica de les Malalties Isquèmiques i Aterotrombòtiques. 2021 SGR 01006. Agència de Gestió d'Ajuts Universitaris i de Recerca (AGAUR). Duration: 2022-2024. 60.000 €.
- Badimon Maestro, Lina. RICORS TERA.V. RD21/0017/0013. Instituto de Salud Carlos III (ISCIII). Duration: 2022-2024. 90.000,90 €
- Badimon Maestro, Lina. TRANSBIOLINE: Translational Safety Biomarker Pipeline (TransBioLine): Enabling development and implementation of novel safety biomarkers in clinical trials and diagnosis of disease. TRANSBIOLINE 821283. H2020-JTI-IMI2-2017-13-two-stage. Unión Europea. Duration: 2019-2024. 182.600,00 €
- Borrell Pagès, Maria. Cerebral lipid homeostasis in ischemic stroke: role of lipoprotein receptors and pharmacological interventions. MARATO 202304-10. Fundacio La Marato de TV3. Duration: 2024-2027. 197.937,50 €
- Borrell Pagès, Maria. LDLR family and PCSK9's role in cerebral lipid homeostasis in ischemic stroke. PI23/00589. Instituto de Salud Carlos III. Duration: 2024-2026. 140.000,00 €
- Ramos Regalado, Lisaidy. Mejora de la función cardíaca mediante el conocimiento del eje metabólico triglicéridos/HDL: impacto en las células de la médula ósea y el corazón. 2024 FI-1 00172. Agència de Gestió d'Ajuts Universitaris i de Recerca (AGAUR). Duration: 2024-2027. 72.552,41 €
- Vilahur García, Gemma. Avances en el diagnóstico y pronóstico de Aterosclerosis en pacientes diabéticos. PLEC2021-007664. Ministerio de Ciencia e Innovación (MICINN). Duration: 2021-2024. 271.697,00 €
- Vilahur García, Gemma. Mejora de la función cardíaca mediante el conocimiento del eje metabólico triglicéridos/HDL: Impacto en las células de la médula ósea y el corazón.

PID2021-128891OB-I00. Ministerio de Ciencia e Innovación (MICINN). Duration: 2022-2025. 302.500,00 €

- Vilahur García, Gemma. Noves estratègies de protecció de l'eix cor-cervell després d'una parada cardíaca. CCR 2021. Fundació Acadèmia de Ciències Mèdiques i de la Salut de Catalunya i Balears. Duration: 2021-2024. 6.000,00 €
- Vilahur García, Gemma. Nueva aproximación terapéutica para prevenir el desarrollo de cardiomiopatía diabética a través de la inhibición funcional de la HMGCoA-reductasa y la activación de la vía de señalización de la AMPK. SEC 2020. SEC/FEC-INV-TRL 20/01.Sociedad Española de Cardiología (SEC). Duration: 2020-2024. 15.000,00 €
- Vilahur García, Gemma. Targeted nanomedicine to reverse fibrosis in ischemic cardiomyopathies. PCI2023-143431. Ministerio de Ciencia e Innovación (MICINN). Duration: 2023-2026. 157.300,00 €
- Vilahur García, Gemma. Nanotechnology-based therapeutics to protect the infarcted heart: deciphering the role of innovative HDL bioengineered nanoconstructs. MARATO 202337-30. Fundacio La Marato de TV3. Duration: 2024-2027. 187.248,75 €

DOCTORAL THESES DEFENDED

- Luquero Gómez, Aureli. WNT pathway regulation of lipid handling and inflammation in organ function: the role of LRP5. 09/10/2024. Universitat de Barcelona. Supervisors: Borrell Pagès, Maria; Badimón Maestro, Lina; Corominas Guiu, Montserrat. <http://hdl.handle.net/10803/693605>
- Muñoz García, Natalia. Lipoproteínas, inflamación y antioxidantes dietéticos en la enfermedad cardiovascular. 02/12/2024. Universitat de Barcelona. Supervisors: Badimon Maestro, Lina; Padró Capmany, M.Teresa; Sabaté Tenas, Manuel. <http://hdl.handle.net/10803/693876>.

SCIENTIFIC PRODUCTION

- Arderiu G, Bejar MT, Civit A, Peña E, Badimon L. Crosstalk of human coronary perivascular adipose-derived stem cells with vascular cells: role of tissue factor. BASIC RESEARCH IN CARDIOLOGY. 2024; 119(2). DOI:10.1007/s00395-024-01037-1. PMID:38430261. IF:7,500 (Q1/1D). Document type: Article.
- Arderiu G, Civit A, Díez A, Moscatiello F, Ballesta C, Badimon L. Differentiation of Adipose Tissue Mesenchymal Stem Cells into Endothelial Cells Depends on Fat Depot Conditions: Regulation by miRNA. Cells. 2024; 13(6):513. DOI:10.3390/cells13060513. PMID:38534357. IF:5,100 (Q2/4D). Document type: Article.
- Bellofatto IA, Nikolaou PE, Andreadou I, Canepa M, Carbone F, Ghigo A, Heusch G, Kleinbongard P, Maack C, Podesser BK, Stamatelopoulos K, Stellos K, Vilahur G, Montecucco F, Liberale L. Mechanisms of damage and therapies for cardiac amyloidosis: a role for inflammation?. Clinical Research in Cardiology. 2024; DOI:10.1007/s00392-024-02522-2. PMID:39167195. IF:3,800 (Q1/3D). Document type: Review.
- Ben S, Anwar M, Vilahur G, Martino F, Kyriazis PG, de Winter N, Punjabi PP, Angelini GD, Sattler S, Emanuelli C. Small Extracellular Vesicles in the Pericardium Modulate Macrophage Immunophenotype in Coronary Artery Disease. Jacc-Basic To Translational Science. 2024; 9(9). DOI:10.1016/j.jacbts.2024.05.003. PMID:39444932. IF:8,400 (Q1/1D). Document type: Article.
- Bonifay A, Mackman N, Hisada Y, Sachetto A, Hau C, Gray E, Hogwood J, Aharon A, Badimon L, Barile L, Baudar J, Beckmann L, Benedikter B, Bolis S, Bouriche T, Brambilla M, Burrello J, Camera M, Campello E, Ettelaie C, Faille D, Featherby S, Franco C, Guldenpfennig M, Hansen JB, Judicone C, Kim Y, Kristensen SR, Laakmann K, Langer F, Latysheva N, Lucien F, Menezes E, Mullier F, Norris P, Nybo J, Orbe J, Osterud B, Paramo JA, Radu CM, Roncal C, Samadi N, Snir O, Suades R, Wahlund C, Chareyre C, Abdili E, Martínod K, Thaler J, Dignat F, Nieuwland R, Lacroix R. Comparison of assays measuring extracellular vesicle tissue

- factor in plasma samples: communication from the ISTH SSC Subcommittee on Vascular Biology. *JOURNAL OF THROMBOSIS AND HAEMOSTASIS*. 2024; 22(10). DOI:10.1016/j.jtha.2024.05.037. PMID:38925490. IF:5,500 (Q1/2D). Document type: Article.
- Borrell-Pagès M, Luquero A, Vilahur G, Padró T, Badimon L. Canonical Wnt pathway and the LDL receptor superfamily in neuronal cholesterol homeostasis and function. *Cardiovasc Res*. 2024; 120(2):140-151. DOI:10.1093/cvr/cvad159. PMID:37882606. IF:10,400 (Q1/1D). Document type: Article.
 - Bugiardini R, Cenko E, Yoon J, Bergami M, Vasiljevic Z, Mendieta G, Zdravkovic M, Vavlukis M, Kedev S, Milic D, Badimon L, Manfrini O. Traditional risk factors and premature acute coronary syndromes in South Eastern Europe: a multinational cohort. *Lancet Regional Health-Europe*. 2024; 38:100824. DOI:10.1016/j.lanepe.2023.100824. PMID:38476741. IF:13,600 (Q1/1D). Document type: Article.
 - Carreras J, Vidal M, Rodríguez C, Simón C, Rodríguez L, Sionis A, Giralt T, Martínez MJ, Izquierdo A, Cainzos M, Vaquerizo B, Rivas M, Ribas N. Killip scale reclassification according to lung ultrasound: Killip pLUS. *European Heart Journal-Acute Cardiovascular Care*. 2024; 13(7). DOI:10.1093/ehjacc/zaae073. PMID:38832853. IF:3,900 (Q1/3D). Document type: Article.
 - Carreras J, Vidal M, Rodríguez C, Simón C, Rodríguez L, Sionis A, Giralt T, Martínez MJ, Izquierdo A, Farré N, Cainzos M, Tizón H, García J, Milà L, Vaquerizo B, Rivas M, Ribas N. Lung Ultrasound in the Acute Phase of ST-Segment-Elevation Acute Myocardial Infarction: 1-Year Prognosis and Improvement in Risk Prediction. *Journal of the American Heart Association*. 2024; 13(21):e035688. DOI:10.1161/JAHA.124.035688. PMID:39470045. IF:5,000 (Q1/2D). Document type: Article.
 - Cenko E, Yoon J, Bergami M, Gale CP, Vasiljevic Z, Vavlukis M, Kedev S, Milicic D, Dorobantu M, Badimon L, Manfrini O, Bugiardini R. Coronary revascularization and sex differences in cardiovascular mortality after myocardial infarction in 12 high and middle-income European countries. *European Heart Journal- Quality of Care and Clinical Outcomes*. 2024; DOI:10.1093/ehjqcco/qcae035. PMID:38714331. IF:4,800 (Q1/2D). Document type: Article.
 - de Isla LP, Vallejo AJ, Watts GF, Muñoz O, Alonso R, Díaz JL, Arroyo R, Aguado R, Argueso R, Mauri M, Romero MJ, Álvarez P, Mañas D, Cepeda JM, González P, Casañas M, Michan A, Muñoz JFS, Faedo C, Barba MA, Dieguez M, de Andrés R, Hernández AM, González A, Padró T, Fuentes F, Badimon L, Mata P, SAFEHEART I. Long-term sex differences in atherosclerotic cardiovascular disease in individuals with heterozygous familial hypercholesterolaemia in Spain: a study using data from SAFEHEART, a nationwide, multicentre, prospective cohort study. *Lancet Diabetes & Endocrinology*. 2024; 12(9). DOI:10.1016/S2213-8587(24)00192-X. PMID:39098315. IF:44,000 (Q1/1D). Document type: Article.
 - Devaux Y, Zhang L, Lumley AI, Karaduzovic K, Mooser V, Rousseau S, Shoaib M, Satagopam V, Adilovic M, Srivastava PK, Emanuelli C, Martelli F, Greco S, Badimon L, Padró T, Lustrek M, Scholz M, Rosolowski M, Jordan M, Brandenburger T, Benczik B, Agg B, Ferdinandy P, Vehreschild JJ, Lorenz B, Dorr M, Witzke O, Sánchez G, Kul S, Baker AH, Fagherazzi G, Ollert M, Wereski R, Mills NL, Firat H. Development of a long noncoding RNA-based machine learning model to predict COVID-19 in-hospital mortality. *Nature Communications*. 2024; 15(1):4259. DOI:10.1038/s41467-024-47557-1. PMID:38769334. IF:14,700 (Q1/1D). Document type: Article.
 - Escate R, Padró T, de Isla LP, Fuentes F, Alonso R, Mata P, Badimon L. Circulating miR-6821-5p levels and coronary calcification in asymptomatic familial hypercholesterolemia patients. *ATHEROSCLEROSIS*. 2024; 392:117502. DOI:10.1016/j.atherosclerosis.2024.117502. PMID:38513437. IF:4,900 (Q1/2D). Document type: Article.
 - Escate R, Padró T, Suades R, Sans J, Devaux Y, Lakkisto P, Harjola VP, Sionis A, Badimon L. miR-619-5p and cardiogenic shock in patients with ST-segment elevation myocardial infarction. *EUROPEAN JOURNAL OF CLINICAL INVESTIGATION*. 2024; 54(8). DOI:10.1111/

- eci.14186. PMID:38376079. IF:4,400 (Q1/2D). Document type: Article.
- Fabin N, Cenko E, Bergami M, Yoon J, Vadalà G, Mendieta G, Kedev S, Kostov J, Vavlukis M, Vraynko E, Milicic D, Vasiljevic Z, Zdravkovic M, Badimon L, Galassi AR, Manfrini O, Bugiardini R. Early coronary revascularization among 'stable' patients with non-ST-segment elevation acute coronary syndromes: the role of diabetes and age. *CARDIOVASCULAR RESEARCH*. 2024; 120(16). DOI:10.1093/cvr/cvae190. PMID:39196713. IF:10,200 (Q1/1D). Document type: Article.
 - Kleinbongard P, Arriola CG, Badimon L, Crisostomo V, Giricz Z, Gyöngyösi M, Heusch G, Ibanez B, Kiss A, de Kleijn DPV, Podesser BK, Carracedo RR, Rodríguez A, Ruíz M, Margallo FMS, Vilahur G, Zamorano JL, Zaragoza C, Ferdinandy P, Hausenloy DJ. The IMProving Preclinical Assessment of Cardioprotective Therapies (IMPACT): multicenter pig study on the effect of ischemic preconditioning. *BASIC RESEARCH IN CARDIOLOGY*. 2024; 119(6). DOI:10.1007/s00395-024-01083-9. PMID:39422732. IF:7,500 (Q1/1D). Document type: Article.
 - López A, Muñoz N, Villaplana VD, Padró T, Badimon L. Effect of Moderate Beer Intake on the Lipid Composition of Human Red Blood Cell Membranes. *Nutrients*. 2024; 16(20):3541. DOI:10.3390/nu16203541. PMID:39458535. IF:4,800 (Q1/2D). Document type: Article.
 - Luquero A, Pimentel N, Vilahur G, Badimon L, Borrell M. Unique Splicing of *Lrp5* in the Brain: A New Player in Neurodevelopment and Brain Maturation. *INTERNATIONAL JOURNAL OF MOLECULAR SCIENCES*. 2024; 25(12):6763. DOI:10.3390/ijms25126763. PMID:38928468. IF:4,900 (Q1/3D). Document type: Article.
 - Muñoz N, Cordero A, Padró T, Mendieta G, Vilahur G, Flores E, Badimon L. First time ACS in patients with on-target lipid levels: Inflammation at admission and re-event rate at follow-up. *EUROPEAN JOURNAL OF CLINICAL INVESTIGATION*. 2024; 54(12). DOI:10.1111/eci.14305. PMID:39159006. IF:4,400 (Q1/2D). Document type: Article.
 - Padró T, Santisteban V, Huedo P, Puentes M, Aguiló M, Espadaler J, Badimon L. Lactiplantibacillus plantarum strains KABP011, KABP012, and KABP013 modulate bile acids and cholesterol metabolism in humans. *CARDIOVASCULAR RESEARCH*. 2024; 120(7). DOI:10.1093/cvr/cvae061. PMID:38525555. IF:10,200 (Q1/1D). Document type: Article.
 - Pirri D, Tian SY, Tardajos B, Irving SE, Donati F, Allen SP, Mammoto T, Vilahur G, Kabir L, Bennett J, Rasool Y, Pericleous C, Mazzei G, McAllan L, Scott WR, Koestler T, Zingg U, Birdsey GM, Miller CL, Schenkel T, Chambers EV, Dunning MJ, Serbanovic J, Botrè F, Mammoto A, Xu SW, Osto E, Han WP, Fragiadakis M, Evans PC. EPAS1 Attenuates Atherosclerosis Initiation at Disturbed Flow Sites Through Endothelial Fatty Acid Uptake. *CIRCULATION RESEARCH*. 2024; 135(8). DOI:10.1161/CIRCRESAHA.123.324054. PMID:39234692. IF:16,500 (Q1/1D). Document type: Article.
 - Ramos L, Alcover S, Badimon L, Vilahur G. The Influence of Metabolic Risk Factors on the Inflammatory Response Triggered by Myocardial Infarction: Bridging Pathophysiology to Treatment. *Cells*. 2024; 13(13):1125. DOI:10.3390/cells13131125. PMID:38994977. IF:5,100 (Q2/4D). Document type: Review.
 - Santisteban V, Muñoz N, López A, Puentes M, Badimon L, Padró T. Efficacy of Food Industry By-Product β -Glucan/Chitin-Chitosan on Lipid Profile of Overweight and Obese Individuals: Sustainability and Nutraceuticals. *Nutrients*. 2024; 16(19):3420. DOI:10.3390/nu16193420. PMID:39408385. IF:4,800 (Q1/2D). Document type: Article.
 - Suades R, Greco MF, Padró T, de Santisteban V, Domingo P, Benincasa G, Napoli C, Greco S, Madè A, Ranucci M, Devaux Y, Martelli F, Badimon L. Blood CD45⁺/CD3⁺ lymphocyte-released extracellular vesicles and mortality in hospitalized patients with coronavirus disease 2019. *EUROPEAN JOURNAL OF CLINICAL INVESTIGATION*. 2024; DOI:10.1111/eci.14354. PMID:39548690. IF:4,400 (Q1/2D). Document type: Article.

- Suades R, Greco MF, Prieto P, Padró T, Devaux Y, Domingo P, Badimon L. CD66b⁺/CD68⁺ circulating extracellular vesicles, lactate dehydrogenase and neutrophil-to-lymphocyte ratio can differentiate coronavirus disease 2019 severity during and after infection. *Journal of Extracellular Vesicles*. 2024; 13(7):e12456. DOI:10.1002/jev2.12456. PMID:39007437. IF:15,500 (Q1/1D). Document type: Article.
- Sutelman P, Radike M, Vilahur G. Seeing is believing: pathway strategies for a personalised non-invasive diagnosis of coronary artery disease. *Internal and Emergency Medicine*. 2024; 19(2). DOI:10.1007/s11739-023-03526-y. PMID:38315383. IF:3,200 (Q1/2D). Document type: Article.
- Tesoro L, Hernández I, Saura M, Badimón L, Zaragoza C. Novel cutting edge nano-strategies to address old long-standing complications in cardiovascular diseases. A comprehensive review. *EUROPEAN JOURNAL OF CLINICAL INVESTIGATION*. 2024; 54(7). DOI:10.1111/eci.14208. PMID:38622800. IF:4,400 (Q1/2D). Document type: Review.
- Triska J, Maitra N, Deshotels MR, Haddadin F, Angiolillo DJ, Vilahur G, Jneid H, Atar D, Birnbaum Y. A Comprehensive Review of the Pleiotropic Effects of Ticagrelor. *Cardiovasc Drugs Ther*. 2024; 38(4):775-797. DOI:10.1007/s10557-022-07373-5. PMID:36001200. IF:3,100 (Q2/4D). Document type: Review.
- Vilahur G, Radike M, Sutelman P, Ben S, Gutiérrez M, Casaní L, Hovdal D, Ongstad EL, Gabrielsen A, Hidalgo A, Fjellström O, Carlsson L, Badimon L. Recombinant human soluble domain of CD39L3 and ticagrelor: cardioprotective effects in experimental myocardial infarction. *EUROPEAN HEART JOURNAL*. 2024; 45(17). DOI:10.1093/eurheartj/ehae107. PMID:38486376. IF:37,600 (Q1/1D). Document type: Article.