

## Cardiovascular Biochemistry

### Group leader

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### DESCRIPTION

The group is made up of personnel from the Research Institute of the Hospital de Sant Pau (IR-HSP) and the Biochemistry Department of the Hospital de la Santa Creu and Sant Pau (HSCSP). The group's main lines of research focus on the study of the molecular mechanisms underlying the development of cardiovascular diseases, specifically those derived from alterations in lipoprotein metabolism or inflammatory processes. Our objective is to transfer the knowledge obtained from the lines of translational research to clinical application in a Clinical Biochemistry Laboratory of a University Hospital.

### MAIN LINES OF RESEARCH

#### Atherosclerosis Mechanisms

- Mechanisms leading to lipoprotein aggregation and cholesterol accumulation in the arterial wall.
- Mimetic peptides derived from apoJ as therapeutic tools.
- Inflammatory, apoptotic, and lipid accumulation-related pathways induced by modified LDL in monocytes, endothelial cells, and cardiomyocytes, in the context of diabetes, obesity, heart failure, and ischemic stroke.
- Analysis of the secretome of the adipose tissue from cardiac surgery patients with diabetes or obesity.

#### Diagnosis and Biomarkers

- Analysis of apolipoprotein J (apoJ) as a marker of CVR.



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- Assessment of new biomarkers of acute and chronic cardiovascular disease.
- Biomarkers of epicardial fat accumulation.
- Development of algorithms for ruling out acute coronary disease.
- Development of methods for point-of-care biomarker measurement.
- Vulnerability markers to assess carotid plaque inflammation in ischemic stroke.
- Puig Grifol, Nuria. Contractes Predoctorals PFIS 2020. FI20/00252. Instituto de Salud Carlos III (ISCIII). Duration: 2021-2024. 82.400,00 €.
- Rives Jiménez, José. Tejido adiposo epicárdico en obesidad y diabetes. Mecanismos moleculares de riesgo cardiovascular y búsqueda de nuevos biomarcadores. Beca post-residencia a proyectos de investigación 2022. Fundación J.L.Castaño y Sociedad Española de Medicina de Laboratorio (SEQCML). Duration: 2022-2023. 15.000,00 € (FGS).
- Sánchez Quesada, Jose Luis. Tejido adiposo epicárdico en obesidad y diabetes. Mecanismos moleculares de riesgo cardiovascular y búsqueda de nuevos biomarcadores. PI20/00334. Instituto de Salud Carlos III (ISCIII). Duration: 2021-2023. 147.620,00 €.

### SCIENTIFIC CHALLENGES

- Determine the intracellular mechanisms involved in the inflammatory response induced by LDL(-) and the components of the particle that entail atherogenicity.
- Analyze the therapeutic potential of mimetic peptides derived from apoJ to delay the development of atherosclerosis in animal models.
- Find new markers of cardiovascular risk in diseases such as diabetes, obesity, HIV, or cardiac failure.
- Strengthen international collaborations to set up future applications for International funding and participation in multidisciplinary international research projects. Investigate if PCSK9 antibodies correct HDL dysfunction in familial hypercholesterolemia.

### ACTIVE GRANTS

- Almendra Pegueros, Rafael Antonio. Contractes predoctorals PFIS 2021. FI21/00125. Instituto de Salud Carlos III (ISCIII). Duration: 2022-2024.
- Benitez Gonzalez, Sónia. Lipoproteínas modificadas y marcadores inflamatorios asociados con vulnerabilidad de placa carotídea e ictus isquémico. PI19/00421. Instituto de Salud Carlos III (ISCIII). Duration: 2020-2024. 130.680,00 €.
- Benitez Gonzalez, Sónia. LRP1 como mediador de los efectos proinflamatorios de la LDL modificada electronegativa en la arteriosclerosis. Sociedad Española de Arteriosclerosis (SEA). Duration: 2021-2023. 15.000,00 €.
- Genua Trullós, Idoia. Nuevos biomarcadores de insuficiencia cardíaca y perfil de microRNAs. SED 2021. Sociedad Española de Diabetes (SED). Duration: 2021-2023. 20.000,00 €.

### GRANTS AWARDED

- Sánchez Quesada, Jose Luis. Papel de las glicofomas de clusterina/apolipoproteína J en la dislipemia diabética. PI23/00888. Instituto de Salud Carlos III (ISCIII). Duration: 2024-2026. 127.500,00 €.
- García Osuna, Álvaro. Performance Evaluation cobas click for HbA1c and Lipid panel. RD006511. Non-Competitive. Roche Diagnostics Intern LTD. Duration: 2023-2024. 90.000,00 €.

### DOCTORAL THESES DEFENDED

- Puig Grifol, Nuria. Lipoprotein-related biomarkers and carotid plaque inflammation in ischemic ictus. 30/11/2023. Universitat Autònoma de Barcelona. Supervisors: Benítez González, Sónia; Sánchez Quesada, José Luis; Camps Renom, Pol.

### SCIENTIFIC PRODUCTION

- Amorós G, Casabella S, Company G, Arzamendi D, Jorge E, García A, Macías Y, Sánchez D, Rosell J, Guerra JM, Cinca J. Electrophysiological and histological characterization of atrial scarring in a model of isolated atrial myocardial infarction. *Frontiers in Physiology*. 2023; 13:1104327. DOI:10.3389/fphys.2022.1104327. PMID:36714312. IF:4,000 (Q2/3D). Document type: Article.
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- Benitez S, Puig N, Sánchez JL. Chapter 14: Role of platelet-activating factor acetylhydrolase on the inflammatory and apoptotic processes in atherosclerosis. *Phospholipases in Physiology and Pathology*. 2023; (4)231-251. DOI: 10.1016/B978-0-323-95698-7.00013-9. Document type: Book chapter.
  - Benitez S, Sánchez JL. Special Issue: New Insight into the Molecular Role of Lipids and Lipoproteins in Vascular Diseases. *INTERNATIONAL JOURNAL OF MOLECULAR SCIENCES*. 2023; 24(13):10659. DOI:10.3390/ijms241310659. PMID:37445837. IF:5,600 (Q1/3D). Document type: Editorial Material.
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