

Stroke Pharmacogenomics and Genetics

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DESCRIPTION

The Stroke Pharmacogenomics and Genetics group is a multidisciplinary group composed of 12 members, including biologists, biotechnologists and neurologists. The objectives of the group are to find treatments for stroke and other neurological diseases that can be used in the clinical practice. To identify these treatments, we are utilising genome-wide techniques such as GWAS, EWAS, TWAS, PWAS, or microbiome analysis. This includes genetics, epigenetics, transcriptomics, proteomics and microbiomics with large cohorts of patients.

MAIN LINES OF RESEARCH

- L1 Genetic risk factors in stroke. (Cárcel Márquez, Jara).
- L2 Pharmacogenetics of neurovascular diseases. (Fernández Cadenas, Israel).
- L3 Genetic and epigenetic risk factors associated with the neurological deterioration and the disability after stroke. (Gallego Fabrega, Cristina; Cullell Fornes, Natalia).
- L4 Genetic, epigenetic and proteomic factors associated with the endophenotypes of the acute phase of stroke. Integromics. (Fernández Cadenas, Israel).
- L5 Microbiome and Stroke. (Fernández Cadenas, Israel).
- L6 Lipids and Stroke. (Martín Campos, Jesús Maria).
- L7 CADASIL and other neurological diseases. (Muiño Acuña, Elena).

SCIENTIFIC CHALLENGES

- Integration of multi-omic data to find the key drivers associated with stroke risk and outcome.
- To find drug targets and treatments in stroke risk and outcome using bioinformatic and AI analysis.
- To understand the biological mechanisms of stroke and other neurological pathologies.
- To find treatments for CADASIL, a rare disease that causes vascular dementia and stroke.

ACTIVE & AWARDED GRANTS

- Cárcel Márquez, Jara. Gen-X project: Genetic and epigenetic study of ischemic stroke and its sex differences. MARATO 202306-30. Fundació La Marató de TV3. Duration: 2024-2027. 199.801,25 €
- Fernández Cadenas, Israel. COPYCTUS: Estudio de la variación en el número de copias y análisis genómico 3D para encontrar dianas terapéuticas en relación al deterioro neurológico post-ictus. PI21/01088. Instituto de Salud Carlos III (ISCIII). Duration: 2022-2024. 96.800,00 €
- Fernández Cadenas, Israel. Biomarcadors proteòmics cardiometabòlics i immunitaris de la Covid-19 per a l'avaluació clínica de la infecció, la gravetat de la malaltia i les complicacions postpandèmiques de salut. MARATO 202107-31. Fundació La Marató de TV3. Duration: 2022-2024. 129.750,00 €
- Fernández Cadenas, Israel. Elucidating the Key Mediators and Mechanisms of Cerebral Edema and Hemorrhagic Transformation after Hemispheric Stroke using Quantitative Imaging and Genetics. NIH RO1 edema. (Raj Dhar and Spanish network) NIH - WUSTL. Duration: 2022-2027. 344.242,00 €
- Fernández Cadenas, Israel. CNV and Stroke (CaNVAS). NIH MARYLANDO (CaNVAS) 1R01NS114045-01. National Institute of Neurological Disorders. Duration: 2020-2024. 120.084,00 €
- Fernández Cadenas, Israel. CADASIL-Historia Natural (CADANHIS). AC23_2/00041.

Instituto de Salud Carlos III (ISCIII). Duration: 2024-2026. 179.375,00 €

- Fernández Cadenas, Israel. Stopped-Stroke. Reversible epigenetic therapies to STOP biological age and reduce STroke risk. MARATO 202310-30. Fundació La Marató de TV3. Duration: 2024-2027. 133.972,50 €
- Fernández Cadenas, Israel. OneCareAI - AI Powered Neurovascular Health Monitoring. 2024 PROD 00080. Agència de Gestió d'Ajuts Universitaris i de Recerca (AGAUR). Duration: 2024-2026. 38.500,00 €
- Fernández Cadenas, Israel. Evaluación de la eficacia de la leriglitazona y búsqueda de potenciales biomarcadores en enfermedades de la sustancia blanca. CPP2023-010519. Ministerio de Ciencia, Innovación y Universidades. Duration: 2024-2027. 331.125,64€
- Fernández Cadenas, Israel. PROMETEO: Estudio Proteo-genómico y de integrómica de datos para identificar tratamientos que mejoren la evolución neurológica del ictus. PI24/02102. Instituto de Salud Carlos III (ISCIII). Duration: 2025-2027. 196.250,00 €

DOCTORAL THESES DEFENDED

- Lledos de Benito, Miquel. Caracterización de la microbiota intestinal en pacientes con ictus isquémico: un estudio metagenómico. 15/03/2024. Universitat de Barcelona. Supervisors: Fernández Cadenas, Israel; Muiño Acuña, Elena; Rabionet Janssen, Raquel. <http://hdl.handle.net/10803/691393>.

SCIENTIFIC PRODUCTION

- Cárcel J, Muiño E, Gallego C, Cullell N, Lledós M, Lluçà L, Martín JM, Sobrino T, Campos F, Castillo J, Freijo M, Arenillas JF, Obach V, Álvarez J, Molina CA, Ribó M, Jiménez J, Roquer J, Muñoz L, López E, Millán M, Díaz R, Vives C, Serrano G, Segura T, Ibañez L, Heitsch L, Delgado P, Dhar R, Krupinski J, Prats L, Camps P, Guasch M, Ezcurra G, Blay N, Sumoy L, de Cid R, Montaner J, Cruchaga C, Lee JM, Martí J, Fernández I. Sex-Stratified

- Genome-Wide Association Study in the Spanish Population Identifies a Novel Locus for Lacunar Stroke. *STROKE*. 2024; 55(10). DOI:10.1161/STROKEAHA.124.047833. PMID:39315829. IF:7,800 (Q1/1D). Document type: Article.
- Fernández JM, Olmedo G, Querol LA, Kulisevsky J, Pérez J. Crossed-reflex in antiphospholipid chorea. *NEUROLOGICAL SCIENCES*. 2024; 45(9). DOI:10.1007/s10072-024-07622-5. PMID:38896185. IF:2,700 (Q2/4D). Document type: Article.
 - Gallego C, Temprano G, Cárcel J, Muiño E, Cullell N, Lledós M, Llucía L, Martín JM, Sobrino T, Castillo J, Millán M, Muñoz L, López E, Ribó M, Álvarez J, Jiménez J, Roquer J, Tur S, Obach V, Arenillas JF, Segura T, Serrano G, Martí J, Freijo M, Moniche F, Castellanos MDM, Morrison AC, Smith NL, de Vries PS, Fernández I, Sabater M, Dehghan A, Heath AS, Reiner AP, Johnson A, Richmond A, Peters A, van Hylckama Vlieg A, McKnight B, Psaty BM, Hayward C, Ward C, O'Donnell C, Chasman D, Strachan DP, Tregouet DA, Mook D, Gill D, Thibord F, Asselbergs FW, Leebeek FWG, Rosendaal FR, Davies G, Homuth G, Temprano G, Campbell H, Taylor HA, Bressler J, Huffman JE, Rotter JI, Yao J, Wilson JF, Bis JC, Hahn JM, Desch KC, Wiggins KL, Díez L, Raffield LM, Bielak LF, Yanek LR, Kleber ME, Mueller M, Kavousi M, Mangino M, Conomos MP, Liu M, Brown MR, Jhun M-A, Chen M-H, de Maat MPM, Pankratz N, Peyser PA, Elliot P, Wei P, Wild PS, Morange PE, van der Harst P, Yang Q, Marioni R, Li R, Damrauer SM, Cox SR, Trompet S, Felix SB, Völker U, Tang W, Koenig W, Jukema JW, Guo X. A multitrait genetic study of hemostatic factors and hemorrhagic transformation after stroke treatment. *JOURNAL OF THROMBOSIS AND HAEMOSTASIS*. 2024; 22(4). DOI:10.1016/j.jtha.2023.11.027. PMID:38103737. IF:5,500 (Q1/2D). Document type: Article.
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