

Part A. PERSONAL INFORMATION		CV date	19/11/2024
First name	María Dolores		
Family name	Ganfornina Álvarez		
e-mail	mdganfornina@uva.es	URL Web: http://www.ibgm.med.uva.es/investigacion/genetica-molecular-de-la-enfermedad/desarrollo-y-degeneracion-del-sistema-nervioso	
Open Researcher and Contributor ID (ORCID) (*)	0000-0002-8567-4826		

(*) Mandatory

A.1. Current position

Position	Full Professor (Catedrático de Universidad)		
Initial date	29/04/2020		
Institution	Universidad de Valladolid		
Department/Center	Bioquímica y Biología Molecular y Fisiología / School of Medicine		
Country	Spain	Phone number	+34 983184814
Key words	lipid-binding proteins; oxidative stress; myelin and membranes; glial cells; neuroprotection		

A.2. Previous positions (research activity interruptions, indicate total months)

Period	Position/Institution/Country/Interruption cause
2010-2020	Associate Professor / UVa / Spain
2007-2010	Assistant Professor (I3 Program) / UVa / Spain
2002-2007	Ramón y Cajal Program Researcher / UVa / Spain
1996-2000	Research Assistant Professor /U. Utah /USA
1992-1995	Postdoctoral Researcher /U. Utah /USA

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Graduate	Sevilla	1988
PhD	Sevilla	1991

Part B. CV SUMMARY (max. 5000 characters, including spaces)

Scientific contributions:

PhD education (1988-1992): *Education*: Electrophysiology. Single-channel recording. Programming. Mathematical analysis of electrical signals. *Accomplishments*: Discovery of an ion channel related to the oxygen sensing mechanism in carotid body chemoreceptor cells. Five publications.

Postdoctoral education (U. of Utah 1992-1995): *Education*: Generation of monoclonal antibodies against axon guidance molecules. *Accomplishments*: Discovery of two axon guidance genes: Conulin and Lazarillo. Analysis of gene expression, biochemical properties and biological role. Protein purification, Lazarillo gene cloning and sequencing. Novel implication of lipid-binding proteins in axon guidance. Three publications.

Research Assistant Professor (U. of Utah 1996-2000): *Education*: Design and writing research projects to fund my research; education of undergraduate and graduate students, technicians and junior postdoctoral fellows. Functional analysis of genes homologous to Lazarillo in genetically modifiable organisms (mouse and Drosophila). *Accomplishments*: Discovery of two new Drosophila genes, NLaz and GLaz; gene expression characterization of Drosophila NLaz, and GLaz, and mouse ApoD (centered in the nervous system). Design and generation of KO mutants for GLaz and ApoD. Evolutionary Biology: study of mechanisms generating evolutionary novelties. Eleven publications.

Ramón y Cajal Researcher (UVa 2002-2007): Founding an independent Research Program devoted to study the function of Lipocalins, lipid-binding proteins, in the nervous system, and



their role in aging and neurodegeneration. *Accomplishments*: Organization and set up (pioneers in my institution) of the equipment and services for maintenance and analysis of genetically modified mice and Drosophila flies. Analysis of ApoD expression in the chicken embryo and in mouse postnatal stages. Molecular evolution analysis, involving a new method applicable to the phylogeny of Lipocalin gene family.

Assistant Professor (I3 Program) (UVa 2007-2010). *Accomplishments*: Analysis of ApoD mutants in mice and GLaz mutants in Drosophila. Discovery of their biological function: neuroprotectors against oxidative stress, in basal conditions or upon senescence or neurodegeneration. Biochemical analysis of molecular ligands of Lazarillo to test their physiological role in nervous system cells. Scientific leadership in the Lipocalin community.

Tenured University Professor (UVa; Associate Prof. 2010-2020; Full Prof. 2020-today).

Accomplishments: Analysis of ApoD function in humans and mice, and of NLaz and GLaz in Drosophila. Analysis of their neuroprotective function in the nervous system upon oxidative stress, in models of neurodegenerative disorders and during physiological aging.

Biochemical analysis of NLaz and ApoD ligands and test of their physiological role.

Discovery of ApoD role in myelin homeostasis and myelin biogenesis in central and peripheral nervous system. Discovery of ApoD subcellular and intercellular traffic, and its mechanism of action: stabilization of lysosomal membrane. Analysis of the consequences of ApoD lysosomal membrane management in physiological and pathological situations: myelin maturation and compaction. Discovery of ApoD glia-to-neuron exchange via exosomes and its requirement for neuroprotection. 34 primary articles and 1 systematic review published related to the Lipocalin Research Program. Contributor to a book on Lipocalins (ISBN 1-58706-297-6). Editor of a Lipocalins Research Topic (doi:10.3389/978-2-88976-197-5). Eight competitive grants for this Research Program as PI/co-PI (881,190€).

Significant aspects of my research: Multidisciplinary education. Specialization within the research group in biochemical and cell culture techniques, and the direction of projects related to Drosophila and mouse as model organisms. Direct participation in experimental lab work, with my own research project carried out in parallel with mentoring and managing the laboratory, graduate and postgraduate teaching, and institutional management. Productive local (2), national (5) and international (5) collaborations.

WoS metrics (12/12/2022): 54.6 average citations/year (without self-citations).

Contributions to society

Participation in Neuroscience public outreach activities. Participation as a Science Communicator for the Spanish Association of Ataxia patients. Scientific dissemination activities with High School students and teachers.

Contributions to Science community

Education of seven PhD students (5 International doctorates); 2 Extraordinary awards UVa). Three students hold Academic Research-Teaching posts; two hold Teaching posts; one works in Clinical research laboratory; one in Biotechnology. Contribution to peer-review scientific publications. Evaluator of scientific projects and researchers. Board Member of Spanish Society of Neuroscience.

Other contributions

Yearly teaching 12 ECTS courses on Physiology and Biomedical Research (Medical Degree), and 4 ECTS in Master course on Data analysis.

Part C. RELEVANT MERITS

C.1. Publications (most relevant)

Ganfornina MD, Diez-Hermano S, Sanchez D. 2023. Flipped classroom in neurophysiology: performance analysis of a system focusing on intrinsic students' motivation. *Front Physiol.* 2023 Dec 8;14:1308647. doi: 10.3389/fphys.

Corraliza-Gomez M*, Bermejo T, Lilue J, Rodriguez-Iglesias N, Valero J, Cozar-Castellano I, Arranz E, Sanchez D, Ganfornina MD*. 2023. Insulin-degrading enzyme (IDE) as a modulator of microglial phenotypes in the context of Alzheimer's disease and brain aging. *J Neuroinflammation.* 2023 Oct 11;20(1):233. doi: 10.1186/s12974-023-02914-7.

Corraliza-Gomez, M, Bendito, B, Sandonis-Camarero, D, Mondejar, J, Villa, M, Poncela, M, Valero, J, Sanchez*, D & Ganfornina, MD*. 2023. Dual role of Apolipoprotein D as long-



- term instructive factor and acute signal conditioning microglial secretory and phagocytic responses. *Frontiers in Cellular Neuroscience*. 2023 Jan 26;17:1112930. doi: 10.3389/fncel.2023.1112930.
- Corraliza-Gomez, M, del Cano-Espinel, M, Sanchez, D & Ganfornina, MD. 2022. The Neuroprotective Lipocalin Apolipoprotein D Stably Interacts with Specific Subtypes of Detergent-Resistant Membrane Domains in a Basigin-Independent Manner. *Mol Neurobiol*. 59(7):4015-4029. doi: 10.1007/s12035-022-02829-z.
- Pascua-Maestro, R, Corraliza-Gomez, M; Fadrique-Rojo, C; Ledesma, MD, Schuchman, EH, Sanchez, D* & Ganfornina, MD*. 2020. Apolipoprotein D-mediated preservation of lysosomal function promotes cell survival and delays motor impairment in Niemann-Pick type A disease *Neurobiol Dis*. 144:105046. doi: 10.1016/j.nbd.2020.105046.
- García-Mateo N, Pascua-Maestro R, Pérez-Castellanos A, Lillo C, Sanchez D & Ganfornina MD. 2018. Myelin extracellular leaflet compaction requires Apolipoprotein D membrane management to optimize lysosomal-dependent recycling and glycocalyx removal. *Glia* 66(3):670-687. doi: 10.1002/glia.23274.
- Pascua-Maestro R, Diez-Hermano S, Lillo C, Ganfornina MD*, Sanchez D*. 2017. Protecting cells by protecting their vulnerable lysosomes: Identification of a new mechanism for preserving lysosomal functional integrity upon oxidative stress. *PLoS Genetics* 9;13(2): e1006603. doi: 10.1371/journal.pgen.1006603.
- Del Caño-Espinel M, Acebes JR, Sanchez D* & Ganfornina MD*. 2015. Lazarillo-related Lipocalins confer long-term protection against type I Spinocerebellar Ataxia degeneration contributing to optimize selective autophagy. *Mol Neurodegener*. 19;10(1):11. doi: 10.1186/s13024-015-0009-8.
- Bajo-Grañeras R, Ganfornina MD*, Martín-Tejedor E & Sanchez D*. 2011. Apolipoprotein D mediates autocrine protection of astrocytes and controls their reactivity level, contributing to the functional maintenance of paraquat-challenged dopaminergic systems. *Glia* 59(10):1551-66. doi: 10.1002/glia.21200.
- Ganfornina, MD*, Do Carmo, S, Lora, JM, et al., Rassart, E^(AC) & Sanchez, D^(AC)*. 2008. Apolipoprotein D is involved in the mechanisms regulating protection from oxidative stress. *Aging Cell* 7, 506-515. doi: 10.1111/j.1474-9726.2008.00395.x. Author position: 10/10.
- Sanchez, D*, Lopez-Arias, B, Torroja, L, Canal, I, Wang, X, Bastiani, MJ & Ganfornina, MD*. 2006. Loss of glial lazardillo, a homolog of apolipoprotein D, reduces lifespan and stress resistance in *Drosophila*. *Curr Biol*. 16, 680-6. doi: 10.1016/j.cub.2006.03.024.
- Asterisks indicate authors with equivalent contributions.*

C.2. Congress (most relevant)

- Regulation of amyloidogenesis by the glial membrane-binding protein Apolipoprotein D. Jorge Mondejar-Duran, Beatriz Duran, Diego Sanchez, Maria D. Ganfornina. Poster. (IBRO23) THE 11TH WORLD CONGRESS OF NEUROSCIENCE.
- The neuroprotective Lipocalin Apolipoprotein D interacts with specific subtypes of detergent-resistant membrane domains in a Basigin-independent manner. M. Corraliza-Gomez; M. del Caño; D Sanchez; MD Ganfornina. Poster. 19th SENC Meeting. Lleida, 3-5/11/2021.
- Apolipoprotein D-mediated regulation of lysosomal membrane integrity preserve lysosomal function and promotes cell survival in Niemann-Pick Type A disease. MD Ganfornina; R Pascua-Maestro; MD Ledesma; D Sánchez. Poster. 48th Society for Neuroscience Meeting. San Diego (USA), 3-7/11/2018.
- Protecting the nervous system by protecting the vulnerable lysosomes: Identification of a new glia-derived mechanism for preserving lysosomal functional integrity upon oxidative stress. R Pascua-Maestro; S Diez-Hermano; C Lillo; MD Ganfornina; D Sanchez. Poster. XIII European Meeting on Glial Cells in Health and Disease. Edinburgh (UK), 8-11/7/2017
- Myelin extracellular leaflet compaction requires Apolipoprotein D membrane management by optimizing lysosomal-dependent recycling and glycocalyx removal. N García-Mateo; R Pascua-Maestro; A Pérez-Castellanos; C Lillo; D Sánchez; MD Ganfornina. Oral communication. XVII SENC Meeting. Alicante, 27-30/9/2017.
- Glial Lazarillo protects neurons from Type I Spinocerebellar Ataxia (SCA1) degeneration by a mechanism involving the control of autophagy flow and of lipid peroxide clearance. MD Ganfornina; M del Caño; D Sanchez. Poster. XV SENC Meeting. Oviedo, 25/9/2013.
- Apolipoprotein D mediates autocrine protection of astrocytes and controls their reactivity



level, contributing to the functional maintenance of paraquat-challenged dopaminergic systems. R Bajo-Grañeras; D Sanchez; MD Ganfornina. Invited Conference (L. Acarin Award). Workshop Frontiers in Glial Research (FENS). Barcelona, 13/7/2012.

Control del balance redox y de la neurodegeneración por la lipocalina Lazarillo-Apolipoproteína D, un estudio genético en *Drosophila* y en ratón. MD Ganfornina. Oral communication. XII SENC Meeting. Valencia 7/9/2007.

Glial Lazarillo, a homolog of Apolipoprotein D in flies, confers protection in situations of unbalanced oxidative stress. MD Ganfornina. Oral communication. 37th Meeting of the American Society of Neurochemistry. Portland (Oregon, USA), 11/03/2006.

C.3. Research projects (most relevant)

Apolipoprotein D cell-to-cell traffic within the nervous system: Functional consequences in health and disease. PID2022-137956NB-I00. Ministerio de Ciencia e Innovación; 13/12/2023-31/12/2026. Amount: 168.750 €. PIs: María D. Ganfornina Álvarez & Diego Sanchez Romero (UVa).

Mechanism of action of lipoproteins on cell membrane homeostasis and repair: Therapeutic targets for neurodegenerative diseases. PID2019-110911RB-I00. Ministerio de Ciencia e Innovación; 01/06/2020-31/05/2023. Amount: 119,790 €. PIs: María D. Ganfornina Álvarez & Diego Sanchez Romero (UVa).

Estudio de la bioquímica cerebral en pacientes neurocríticos mediante la implementación de neuromonitorización multimodal invasiva. GRS 2554/A/22. Junta de Castilla y León. Conserjería de Sanidad; 1/1/2022-31/12/2022 PI: Sergio García García. MD Ganfornina (equipo investigación).

Role of lipid-binding proteins on cell membrane homeostasis: therapeutic targets for neurodegenerative and demyelinating diseases. BFU2015-68149-R; Ministerio de Economía y Competitividad; 1/1/2016-31/12/2019. Amount: 157,300€. PIs: Diego Sanchez Romero & Maria D. Ganfornina Álvarez (UVa).

Estudio del mecanismo de acción de Laz/ApoD: Efectos sobre las membranas celulares en diferentes procesos biológicos. BFU2011-23978. Ministerio de Ciencia e Innovación; 1/1/2012-31/12/2015. Amount: 235,950€. PI: Maria D. Ganfornina Álvarez (UVa).

Estudio de la apolipoproteína D como parte de la respuesta endógena al estrés y su relación funcional con el envejecimiento cerebral y metabólico. VA180A11-2. Junta de Castilla y León, Consejería de Educación; 1/1/2011-31/12/2013. Amount 30,000€. PI: Maria D. Ganfornina Álvarez (UVa).

Mecanismo de acción de la proteína neuroprotectora Lazarillo en la Ataxia Espinocerebelosa Tipo I: Dependencia de los procesos de autofagia. Fundación Eugenio Rodríguez Pascual. 1/1/2011-31/12/2011. Amount 15.750€. PI: Maria D. Ganfornina Álvarez (UVa).

*Estudio de la función de la apolipoproteína D en el desarrollo y degeneración del sistema nervioso. BFU2008-01170/BFI. Ministerio de Ciencia e Innovación; 1/1/2009-31/12/ 2011. Amount: 169,400€. PI: Diego Sánchez Romero (UVa).

Estudio de los mecanismos moleculares y celulares del papel neuroprotector de la apolipoproteína D y evaluación de su potencial terapéutico en las ataxias cerebelosas. VA049A05. Junta de Castilla y León, Consejería de Educación; 1/7/2005-30/06/2008. Amount: 25,000€. PI: Maria D. Ganfornina Álvarez (UVa).

Estudio de la función de la apolipoproteína D en el balance supervivencia-muerte celular en el sistema Nervioso. Ministerio de Educación y Ciencia BFU2005-00522. 01/01/2006-31/12/2008. Amount: 128.000 €. PI: Maria D. Ganfornina Alvarez (UVa).

Although unrecognized by Spanish Science Agencies at the time, co-PI role is marked with asterisk.

C.4. Contracts, technological or transfer merits

Collaboration with IMG Pharma Biotech SL to develop microarrays of cell membrane subdomains as analytical platforms to assay therapeutic targets in neurodegenerative conditions. This collaboration was formally supported by a partnership agreement between UVa and the company to achieve PhD education of a student supported by Programa de Doctorado Industrial (Ministerio de Ciencia e Innovación). Co-supervisor role for the Thesis defended in December 2023.