

Serena Mirra



Born in Naples (Italy) on 16/10/1984
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Current Position: Research scientist

Current Affiliation:

Department of Biology and Evolution of Marine Organisms (BEOM), Stazione Zoologica Anton Dohrn, Napoli (Italy)

Education/Training/Experience

Institute and Location	Degree / Function	Year	Field of Study
University of Naples Federico II, Naples, Italy	BA	2002-2005	Biological sciences
University of Naples Federico II, Naples, Italy	MS	2005-2007	Biological sciences
Institute of Genetics and Biophysics A. Buzzati Traverso (IGB), Naples, Italy	MS Student/ Predoctoral Researcher	2006-2008	Human Genetics
University of Barcelona, Barcelona, Spain	MS Student/ Predoctoral Researcher	2008-2009	Neuroscience
Institute for Research in Biomedicine (IRB) and Department of Cell Biology, University of Barcelona, Barcelona, Spain	Ph.D.	2009-2013	Biomedicine and Neurobiology
CIBERNED and Department of Cell Biology, University of Barcelona, Barcelona, Spain	Postdoc	2013-2018	Developmental Biology and Neurobiology
CIBERER and Department of Genetics, University of Barcelona, Barcelona, Spain	Postdoc	2018-2023	Human Genetics and Neurobiology
Stazione Zoologica Anton Dohrn, Napoli, Italy	Ricercatore	2023-present	Neurobiology, Physiology, Cell Biology

Appointments and awards

2022: STM (Short Term Mobility); Aims: Invited Researcher;
Awarding entity: Consiglio Nazionale delle Ricerche (CNR); Duration: 10 days
Entity where activity was carried out: IGB-CNR, Naples (Italy)

2022: EMBO Scientific Exchange Grant; Aims: Postdoctoral Mobility;
Awarding entity: EMBO; Duration: 2 months
Entity where activity was carried out: Telethon Institute of Genetics and Medicine (TIGEM),
Naples (Italy)

2021: International Short Mobility Fellowship 202; Aims: Postdoctoral Mobility;
Awarding entity: CIBER ENFERMEDADES RARAS (CIBERER); Duration: 3 months
Entity where activity was carried out: IGB-CNR, Naples (Spain)

2018: Convocatoria Competitiva CIBERER 1179/1487; Aims: Postdoctoral Contract;
Awarding entity: CIBER ENFERMEDADES RARAS (CIBERER); Duration: 5 years
Entity where activity was carried out: University of Barcelona (Spain)

2009: FPU Fellowship - *Beca de formación de profesorado universitario*; Aims: Pre-doctoral;
Awarding entity: MINISTERIO DE EDUCACION Y CIENCIA; Duration: 4 years
Entity where activity was carried out: IRB - Institute for Research in Biomedicine/University of
Barcelona, (Spain)

2008: *Progetto formativo e di orientamento per attività di tirocinio*; Aims: Pre-doctoral;
Awarding entity: University of Naples Federico II; Duration: 6 months
Entity where activity was carried out: IGB-CNR, Naples, (Spain)

2007: Socrates/Erasmus Scholarship; Aims: Scholarship;
Awarding entity: University of Naples Federico II; Duration: 5 months
Entity where activity was carried out: University of Granada, (Spain)

Other

Course and Certificates

2023: National Scientific qualification as Associate Professor in the Italian higher education system, in the call 2021/2023 (Ministerial Decree n. 553/2021 and 589/2021) for the disciplinary field of 05/F1 - Experimental biology. Academic Recruitment Field 05/F - Experimental biology, according to the national classification. 553/2021 (Italy). Validity of the qualification. 2023-2034.

2018: Clinical Study Coordinator Course, IUSC | International University Study Center, Barcelona

2017: Accredited as Lecturer, *Agència per a la Qualitat del Sistema Universitari de Catalunya*

2016: *Certificat de suficiència en llengua catalana per a la docència universitària (C1), Serveis Lingüístics UB*

Research Grants

2022-2023: ACCI 2021 - *Terapia génica para la Retinitis Pigmentosa causada por mutaciones en CERKL: prueba preclínica mediante virus adenoasociados (AAVs) en el modelo de ratón Cerkl^{KD/KO}*

PI: Serena Mirra

Entity where project took place: University of Barcelona

Nº of researchers: 5; Total amount: 55,600 €

2020-2023: Targeting regulatory signalling pathways in retinal neurosensorial genetic disorders: a window for therapy.

Co-PIs: Gemma Marfany and Serena Mirra

Entity where project took place: University of Barcelona

Nº of researchers: 4; Total amount: 113,740€

2020-2021: ACCI 2019 – *Dinámica mitocondrial y metabólica en un modelo de retinitis Pigmentosa. ¿una nueva vía terapéutica?*

PI: Serena Mirra

Entity where project took place: University of Barcelona

Nº of researchers: 9; Total amount: 39,300 €

Participation in R&D Projects

2017: The ALS Ciberned Challenge: Accelerating New Drug Discovery

Entity where project took place: CIBER ENFERMEDADES NEURODEGENERATIVAS (CIBERNED)

PI: Adolfo López de Munain Arregui

Funding entity or body: COLLABORATIVE PROJECT OF CENTRAL AND TRASLATIONAL RESEARCH

2013-2017: Lipotoxicity, Hepatic steatosis and Hepatocarcinoma

Entity where project took place: University of Barcelona

PI: Eduardo Soriano Garcia

Funding entity or bodies: La Fundació la Marató de TV3

2013-2015: Role of Armcx proteins in Parkinson disease

Entity where project took place: CIBER ENFERMEDADES NEURODEGENERATIVAS (CIBERNED)

PI: Eduardo Soriano Garcia

Funding entity or bodies: CIBERNED intramural grant

2012-2014: *Alteraciones en la conexión GABAérgica septohipocámpica en Alzheimer. Implicaciones terapéuticas.*

Entity where project took place: IRB - Institute for Research in Biomedicine

PI: Marta Pascual Sanchez

Funding entity or bodies: Ministerio de Ciencia e Innovación

2009-2013: Support to Research Groups Established in Catalonia (SGR)

Entity where project took place: IRB - Institute for Research in Biomedicine

PI: Eduardo Soriano Garcia

Funding entity or bodies: Generalitat de Catalunya

2011-2012: Generation and functional analyses of knock-down mice for the *Armcx* genes
Entity where project took place: IRB - Institute for Research in Biomedicine
PI: Eduardo Soriano Garcia
Funding entity or bodies: Ministerio de Ciencia e Innovación

Reviewer activity

International Journal of Molecular Science, Journal of Clinical Medicine, BIOLOGICAL CHEMISTRY, Frontiers in aging neuroscience, Antioxidants

Students' Supervision

Co-direction of 13 M.Sc. or B.Sc. students and 1 PhD student.

Teaching experience

2021-2022: Adjunct Professor - Department of Genetics, Faculty of Biology (UB), (70.14 hours).

2021: Invited Professor - Master in Biomedicine (UB)

2018-2022: Course of Developmental Biology (practical course) - BSc in Biomedical Sciences and Biology (UB), 2018-2019 (48 hours/1.92 credits), 2019-2020 (60 hours/2.4 credits), 2020-2021 (45 hours/ 1.75 credits), 2021-2022 (15 hours/ 0.6 credits).

2017-2018: Course of Cell Biology (practical course) - BSc in Biotechnology (UB), (30 hours/1.2 credits).

2016-2018: Course of Neurobiology (practical course) - BSc in Biomedical Sciences and Biology (UB), 2016-2017 (54 hours/2.16 credits) and 2017-2018 (32 hours/1.28 credits).

2014-2021: Member of the final examination committee - MSc in Neuroscience, (UB) 2020-2021 and 2014-2015; BSc in Biology, Biotechnology and Biomedical Science, (UB) 2019-2020 (14.4 hours/0.576 credits).

Scientific divulgation activities

2021: Participation in European Researchers' Night in Catalonia 2021: Short talk as Sant Joan de Deu Research Institute member

2021: Participation in the SEBBM (Sociedad Española de Bioquímica y Biología Molecular) informative video on animal research (Global Get on #BOARD Campaign -Be Open about Animal Research Day).

2021: Publication of scientific divulgation article: *Un nuevo estudio ayuda a comprender las bases moleculares de las distrofias de retina causadas por el gen CERKL* (<https://genotipia.com>).

2021: Selected in Women and Girls in Science Day as CIBER young woman researcher (CIBER).

2021: Participation in Scientific photography competition (CIBER-ER).

2020: participation in Science Communication Video competition (#QueSigaLaCiencia).

2020: Participation in Science Communication Video competition: meet the researchers CIBER.

Publications

Author of 26 publications on ISI-journals (h index: 10)

List of publications of the last 10 years:

Peer-reviewed publications:

1. R. García-Arroyo, Domènech EB, Herrera-Úbeda C, Asensi MA, Núñez de Arenas C, Cuezva JM, Garcia-Fernández J, Pallardó FV, S. Mirra[±], G. Marfany[±]. **Exacerbated response to oxidative stress in the Retinitis Pigmentosa Cerkl^{KD/KO} mouse model triggers retinal degeneration pathways upon acute light stress.** *Redox Biol.* 23/08/2023
Impact index in year of publication: 10.89; Journal in the top 25%.
doi: 10.1016/j.redox.2023.102862.
2. R. García-Arroyo, A. Gavaldà-Navarro, F. Villarroya; G. Marfany[±], S. Mirra[±]. **CERKL, a Retinal Dystrophy Gene, Regulates Mitochondrial Transport and Dynamics in Hippocampal Neurons.** *International Journal of Molecular Sciences.* 30/09/2022.
Impact index in year of publication: 6.208; Journal in the top 25%.
DOI: <https://doi.org/10.3390/ijms231911593> Accession Number WOS:000867757100001
3. S. Mirra[±], L. Sánchez-Bellver, C. Casale, A. Pescatore, G. Marfany[±]. **Ubiquitin Specific Protease USP48 Destabilizes NF-κB/p65 in Retinal Pigment Epithelium Cells.** *International Journal of Molecular Sciences.* 26/08/2022.
Impact index in year of publication: 6.208; Journal in the top 25%.
DOI: <https://doi.org/10.3390/ijms23179682> Accession Number WOS:000851128200001
4. A. Gavaldà-Navarro, S. Mirra, Y. Manso, D. Sanchez-Infantes, M. Giralt, E. Soriano, F. Villarroya. **The armadillo-repeat containing X-linked protein 3, ARM CX3, is a negative regulator of the browning of adipose tissue associated with obesity.** *International Journal of Obesity.* 15/06/2022.
Impact index in year of publication: 5.095; Journal in the top 25%.
DOI: <https://doi.org/10.1038/s41366-022-01169-1> Accession Number WOS:000811447500001
5. R. García-Arroyo, A. Gavaldà-Navarro, F. Villarroya; G. Marfany[±], S. Mirra[±]. **Overexpression of CERKL Protects Retinal Pigment Epithelium Mitochondria from Oxidative Stress Effects.** *Antioxidants (Basel).* 19/12/2021.
Impact index in year of publication: 6.313; Journal in the top 10%.
DOI: 10.3390/antiox10122018; Accession Number WOS:000735481700001
6. S. Mirra^{*;±}; R. García-Arroyo; E. B-Domènech; A. Gavaldà-Navarro; C. Herrera-Úbeda; C. Oliva; J. Garcia-Fernández; R. Artuch; F. Villarroya; G. Marfany[±]. **CERKL, a retinal dystrophy gene, regulates mitochondrial function and dynamics in the mammalian retina.** *Neurobiol Dis.*, 25/05/2021. Impact index in 2020: 5.996; Journal in the top 25%.
DOI: 10.1016/j.nbd.2021.105405; Accession Number WOS:000677548100003.
7. S. Mirra^{*}, A. Gavaldà-Navarro^{*}, Y. Manso, M. Higuera, R. Serrat, M. Salcedo, F. Burgaya, J.M. Balibrea, E. Santamaría, I. Uriarte, C. Berasain, M.A. Avila, B. Mínguez, E. Soriano and F. Villarroya. **ARM CX3 Mediates Susceptibility to Hepatic Tumorigenesis Promoted by Dietary Lipotoxicity.** *Cancers.* 13(5), 1110, 05/03/2021. Impact index in 2020: 6.639; Journal in the top 25%.

DOI: <https://doi.org/10.3390/cancers13051110>; Accession Number WOS:000627947800001.

8. E. Navas-Pérez*; C. Vicente-Garcia*; S. Mirra*; D. Burguera; N. Fernández-Castillo; A. Rodríguez-Moreno; J.L. Ferrán; M. López-Mayorga; M. Alaiz-Noya; I. Suárez-Pereira; E. Antón-Galindo; F. Ulloa; P. Cuscó; R. Falcón-Moya; S. D'Aniello; B. Cormand; G. Marfany; E. Soriano; Á.M. Carrión; J.J. Carvajal; J. Garcia-Fernández. **A transposon domestication shared by placental mammals with relevance to autism spectrum disorder.** *Genome Biology*, 21 - 1, 26/10/2020. Impact index in year of publication: 13.583; Journal in the top 10%. DOI: 10.1186/s13059-020-02172-3; Accession Number WOS:000582561300001.

9. E. Borrego-Domenech; R. Andres; M.J. Lopez-Iniesta; S. Mirra; R. Garcia-Arroyo; S. Milla; F. Sava; J. Andilla; P. Loza-Alvarez; P. De la Villa; R. Gonzales-Duarte; G. Marfany. **A new *Cerkl* mouse model generated by CRISPR-Cas9 shows progressive retinal degeneration and altered morphological and electrophysiological phenotype.** <https://doi.org/10.1167/iavs.61.8.14>. 61 - 8, pp. 14. *IOVS*, 13/07/2020. Impact index in year of publication: 4.799; Journal in the top 25%. DOI: 10.1167/iavs.61.8.14; Accession Number WOS:000554499000016.

10. S. Mirra; F. Ulloa; I. Gutierrez-Vallejo; E. Martí; E. Soriano. **Function of *Armex3* and *Arm10/SVH* genes in the regulation of progenitor proliferation and neural differentiation in the chicken spinal cord.** *Frontiers in Cellular Neuroscience*, 01/04/2016. Impact index in year of publication: 4.555; Journal in the top 25%. DOI: 10.3389/fncel.2016.00047. Accession Number WOS:000371293500001.

11. D.J. Barbosa*; R. Serrat*; S. Mirra; M. Quevedo; E. Gómez de Barreda; J. Àvila; E. Fernandes; M. de Lourdes Bastos; J.P. Capela; F. Carvalho; E. Soriano. **MDMA impairs mitochondrial neuronal trafficking in a Tau- and Mitofusin2/Drp1-dependent manner.** 88-8, pp.1561-1572. *Archives of Toxicology*, 08/2014. Impact index in year of publication: 5.980; Journal in the top 10%. DOI: 10.1007/s00204-014-1209-7; Accession Number WOS:000339898700009.

12. D.J. Barbosa*; R. Serrat*; S. Mirra; M. Quevedo; E. Gómez de Barreda; J. Àvila; L.M. Ferreira; P. Sérgio Branco; E. Fernandes; M. de Lourdes Bastos; J. Paulo Capela; E. Soriano; F. Carvalho. **The mixture of "ecstasy" and its metabolites impairs mitochondrial fusion/fission equilibrium and trafficking in hippocampal neurons, at in vivo relevant concentrations.** *Toxicological Sciences*, 06/2014. Impact index in year of publication: 3.854; Journal in the top 25%. DOI: 10.1093/toxsci/kfu042; Accession Number WOS:000337075900013.

13. R. Serrat *; S. Mirra*; J. Figueiro-Silva; E. Navas-Pérez; M. Quevedo; G. López-Doménech; P. Podlesniy; F. Ulloa; J. Garcia-Fernández; R. Trullas; E. Soriano. **The *Armex10/SVH* gene: genome context, regulation of mitochondrial dynamics and protection against Aβ-induced mitochondrial fragmentation.** *Cell Death and Disease*, 04/2014. Impact index in year of publication: 5.014; Journal in the top 25%. DOI: 10.1038/cddis.2014.121; Accession Number WOS:000335450400009.

14. R. Serrat*; G. López-Doménech*; S. Mirra; M. Quevedo; J. Garcia-Fernández; F. Ulloa; F. Burgaya; E. Soriano. **The non-canonical Wnt/PKC pathway regulates mitochondrial dynamics through degradation of the arm-like domain-containing protein Alex3.** *PLoS One*, 02/07/2013. Impact index in year of publication: 3.534; Journal in the top 25%. DOI: 10.1371/journal.pone.0067773; WOS:000321341000095.

15. G. López-Doménech*; R. Serrat*; S. Mirra; S. D'Aniello; I. Somorjai; A. Abad; N. Vitureira; E. García-Arumí; M. Alonso; M. Rodríguez-Prados; F. Burgaya; A. Andreu; J. García-Sancho; R. Trullas; J. Garcia-Fernández; E. Soriano. **The Eutherian Armcx genes regulate mitochondrial trafficking in neurons and interact with Miro and Trak2.** *Nat. Communications*, 05/2012. Impact index in year of publication: 10.01; Journal in the top 10%: Yes. DOI:10.1038/ncomms1829.3-814; Accession Number WOS:000304611400014.

Peer Reviewed Reviews

1. J. Luque, I. Mendes, B. Gómez, B. Morte, M. López de Heredia, E. Herreras, V. Corrochano, J. Bueren, P. Gallano, R. Artuch, C. Fillat, L.A Pérez-Jurado, L. Montoliu, Á. Carracedo, J. M Millán, S. M Webb, F. Palau , CIBERER Network (*including S. Mirra*); Pablo Lapunzina. **CIBERER: Spanish national network for research on rare diseases: A highly productive collaborative initiative.** *Clin Genet.* 01/05/2022
Impact index in year of publication: 4.438; Journal in the top 25%.
DOI: 10.1111/cge.14113; Accession Number WOS:000750972100001

2. I. Aisa-Marín, R. García-Arroyo, S. Mirra, G. Marfany. **The alter retina: alternative splicing of retinal genes in health and disease.** *Int. J. Mol. Sci.* 02/2021. Impact index in 2020: 5.924; Journal in the top 25%.
DOI: <https://doi.org/10.3390/ijms22041855>; Accession Number WOS:000623794900001.

3. S. Mirra; G. Marfany; J. Garcia-Fernández. **Under pressure: cerebrospinal fluid contribution to the physiological homeostasis of the eye.** *Seminars in Cell and Dev Biology*, 06/2020. Impact index in year of publication: 7.727; Journal in the top 10%.
DOI: doi.org/10.1016/j.semdb.2019.11.003; Accession Number WOS:000534484400006.

4. S. Mirra[‡]; G. Marfany[‡]. **Mitochondrial gymnastics in retinal cells: a resilience mechanism against oxidative stress and neurodegeneration.** *Adv Exp Med Bio*, 2019. Impact index in year of publication: 2.450.
DOI: 10.1007/978-3-030-27378-1_84.1185; Accession Number WOS:000514087200085.

Meeting Abstracts

1. I. Izquierdo-Villalba; S. Mirra, A. Parcerisas; M. Herrero; C. Beninca; E. Rebollo; E. Soriano; A. Aragay. **G alpha q activation induces mitochondrial arrest by interacting with Alex3, Miro1 and Trak1/2 proteins.** *FEBS OPEN BIO*, 2019. Impact index in year of publication: 2,693.
Accession Number WOS:000486972402034.

2. G. Marfany; V. Toulis; EB Domenech; I. Aisa-Marin; S. Mirra; MDP da Costa; S. Erceg; D. Lukovic; R. Gonzalez-Duarte. **Gene-edited mouse models and human retinal organoids to study the function of CERKL, NR2E3 and ATXN3 genes in inherited retinal dystrophies.** *INVESTIGATIVE OPHTHALMOLOGY & VISUAL SCIENCE*, 07/2019. Impact index in year of publication: 4,799. Accession Number WOS:000488628104140.

3. I. Izquierdo-Villalba; S. Mirra, E. Rebollo; C. Benincá; JA Enriquez; E. Soriano; A. Aragay. **G alpha q regulates mitochondrial trafficking in neurons and interacts with Alex3, Miro1 and Trak proteins.** *FEBS OPEN BIO*, 2019. Impact index in year of publication: 2,231.
Accession Number WOS:000486972402034.

4. F. Villarroya; A. Gavalda-Navarro; S. Mirra; M. Higuera; Y. Manso;; R. Moure; M. Cairo; B. Minguez; E. Soriano, E. **Novel mitochondrial actors in the control of hepatic damage elicited by lipotoxicity.** *EUROPEAN JOURNAL OF CLINICAL INVESTIGATION*, 2018. Impact index in year of publication: 2,784. Journal in the top 25%.
Accession Number WOS:000434100200048

5. M. Higuera; Y. Manso, A. Gavaldá; S. Mirra; M. Salcedo; M. Ventura-Cots; JM Balibrea; F. Villarroya; E. Soriano; B. Minguez. **Impact of ARMC/ARMCX family genes in HCC development.** *HEPATOLOGY*, 01/10/2017. Impact index in year of publication: 14,079. Journal in the top 10%.
Accession Number WOS:000412089802216.

6. D. Barbosa; R. Serrat; S. Mirra; M. Quevedo; E. Gomez de Barreda; J. Avila; E. Fernandes; M. Bastos Capela; F. Carvalho; E. Soriano. **"Ecstasy" impairs mitochondrial trafficking in hippocampal neurons by a Tau phosphorylation-dependent mechanism involving GSK3 beta.** *TOXICOLOGY LETTERS*, 28/08/2013. Impact index in year of publication: 3,858.
DOI: 10.1016/j.toxlet.2013.05.358; Accession Number WOS:000323865800510.

Preprints

1. I. Izquierdo-Villalba*; S. Mirra*, Y. Manso, A. Parcerisas;J. Rubio; j. Del Valle; F. Gil-Bea; M. Herrero; E. Verdaguer; C. Benincá; RC Castro Torres; E. Rebollo; G. Marfany; C. Auladell; X. Navarro; A. Aragay; E. Soriano. **A novel Alex3/Gαq protein complex regulating mitochondrial dynamics, dendritic complexity, and neuronal survival.** *bioRxiv*, 2021.