Centro de Investigaciones en Bionanociencias (CIBION)
Laboratorio de Biofísica de Virus
Godoy Cruz 2390, C1425FQD, Buenos Aires, Argentina.
+54 11 4899 5500 int 6506
mdellarole@cibion.conicet.gov.ar
mdellarole@gmail.com

Líneas de interés en investigación:

Interacciones moleculares entre proteínas, ADN y lípidos, su estabilidad, estructura, dinámica y evolución. Enfermedades infecciosas virales emergentes y re-emergentes.

Cargo actual:

Investigador Adjunto, CONICET.
Director del Laboratorio Biofísica de Virus, CIBION, Buenos Aires, Argentina.

Educación:

Marzo de 2011: Doctorado en Química Biológica, Universidad de Buenos Aires, Argentina.
Junio de 2005: Licenciatura en Biología, FCEN, Universidad de Buenos Aires, Argentina.

Idiomas:

Español: nativo.
Inglés: nivel competente. Habla, escribe y lee con fluidez.
Francés: segundo idioma. Habla, escribe y lee con fluidez.

Experiencia en investigación:

2019: Postdoc de Reinserción, CONICET, CIBION.
2014 a 2018: Postdoc e investigador asistente, Unidad de Virología Estructural, Instituto Pasteur, París, Francia. Tema: “Mecanismos de fusión viral y fusión célula-célula: biología estructural. Criotomografía eletrónica”.
2011 a 2013: Postdoc, Centro de Bioquímica Estructural, Montpellier, Francia. Tema: "Estabilidad y función de proteínas bajo alta presión. RMN fluorescencia y calorimetría”.
2005 a 2011: Doctorado, Instituto Leloir, Buenos Aires, Argentina. Tema: "Transcripción y regulación de la replicación: interacción proteína-ADN, dinámica conformacional y evolución".
2003 a 2005: Maestría, Instituto Leloir, Buenos Aires, Argentina. Asunto: "Diseño e ingeniería de proteínas de cadena única para una mejor actividad de unión al ADN”.

Publicaciones:

Artículos revisados por pares:

1. Vaney M*, Dellarole M*, Duquerroy M*, Medits I, Tsouchnikas G, Rouvinski A, England P, Stiasny K, Heinz F and Rey F. Evolution and activation mechanism of the flavivirus class II membrane-fusion machinery. Nature Comm 2022, Jun; 13(1): 3718.
2. Benfrid S, Park K, Dellarole M, Voss J, Tamietti C, Pehau-Arnaudet G, Raynal B, Brûlé S, England P, Zhang X, Mikhailova A, Hasan M, Ungeheuer M, Petres S, Biering S, Harris E, Sakuntabhai A, Buchy P, Duong V, Dussart P, Coulibaly F, Bontems F, Rey F, and Flamand M. Dengue virus NS1 protein conveys pro-inflammatory signals by docking onto high-density lipoproteins. Embo Reports 2022, 23:e53600.
3. Belotserkovsky I, Brunner K, Pinaud L, Rouvinski A, Dellarole M, Baron B, Dubey G, Samassa F, Parsot C, Sansonetti P, Phalipon A. Glycan-Glycan Interaction Determines Shigella Tropism toward Human T Lymphocytes. MBio. 2018 Feb 13;9.

4. Fossat MJ, Dao TP, Jenkins K, Dellarole M, Yang Y, McCallum SA, Garcia AE, Barrick D, Roumestand C, Royer CA. High-Resolution Mapping of a Repeat Protein Folding Free Energy Landscape. Biophys J. 2016 Dec 6;111(11):2368-2376.
5. Saotome T, Nakamura S, Islam MM, Nakazawa A, Dellarole M, Arisaka F, Kidokoro S, Kuroda Y. Unusual Reversible Oligomerization of Unfolded Dengue EnvelopeProtein Domain 3 at High Temperatures and Its Abolition by a Point Mutation. Biochemistry. 2016 Aug 16;55(32):4469-75.
6. Dellarole M, Caro JA, Roche J, Fossat M, Barthe P, García-Moreno E B, Royer CA, Roumestand C. Evolutionarily Conserved Pattern of Interactions in a Protein Revealed by Local Thermal Expansion Properties. J Am Chem Soc. 2015 Jul 29;137(29):9354-62.
7. Mesnage S, Dellarole M, Baxter NJ, Rouget JB, Dimitrov JD, Wang N, Fujimoto Y, Hounslow AM, Lacroix-Desmazes S, Fukase K, Foster SJ, Williamson MP. Molecular basis for bacterial peptidoglycan recognition by LysM domains. Nat Commun. 2014 Jun 30;5:4269.
8. Sibille N, Dellarole M, Royer C, Roumestand C. Measuring residual dipolar couplings at high hydrostatic pressure: robustness of alignment media to high pressure. J Biomol NMR. 2014 Jan;58(1):9-16.
9. Roche J*, Dellarole M* Caro JA, Norberto DR, Garcia AE, Garcia-Moreno B, Roumestand C, Royer CA. Effect of internal cavities on folding rates and routes revealed by real-time pressure-jump NMR spectroscopy. J Am Chem Soc. 2013 Oct 2;135(39):14610-8.
10. Guca E, Roumestand C, Vallone B, Royer CA, Dellarole M**. Low-cost equilibrium unfolding of heme proteins using 2 µl samples. Anal Biochem. 2013 Dec 1;443(1):13-5.
11. Dellarole M, Kobayashi K, Rouget JB, Caro JA, Roche J, Islam MM, Garcia-Moreno E B, Kuroda Y, Royer CA. Probing the physical determinants of thermal expansion of folded proteins. J Phys Chem B. 2013 Oct 24;117(42):12742-9.
12. Dellarole M, Roumestand C, Royer C, Lecomte JT. Volumetric properties underlying ligand binding in a monomeric hemoglobin: a high-pressure NMR study. Biochim Biophys Acta. 2013 Sep;1834(9):1910-22.
13. Roche J, Caro JA, Dellarole M, Guca E, Royer CA, García-Moreno BE, Garcia AE, Roumestand C. Structural, energetic, and dynamic responses of the native state ensemble of staphylococcal nuclease to cavity-creating mutations. Proteins. 2013 Jun;81(6):1069-80.
14. Roche J, Dellarole M, Caro JA, Guca E, Norberto DR, Yang Y, Garcia AE, Roumestand C, García-Moreno B, Royer CA. Remodeling of the folding free energy landscape of staphylococcal nuclease by cavity-creating mutations. Biochemistry. 2012 Nov 27;51(47):9535-46.
15. Dellarole M, Sánchez IE, de Prat Gay G. Thermodynamics of cooperative DNA recognition at a replication origin and transcription regulatory site. Biochemistry. 2010 Dec 7;49(48):10277-86.
16. Sánchez IE, Ferreiro DU, Dellarole M, de Prat-Gay G. Experimental snapshots of a protein-DNA binding landscape. Proc Natl Acad Sci U S A. 2010 Apr 27;107(17):7751-6.
17. Smal C, Wetzler DE, Dantur KI, Chemes LB, Garcia-Alai MM, Dellarole M, Alonso LG, Gaston K, de Prat-Gay G. The human papillomavirus E7-E2 interaction mechanism in vitro reveals a finely tuned system for modulating available E7 and E2 proteins. Biochemistry. 2009 Dec 22;48(50):11939-49.
18. Eliseo T, Sánchez IE, Nadra AD, Dellarole M, Paci M, de Prat Gay G, Cicero DO. Indirect DNA readout on the protein side: coupling between histidine protonation, global structural cooperativity, dynamics, and DNA binding of the human papillomavirus type 16 E2C domain. J Mol Biol. 2009 May 1;388(2):327-44.
19. Sánchez IE*, Dellarole M*, Gaston K, de Prat Gay G. Comprehensive comparison of the interaction of the E2 master regulator with its cognate target DNA sites in 73 human papillomavirus types by sequence statistics. Nucleic Acids Res. 2008 Feb;36(3):756-69.
20. Dellarole M, Sánchez IE, Freire E, de Prat-Gay G. Increased stability and DNA site discrimination of "single chain" variants of the dimeric beta-barrel DNA binding domain of the human papillomavirus E2 transcriptional regulator. Biochemistry. 2007 Oct 30;46(43):12441-50.
21. Cicero DO, Nadra AD, Eliseo T, Dellarole M, Paci M, de Prat-Gay G. Structural and thermodynamic basis for the enhanced transcriptional control by the human papillomavirus strain-16 E2 protein. Biochemistry. 2006 May 30;45(21):6551-60.
22. Ferreiro DU, Dellarole M, Nadra AD, de Prat-Gay G. Free energy contributions to direct readout of a DNA sequence. J Biol Chem. 2005 Sep 16;280(37):32480-4.

Capítulos de libro revisados por pares:

23. Rey FA, Stiasny K, Vaney MC, Dellarole M, Heinz FX. The bright and the dark side of human antibody responses to flaviviruses: lessons for vaccine design. EMBO Rep. 2018 Feb;19(2):206-224.

24. Roche J, Dellarole M, Royer CA, Roumestand C. Exploring the Protein Folding Pathway with High-Pressure NMR: Steady-State and Kinetics Studies. Subcell Biochem. 2015;72:261-78.
25. Dellarole M, Royer CA. High-pressure fluorescence applications. Methods Mol Biol. 2014;1076:53-74. doi: 10.1007/978-1-62703-649-8_4.

Tesis:

26. PhD thesis from the department of Biological Chemistry, Faculty of Exact and Natural Sciences, University of Buenos Aires, Argentina. 2011. Advisor: de Prat Gay G. Title: "E2, transcription and replication regulator of human papillomavirus: protein-DNA interaction, conformational dynamics and evolutionary divergence".
27. MSc thesis from the department of Biological Chemistry, Faculty of Exact and Natural Sciences, University of Buenos Aires, Argentina. 2005. Advisor: de Prat Gay G. Title: "Design and characterisation of monomerics variants of the dimeric DNA binding domain of the transcription factor E2 from human papillomavirus".

Patentes:

28. M. Flamand, K.-H. Park, S. Benfrid, C. Tamietti, J. Voss, F. Coulibaly, V. Duong, P. Dussart, A. Sakuntabhaï, Q. Giai Gianetto, M. Matondo, M. Dellarole, F. Bontems, F. Rey. A novel complex formed between the flaviviral non-structural ns1 protein and plasma lipoproteins. WO2021058809A1 2021 Declaration of Invention at Research Applications. Branch and Industrial Relations, Pasteur Institute, Paris, France.

Pre-prints no publicados en revistas:

29. E. Crampon, E. Covernton, M.C. Vaney, M. Dellarole, A. Sharma, A. Haouz, P. England, J. Lepault, S. D uquerroy, F.A. Rey, G. Barba-Spaeth. "Molecular mechanisms regulating the pH-dependent pr/E interaction in yellow fever virus". bioRxiv 2022.12.06.519383; doi: https://doi.org/10.1101/2022.12.06.519383

*contribución igualitaria. **autor correspondiente

Conferencias (selección):

2022: Uruguay, Instituto Pasteur de Montevideo, conferencia institucional "Origen evolutivo y mecanismo subyacente del autocontrol de la maquinaria de fusión de membranas de flavivirus" y docencia en el curso CABBIO (Centro latinoamericano de biotecnología) teórico-práctico "Clones infecciosos: una valiosa herramienta para estudiar virus por genética reversa".

2022: Webinar, Sociedad Argentina de Virología, simposio Avances en Dengue "HDL, un nuevo ligando de NS1 que abre camino para mejores diagnósticos y tratamientos de dengue".

2022: Argentina, INEVH "Dr. Julio I. Maiztegui"- ANLIS "La proteína NS1 del virus del dengue transmite señales proinflamatorias al acoplarse a lipoproteínas de alta densidad."

2022: Argentina, Fundación Instituto Leloir, seminario institucional "Mecanismos de acción molecular de las glicoproteínas de flavivirus".

2021: France, online. XXIII Journées Francophones de Virologie. ePoster: "La protéine non structurale NS1 du virus de la dengue forme un complexe pro-inflammatoire avec les particules lipoprotéiques de haute densité (HDL) humaines." Benfrid S, Park K, Dellarole M, Tamietti C, Brûlé B, Raynal B, England P, Pehau-Arnaudet G, Bontems F, Rey F, Flamand M.

2020: Argentina, online. Workshop, Technological capabilities and Electron Microscopy Research in Argentina. Invited speaker: Structural characterization of membrane proteins by cryoelectronic tomography: study of the mechanism of membrane fusion.

2019: Argentina, Fundación Instituto Leloir, seminario institucional "Etudios sobre el mecanismo de fusión de membrana plasmática mediado por la proteína de C. elegans EFF-1 usando tomografía crioelectrónica."

2018: Israel, Be'er Sheva, Ben-Gurion University of the Negev, seminario departamental "EFF-1 Mediated Membrane Fusion".

2018: London, UK. 3rd European MicroCal User Meeting. Invited speaker: "DSC under pressure, addressing protein systems volumetrically".

2017: New Orleans, USA. Biophysical Society 61th. Annual Meeting. Biophysical Journal, 104-2, 397a. Poster: "Structural Snapshots of EFF-1 Mediated Membrane Fusion" Dellarole M, Meola A, Pehau-Arnaudet G, Bontems F, Borgnia MJ, Krey T, Volkmann N, Hanein D, Rey FA.

2016: Dortmund, Germany. 8th International Meeting on Biomolecules under Pressure. Invited speaker: "Evolutionarily Conserved Pattern of Interactions in a Protein Revealed by Local Thermal Expansion Properties".
2015: Philadelphia, USA. Biophysical Society 59th Annual Meeting. Biophysical Journal, 104-2, 397a. Poster: "Internal Cavities and their Role as Determinants of Pressure Unfolding of Proteins" Caro JA, Dellarole M, Schlessman JL, Roumestand C, Royer CA, and Garcia-Moreno EB.
2014: Montpellier, France. 7th International Meeting on Biomolecules under Pressure. Invited speaker: "Cavity Choreography Induced by Ligand Binding of Monomeric Hemoglobins: Combining High Pressure NMR and Sequence Information".
2013: Philadelphia, USA. Biophysical Society 57th Annual Meeting. Biophysical Journal, 104-2, 397a. Poster: "Assessing the Contribution of Cavity Density to Protein Partial Molar Expansivity by High-Pressure NMR" Dellarole M, Roche J, Caro JA, Rouget JB,Garcia AE, Garcia-Moreno B, Roumestand C and Royer CA.
2013: San Francisco, USA. Protein Folding Consortium, 2013 PFC. Oral presentation: "Combining High Pressure NMR and Sequence Information in monomeric hemoglobins" Dellarole M, Roumestand C, Royer CA, Lecomte J.
2012: Parma, Italy. XVII International Conference on Oxygen Binding and Sensing Proteins. Oral presentation: "High pressure NMR spectroscopy of a monomeric hemoglobin: assessing cavities and detecting rare conformations" Dellarole M, Roumestand C, Royer CA, Lecomte J.
2012: Enval, France. VIII Forum des hautes pression. Invited speaker: "The inner life of a monomeric hemoglobin: Detecting tunnels and cavities with high-pressure NMR and heteronuclear relaxation methods"
2012: Long Island, Stony Brook, USA. Protein Folding Consortium, 2012 PFC. Poster: "Pressure-jump at single-residue resolution" Dellarole M, Roche J, Caro JA, Schlessman JL, Garcia AE, Roumestand C, Garcia-Moreno B, and Royer CA.
2011: Otsu, Japan. 6th International Meeting on Biomolecules under Pressure. Poster: "Understanding protein native expansivity by mutants affecting cavities, surface and order" Dellarole M, Rouget JB, Kobayashi K, Kuroda Y and Royer CA.
2009: São Paulo, Brasil. XXXVIII Annual Meeting of SBBq. Oral presentation: "Comprehensive Comparison of the Interaction of the E2 Master Regulator with its Cognate Target DNA Sites in 73 Human Papillomavirus Types by Sequence Statistics" Dellarole M, Sánchez IE and de Prat Gay G.
2008: San Diego, USA. 22nd Symposium of The Protein Society. Poster: "Asymmetry in a linked dimeric ß-barrel yields a stable oligomer that resembles amyloid intermediates" Dellarole M, Sánchez IE and de Prat Gay G.
2006: Rio de Janeiro, Brasil. Workshop on Biocalorimetry and Biological Thermodynamics. Poster: "Increased stability and DNA binding of monomeric variants of the dimeric DNA binding domain of the human papillomavirus E2C transcriptional regulator" Dellarole M and Prat-Gay G.
2005: Pinamar, Argentina. SAIB, XLI Annual Meeting Pinamar. Poster: "Increased stability and DNA binding of monomeric variants of the dimeric DNA binding domain of the human papillomavirus E2C transcriptional regulator" Dellarole M and de Prat-Gay G, Argentina.

Enseñanza, tutorías y co-tutorías:

Actualmente: co-Director PhD de Facundo Gallo, CONICET, UBA. Director Magister Yanina Godoy, UTN, ANMAT.
de 2010 a 2020: Tutor / co-tutor de 11 estudiantes de maestría de University of Montpellier, France, University of Rennes, France, AgroParis Tech, France, University of Cergy-Pontoise, France, Faculty of Technology TUAT, Japan, and Faculty of Exact and Natural Sciences, Argentina. Students: Carre M, Gaudeaux P, Fossat M, El Ansari H, Guca E, Kobayashi K, Accialini P, Carlo J, Boudjadja B, Minebois A, Schlincken J.

Divulgación y aspectos destacados de publicaciones:

2022: “Un importante hallazgo científico cambiaría el tratamiento y la prevención del dengue y el zika” Infobae Por Romina Cansler.

2016: "High-Resolution Mapping of a Repeat Protein Folding Free Energy Landscape". Lapidus L, in F1000Prime; doi:10.3410/f.727082876.793536723.

2014: "How LysM binds Peptidoglycans", Nenes-Alves C, in Nature Reviews Microbiology 12, 532.

2010: "Primera cartografía energética de interacción entre proteínas y genes", in Agencia CyTA, Argentina.

2007: "Descubren claves del modo de acción del virus del papiloma" in La Nación Ciencia/Salud, Argentina.

Otras actividades científicas:

2021-2023: Titular Consejo Directivo CIBION-CONICET

2020 al presente: Comité de seguimiento de tesis doctorales, del Departamento de Química Biológica (QB) FCEN UBA y del Instituto FIL, FCEN UBA. E.Galpern, G. Antelo, R. Martinez.

2020 al presente: Jurado de Tesis M Pascual UNSAM Escuela de Bio y Nanotecnologías. Jurado de tesina R, Martinez, Departamento de Química Biológica FCEN UBA.

2020 al presente: Evaluador técnico de proyectos de investigación PICT Agencia**,** del Fondo Clemente Estable ANII, Uruguay y de entrada a carrera CIC, Conicet.

2018 al presente: Revisor de manuscritos enviados a Dyes and Pigments, Biophysical Journal, Current Microbiology, Archives of Microbiology, Frontiers in Microbiology/Virology

2004 al presente: Creación y mantenimiento del repositorio en línea de la base de datos de archivos ProFit .func.

2012: Organización del 1er evento Mercado de Posters. Montpellier, Francia.

2003 a 2005: Representante estudiantil consejo universitario, IIBBA, Universidad de Buenos Aires, Argentina.

Premios y subsidios para investigación:

2022: “Producción recombinante de la maquinaria de fusión de flavivirus para el desarrollo de antígenos y antivirales eficientes.” PIBAA-2872021010-1299CO 2023-2024

2020: “Desarrollo de herramienta para el diagnóstico de dengue y otros arbovirus por calorimetría de barrido diferencial” PICT-2020-SERIEA-03739 2022-2024

2019: “Instalación de un laboratorio de biofísica de interacciones proteicas para la detección y el tratamiento de enfermedades infecciosas.” PICT-PRH-2019-0017. Subsidio Raíces Repatriación y Reinstalación, CONICET.

2018: COST short-term scientific mission for young researchers, STSM Action CM1306- 40749, in University of the Negev, Beer-Sheva, Israel.

2009: SBBq travel and accommodation for the 39th Annual Meeting of SBBq, São Paulo, Brasil.

2007: AMSUD-Pasteur travel and accommodation for the course "Folding, Misfolding and Degradation of Cellular Proteins", Pasteur Institute, Montevideo, Uruguay.

2007: AMSUD-Pasteur travel and accommodation for the course "Protein Biochemistry", Pasteur Institute, Paris, France.

2006: WBBT travel and accommodation for the workshop on Biocalorimetry and Biological Thermodynamics, Rio de Janeiro, Brasil.

2006 to 2011: CONICET PhD scholarship I and II, Argentina.