



# Margot DI CESARE

📍 727 W 40<sup>th</sup> ST, BALTIMORE, MD 21211

✉️ margotdicesare@gmail.com

☎️ +33620231323

🐦 @Margot\_DiCesare

**Postdoctoral fellow**  
in Structural Biochemistry

<https://orcid.org/0000-0002-7883-852X>

## Education

---

- 2016-2018 **Master in Biochemistry, with honors**  
Faculty of Sciences and Technologies, University of Lorraine (Nancy, FRANCE)  
**Erasmus Exchange Program**, University of Linköping (SWEDEN)  
Biochemistry and Molecular Biology studies
- 2013-2016 **Bachelor in Life Sciences, with honors**  
Faculty of Sciences and Technologies, University of Lorraine (Nancy, FRANCE)

## Research

---

- November 2019 - December 2023 (4 years) **PhD Student, Molecular Microbiology and Structural Biochemistry** (University of Lyon, FRANCE)  
Bacterial nucleotide-binding proteins team (Dr. J.M. JAULT)  
Supervisors: Drs. Jean-Michel JAULT and Cedric ORELLE  
Subject: Molecular mechanism of a bacterial ABC multidrug transporter, BmrA
- April 2019 - October 2019 (7 months) **Research Assistant, International Center for Infectiology Research** (Lyon, FRANCE)  
RNA Expression in Viruses and Eukaryotes team (Dr. T. OHLMANN) and Vetophage company (Dr. M. H. CHATAIN-LY)  
Supervisor: Dr. Henri GRUFFAT  
Subject: Identification and characterization of bacteriophages receptor-binding proteins infecting *Staphylococcus aureus*
- January 2018 - July 2018 (6 months) **Research Assistant/Intern, R&D Project Manager, Calixar** (Lyon, FRANCE)  
Collaborative R&D project « ChikVax » with Ciloa (Montpellier, FRANCE) and Institut Pasteur (U1117, Paris, FRANCE)  
Supervisor: Dr. Vincent CORVEST  
Subject: Expression, solubilization and purification of native membrane antigens for the development of a new generation of vaccines
- June 2017 - July 2017 (2 months) **Research Assistant/Intern, Graduate School of Agricultural and Life Sciences** (University of Tokyo, JAPAN)  
Department of Biotechnology, Fermentation and Microbiology team (Pr. Y. OHNISHI)  
Supervisor: Dr. Danyao DU  
Subject: Purification and enzymatic assay of CreE homologue proteins, involved in cremeomycin biosynthetic pathway in Actinobacteria, for crystal screening
- June 2016 - July 2016 (2 months) **Research Assistant/Intern, Institute of Human Genetics** (University of Montpellier, FRANCE)  
mRNA Regulation and Development team (Dr. M. SIMONELIG)  
Supervisor: Dr. Aymeric CHARTIER  
Subject: Development of a new technique for ribonucleoprotein-pulldown using RNA aptamer

## Skills

---

<b>Molecular Biology</b>	Cloning, Mutagenesis, RNA extraction, RNA-pulldown
<b>Cell Culture</b>	Bacteria, Insect cells, Mammalian cells
<b>Biochemistry</b>	Membrane Protein Extraction and Solubilization, Protein Purification, Gel Filtration, Protein Reconstitution (liposomes, nanodiscs, amphipols), WB, Native Gel, Enzymology
<b>Biophysics/structural</b>	HDX-MS, Circular Dichroism, NanoDSF, Fluorescence, Cryo-EM, Negative Staining
<b>Softwares</b>	Pymol, Phenix, Wincoot, ChimeraX, DynamX, Deuterios, GraFit

## Publications

---

**Margot Di Cesare**, Elise Kaplan, Julia Rendon, Guillaume Gerbaud, Alexia Gobet, Sepideh Valimehr, Thu-Anh Thi Ngo, Vincent Chaptal, Pierre Falson, Marlène Martinho, Pierre Dorlet, Eric Hanssen, Jean-Michel Jault and Cédric Orelle. *The transport activity of the multidrug ABC transporter BmrA does not require a wide separation of the nucleotide-binding domains*. **Journal of Biological Chemistry**, 300(1).

**Margot Di Cesare**, Aissatou Maty Diagne, Benjamin Bourgey, Jean-Michel Jault and Cédric Orelle (2022). *Functional Overexpression of Membrane Proteins in: The Good, the Bad, and the Ugly*. In Heterologous Expression of Membrane Proteins. **Methods in Molecular Biology**, pp. 41-58.

Denis Lacabanne<sup>†</sup>, Thomas Wiegand<sup>†</sup>, **Margot Di Cesare**, Cédric Orelle, Matthias Ernst, Jean-Michel Jault, Beat H Meier, Anja Böckmann (2022). *Solid-State NMR Reveals Asymmetric ATP Hydrolysis in the Multidrug ABC Transporter BmrA*. **Journal of the American Chemical Society**, 144(27), 12431-12442.

<sup>†</sup> Equal contributions as first co-authors.

Vincent Chaptal<sup>†</sup>, Veronica Zampieri<sup>†</sup>, Benjamin Wiseman<sup>†</sup>, Cédric Orelle<sup>‡</sup>, Juliette Martin<sup>‡</sup>, Kim-Anh Nguyen<sup>‡</sup>, Alexia Gobet<sup>‡</sup>, **Margot Di Cesare**<sup>‡</sup>, et al (2022). *Substrate-bound and -free outward-facing structures of a multidrug ABC exporter*. **Sciences Advances**, 8(4), eabg9215.

<sup>††</sup> Equal contributions as first (†) and second (‡) co-authors, respectively.

## Scientific Communications

---

March 2023	<b>Poster Communication, FEBS Advanced Course: ABC meeting 2023</b> (Innsbrück, AUSTRIA) Title: "A conformational relay between the ATP and the drug-binding site in the bacterial multidrug ABC transporter BmrA"  <b>→ Best Poster Award</b>
November 2022	<b>Oral Communication, GdR APPICOM 2022: Integrative Approach for a multi-scale understanding of Membrane Proteins Functions</b> (Dourdan, FRANCE) « Bioanalytical Method I » Session Title: "Using hydrogen-deuterium exchange coupled to mass spectrometry to study the conformational changes of a bacterial multidrug ABC transporter, BmrA"  <b>Chairman, GdR APPICOM 2022</b> (Dourdan, FRANCE)
October 2022	<b>Oral Communication, Internal Seminar of MMSB Unit</b> (Lyon, FRANCE) Title: "Efflux mechanism of BmrA, a bacterial ABC transporter involved in multidrug resistance"
March 2022	<b>Poster Communication, Inserm Workshop 267: Membrane proteins in reconstituted systems: from the latest advances in fundamental research to therapeutic applications</b> (Bordeaux, FRANCE) Title: "Conformational changes of a bacterial ABC multidrug efflux pump, BmrA, witnessed through Hydrogen-Deuterium Exchange coupled to Mass Spectrometry"
November 2021	<b>Chairman, GdR APPICOM 2021: Integrative Approach for a multi-scale understanding of Membrane Proteins Functions</b> (Lyon, FRANCE)  <b>Oral Communication, 27<sup>th</sup> Scientific Day of EDISS</b> (Virtual Meeting) Biochemistry Session Title: "Changements conformationnels d'un transporteur ABC bactérien de multiples drogues, BmrA, étudiés par la technique d'échange hydrogène/deuterium couplée à la spectrométrie de masse"
September 2021	<b>Oral Communication, SFB-GEM Meeting 2021: Biophysics of Membranes and Beyond</b> (Virtual Meeting) « Mass Spectrometry approaches in membrane protein studies » Session Title: "Conformational changes of a bacterial ABC multidrug efflux pump, BmrA, witnessed through Hydrogen-Deuterium Exchange coupled to Mass Spectrometry"

## Collaborations

---

- 2019 - Today **Dr. Julien MARCOUX, Institute of Pharmacology and Structural Biology, Toulouse III – Paul Sabatier University** (Toulouse, FRANCE)  
Collaboration for dynamic and structural characterization of BmrA  
→ Hydrogen/Deuterium Exchange coupled to Mass Spectrometry (HDX-MS)  
→ **2 months per year spent in their lab since the start of my PhD**
- 2019 - Today **Dr. Pierre DORLET, Bioenergetics and Protein Engineering, University of Aix-Marseille** (Marseille, FRANCE)  
Collaboration for dynamic and structural characterization of BmrA  
→ Electron Paramagnetic Resonance (EPR)
- 2020 - Today **Dr. Ute A. HELLMICH, Institute of Organic Chemistry and Macromolecular Chemistry, Friedrich Schiller University Jena** (GERMANY)  
Study of a conformational relay between the ATP and the drug-binding site in the bacterial multidrug ABC transporter BmrA  
→ Nuclear Magnetic Resonance (NMR)
- 2021 - Today **Pr. Eric HANSEN, Bio21 Molecular Science & Biotechnology Institute, University of Melbourne** (AUSTRALIA)  
Collaboration for structural characterization of BmrA  
→ Cryo-Electron Microscopy (Cryo-EM)

## Fundings

---

- 2022 **6-months PhD extension, Fondation pour la Recherche Médicale** (FRM)
- 2021 **Funding for a national conference attendance, Ecole Doctorale Interdisciplinaire Sciences et Santé** (EDISS)

## Activities

---

- 2020 **Supervision of a Master Student (Benjamin Mulot) for two months, during my PhD**
- 2019 **Organizer, Science festival: Pint of Science** (Lyon, FRANCE)
- 2014-2017 **Student Association President, Association des Etudiants du Coursus Master en Ingénierie de Nancy** (Nancy, FRANCE)

## Hobbies

---

- **Handball player for 12 years, pre-professional level**
- Climbing, skiing, trekking, hiking, travelling
- Video-games

## References

---

- Dr. Jean-Michel JAULT** **CNRS Research Director, Team leader**, Molecular Microbiology and Structural Biochemistry, CNRS, University of Lyon, FRANCE  
✉ jean-michel.jault@ibcp.fr ☎ +33472722611
- Dr. Cedric ORELLE** **CNRS Research Director**, Molecular Microbiology and Structural Biochemistry, CNRS, University of Lyon, FRANCE  
✉ cedric.orelle@ibcp.fr ☎ +33472722611
- Dr. Julien MARCOUX** **CNRS Researcher**, Institute of Pharmacology and Structural Biology, Toulouse III – Paul Sabatier University, FRANCE  
✉ julien.marcoux@ipbs.fr ☎ +33561175595