



MARIE SKŁODOWSKA-CURIE INDIVIDUAL FELLOWSHIPS 2018
EXPRESSION OF INTEREST FOR HOSTING MARIE CURIE FELLOWS

HOST INSTITUTION

School of Sciences and Technology | LAQV@REQUIMTE Research Unit

RESEARCH GROUP AND URL

Organic Synthesis & Chemical Biology – MMMarques LAB
<http://docentes.fct.unl.pt/msbm/>

SUPERVISOR (NAME AND E-MAIL)

Maria Manuel Marques
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SHORT CV OF THE SUPERVISOR

Maria Manuel Marques was born in Lisbon, Portugal. She studied chemistry at the New University of Lisbon, from where she also received her Ph.D. in organic chemistry in 2001 under the supervision of Prof. Dr. S. Prabhakar. From 2001 to 2003 she joined the group of Prof. Dr. J. Mulzer at the Institute of Organic Chemistry at the University of Vienna, as a postdoctoral research fellow. In 2003, she returned to the Faculty of Science and Technology, New University of Lisbon (Requimte) as a research fellow. Since 2004 she has been involved in organic chemistry teaching at the Chemistry Department. She has a large experience on supervising postdocs, PhD students and master students. In 2016 she obtained her Habilitation in Chemistry and in 2018 she became Assistant Professor at the Chemistry Department (New University of Lisbon). Her research encompasses the development of new synthetic and sustainable methodologies involving metal-catalyzed reactions towards bioactive compounds, in particular heterocyclic molecules, and the development of new synthetic strategies to prepare glycopeptides in order to understand biological systems.

SELECTED PUBLICATIONS

- Selective Modification of Chitin and Chitosan: on the route to tailored oligosaccharides; Carvalho L. C. R., Queda F., Santos C. V. A., Marques M. M. B. *Chem. Asian J.* 2016, 11, 3468-3481. DOI: 10.1002/asia.201601041;
- Synthesis of the NAG-NAM disaccharide via a versatile intermediate; Enugala R., Pires M. J. D., Marques M. M. B. *Carbohydr. Res.* 2014, 384, 112-118. DOI: 10.1016/j.carres.2013.12.007;
- Stereoselective Glycosylation of Glucosamine: The Role of the N-Protecting Group; Enugala R., Carvalho L. C. R., Pires M. J. D., Marques M. M. B.* *Chem. Asian J.* 2012, 7, 2482-250. DOI: 10.1002/asia.201200338;
- Towards Glucosamine Building Blocks: Regioselective One-Pot Protection and Deallylation Procedures; Enugala R., Carvalho L. C. R., Marques M. M. B.* *Synlett* 2010, 18, 2711-2716. DOI: 10.1055/s-0030-1259001.



UNIVERSIDADE
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PROJECT TITLE AND DESCRIPTION

Rethinking Bacterial Cell Wall Synthesis

Peptidoglycan (PGN) is a major component of the bacterial cell wall, and its synthesis and composition is associated with bacterial resistance to different antibiotics and with a variety of host/bacteria interactions. The determination of the role of PGN in host disease has been hampered by the lack of pure and homogeneous polymerized PGN. PGN is present as long molecules, not as monomers, and the polymerization degree is essential for host recognition. In order to mimic biological samples, we want to produce PGN surrogates, fragments of controllable degree of polymerization and high molecular weight. The major aim of this project is to develop an innovative, sustainable and simple methodology, based on a combined synthetic and enzymatic route, to produce artificial bacterial PGN fragments of high-molecular weight. There are two major obstacles for this synthesis: (i) the presence of a β -1,4 glycosidic bond, as it becomes necessary to perform multistep synthetic sequences to obtain a regio and stereoselective assembly of glycosidic bonds crucial for biological activity and (ii) obtaining sufficient long PGN fragments to replace samples of biological origin. We propose to address this problem by establishing a chemoenzymatic synthesis of PGN polymers. The main goal of the project consists on developing a practical approach for a straightforward synthesis of glycopeptides that mimic the natural PGN by combining chemical and enzymatic reactions. This straightforward strategy consists on an unprecedented approach to prepare highly valuable compounds paramount to unravel bacteria-host interactions. The methodology to be developed will significantly improve the access to this complex molecules, relative to the previously reported approaches that involve multiple protection/deprotection and purification steps. This project will be developed in collaboration with Professor Sérgio Filipe from UCIBIO-Requimte at FCT-UNL.

SCIENTIFIC AREA WHERE THE PROJECT FITS BEST

Chemistry (CHE)

OTHER RELEVANT INFORMATION

The candidates should have a solid experience on the synthesis of carbohydrates. Furthermore, experience with peptides and glycopeptides will be highly appreciated. The candidate should, demonstrate ability to work successfully and willing to participate in supervising and mentoring activities. The candidate should have excellent presentation, writing and communication skills. Mobility will be appreciated. Candidates should send by email to Prof. Maria Manuel B.Marques (mmbmarques@fct.unl.pt) the following documents:

- Curriculum Vitae
- Brief description of the candidate's previous experience and expertise he/she would bring to the institution
- A motivation letter (1 page)
- Contact information of two referees