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CiQUS Lecture



Complex lipid membranes under the MD/NMR molecular microscope

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MARTIN-LUTHER-UNIVERSITÄT HALLE-WITTENBERG

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Abstract:

Lipid membranes are key elements of cells and of a number of biological systems such as myelin and lung surfactant. Presently, the most powerful approach for the molecular characterisation of lipid membranes is a combined use of solid-state nuclear magnetic resonance (NMR) spectroscopy and molecular dynamics (MD) simulations. This approach has been however limited to simple membranes so far. I will describe our most recent achievements for pushing the boundaries of such methodology towards the characterisation of more complex lipid membranes, namely aiming to investigate the structure of biological myelin at the molecular level.

Biosketch:

Tiago Mendes Ferreira graduated in Chemistry, with a specialisation in Quantum Chemistry, in the University of Coimbra (Portugal), and obtained his PhD in the University of Lund (Sweden) under the guidance of Prof. Daniel Topgaard. During his PhD studies he focused on the use of solid-state nuclear magnetic resonance (NMR) spectroscopy and molecular dynamics (MD) simulations to investigate liquid crystalline systems. After his PhD studies, he was awarded with a 2-year grant as temporary principal investigator by the German Research Foundation (Deutsche Forchungsgemeinschaft) to work on the characterisation of lung surfactant in the Martin Luther University Halle-Wittenberg (MLU) in the NMR laboratory led by Prof. Kay Saalwaechter in Halle (Germany). Later, he started the membrane biophysics junior research group in the MLU. In the last few years, he has been the main responsible for the solid-state NMR experiments in the NMRlipids project, an open collaborative endeavour that unites several international research groups with the goal of improving the use of lipid membrane MD simulations. Most recently, he has been focusing on optimising the MD simulation and NMR methodologies towards investigating more complex membrane systems. In September this year, he will move to the University of



Santiago de Compostela in association with the Physical Chemistry department and CiQUS to work as a "Ramón y Cajal" researcher.