



School of Pharmacy PhD Projects 2014

Project Title Synthesis and evaluation of Co-enzyme-A derivatives to probe the role of acyl Co-A in diseases and ageing.

Supervisors Dr M. Migaud, Prof T. Robson.

Description Coenzyme A (CoA) is an indispensable cofactor in all living organisms. It functions as an acyl group carrier and carbonyl-activating group in a number of central biochemical transformations, including the tricarboxylic acid cycle and fatty acid metabolism. About 4% of known enzymes utilize CoA as an obligate cofactor. Acyl Co-A is also the cofactor used by a number of regulatory enzymes for the acylation of partner proteins, as part of the post-translational modifications and the epigenetic process of cell regulation. In the last few years, all of the genes encoding the CoA biosynthetic enzymes have been identified and CoA is assembled in five steps from pantothenic acid and pathway intermediates are common to both prokaryotes and eukaryotes. These intermediates can be used as template to generate chemical tools to probe the biology of Co-enzyme-A under a range of physiological conditions, in particular in relation to neuronal defects, diabetes and ageing. In collaboration with a group from University College London-UK and a group from Bergen University in Norway, we are investigating the regulation processes that CoA can be involved in, by synthesising reporting molecules which are either used as stable biosynthetic precursors that can be used in monitoring or as inhibitors of specific biosynthetic enzymes.

The QUB laboratory will focus on developing modified CoA derivatives, which will be key-reporting tools, to be used by the partnered laboratories. The synthetic work will focus in particular on the preparation of some isotopically labeled (non-radioactive), enzymatically stable, CoA derivatives to conduct, for instance, LC-MS-MS quantifications in collaboration with the partnered biology groups.

This project brings together the expertise of the Medicinal Chemistry and Chemical Biology Group in the school of Pharmacy and collaborators from the University of Bergen (Norway-Biology/Biochemistry) and UCL (molecular biology). The student will therefore learn a wide range of skills in the field of chemical biology and biological sciences while relying on his/her own expertise in synthetic organic chemistry and developing effective synthetic methods to access challenging yet much needed molecular probes.

Start Date 1 Oct 2014

Keywords Synthetic organic chemistry, Chemical biology, Enzymology

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How to Apply

Postgraduate applications should be made using Queen's Online:

<http://go.qub.ac.uk/pgapply>

Please note that there are two application processes: one for admission to the university and another for postgraduate awards.

Further Information

Additional information for prospective postgraduate students can be found on the School of Pharmacy website:

<http://www.qub.ac.uk/pha>

and the Queen's Postgraduate website:

<http://www.qub.ac.uk/home/ProspectiveStudents/PostgraduateStudents/>