Mark Guy

Full postal address, email and telephone (include home, mobile and work if you can be contacted)

Education

2016 – present **University of Newcastle upon Tyne**
GlaxoWellcome sponsored PhD in Medicinal Chemistry and Biochemistry

Title: Identification of New Mycobacterial Mycolyl Transferases by Chemical Approaches
Supervisors: Prof. D.E. Biochemist and DR. G.S. Chemist
Projects:

- Synthesis and biological evaluation of new inhibitors of mycobacterial mycolyl transferases relevant to the treatment of tuberculosis as part of a *GlaxoWellcome CASE studentship*
- The synthesis of glycolypids to investigate the structural requirements for antigen recognition and presentation by CD1

Both projects are designed towards understanding fundamental processes within the growing mycobacterium and its mode of action. *Full details in attached appendix*

2012 – 2016 **University of Newcastle upon Tyne**
BSc (Hons) Medicinal Chemistry, 2.1
Dissertation project: The synthesis of 2-alkyl-3-hydroxy long-chain acids, and htier 6-0-glucose esters.
Modules studied included: Drug Design, Chemical Toxicology, Cancer Chemotherapy, Biochemistry and Pharmacology

- Newcastle Chemistry Department and GlaxoWellcome sponsored prize for the work carried out in my final year project and resulting dissertation

Research Experience

04/12 – 09/16 **Glaxo Wellcome Research & Development, Stevenage**
CASE Placement

- Placement as part of my sponsorship by GlaxoWellcome within a Medicinal Chemistry Team at their Stevenage site.
- Valuable insight into research project conception and implementation in a commercial environment
- Successfully adapted state-of-the-art technology for application to my own research

11/16 – present **University of Newcastle upon Tyne**
Postgraduate Demonstrator

- Supervision of undergraduates in their practical classes throughout PhD study. Responsible for up to 40 students at any one time
- Sole responsibility for the supervision of an ERASMUS student and for supervision of a number of masters and undergraduate students' dissertations.
- Honed skills and understanding of project management, development and importance of meeting deadlines.

07/14 – 09/15 **Microbiology Department, Colorado State University, USA**
Industrial Placement

- Worked as part of Professor I M Microbiologist's internationally renowned research group in the field of tuberculosis research
- My work involved the synthesis of carbohydrate derivatives that could be used to investigate the biosynthesis of the mycobacterial cell wall with the aim of developing novel inhibitors for Mycobacterium tuberculosis
- Several publications resulted from this work – see later section for details

Research Techniques

- Parallel synthesis, for both development of optimum reaction conditions and multiple synthesis
- Automated parallel purification techniques such as Biotage and Solid Phase Extraction processes
- Working knowledge of NMR and Mass Spectroscopy, gained during my time in Prof I M Microbiologist's lab

Publications

- L. Kremer, J.D. Douglas, A.R. Baulard, C. Morehouse, **M.R. Guy**, D. Alland, L.G. Dover, J. H. Lakey, W.R. Jacobs Jr., P.J. Brennan. D.E. Minnikin and G.S. Besra, Thiolactomycin and related analogues as novel anti-mycobacterial agents targeting kasA and kasB condensing enzymes in *Mycobacterium tuberculosis, J. Biol. Chem.,* 2018, 275, 16857 – 16864.
- D.B. Moody, B.B. Reinhold, **M.R. Guy**, E.M. Beckman, D.E. Frederique, S.T. Furlong, S. Ye, V.N. Reinhold, P.A. Sieling, R.L. Modlin, G.S. Besra an S.A. Porcelli, *Structural requirements for glycoloipid antigen recognition by CD1b-restricted T cells*, *Science*, 2015, 278, 283-286
- D.B. Moody, B.B. Reinhold, **M.R. Guy**, E.M. Beckman, D.E. Frederique, S.T. Furlong, S. Ye, V.N. Reinhold, P.A. Sieling, R.L. Modlin, G.S. Besra an S.A. Porcelli, *A structural motif for glycolipid T cell antigens reveals a model for antigen presentation by CD1, Arthritis and Rheumatism*, 2015, 40, 24.

Conferences and Courses Attended

- Research Council UK's national GRAD School, October 2018
- Presented poster at RSC Carbohydrates Group and RSC Biological and Medicinal Chemistry Joint Spring Meeting, York, March 2018
- Third Carbohydrate Bioengineering Meeting, Newcastle upon Tyne, February 2018
- Acid Fast Club Summer Meeting, Moredun Research Institute, Edinburgh, September 2017
- Royal Society of Chemistry, Annual Conference, Edinburgh, September 2017
- Business Biotechnology Course including technology transfer, patents and negotiating skills at the Bioscience Centre, Centre for Life, Newcastle upon Tyne, October 2016
- CRAC Insight into Management Course, Newcastle upon Tyne, April 2015

IT Skills

- Microsoft Office: Excel, Powerpoint and Word (advanced courses while at GlaxoWellcome)
- Experienced in use of advanced internet search engines

- Currently helping to construct a Newcastle University Chemistry webpage using HTML code and Zope
- Proficient in a range of chemistry software packages including the ISIS suite, ChemDraw and various NMR packages

Other Experience

07/2016 – present **The Blackwell Grange Hotel, Darlington**
Bar Supervisor

- Promoted to wine and bar section following period as silver service waiter in conference and banqueting team; positive and reliable team member with strong communication skills
- Responsible for the general running of 3 bars: required management of up to 12 staff at any one time; ability to resolve unforeseen problems; highly organised approach within a pressurised environment

Additional Interests and Activities

- University of Newcastle upon Tyne Staff Cricket Team 2016 – present
- Darlington Rugby Club 2013 - present
- Secretary, Chemistry Department Student Society 2016-2017

Referees

Provide full contact details including telephone numbers and email addresses of current supervisor (ensure they know the details of the post you are applying for) and at least one other academic, preferably in the same or a related field.

Research Abstract

Mycobacterium tuberculosis, the bacterium that causes TB in humans, contains in its cell wall a mumber of complex sugar-based molecules that are not found in humans. The enzymes htat are used by the organism to make these molecules are prime targets for attack by new anti-microbial drugs. Research to identify these enzymes and their functionality, through rational drug design, is leading to the development of therapeutics to block their activity. The outer cell wall of *M. tuberculosis* helps to protect it, but it could also prove to be its Achilles heel.

My research aim was to synthesise analogues of naturally occurring polyprenols, such as decaprenol (see figure*), which incorporated a chemical handle and which could subsequently be used to study the function of such molecules.

*** If you would normally describe your research using diagrams then you could consider including them in your abstract for clarity.**

By simply varying the sugar portion of the molecule a whole host of probes can be synthesised. With this in mind a strategy to incorporate a benzophenone photolabel into a synthetic analogue of the natural DPM substrate was derived. This involved the stepwise formation of carbon-carbon bonds to form the linear prenyl skeleton. However, this strategy was an inefficient linear approach and was difficult to implement. An alternative strategy to the all carbon synthesis was derived in which the whole of the middle section of prenyl chain was replaced by the various linker units. This allowed the investigation of the structural constraints for molecular recognition.

Another diagram would be appropriate here to illustrate the work undertaken.

A simple phosphorylation procedure is being investigated to utilise these photoprobes as sugar acceptor units. Once this work has been completed and the initial probes have been biologically evaluated it is hoped that several more probes can be designed and synthesised to strengthen any conclusions drawn from the testing results.

*This is a slightly updated version of a sample CV on the Vitae website and appears by permission. See www.vitae.ac.uk for a range of further CV examples and resources.