University of Birmingham

Rachel Gurney

Doctoral Researcher

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About

PhD Title: Biosynthesis of the antibiotic mupirocin by *Pseudomonas fluorescens* NCIMB 10586

Supervisors: Professor Christopher M Thomas and Dr Joanne Hothersall

Mupirocin is a polyketide antibiotic produced by *Pseudomonas fluorescens* NCIMB 10586. The biosynthetic pathway belongs to the trans-AT group in which acyltransferase (AT) activity is provided by a separate polypeptide rather than in-cis as found in the original type I polyketide synthases. Rachel's research focuses on characterizing these trans-acting acyltransferases. She is also investigating the roles of AT 'docking domains' within the mupirocin cluster.

Qualifications

BSc (Hons) Biomedical Science from the University of Coventry

Biography

I obtained my 2:1 degree in Biomedical Science from the University of Coventry in 2007. During this period I developed an interest in general microbiology, the human microbiome, probiotics and antibiotic resistance. For my undergraduate honors project I chose to investigate the effect cranberry juice had on the adhesion of yeast to different cell lines. I started my 4 year BBSRC funded doctoral training PhD at the University of Birmingham in 2008, after working in industry as a microbiology technician for one year. Mupirocin is currently used in hospitals to prevent the spread of MRSA and understanding the biosynthesis pathway will lead to the production of novel antibiotics in the future.

Research

Antibiotic resistance, antibiotic biosynthesis, polyketides, protein structure and function

Other activities

- A member of the Society for General Microbiology.
- A member of the Biochemical Society
- A demonstrator for undergraduate practical classes at the University of Birmingham
- Undergraduate project supervisor

Publications

Gurney, R. and Thomas, C. M (2011) 'Mupirocin: biosynthesis, special features and applications of an antibiotic from a Gram negative organism.' Applied Microbiology and Biotechnology 90: 11-21

Fukuda, D., Haines, A. S., Song, Z., Murphy, A. C., Hothersall, J., Stephens, E. J., Gurney, R., Cox, R. J., Crosby, J., Willis, C. L., Simpson, T. J., and Thomas, C. M. (2011) 'A Natural Plasmid Uniquely Encodes Two Biosynthetic Pathways Creating a Potent Anti-MRSA Antibiotic.' PLoSone 6(3):e18031

Poster at SGM spring conference 2010 'Substrate specificity of the trans-acting acyltransferases of the mupirocin biosynthetic cluster.'

Talk at An Integrated Approach to Research in Infectious Diseases symposium at the University of Birmingham 2010 'Understanding acyl transfer to allow engineering of new antibiotics.'

Poster at GIM2010 conference in Melbourne, Australia 'Substrate specificity of the trans-acting acyltransferases of the mupirocin biosynthetic cluster.' Also presented at the BGRS symposium at the University of Birmingham.

Poster at the University of Birmingham poster conference 2010 'Understanding acyl transfer to allow engineering of new antibiotics.'

Poster at the ESF-EMBO symposium on Synthetic Biology of Antibiotic Production in Sant Felie de Guixols, Spain 'Substrate specificity of the trans-acting acyltransferases of the mupirocin biosynthetic cluster'.