Martin Jones

School of Biosciences (/schools/biosciences/index.aspx)

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About

PhD Title: Bioanalytical Chemistry

Supervisors: Professor Mark Viant (P.I.), Professor John Colbourne (joint secondary supervisor) and Dr Warwick Dunn (joint secondary supervisor)

The initial aim of Martin's research is to establish a robust workflow enabling the comprehensive annotation of the many thousands of metabolites found within biological organisms, tissues and fluids. This workflow will be applied principally to the study of the freshwater keystone species, *Daphnia magna* (water flea), with a vision to empowering current environmental monitoring regimens and basic ecotoxicological research.

Qualifications

BSc (Hons) Forensic Science
MSc Analytical Toxicology

Biography

Between 2006 and 2010 I studied for my undergraduate degree in Forensic Science (BSc Hons) at De Montfort University, Leicester. During this time I was fortunate enough to have had the opportunity to undertake an industrial placement with the pharmaceutical firm, Pfizer Ltd, wherein I was tasked with exploring the moisture sorption kinetics of various polymeric materials. The foundations for my interest in analytical chemistry were laid throughout these years.

September 2010 marked the start of my MSc studies in Analytical Toxicology with King's College London, covering such topics as xenobiotic absorption and transformation, pharmaco- and toxico-kinetics, therapeutic drug monitoring and clinical and forensic case studies. The theories and applications of analytical instrumentation were explored in considerable detail, with particular focus paid to exploring the merits of mass spectrometry, coupled with gas and liquid phase chromatography, in answering questions of clinical and toxicological importance. The final three months of my time with King's College London were spent under the supervision of Dr Stephen Morley at Sheffield's Teaching Hospitals, wherein I was responsible for establishing a liquid chromatography-tandem mass spectrometry method for the parallel detection and quantification of antipsychotic medications.

From January through August 2012 I returned to Sheffield's Teaching Hospitals, again under the supervision of Dr Morley, working to establish a liquid chromatography-tandem mass spectrometry methodology for the detection and differentiation of endogenous and exogenous analogues of a routine medicinal peptide. This method was important in overcoming the shortcomings in more traditional methodologies applied within the clinical and forensic communities.

In October 2012 I moved from Sheffield to the University of Birmingham to start my doctoral studies within the Environmental Metabolomics Research Laboratory of Professor Mark Viant. Here, under the supervision of Professor Viant, Professor John Colbourne and Dr Warwick Dunn, I am now focusing on establishing a robust workflow for the comprehensive annotation of the thousands of small molecules (metabolites) potentially present within biological matrices. When complete, this workflow will be utilized to advance our current understanding of the metabolic composition of a range of biological organisms, tissues and fluid, including the freshwater crustacean, Daphnia magna - a keystone species of many freshwater ecosystems and recognized model organism for both ecotoxicity testing (OECD) and basic biomedical research (National Institutes of Health, U.S.A.). Ultimately, it is hoped that this work will empower researchers and regulatory agencies working with Daphnia magna.

Solid phase extraction, liquid chromatography, diode array-based detection, high resolution accurate mass mass spectrometry (MS), multiple stage (MSn) mass spectrometry and one- & two-dimensional NMR methodologies will all be applied as part of this workflow. Complementary analytical strategies are also being sought that offer yet more complete small molecular coverage of distinct biological sample types.

Research

Separation science, mass spectrometry, nuclear magnetic resonance spectroscopy, biochemistry and metabolomics.

Other activities

I am a current student member of both the Metabolomics Society and the LTG (formerly the London Toxicology Group). Within the School of Biosciences, I am a member of the Biosciences Graduate Student Committee.

Publications

Development of strategies for integrated full-scan profiling and data dependent MS/MS and MSn applying CID and HCD on hybrid Orbitrap mass spectrometers (2013). Oral presentation, Glasgow (U.K.), International Conference of the Metabolomics Society.