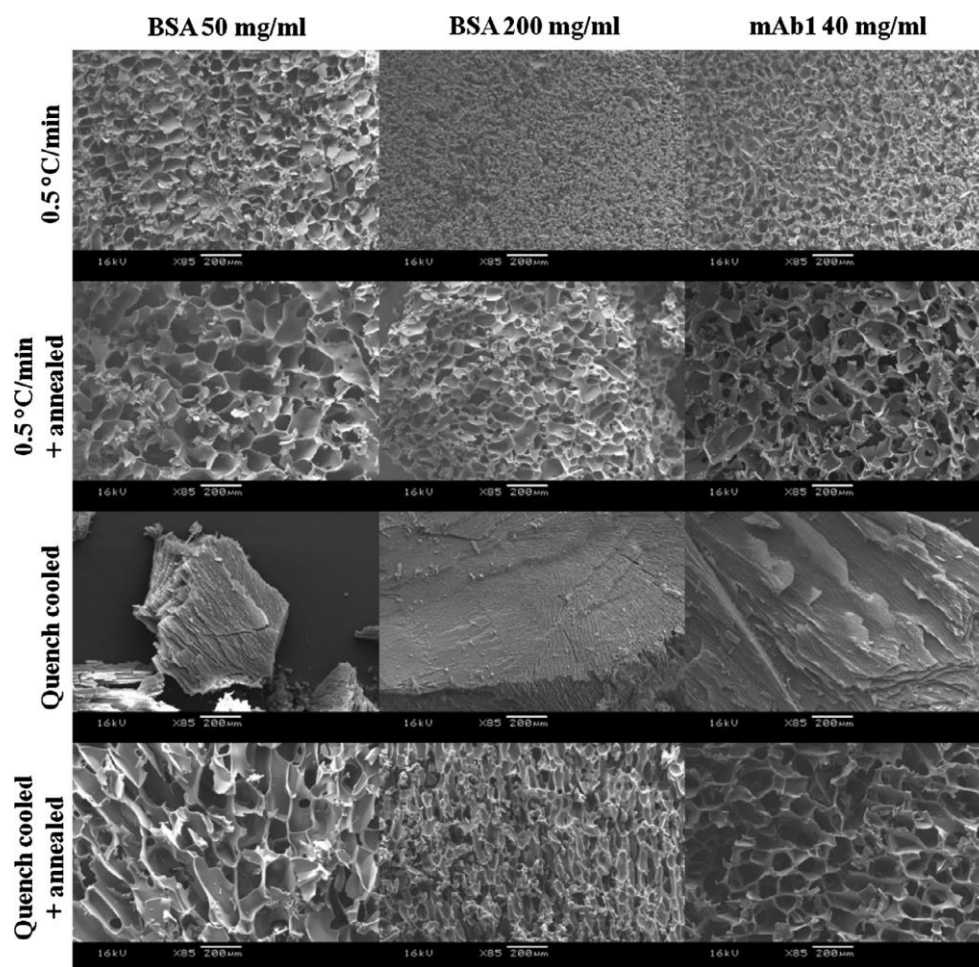




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The School of Pharmacy Journal

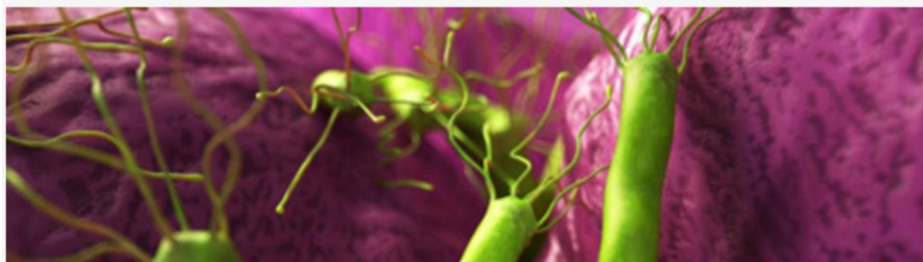


August-October 2015

Foreword

Welcome to our latest edition of the School of Pharmacy Journal, a quarterly collection of publications and press releases from August to October 2015.

Revealed *Helicobacter pylori*'s secret weapon



Discovered in 1982, *Helicobacter pylori* (*H. pylori*) is a disease-causing bacterium that survives in our stomachs despite the harsh acidic conditions. It is estimated that one in two people have got it, though most won't ever experience any problems. Even so, it is considered one of the most common bacterial infections worldwide and a leading cause of dyspepsia, peptic ulceration and gastric cancer. Through unique evolutionary adaptations, *H. pylori* is able to evade the antiseptic effect of our stomach acid by hiding within the thick acid-resistant layer of mucus that coats the stomach wall. Once within the mucus layer, the bacterium latches onto sugars naturally found on the stomach wall using its adhesion proteins. This attachment is so effective that the bacterium can resist attempts by the body to 'flush' it away, allowing the pathogen to colonise with impunity.

But the game could be up for *H. pylori*. Researchers in the School of Pharmacy, at The University of Nottingham and AstraZeneca R&D have identified the molecular mechanism that the bacterium's best-known adhesion protein uses to attach to stomach sugars. The research is published today, August 14 2015, in the prestigious scientific journal *Science Advances*. (2015) 1, e1500315 DOI: [10.1126/sciadv.1500315](https://doi.org/10.1126/sciadv.1500315)

Powerful x-rays reveal special 'groove' Naim Hage, the postgraduate researcher who worked on this project as part of his doctoral thesis, said: "Although it's still very early, the insight we've gained from this study is already very exciting news for patients." Using extremely powerful x-rays, the scientists were able to study the interactions between the *H. pylori* adhesion protein BabA and Lewis^b sugars of the gastric mucosa at the atomic level. They found that, right at its tip, BabA possesses a specific groove that enables it to securely attach to Lewis^b using a network of hydrogen bonds (the same kind of interactions that keep water molecules together).

The principal investigator behind the project, Dr Franco Falcone, said: "While this study answers long-standing questions about how *H. pylori* colonises the stomach, it represents the very first step in the development of novel therapies. The next few years of laboratory-based research will be crucial to determine if an anti-BabA adhesion approach is viable and can progress to clinical development. A similar approach is already showing promising results for the treatment of urinary tract infections in preclinical models. Looking forward, we are excited to continue working closely with AstraZeneca R&D who have provided a tremendous amount of support to achieve this discovery."

Student success at the RPS conference 2015

School of Pharmacy staff and student representatives at the RPS conference:



Students from the Nottingham School of Pharmacy did exceptionally well at this year's Royal Pharmaceutical Society (RPS) conference held at the ICC Birmingham. Meera Vara's research poster entitled 'Perceptions and Experiences of Women Who Have Ever Stopped Taking Aromatase Inhibitors' took the prize for best poster in the Practice Research section. The poster 'Evaluation of community pharmacy customers' views of the seasonal influenza vaccination and community pharmacy vaccine service' by Sui Tan and Yuen Man was also highly commended in the same section.

MPharm research project delivers real life drug discovery experience



Students from the drug discovery team in the lab

Students in the School of Pharmacy now have the opportunity to participate in a real life experience of the drug discovery process thanks to an innovative new project supported by academics from the Division of Medicinal Chemistry and Structural Biology and the pharmaceutical company, GlaxoSmithKline (GSK). Working in teams, 24 students from the MPharm undergraduate programme established virtual drug discovery companies where they designed and synthesised new chemical compounds as potential drugs to treat asthma. Responsible for devising their own work programmes and balancing budgets, the resulting compounds were tested against an important biological target by scientists at GSK, feeding back valuable data to enable the teams to further refine their potential as future asthma drugs. The success of the project means that it will be extended to students on the MSc in Drug Discovery and Pharmaceutical Sciences. This builds on the successful GSK-sponsored programme in the School of Chemistry (led by Dr Jonathan Fray under the sponsorship of Professor Chris Moody) which generated the starting materials for the School of Pharmacy students to work with. Special thanks are extended to our colleagues at GSK (Dr Simon Macdonald and James Rowedder) who also arranged an entertaining afternoon of introductory lectures and workshops demonstrating the benefits of team working for successful project delivery. The project leader, Dr Michael Stocks said "This is an innovative approach to running undergraduate projects; giving students a feel for both drug discovery and project management and it is hoped that this project will evolve in future years to generate first-class data fit for scientific publication"

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 - [Paper accepted in Molecular Pharmaceutics and selected to be featured in ACS Editors' Choice](#)
 - [Postgraduate team wins the regional heat of Biotechnology YES competition](#)
 - [Cameron Alexander contributes to the cover image of the Biomaterials Science journal](#)

- **Collated Research Papers:**

[A Gastrointestinal Transit Study on Amphotericin B-Loaded Solid Lipid Nanoparticles in Rats](#)

Hilda Amekyeh, Nashiru Billa, Kah-Hay Yuen and Sherlyn Lim Sheau Chin

AAPS PharmSciTech (2015) 16, 871-877 DOI: 10.1208/s12249-014-0279-4

[Bleeding in the jungle](#)

Alejandro Arbelaez, Johan Niemann, Robert Freney, Maha Othman, Jonas Emsley, Soma Mohammed and Emmanuel J. Favalaro

American Journal of Hematology (2015) 90, 843-846 DOI: 10.1002/ajh.24032

[Asymmetric Pentafulvene Carbometalation—Access to Enantiopure Titanocene Dichlorides of Biological Relevance](#)

Melchior Cini, Tracey D. Bradshaw, Simon Woodward and William Lewis

Angewandte Chemie (2015) 54, 14179-14182 DOI: 10.1002/anie.201508034

[Fast, Ultrasensitive Detection of Reactive Oxygen Species Using a Carbon Nanotube Based-Electrocatalytic Intracellular Sensor](#)

Frankie J. Rawson, Jacqueline Hicks, Nicholas Dodd, Wondwossen Abate, David J. Garrett, Nga Yip, Gyorgy Fejer, Alison J. Downard, Kim H. R. Baronian, Simon K. Jackson and Paula M. Mendes

Applied Materials & Interfaces (2015) 23527-23537 DOI: 10.1021/acsami.5b06493

[Structural basis of Lewis^b antigen binding by the Helicobacter pylori adhesin BabA](#)

Naim Hage, Tina Howard, Chris Phillips, Claire Brassington, Ross Overman, Judit Debreczeni, Paul Gellert, Snow Stolnik, G. Sebastiaan Winkler and Franco H. Falcone

Science Advances (2015) 1, e1500315 DOI: 10.1126/sciadv.1500315

[Cell and protein compatible 3D bioprinting of mechanically strong constructs for bone repair](#)

M J Sawkins, P Mistry, B N Brown, KMSakesheff, L J Bonassar and J Yang

Biofabrication (2015) 7, 035004 DOI: 10.1088/1758-5090/7/3/035004

[3D chemical characterization of frozen hydrated hydrogels using ToF-SIMS with argon cluster sputter depth profiling](#)

Michael Taylor, David Scurr, Matthias Lutolf, Lee Buttery, Mischa Zelzer and Morgan Alexander

Biointerphases (2015) 11, 02A301 DOI: 10.1116/1.4928209

[A defined synthetic substrate for serum-free culture of human stem cell derived cardiomyocytes with improved functional maturity identified using combinatorial materials microarrays](#)

Asha K. Patel, Adam D. Celiz, Divya Rajamohan, Daniel G. Anderson, Robert Langer, Martyn C. Davies, Morgan R. Alexander and Chris Denning

Biomaterials (2015) 61, 257-265 DOI: 10.1016/j.biomaterials.2015.05.019

[Systemic in vivo delivery of siRNA to tumours using combination of polyethyleneimine and transferrin–polyethyleneimine conjugates](#)

Anna M. Grabowska, Ralf Kircheis, Rajendra Kumari, Philip Clarke, Andrew McKenzie, Jaime Hughes, Cerys Mayne, Arpan Desai, Luana Sasso, Susan A. Watson and Cameron Alexander

Biomaterials Science (2015) available online DOI: 10.1039/c5bm00101c

[Heparin molecularly imprinted surfaces for the attenuation of complement activation in blood](#)

Jenny P. Rosengren-Holmberg, Jonas Andersson, James R. Smith, Cameron Alexander, Morgan R. Alexander, Günter Tovar, Kristina N. Ekdahl and Ian A. Nicholls

Biomaterials Science (2015) 3, 1208-1217 DOI: 10.1039/c5m00047e

[Antitumour benzothiazoles. Part 32: DNA adducts and double strand breaks correlate with activity; synthesis of 5F203 hydrogels for local delivery](#)

Erica L. Stone, Francesca Citossi, Rajinder Singh, Balvinder Kaur, Margaret Gaskell, Peter B. Farmer, Anne Monks, Curtis Hose, Malcolm F. G. Stevens, Chee-Onn Leong, Michael Stocks, Barrie Kellam, Maria Marlow and Tracey D. Bradshaw

Bioorganic & Medicinal Chemistry (2015) 23, 6891-6899

DOI: 10.1016/j.bmc.2015.09.052

[Discovery, synthesis and biochemical profiling of purine-2,6-dione derivatives as inhibitors of the human poly\(A\)-selective ribonuclease Caf1](#)

Gopal P. Jadhav, Ishwinder Kaur, Maryati Maryati, Blessing Airhihen, Peter M. Fischer and G. Sebastiaan Winkler

Bioorganic & Medicinal Chemistry Letters (2015) 25, 4219-4224

DOI: 10.1016/j.bmcl.2015.07.095

[The impact of the 'Better Care Better Value' prescribing policy on the utilisation of angiotensin-converting enzyme inhibitors and angiotensin receptor blockers for treating hypertension in the UK primary care setting: longitudinal quasi-experimental design](#)

Amanj Baker, Li-Chia Chen, Rachel A. Elliott and Brian Godman

BMC Health Services Research (2015) 15, 367 DOI 10.1186/s12913-015-1013-y

[Hospital pharmacists' perceptions of the suitability of doctor of pharmacy graduates in hospital settings in Thailand](#)

Teeraporn Chanakit, Bee Yean Low, Payom Wongpoowarak, Summana Moolasarn and Claire Anderson

BMC Medical Education (2015) 15, 181 DOI 10.1186/s12909-015-0471-6

[Insights into the influence of the cooling profile on the reconstitution times of amorphous lyophilized protein formulations](#)

Karen E. Beech, James G. Biddlecombe, Christopher F. van der Walle, Lee A. Stevens, Sean P. Rigby, Jonathan C. Burley and Stephanie Allen

European Journal of Pharmaceutics and Biopharmaceutics (2015) 96, 247-254

DOI: 10.1016/j.ejpb.2015.07.029

[Cationic polymer mediated bacterial clustering: Cell-adhesive properties of homo- and copolymers](#)

Iria Louzao, Cheng Sui, Klaus Winzer, Francisco Fernandez-Trillo and Cameron Alexander

European Journal of Pharmaceutics and Biopharmaceutics (2015) 95, 47-62

DOI: 10.1016/j.ejpb.2015.05.026

[The influence of polymer content on early gel-layer formation in HPMC matrices: The use of CLSM visualisation to identify the percolation threshold](#)

Laura Michelle Mason, María Dolores Campiñez, Samuel R. Pygall, Jonathan C. Burley, Pranav Gupta, David E. Storey, Isidoro Caraballo, Colin D. Melia

European Journal of Pharmaceutics and Biopharmaceutics (2015) 94, 485-492

DOI: 10.1016/j.ejpb.2015.06.019

[Pseudomonas aeruginosa quorum sensing molecules correlate with clinical status in cystic fibrosis](#)

Helen L. Barr, Nigel Halliday, Miguel Cámara, David A. Barrett, Paul Williams, Douglas L. Forrester, Rebecca Simms, Alan R. Smyth, David Honeybourne, Joanna L. Whitehouse, Edward F. Nash, Jane Dewar, Andrew Clayton, Alan J. Knox and Andrew W. Fogarty

European Respiratory Journal (2015) 26, 1046-1054 DOI: 10.1183/09031936.00225214

[Evaluation of nanostructure and microstructure of bone regenerated by BMP-2-porous scaffolds](#)

Carlos Del Rosario, Maria Rodríguez-Evora, Ricardo Reyes, Alejandro González-Orive,³ Alberto Hernández-Creus, Kevin M Shakesheff, Lisa J White, Araceli Delgado and Carmen Evora

Journal of Biomedical Materials Research Part A (2015) 103A, 2998-3011

DOI: 10.1002/jbm.a.35436

[Electrospray deposition in vacuum as method to create functionally active protein immobilization on polymeric substrates](#)

Enzo Fornari, Clive J. Roberts, Robert H. Temperton and James N. O'Shea

Journal of Colloid and Interface Science (2015) 453, 252-259

DOI: 10.1016/j.jcis.2015.05.007

[Adapting the Electrospinning Process to Provide Three Unique Environments for a Tri-layered *In Vitro* Model of the Airway Wall](#)

Jack C. Bridge, Jonathan W. Aylott, Christopher E. Brightling, Amir M. Ghaemmaghmi, Alan J. Knox, Mark P. Lewis, Felicity R.A.J. Rose and Gavin E. Morris

Journal of Visualized Experiments (2015) 101, e52986, DOI: 10.3791/52986

[Development of a simple and sensitive HPLC-UV method for the simultaneous determination of cannabidiol and \$\Delta^9\$ -tetrahydrocannabinol in rat plasma](#)

Atheer Zgair, Jonathan C.M. Wong, Akmal Sabri, Peter M. Fischer, David A. Barrett, Cris S. Constantinescu and Pavel Gershkovich

Journal of Pharmaceutical and Biomedical Analysis (2015) 114, 145-151

DOI: 10.1016/j.jpba.2015.05.019

[Imprinted Contact Lenses for Sustained Release of Polymyxin B and Related Antimicrobial Peptides](#)

Negin Malakooti, Cameron Alexander and Carmen Alvarez-Lorenzo

Journal of Pharmaceutical Sciences (2015) 104, 3386-3394 DOI 10.1002/jps.24537

[Facile approach to generating polymeric nanoarrays containing populations of nanoparticles](#)

Leonel Marques, Xinyong Chen, Clive J. Roberts, Matthew Clark and Jonathan W. Aylott

Micro & Nano Letters (2015) 10, 378-383 DOI: 10.1049/mnl.2015.0041

[Investigating the Dissolution Performance of Amorphous Solid Dispersions Using Magnetic Resonance Imaging and Proton NMR](#)

Francesco Tres, Steven R. Coombes, Andrew R. Phillips, Leslie P. Hughes, Stephen A. C. Wren, Jonathan W. Aylott and Jonathan C. Burley

Molecules (2015) 20, 16404-16418 DOI: 10.3390/molecules200916404

[Nose-to-Brain Delivery: Investigation of the Transport of Nanoparticles with Different Surface Characteristics and Sizes in Excised Porcine Olfactory Epithelium](#)

Alpesh Mistry, Snjezana Stolnik, and Lisbeth Illum

Molecular Pharmaceutics (2015) 12, 2755-2766

DOI: 10.1021/acs.molpharmaceut.5b00088

[Live imaging of cellular internalization of single colloidal particle by combined label-free and fluorescence total internal reflection microscopy](#)

Gerard D. Byrne, Driton Vllasaliu, Franco H. Falcone, Michael G. Somekh and Snjezana Stolnik

Molecular Pharmaceutics (2015) 12 DOI: 10.1021/acs.molpharmaceut.5b00215

[Controlled intracellular generation of reactive oxygen species in human mesenchymal stem cells using porphyrin conjugated nanoparticles](#)

Andrea S. Lavado, Veeren M. Chauhan, Amer Alhaj Zen, Francesca Giuntini, D. Rhodri E. Jones, Ross W. Boyle, Andrew Beeby, Weng C. Chan and Jonathan W. Aylott

Nanoscale (2015) 7, 14525-14531 DOI: 10.1039/c5nr00795j

[Association of herbal and dietary supplements with progression and complications of chronic kidney disease: A prospective cohort study](#)

Mayuree Tangkiatkumjai, Helen Boardman, Kearkiat Praditpornsilpa and Dawn-Marie Walker

Nephrology (2015) 20, 679-687 DOI: 10.1111/nep.12531

[MIR137 is an androgen regulated repressor of an extended network of transcriptional coregulators](#)

Emeli M. Nilsson, Kristian B. Laursen, Jonathan Whitchurch, Andrew McWilliam, Niels Ødum, Jenny L. Persson, David M. Heery, Lorraine J. Gudas and Nigel P. Mongan

Oncotarget (2015) 6, 35710-35725 DOI: 10.18632/oncotarget.5958

[Genome-Wide Analysis of PAPS1-Dependent Polyadenylation Identifies Novel Roles for Functionally Specialized Poly\(A\) Polymerases in Arabidopsis thaliana](#)

Christian Kappel, Gerda Trost, Hjördis Czesnick, Anna Ramming, Benjamin Kolbe, Son Lang Vi, Cláudia Bispo, Jörg D. Becker, Cornelia de Moor and Michael Lenhard

PLOS Genetics (2015) 11, e1005474 DOI: 10.1371/journal.pgen.1005474

[New biomaterials from renewable resources – amphiphilic block copolymers from \$\delta\$ -decalactone](#)

Kuldeep K. Bansal, Deepak Kakde, Laura Purdie, Derek J. Irvine, Steven M. Howdle, Giuseppe Mantovani and Cameron Alexander
Polymer Chemistry (2015) 6, 7196-7210 DOI: 10.1039/c5py01203a

[In vivo efficacy and molecular docking of designed peptide that exhibits potent antipneumococcal activity and synergises in combination with penicillin](#)

Cheng-Foh Le, Mohd Yasim Mohd Yusof, Mahmood Ameen Abdulla Hassan, Vannajan Sanghiran Lee, Diyana Mohd Isa and Shamala Devi Sekaran
Scientific Reports (2015) 5, 11886 DOI: 10.1038/srep11886

[A competing risk analysis of sequential complication development in Asian type 2 diabetes mellitus patients](#)

Li-Jen Cheng, Jeng-Huei Chen, Ming-Yen Lin, Li-Chia Chen, Chun-Huan Lao, Hsing Luh and Shang-Jyh Hwang
Scientific Reports (2015) 5, 15687 DOI: 10.1038/srep15687

["My dirty little habit": Patient constructions of antidepressant use and the 'crisis' of legitimacy](#)

Damien Ridge, Renata Kokanovic, Alex Broom, Susan Kirkpatrick, Claire Anderson and Claire Tanner
Social Science & Medicine (2015) 146, 53-61 DOI: 10.1016/j.socscimed.2015.10.012

[Synthesis of 6-arylisocytosines and their potential for hydrogen bonding interactions](#)

Alpa Patel, William Lewis, Mark S. Searle, Malcolm F.G. Stevens, Christopher J. Moody
Tetrahedron (2015) 71, 7339-7343 DOI: 10.1016/j.tet.2015.04.084

[The role of the pharmacist in the selection and use of over-the-counter proton-pump inhibitors](#)

Helen F. Boardman and Gordon Heeley
International Journal of Clinical Pharmacy (2015) 37, 709-716
DOI: 10.1007/s11096-015-0150-z

Staff Research News

- [Professor Claire Anderson](#) has been re-elected to the Royal Pharmaceutical Society English Pharmacy Board (EPB) for a further three year period.
- Professor Jonas Emsley has been invited to give a talk and the 2nd Protease Inhibitors in Drug Discovery meeting (March 1-2, 2016 - San Diego CA)
<https://www.gtcbio.com/conferences/protease-inhibitors-drug-discovery-overview>
- [Dr Charlie Laughton](#) was invited to give a talk entitled "Towards Structure-Based Formulation Design: Computational Modelling of Drug-Polymer Nanoparticle Self Assembly" at the [First International Conference of the Jordanian Faculties of Pharmacy](#). The conference was held at Isra University in Jordan from 28-29 October 2015.
- [Dr David Scurr](#) has been invited to give undergraduate lectures at Imperial College London.
- [Dr Michael Stocks](#) has been invited to give talks at the University of East Anglia and GlaxoSmithKline.



Grant/Studentships Awarded

- [Dr Stephanie Allen](#) and [Dr Jon Aylott](#) have been awarded £191,613 EU RISE: Future formulations: developing future pharmaceuticals through advanced analysis and intersectorial exchange (FutForm).
- [Dr Jon Aylott](#) and [Dr Frankie Rawson](#) have been awarded £127,338 Innovate UK grant: KTP with Surescreen Diagnostics
- [Dr Matt Boyd](#) and [Professor Claire Anderson](#) been awarded £47,781 by the Nottinghamshire and Derbyshire NHS England Local Area Team to do a one year evaluation looking at "**NHS England Pilot of Community Pharmacists in General Practice**" (with Professor Tony Avery, Medicine and Professor Justin Waring, Business School).
- [Dr Weng Chan](#) and [Professor Jonas Emsley](#) have been awarded £473,282 as co-investigators on an MRC programme grant led by the School of Life Sciences: "Quorum sensing and virulence in Gram positive pathogens: structure, function and inhibition of the agr system" (total award £1.07m).
- [Professor Jonas Emsley](#) has been awarded £88,967 as a co-investigator NIH grant led by Emory University (US): Structure and function of platelet glycoprotein Ib-IX-V complex.
- [Dr Dong-Hyun Kim](#) has been awarded £15,000 Tom West Analytical Fellowship from the Analytical Chemistry Trust Fund "Distinguishing intra-tumour metabolomics heterogeneity in malignant brain tumours using novel tissue imaging with multiple isotopes".

Student News

- Nora Francini was awarded an EPSRC Postdoctoral Fellowship and has now started working in Dr Franco Falcone's lab in the School of Pharmacy and Dr Karen Robinson's lab in the School of Medicine.
- Congratulations to the winners of the Postgraduate Poster Session:
 - Best Academic Assessor Feedback: Amanda Hüsler
 - Highest Score in Peer Voting: Thomas Upton
 - Best Postgraduate Seminar Presentation 2015/16: Taranjit Singh
- A group of postgraduate students from the School of Pharmacy recently won the regional heat of the [Biotechnology YES competition](#) (14-16 October 2015). The business idea for the competition was a head lice detection and treatment spray. The team's tag line was 'revealing life's little critters'. The team members (from left to right in the photograph) were Georgina Marsh, Monica Mistry, Claire Lewis, Gudrun Fridgeirdottir and Rosa Catania. The final will take place in London on Thursday 10th December 2015.

Highlighted Papers

[MIR137 is an androgen regulated repressor of an extended network of transcriptional coregulators](#)

Emeli M. Nilsson, Kristian B. Laursen, Jonathan Whitchurch, Andrew McWilliam, Niels Ødum, Jenny L. Persson, David M. Heery, Lorraine J. Gudas and Nigel P. Mongan
Oncotarget (2015) 6, 35710-35725 DOI: 10.18632/oncotarget.5958

This paper reports a novel regulatory mechanism involving androgen-stimulated expression of miR137, which in turn suppresses genes encoding Androgen receptor co-regulators that are chromatin modulators. In prostate cancer cells that are resistant to androgen therapy, miR137 is epigenetically silenced leading to overexpression of AR cofactors and tumour progression.

The study was a collaborative effort with the School of Veterinary Medicine and Science, Nottingham, Lund University Sweden, University of Copenhagen and Cornell Weill, USA, and featured on BBC East Midlands Today and BBC radio.

["My dirty little habit": Patient constructions of antidepressant use and the 'crisis' of legitimacy](#)

Damien Ridge, Renata Kokanovic, Alex Broom, Susan Kirkpatrick, Claire Anderson and Claire Tanner

Social Science & Medicine (2015) 146, 53-61 DOI: 10.1016/j.socscimed.2015.10.012

Professor Claire Anderson has been working with colleagues from University of Oxford, University of Westminster and Monash University in Melbourne, Australia and they have combined data from over 100 patient interviews. There were similarities across the data set regarding moral ideas about antidepressants. People are really concerned about their antidepressant use and commonly experience the desire to avoid stigma, such as being labelled a 'malingerer'. They are also really concerned about becoming dependent on the treatment. For more details of people's experiences of taking antidepressants see <http://www.healthtalk.org/peoples-experiences/mental-health/experiences-antidepressants/topics>

[Fast, Ultrasensitive Detection of Reactive Oxygen Species Using a Carbon Nanotube Based-Electrocatalytic Intracellular Sensor](#)

Frankie J. Rawson, Jacqueline Hicks, Nicholas Dodd, Wondwossen Abate, David J. Garrett, Nga Yip, Gyorgy Fejer, Alison J. Downard, Kim H. R. Baronian, Simon K. Jackson and Paula M. Mendes

Applied Materials & Interfaces (2015) 23527-23537 DOI: 10.1021/acsami.5b06493

In this multidisciplinary Nottingham led collaboration with the University Birmingham, University of Plymouth, University of Melbourne and University of Canterbury, we have developed an intracellular nanosensor-cell construct, which has enabled new insights on macrophage innate immune responses to be elucidated. Utilising the newly developed nanotechnology, we demonstrate that on stimulation of two types of macrophage with bacterial lipopolysaccharide (LPS), a rapid ROS burst is generated on a short time scale that has not previously been seen. We take advantage of a new macrophage cell model (MPI), which was recently characterised by our collaborator and reported in PNAS (Fejer et al, 2013), to elucidate that this burst requires engagement of LPS with the Toll like Receptor TLR 4 and an associated NADPH oxidase. We conclude that TLR4 must be closely associated with a novel ready activated, pool of NADPH oxidase. The nature of the early ROS response detected is different from the classical metabolic production of ROS associated with LPS stimulation which suggests this early ROS pulse is an initiating cell signalling mechanism for priming an innate immune response. The work represents a major milestone in Dr Rawson's Leverhulme Early Career Fellowship.

[Structural basis of Lewis^b antigen binding by the Helicobacter pylori adhesin](#)

[BabA](#)

Naim Hage, Tina Howard, Chris Phillips, Claire Brassington, Ross Overman, Judit Debreczeni, Paul Gellert, Snow Stolnik, G. Sebastiaan Winkler and Franco H. Falcone
Science Advances (2015) 1, e1500315 DOI: 10.1126/sciadv.1500315

This is Dr Franco Falcone's first structural paper and was published in a top journal. The AltMetrics score is 51 and the article was highlighted on many blogs and news releases worldwide, as well as in the Daily Telegraph.