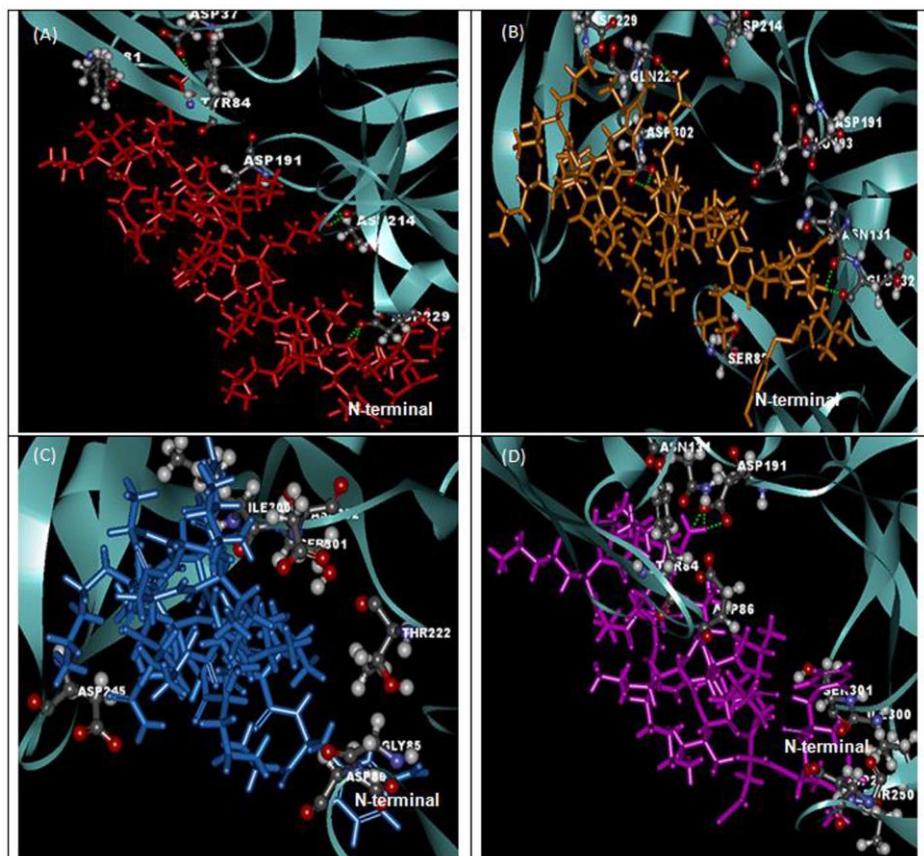




The University of
Nottingham

UNITED KINGDOM • CHINA • MALAYSIA

The School of Pharmacy Journal



May-July 2015

Foreword

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

Nottingham leads on pharmacy education with China



The University of Nottingham and Tianjin University of Traditional Chinese Medicine (TUTCM) are launching the first UK-China joint pharmacy course, starting in September.

The School of Pharmacy at Nottingham, ranked joint number one in the UK for research quality and eighth in the 2015 QS World Rankings for Pharmacy and Pharmacology, will run the new BSc in International Pharmacy, with TUTCM, a top 10 institution in its field.

The five-year course has been developed to create highly-qualified hospital pharmacists for China and to help put pharmacy on an equal footing with other health professions.

"In the UK, the role of the pharmacist is becoming increasingly integrated within the National Health Service, both prescribing as well as dispensing drugs, to take the burden off GPs and hospital doctors. China is becoming increasingly interested in the UK healthcare model and its pharmacy education, and we see great opportunities in working together," explains Professor Clive Roberts, Head of the School of Pharmacy, University of Nottingham.

This is the first time a Chinese university has developed a course of this kind with a UK university. There will be agreed curriculum criteria and standards between both institutions and all pharmacy teaching and exams will be in English – a first for TUTCM. At the end of the five-year programme, students will receive a Bachelor of Science from TUTCM.

Bacteria resistant materials research funding boost - £2m

Controlling the number of infections acquired through indwelling medical devices – such as catheters, intravenous tubes and artificial joints – could significantly reduce the number of medical complications, save thousands of lives a year and reduce medical costs. These Senior Investigator Awards will fund a centre of excellence which will study the underlying mechanisms behind the resistance these materials show to bacterial attachment and biofilm development.

Professor Alexander said: "We have a challenging five years ahead of us. The polymer material chemistries could not have been predicted from our current understanding of bacterial responses to materials. We will develop new analytical approaches to elucidate the mechanisms by which these polymers resist bacterial attachment encompassing the material and the cells."

Professor Williams said: "Bacteria are highly adaptable micro-organisms and we need to discover the genetic basis of how they sense and respond to chemically distinct polymer surfaces. By combining our expertise in materials science and microbiology we are taking an interdisciplinary approach to solving a major medical problem."

A closer understanding of the mechanisms used by bacteria to interact with polymer surfaces could inform rational design of improved bacteria resistant polymers in the future and achieve a transformative change in preventing device-centred infections.

Professors Alexander and Williams propose to build on the discovery of these new materials and their use in indwelling medical devices. Their research will take an interdisciplinary approach, combining material science and molecular microbiology, in conjunction with high-resolution state-of-the-art imaging, exploiting the extensive material chemistry and attachment phenotypes.

Large research grant funds the next generation of biomaterials



A new £5.4 million grant for research aimed at accelerating the discovery and application of new advanced materials in healthcare was announced today by the Engineering and Physical Sciences Research Council (EPSRC).

The grant, awarded to Professor Morgan Alexander at the University of Nottingham, will support a programme, Next Generation Biomaterials Discovery (GoW EP/N006615/1).

Professor Alexander will head a multidisciplinary team spanning Engineering, Science and Medical faculties at Nottingham that will collaborate with leading international groups to realise the vision of materials discovery in 3D, while aiming to keep the UK ahead in the global materials competition. The University of Nottingham has also committed a £1.1 million contribution to the research.

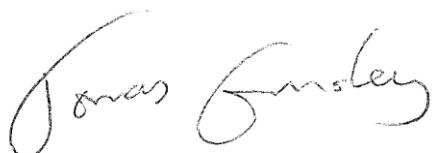
Professor Alexander said: Advanced biomaterials are essential components in targeting infectious diseases and cancers, realising the potential of regenerative medicine and the medical devices of the future. We aim to move beyond the existing limited range of generic bioresorbable polymeric drug and cell delivery agents to bespoke materials identified to function for specific applications.

Defining the chemistry, stiffness, topography and shape of materials can control the response of cells to them. The programme at Nottingham will focus on producing and testing large libraries of these attributes in the form of patterned surfaces, particles and more complex architectures. New materials will be identified for application in the areas of targeted drug delivery, regenerative medicine and advanced materials for next generation medical devices.

The team will also investigate and develop materials that can work around the abilities of bacteria and microbes to sense and signal to each other. This could have application in the field of antimicrobial resistance.

Minister for Life Sciences George Freeman said: From regenerative medicine through to the next generation of cutting-edge medical devices, biomaterials will be essential components of 21st Century healthcare. This £5.4 million government investment will help researchers at the University of Nottingham to develop ground breaking new techniques that will speed up the discovery and application of these increasingly important materials.

Professor Philip Nelson, EPSRC's Chief Executive, said: The development of new advanced materials is vital to extending our capabilities across a wide range of scientific disciplines. The work planned as part of this programme grant promises to find new materials that will have many applications in the healthcare sector. This grant will support some of the UK's talented scientists and help achieve EPSRC's vision to make the UK the best place in the world to research, discover and innovate.



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 - [A Labour of Love \(Or Love Of A Lab\)](#)
 - [CDT student Nichola Starr receives UKICRS travel prize](#)
- [**Collated Research Papers:**](#)

[**Discovery of a Novel Polymer for Human Pluripotent Stem Cell Expansion and Multilineage Differentiation**](#)

Adam D. Celiz, James G. W. Smith, Asha K. Patel, Andrew L. Hook, Divya Rajamohan
Vinoj T. George, Luke Flatt, Minal J. Patel, Vidana C. Epa, Taranjit Singh, Robert Langer,
Daniel G. Anderson, Nicholas D. Allen, David C. Hay, David A. Winkler, David A. Barrett,
Martyn C. Davies, Lorraine E. Young, Chris Denning and Morgan R. Alexander
Advanced Materials (2015) 27, 4006-4012 DOI: 10.1002/adma.201501351

[**Bacterial Attachment to Polymeric Materials Correlates with Molecular Flexibility and Hydrophilicity**](#)

Olutoba Sanni , Chien-Yi Chang , Daniel G. Anderson , Robert Langer , Martyn C. Davies, Philip M. Williams , Paul Williams , Morgan R. Alexander , and Andrew L. Hook Advanced Healthcare Materials (2015) 695-701 DOI: 10.1002/adhm.201400648

Single-Cell Analysis: Visualizing Pharmaceutical and Metabolite Uptake in Cells with Label-Free 3D Mass Spectrometry Imaging

Melissa K. Passarelli, Carla F. Newman, Peter S. Marshall, Andrew West, Ian S. Gilmore, Josephine Bunch, Morgan R. Alexander and Colin T. Dollery Analytical Chemistry (2015) 87, 6696-6702 DOI: 10.1021/acs.analchem.5b00842

Liquid Extraction Surface Analysis Mass Spectrometry Coupled with Field Asymmetric Waveform Ion Mobility Spectrometry for Analysis of Intact Proteins from Biological Substrates

Joscelyn Sarsby, Rian L. Griffiths, Alan M. Race, Josephine Bunch, Elizabeth C. Randall, Andrew J. Creese and Helen J. Cooper Analytical Chemistry (2015) 87, 6791-6800 DOI: 10.1021/acs.analchem.5b01151

The enzyme activities of Caf1 and Ccr4 are both required for deadenylation by the human Ccr4-Not nuclease module

Maryati Maryati, Blessing Airhihen and G. Sebastiaan Winkler Biochemistry Journal (2015) 469, 169-176 DOI:10.1042/BJ20150304

Triblock Copolymer Nanovesicles for pH-Responsive Targeted Delivery and Controlled Release of siRNA to Cancer Cells

Elena Gallon, Teresa Matini, Luana Sasso, Giuseppe Mantovani, Ana Armíñan de Benito, Joaquin Sanchis, Paolo Caliceti, Cameron Alexander, Maria J. Vicent and Stefano Salmaso Biomacromolecules (2015) 16, 1924-1937 DOI: 10.1021/acs.biomac.5b00286

Inhibition of penicillin-binding protein 2a (PBP2a) in methicillin resistant *Staphylococcus aureus* (MRSA) by combination of ampicillin and a bioactive fraction from *Duabanga grandiflora*

Carolina Santiago, Ee Leen Pang, Kuan-Hon Lim, Hwei-San Loh and Kang Nee Ting BMC Complementary Alternative Medicine (2015) 15: 178 DOI 10.1186/s12906-015-0699-z

Chain length affects pancreatic lipase activity and the extent and pH-time profile of triglyceride lipolysis

Paloma Benito-Gallo, Alessandro Franceschetto, Jonathan C.M. Wong, Maria Marlow, Vanessa Zann, Peter Scholes and Pavel Gershkovich
European Journal of Pharmaceutics and Biopharmaceutics (2015) 93, 353-362
DOI: 10.1016/j.ejpb.2015.04.027

Degradation of MSCRAMM target macromolecules in VLU slough by *Lucilia sericata* chymotrypsin 1 (ISP) persists in the presence of tissue gelatinase activity

David I Pritchard & Alan P Brown
International Wound Journal (2014) 12, 414-421 DOI: 10.1111/iwj.12124

In vitro co-culture model of medulloblastoma and human neural stem cells for drug delivery assessment

Delyan P. Ivanov, Terry L. Parker, David A. Walker, Cameron Alexander, Marianne B. Ashford, Paul R. Gellert and Martin C. Garnett
Journal of Biotechnology (2015) 205, 3-13 DOI: 10.1016/j.jbiotec.2015.01.002

Multiscale Modeling of Drug–Polymer Nanoparticle Assembly Identifies Parameters Influencing Drug Encapsulation Efficiency

R. Mackenzie, J. Booth, C. Alexander, M. C. Garnett and C. A. Laughton
Journal of Chemical Theory and Computation (2015) 11, 2705-2713
DOI: 10.1021/ct501152a

The effect of injection using narrow-bore needles on mammalian cells: administration and formulation considerations for cell therapies

Mahetab H. Amer, Lisa J. White and Kevin M. Shakesheff
Journal of Pharmacy and Pharmacology (2015) 67, 640-650 DOI: 10.1111/jphp.12362

Risks of nonadherence to hormone therapy in Asian women with breast cancer

Kun-Pin Hsieh, Li-Chia Chen, Kwok-Leung Cheung and Yi-Hsin Yang
Kaohsiung Journal of Medical Sciences (2015) 41, 328-334
DOI: 10.1016/j.kjms.2015.04.002

Multifunctional Poly[N-(2-hydroxypropyl)methacrylamide] Copolymers via Postpolymerization Modification and Sequential Thiol–Ene Chemistry

Nora Francini, Laura Purdie, Cameron Alexander, Giuseppe Mantovani and Sebastian G. Spain
Macromolecules (2015) 48, 2857-2863 DOI: 10.1021/acs.macromol.5b00447

Lipidomic analysis of plasma samples from women with polycystic ovary syndrome

Zeina Haoula, Srinivasarao Ravipati, Dov J. Stekel, Catharine A. Ortori, Charlie Hodgman, Clare Daykin, Nick Raine-Fenning, David A. Barrett and William Atiomo
Metabolomics (2015) 11, 657-666 DOI 10.1007/s11306-014-0726-y

LC-MS-based absolute metabolite quantification: application to metabolic flux measurement in trypanosomes

Dong-Hyun Kim, Fiona Achcar, Rainer Breitling, Karl E. Burgess and Michael P. Barrett
Metabolomics (2015) available online DOI 10.1007/s11306-015-0827-2

Monitoring the Dissolution Mechanisms of Amorphous Bicalutamide Solid Dispersions via Real-Time Raman Mapping

Francesco Tres, Jamie D. Patient, Philip M. Williams, Kevin Treacher, Jonathan Booth, Leslie P. Hughes, Stephen A. C. Wren, Jonathan W. Aylott and Jonathan C. Burley
Molecular Pharmaceutics (2015) 12, 1512-1522 DOI: 10.1021/mp500829v

Contractile function of smooth muscle retained after overnight storage

B. J. Loong, J. H. Tan, K. H. Lim, Y. Mbaki and K. N. Ting
Naunyn-Schmiedeberg's Archives of Pharmacology (2015) 388, 1061-1067
DOI 10.1007/s00210-015-1140-3

Arboridinine, a Pentacyclic Indole Alkaloid with a New Cage Carbon–Nitrogen Skeleton Derived from a Pericine Precursor

Suet-Pick Wong, Chew-Yan Gan, Kuan-Hon Lim, Kang-Nee Ting, Yun-Yee Low and Toh-Seok Kam
Organic Letters (2015) 17, 3628-3631 DOI: 10.1021/acs.orglett.5b01757

Acupuncture or Low Frequency Infrared Treatment for Low Back Pain in Chinese Patients: A Discrete Choice Experiment

Li-Chia Chen, Li-Jen Cheng, Yan Zhang, Xin He and Roger D. Knaggs
PLOS One (2015) Available online DOI: 10.1371/journal.pone.0126912

Cost-Effectiveness of a Specialist Geriatric Medical Intervention for Frail Older People Discharged from Acute Medical Units: Economic Evaluation in a Two-Centre Randomised Controlled Trial (AMIGOS)

Lukasz Tanajewski, Matthew Franklin, Georgios Gkountouras, Vladislav Berdunov, Judi Edmans, Simon Conroy, Lucy E. Bradshaw, John R. F. Gladman and Rachel A. Elliott
PLOS One (2015) Available online DOI: 10.1371/journal.pone.0121340

The Development and Validation of the Osteoporosis Prevention and Awareness Tool (OPAAT) in Malaysia

Li Shean Toh, Pauline Siew Mei Lai, David Bin-Chia Wu, Kok Thong Wong, Bee Yean Low and Claire Anderson

PLOS One (2015) Available online DOI: 10.1371/journal.pone.0124553

Determining the suitability of mass spectrometry for understanding the dissolution processes involved with pharmaceutical tablets

Claire Lewis, Andrew Ray, Tony Bristow and Stephen Wren

Rapid Communications in Mass Spectrometry (2015) 29, 1107-1114

DOI: 10.1002/rcm.7203

In vitro properties of designed antimicrobial peptides that exhibit potent antipneumococcal activity and produces synergism in combination with penicillin

Cheng-Foh Le, Mohd Yasim Mohd Yusof, Hamimah Hassan and Shamala Devi Sekaran

Scientific Reports (2015) 5, 9761 DOI: 10.1038/srep09761

Activity of Novel Synthetic Peptides against *Candida albicans*

Kah Yean Lum, Sun Tee Tay, Cheng Foh Le, Vannajan Sanghiran Lee, Nadia Hanim

Sabri, Rukumani Devi Velayuthan, Hamimah Hassan and Shamala Devi Sekaran

Scientific Reports (2015) 5, 9657 DOI: 10.1038/srep09657

Regulation of vascular endothelial growth factor in prostate cancer

Simone de Brot, Atara Ntekim, Ryan Cardenas, Victoria James, Cinzia Allegrucci,

David M Heery, David O Bates, Niels Ødum, Jenny L Persson and Nigel P Mongan

Endocrine-Related Cancer (2015) 22, R107-R123 DOI: 10.1530/ERC-15-0123

Physicomechanical properties of sintered scaffolds formed from porous and protein-loaded poly(DL-lactic-co-glycolic acid) microspheres for potential use in bone tissue engineering

Yamina Boukari, David J. Scurr, Omar Qutachi, Andrew P. Morris, Stephen W. Doughty, Cheryl V. Rahman and Nashiru Billa

Journal of Biomaterials Science (2015) 26, 796-811

DOI: 10.1080/09205063.2015.1058696

Partnership in optimizing management of reflux symptoms: a treatment algorithm for over-the-counter proton-pump inhibitors

Boardman, Helen F; Delaney, Brendan C. and Haag, Sebastian

Current Medical Research and Opinion (2015) 31, 1309-1318

DOI: 10.1185/03007995.2015.1047745

Determinants of clinician adoption of regenerative therapies in the UK and Canada: an ophthalmology perspective

Rose, James B; May, Michael and Williams, David J.

Regenerative Medicine (2015) 10, 481-493 DOI: 10.2217/RME.14.82

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.
- [Dr Cristina de Matteis](#) gave two plenary presentations "Working through change; creating a new integrated pharmacy degree programme from scratch" and "Study abroad: developing global citizenship skills in pharmacy undergraduates" at the [Pharmacy Education Symposium](#) held in Prato, Italy in July 2015.
- [Dr Cornelia de Moor](#) received a corporate donation that will enable her laboratory to take their research into the anti-cancer properties of cordycepin to the next level. Cordycepin is isolated from *Cordyceps* fungi, which are famous in Chinese traditional medicine. Work in the De Moor laboratory indicates that it represses the effects of growth factors on cancer cells by a completely novel mechanism involving mRNA polyadenylation. In the new study, Cornelia and her team will determine if cordycepin does indeed affect tumour growth.

Niall McLean, Director of Geo-Rope:- "I see this type of direct donation as a good way to help with funding of alternative treatments for cancer that are not being picked up by the larger cancer charities and the pharmaceutical industry for whatever reason. It's a privilege for myself and the Geo-rope team to be part of this exciting research"

- [Dr Michael Stocks](#) has been invited to give a talk in September 2015 at HitGen, a Chinese Biopharmaceutical company based in Chengdu, China.
- [Dr Kok-Thong Wong](#) has been appointed as a member of the Malaysian Pharmacy Board subcommittee on Provisionally Registered Pharmacist from May 2015 until May 2018.

Grant/Studentships Awarded

- [Dr Stephanie Allen](#) has been awarded a Marie Skłodowska-Curie Research and Innovation Staff Exchange scheme to fund PhD/staff exchange with four European partner SMEs totally €414k.
- [Professor Morgan Alexander](#) (with [Professor Cameron Alexander](#), [Professor Martyn Davies](#) and [Professor Kevin Shakesheff](#) from Pharmacy and colleagues from Life Sciences, Engineering and Chemistry) has been awarded an EPSRC programme grant on Next Generation Biomaterials Discovery totalling £7.7M.
- [Professor Claire Anderson](#), [Dr Pavel Gershkovich](#) and [Dr Mischa Zelzer](#) were awarded Wellcome Trust Vacation Scholarships for current MPharm undergraduate students to undertake research projects in their respective groups.
- [Dr Jonathan Aylott](#) has been awarded an EPSRC Foresight Fellowship worth £132k.
- [Dr Lodewijk Dekker](#) has been awarded a grant from Pancreatic Cancer UK for target validation of Annexin A2 for £71k.
- [Dr James Dixon](#) and [Professor Kevin Shakesheff](#) have been awarded an MRC Confidence-in-Concept grant to use their ImmortaSTEM concept to develop stem therapies worth £60k.
- [Professor Peter Fischer](#) is part of a £1M grant from the BHR using the compound library to screen coupling with gene targeted reports.
- [Dr Chee Mun Fang](#) secured a National Science Fund worth RM 271,000.00 aimed at "Development of enhanced fitness *Salmonella* live vector carrier vaccine by using *Toxoplasma gondii* antigens as a model candidate".
- [Dr Charlie Laughton](#) is part of an EU consortium led by the Institute for Research in Biomedicine (Barcelona) to investigate Multi-Scale Complex Genomics modelling (total award €2.9M).
- [Dr Jing Yang](#) has been awarded an Innovate UK funded project with Asterand Bioscience on 3D cell tissue models.

Student News

- Lina Bader, a PhD student in the Division of Social Research in Medicines and Health, won a prize for the best research presentation for her talk about pharmacy education in Jordan at the [Prato Pharmacy Education Conference](#) in Italy.
- The School of Pharmacy ran a “Students’ Choice” poster competition at the Undergraduate Poster Assessment Day which was held in April 2015. Congratulations to the winners (please click on each name to see the posters in full):
 - [Year 3](#)
 - [Karisma Jethwa](#)
 - [Louis Chan Hong Nian](#)
 - [Mary Ai Joo Ling](#)
 - [Year 4](#)
 - [Hay Lam Mo](#)
 - [Wei Han Ho](#)
- The School would like to congratulate the following postgraduate students who graduated in July 2015:
 - Walla Alelwani
 - Antonio Alfaro Alfonzo
 - Mohammed Algahtani
 - Hamad Alkahtani
 - Kuldeep Bansal
 - Arrandeep Basra
 - Karen Beech
 - Alex Disney
 - Siobhán Dunphy
 - Nuno Vilhena Fernandes Madeira
 - Matthew Franklin
 - Hayley Gratton
 - Moamen Hammad
 - Delyan Ivanov
 - Asma Khurshid
 - Vanessa Loczenski
 - Robert MacKenzie
 - AliReza Mahboubian
 - Hiteshri Makwana
 - Maryati Maryati
 - Gabrielle Milson
 - Oluwagbemileke Ojeleye
 - Yewande Oni
 - James Rose
 - Tara Salter
 - Luana Sasso
 - Saif Shubber
 - Giovanna Sicilia
 - Daniel Wan
 - Szu Wong

General News

A Labour of Love (Or Love of a Lab)

Jack Bosanquet recently undertook work experience at the School of Pharmacy, under the supervision of [Dr Cornelia de Moor](#). Jack, who is 15 and has Duchenne Muscular Dystrophy, wrote an article 'A Labour of Love (or Love of a Lab)' for the September edition of the [IRIS Magazine](#).

Dr de Moor said "We've had work experience students in our lab every summer since 2007. It's been growing into a sort of summer school, with 8 students participating this year. This is a rewarding outreach activity, the students are very enthusiastic and while we've got to do some administration and spend a week supervising them, it will hopefully encourage young people of all backgrounds to enter biomedical research careers. It was a pleasure to have Jack and his fellow students in the lab."

UNMC Revamp Research Webpage

The School's Malaysia campus recently revamped their Research webpage. The School's research is focused on the quest for societal-wellbeing through application of novel technologies and social interaction in the treatment of diseases.

[Dr Nash Billa](#) welcomes comments and feedback.