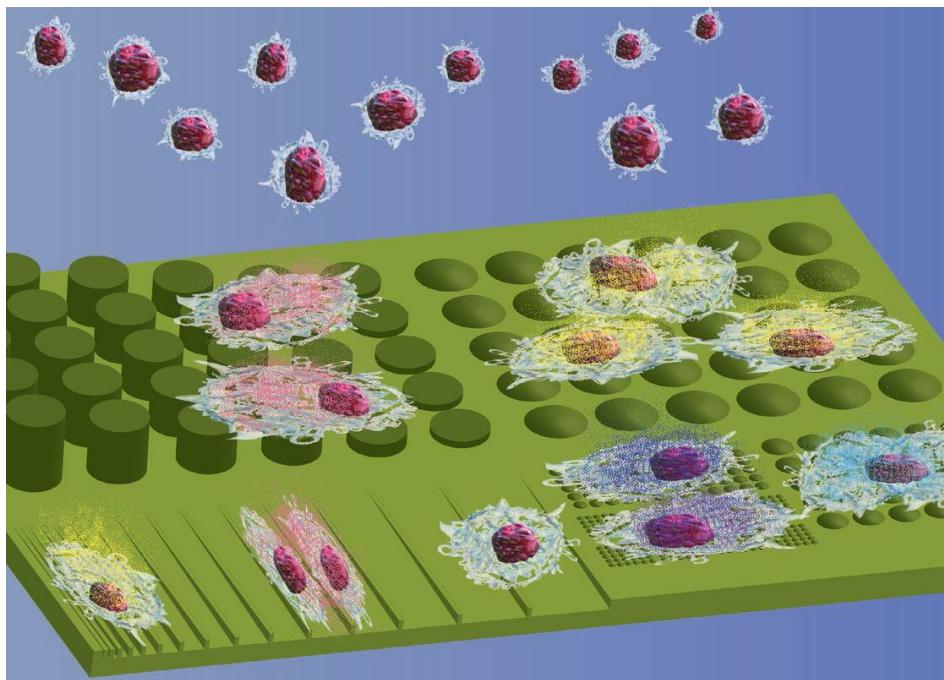




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The School of Pharmacy Journal



February-April 2015

Foreword

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

[Caterpillar fungus could hold the key to relieving the pain of osteoarthritis](#)

Dr Cornelia de Moor and her team have a three-year grant of £260,000 from Arthritis Research UK to investigate cordycepin as a new type of drug that has potential to relieve the symptoms of osteoarthritis, a common joint condition that affects more than eight million people in the UK. They will test the effectiveness of the compound, given as food pellets to rats and mice, to find out if cordycepin can prevent pain occurring after an injury to a joint, and also whether it relieves existing pain. Dr de Moor said that although their research was in its early stages they were excited about cordycepin's prospects as a completely new type of painkiller. "When we first started investigating this compound it was frankly a bit of a long-shot and



there was much scepticism from the scientific community," she said. "But we were stunned by the response from the pilot study, which showed that it was as effective as conventional painkillers in rats." To the best of our knowledge, cordycepin has never been tested as a lead compound for osteoarthritis pain."

**Arthritis
Research UK**

"This study is the first step in a potential drug development for a new class of drugs for osteoarthritis, although there are a number of hurdles we have to go through – necessarily so – before it gets nearer patients. To the best of our knowledge, cordycepin has never been tested as a lead compound for



osteoarthritis pain." Dr de Moor said that provided the safety and effectiveness of the compound could be proven, clinical trials could begin within six to ten years. This research has also featured on BBC local television.

[Youtube video of EPSRC Rise leader Kevin Shakesheff on tissue engineering](#)

EPSRC
Engineering and Physical Sciences
Research Council

RISE Leader Professor Kevin Shakesheff, Nottingham University and Rising Star Dr Marianne Ellis, University of Bath meet with Professor Jeremy Farrar, Director Wellcome Trust.

<https://www.youtube.com/watch?v=gGTrxDMc0Ww>

Kevin Shakesheff's tissue engineering group also published a paper in Nature family journal Scientific Reports (2015) 5, 8577. This shows the ability to build and manipulate multicellular microscopic structures will facilitate a more detailed understanding of cellular function in fields such as developmental and stem cell biology. A holographic optical tweezers based technology accurately generates bespoke cellular micro-architectures.

A second paper in Advanced Materials describes a dual thermoresponsive and magnetic colloidal gel matrix for enhanced stem-cell culture (Advanced Materials (2015) 27, 662-558)



Catherine Jopling has published an exciting study of micro-RNAs in the journal Nature structural and Molecular Biology (22, 319–327 (2015)) showing the mechanisms of how they contribute to the regulation of genes. This project was a collaboration with the group of Nick Proudfoot at Oxford University.

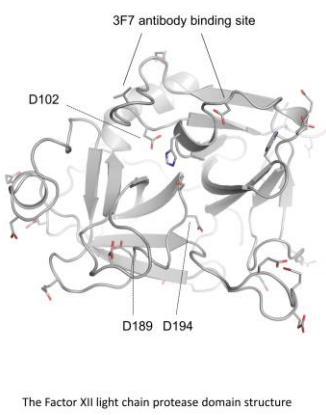


the guardian

There is a new article in The Guardian 04/02/2015 which highlights a study which was published by Rachel Elliott in the Pharmaceutical Journal. This article showed that pharmacist intervention via the New Medicine Service (NMS) increases patient adherence in new medications by around 10%. Such awareness would lead to new approaches in compliance

Structural Biology of the protease coagulation Factor XII resolved

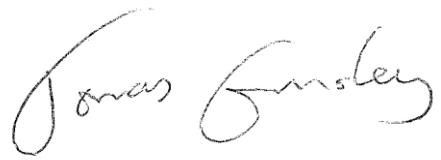
The original model of the waterfall coagulation cascade describing how proteases regulate blood coagulation was published in 1964. Crystal structures have been important for understanding the molecular mechanisms underlying blood coagulation and to date crystal structures are available for all the coagulation proteases except for factor XII (FXII) which lies at the top as initiator of the intrinsic pathway.



The Factor XII light chain protease domain structure

There has been a resurgence of interest in the FXII protease of late as knockout studies in mice reveals it is essential for formation of pathological thrombi in mouse mouse systems of cardiovascular disease and stroke. In addition there is a broad interest in FXII as it is involved not only in blood coagulation but also innate immunity and blood

pressure regulation. In humans it has been shown to cause hereditary angioedema and has been linked to cardiovascular disease and alzheimers. FXII is clinically significant since over 200 million activated partial thromboplastin times (APTT), a routine screening test for bleeding disorders, are performed annually in United States requires its presence to be normal. Despite all this interest there was no structure for the FXII protease domain which is critical to observe the shape of the active site and understand mechanisms of zymogen activation, substrate recognition and inhibitor binding. For the first time the Emsley group at the University of Nottingham presents two crystal structures defining a zymogenic form of the FXII protease domain. This data describes the unique structural features of this important coagulation factor and provides a scaffold to develop novel anti-coagulants with a reduced bleeding side effect. (J. Thromb. Haemost. (2015) 13, 580-591)



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 - [*The School's NMS study appears in the Guardian newspaper*](#)
 - [*How 3-D Printing will enable personalised drug delivery*](#)
 - [*PFDL \(Lab A01\) reborn*](#)
 - [*2015 International Women's Day Events*](#)
 - [*Cell manipulation could lead to the better treatment of disease*](#)
 - [*Supporting Community Pharmacies*](#)
 - [*Kevin Shakesheff's RISE film is released on the EPSRC website*](#)
 - [*UKICRS Summer Studentship Awarded to MPharm Student*](#)
 - [*Caterpillar fungus could hold the key to relieving the pain of osteoarthritis*](#)

- **Collated Research Papers:**

[**A Thermoresponsive and Magnetic Colloid for 3D Cell Expansion and Reconfiguration**](#)

Aram Saeed, Nora Francini, Lisa White, James Dixon, Toby Gould, Hassan Rashidi, Racha Cheikh Al Ghanami, Veronika Hruschka, Heinz Redl, Brian R. Saunders, Cameron Alexander and Kevin M. Shakesheff

Advanced Materials (2015) 27, 662-558 DOI: 10.1002/adma.201403626

[**An International Comparison Study of Pharmacy Students' Achievement Goals and their Relationship to Assessment Type and Scores**](#)

Saleh Alrakaf, Claire Anderson, Sion A. Coulman, Dai N. John, June Tordoff, Erica Sainsbury, Grenville Rose and Lorraine Smith
Am. J. Pharm. Edu (2015) 79, 35 DOI: 10.5688/ajpe79335

[**IL-33 drives airway hyper-responsiveness through IL-13-mediated mast cell: airway smooth muscle crosstalk**](#)

Kaur D, Gomez E, Doe C, Berair R, Woodman L, Saunders R, Hollins F, Rose FR, Amrani Y, May R, Kearley J, Humbles A, Cohen ES,
Allergy (2015) 70, 556-567 DOI: 10.1111/all.12593

The search for mast cell and basophil models – are we getting closer to pathophysiological relevance?

F. Siebenhaar, F. H. Falcone, E. Tiligada, I. Hammel, M. Maurer, R. Sagi-Eisenberg and F. Levi-Schaffer
Allergy (2015) 70, 1-5 DOI: 10.1111/all.12517

Reactive DESI-MS Imaging of Biological Tissues with Dicationic Ion-Pairing Compounds

Dragos Lostun, Consuelo J. Perez, Peter Licence, David A. Barrett and Demian R. Ifa
Analytical Chemistry (2015) 87, 3286-3293 DOI: 10.1021/ac5042445

Increased function of pronociceptive TRPV1 at the level of the joint in a rat model of osteoarthritis pain

S Kelly, R J Chapman, S Woodhams, D R Sagar, J Turner, J J Burston, C Bullock, K Paton, J Huang, A Wong, D F McWilliams, B N Okine, D A Barrett, G J Hathway, D A Walsh and V Chapman

Ann. Rheum. Dis. (2015) 74, 252-259 DOI: 10.1136/annrheumdis-2013-303413

Eukaryotic elongation factor 2 kinase regulates the cold stress response by slowing translation elongation

John R. P. Knight, Amandine Bastide, Anne Roobol, Jo Roobol, Thomas J. Jackson, Wahyu Utami, David A. Barrett, C. Mark Smales and Anne E. Willis
Biochem. J. (2015) 465, 227-238 DOI: 10.1042/BJ20141014

The malignant phenotype in breast cancer is driven by eIF4A1-mediated changes in the translational landscape

A Modelska, E Turro, R Russell, J Beaton, T Sbarrato, K Spriggs, J Miller, S Gräf, E Provenzano, F Blows, P Pharoah, C Caldas and J Le Quesne
Cell Death and Disease (2015) 6, e1603 DOI: 10.1038/cddis.2014.542

Linifanib – a multi-targeted receptor tyrosine kinase inhibitor and a low molecular weight gelator

Maria Marlow, Mohammed Al-Ameedee, Thomas Smith, Simon Wheeler and Michael J. Stocks
Chem. Commun. (2015) 51, 6384 DOI: 10.1039/c5cc00454c

Serum protein layers on poly(ether ether ketone) and silicon oxide: Effect on cell adhesion

Evangelos Delivopoulos, Myriam M. Ouberai, Paul D. Coffey, Marcus J. Swann,

Kevin M. Shakesheff, Mark E. Welland

Colloids and Surfaces B: Biointerfaces (2015) 126, 169–177

DOI: 10.1016/j.colsurfb.2014.12.020

Crystal structure of benzyl (E)-2-(3,4-dimethoxybenzylidene) hydrazine-1-carbodithioate

Yew-Fung Tan, Mohammed Khaled bin Break, M. Ibrahim M. Tahirb and Teng-Jin Khoo

Acta Cryst. (2015) E71, 238-240 DOI: 10.1107/S205698901500095X

The G-quadruplex-stabilising agent RHPS4 induces telomeric dysfunction and enhances radiosensitivity in glioblastoma cells

F. Berardinelli, S. Siteni, C. Tanzarella, M.F. Stevens, A. Sgura, A. Antoccia

DNA Repair (2015) 25, 104-115 DOI: 10.1016/j.dnarep.2014.10.009

Characterisation of human saliva as a platform for oral dissolution medium development

Sally Gittings, Neil Turnbull, Brian Henry, Clive J. Roberts and Pavel Gershkovich

European Journal of Pharmaceutics and Biopharmaceuticals (2015) 91, 16-24

DOI: 10.1016/j.ejpb.2015.01.007

Influence of formulation composition and process on the characteristics and in vitro release from PLGA-based sustained release injectables

Joke Meeus, David J. Scurr, Bernard Appeltans, Katie Amssoms, Pieter Annaert, Martyn C. Davies, Clive J. Roberts and Guy Van den Mooter

European Journal of Pharmaceutics and Biopharmaceuticals (2015) 90, 22-29

DOI: 10.1016/j.ejpb.2014.11.009

Authentication of processed meat products by peptidomic analysis using rapid ambient mass spectrometry

Magdalena Montowska, Morgan R. Alexander, Gregory A. Tucker and David A. Barrett

Food Chemistry (2015) 187, 297-304 DOI: 10.1016/j.foodchem.2015.04.078

Ibogan, Tacaman, and Cytotoxic Bisindole Alkaloids from Tabernaemontana.

Cononusine, an Iboga Alkaloid with Unusual Incorporation of a Pyrrolidone

Moiety

Kuan-Hon Lim, Vijay J. Raja, Tracey D. Bradshaw, Siew-Huah Lim, Yun-Yee Low and Toh-Seok Kam

J. Nat. Prod. (2015) 78, 1129–1138 DOI: 10.1021/acs.jnatprod.5b00117

Optically excited nanoscale ultrasonic transducers

Richard J. Smith, Fernando Perez Cota, Leonel Marques, Xuesheng Chen, Ahmet Arca, Kevin Webb, Jonathon Aylot⁴, Michael G. Somekh and Matt Clark

J. Acouts. Soc. Am. (2015), 137, 219-227 DOI: 10.1121/1.4904487

The Use of Random Projections for the Analysis of Mass Spectrometry Imaging Data

Andrew D. Palmer, Josephine Bunch and Iain B. Styles

J. Am. Soc. Mass. Spectrom. (2015), 26, 315-322

DOI: 10.1007/s13361-014-1024-7

Biomaterial modification of urinary catheters with antimicrobials to give long-term broadspectrum antibiofilm activity

Leanne E. Fisher, Andrew L. Hook, Waheed Ashraf, Anfal Yousef, David A. Barrett, David J. Scurr, Xinyong Chen, Emily F. Smith, Michael Fay, Christopher D.J. Parmenter, Richard Parkinson and Roger Bayston

Journal of Controlled Release (2015) 202, 57-64 DOI:10.1016/j.jconrel.2015.01.037

In vivo evaluation of different formulation strategies for sustained release injectables of a poorly soluble HIV protease inhibitor

Joke Meeus, David J. Scurr, Katie Amssoms, Koen Wuyts, Pieter Annaert, Martyn C. Davies, Clive J. Roberts and Guy Van den Mooter

Journal of Controlled Release (2015) 199, 1-9 DOI: 10.1016/j.jconrel.2014.11.020

Changes in Plasma Levels of N-Arachidonoyl Ethanolamine and N-Palmitoylethanolamine following Bariatric Surgery in Morbidly Obese Females with Impaired Glucose Homeostasis

Akhila Mallipedhi, Sarah L. Prior, Gareth Dunseath, Richard M. Bracken, Jonathan Barry, Scott Caplin, Nia Eyre, JamesMorgan, John N. Baxter, Saoirse E. O'Sullivan, Sarir Sarmad, David A. Barrett, Stephen C. Bain, Steve D. Luzio and Jeffrey W. Stephens
Journal of Diabetes Research (2015) 680867 DOI: 10.1155/2015/680867

The relative anthelmintic efficacy of plant-derived cysteine proteinases on intestinal nematodes

W. Luoga, F. Mansur, D.J. Buttle, I.R. Duce, M.C. Garnett, A. Lowe and J.M. Behnke

Sensitive recovery of recombinant antibody clones after their in silico identification within NGS datasets

Anastasios Spiliotopoulos, Jonathan.P. Owen, Ben.C. Maddison, Ingrid Dreveny, Helen.C. Rees and Kevin.C. Gough

Journal of Immunological Methods (2015) 420, 50-55

DOI: 10.1016/j.jim.2015.03.005

Analysis of leaf surfaces using scanning ion conductance microscopy

Shaun C. Walker, Stephanie Allen, Gordon Bell and Clive J . Roberts

Journal of Microscopy (2015) 258, 119-126 DOI: 10.1111/jmi.1225

The Influence of Spray-Drying Parameters on Phase Behavior, Drug Distribution, and In Vitro Release of Injectable Microspheres for Sustained Release

Joke Meeus, Maité Lenaerts, David J. Scurr, Katie Amssoms, Martyn C. Davies, Clive J. Roberts and Guy Van Den Mooter

Journal of Pharmaceutical Sciences (2015) 104, 1451-1460 DOI 10.1002/jps.24361

Coagulation factor XII protease domain crystal structure

M. Pathak, P. Wilmann, J. Awford, C. Li, B.K. Hamad, P.M. Fischer, I. Dreveny, L.V. Dekker and J. Emsley

J. Thromb. Haemost. (2015) 13, 580-591 DOI: 10.1111/jth.12849

Is It Feasible to Apply Preference-Based Quality-of-Life Measures on Patients with Chronic Myeloid Leukemia?

Teng-Chou Chen and Li-Chia Chen

J Leuk (2015) 3, 165 DOI:10.4172/2329-6917.1000165

Formulations for modulation of protein release from large-size PLGA microparticles for tissue engineering

Roozbeh Qodratnama, Lorenzo Pio Serino, Helen C. Cox, Omar Qutachi and Lisa J. White
Materials Science and Engineering C (2015) 47, 230-236

DOI: 10.1016/j.msec.2014.11.003

Design and characterization of antimicrobial usnic acid loaded-core/shell magnetic nanoparticles

Vincenzo Taresco, Iolanda Francolini, Franco Padella, Mariangela Bellusci, Adriano Boni, Claudia Innocenti , Andrea Martinelli, Lucio D'Ilario and Antonella Piozzi
Materials Science and Engineering C (2015) 52, 72-81
DOI: 10.1016/j.msec.2015.03.044

[Microprocessor mediates transcriptional termination in genes encoding long noncoding microRNAs](#)

Ashish Dhir, Somdutta Dhir, Nick J Proudfoot and Catherine L Jopling
Nature Structural & Molecular Biology (2015) 22, 319-327 DOI:10.1038/nsmb.2982

[Combination of \(M\)DSC and Surface Analysis to Study the Phase Behaviour and Drug Distribution of Ternary Solid Dispersions](#)

Joke Meeus, David J. Scurr, Xinyong Chen, Katie Amssoms, Martyn C. Davies, Clive J. Roberts and Guy Van den Mooter
Pharm Res (2015) 32, 1407-1416 DOI: 10.1007/s11095-014-1543-8

[The Effects of 1 \$\alpha\$, 25-dihydroxyvitamin D₃ and Transforming Growth Factor- \$\beta\$ 3 on Bone Development in an Ex Vivo Organotypic Culture System of Embryonic Chick Femora](#)

Emma L. Smith, Hassan Rashidi, Janos M. Kanczler, Kevin M. Shakesheff and Richard O.C. Oreffo
PLOS One (2015) 10, 30121653 DOI:10.1371/journal.pone.0121653

[Exploring safety systems for dispensing in community pharmacies: Focusing on how staff relate to organizational components](#)

Jasmine Harvey, Anthony J. Avery, Darren Ashcroft, Matthew Boyd, Denham L. Phipps and Nicholas Barber
Research in Social and Administrative Pharmacy (2015) 11, 216-227
DOI: 10.1016/j.sapharm.2014.06.005

[Precision Assembly of Complex Cellular Microenvironments using Holographic Optical Tweezers](#)

Glen R. Kirkham, Emily Britchford, Thomas Upton, James Ware, Graham M. Gibson, Yannick Devaud, Martin Ehrbar, Miles Padgett, Stephanie Allen, Lee D. Buttery and Kevin Shakesheff
Scientific Reports (2015) 5, 8577 DOI: 10.1038/srep08577

[Multi-trait mimicry of ants by a parasitoid wasp](#)

Miriama Malcicka, T. Martijn Bezemer, Bertanne Visser, Mark Bloemberg, Charles J. P. Snart, Ian C. W. Hardy and Jeffrey A. Harvey
Scientific Reports (2015) 5, 8043 DOI: 10.1038/srep08043

Investigation of interaction studies of cefpirome with ACE-inhibitors in various buffers

Muhammad Nawaz, Muhammad Saeed Arayne, Najma Sultana, Hira Fatima Abbas
Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy (2015) 137, 1050-1054 DOI: 10.1016/j.saa.2014.08.152

Reviews

Impact of surface chemistry and topography on the function of antigen presenting cells

H. M. Rostam, S. Singh, N. E. Vrana, M. R. Alexander and A. M. Ghaemmaghami
Biomat. Sci. (2015) 3, 424-441 DOI: 10.1039/c4bm00375f

Annexin A2 complexes with S100 proteins: structure, function and pharmacological manipulation

Yidong Liu, Helene K Myrvang and Lodewijk V Dekker
British Journal of Pharmacology (2015) 172, 1664-1676 DOI:10.1111/bph.12978

Entometabolomics: applications of modern analytical techniques to insect studies

Charles J.P. Snart, Ian C.W. Hardy and David A. Barrett
Entomologia Experimentalis et Applicata (2015) 155, 1-17 DOI: 10.1111/eea.12281

Application of secondary ion mass spectrometry to biomaterials, proteins and cells: a concise review

J. Yang and I. Gilmore
Materials Science and Technology (2015) 31, 131-136
DOI 10.1179/1743284714Y.0000000613

Staff Research News

- In the [University Staff Oscars](#) Professor Barrie Kellam won the 'Personal Tutors: All Rounder' category and [Mr Gautam Paul](#) was runner up in the 'University Life: Prepare for the Future' category and was also nominated for the 'Teaching: Most Inspiring' category.
- [Professor Morgan Alexander](#) has been invited to give a talk at the [16th European Conference on Applications of Surface and Interface Analysis](#), Granada, Spain.
- [Dr Frankie Rawson](#) has been invited to be a member of the Royal Society of Chemistry's Analytical Bioscience Interest Group Committee.
- [Dr Kok Thong Wong](#) is a member of the Organising Committee for the [12th Malaysian Pharmaceutical Society Scientific Conference 2015](#).

Grant/Studentships Awarded

- [Dr Matthew Boyd](#) has been awarded £25k from the Nottingham City CCG Research Capability Fund "Pump priming funding to enable RfPB application workup". The project is a collaboration with Professor AJ Avery, B Roe and L Hyland.
- [Professor Barrie Kellam](#) has been awarded a British Council Newton Fund for £144k and is also part of another Newton Fund award with Professor Steve Hill (School of Life Sciences, UoN).
- [Dr Beppe Mantovani](#) has been awarded a grant of £573k from the Medical Research Council for a project entitled "Targeting glycans for the treatment of ischemia-reperfusion injury". The project is a collaboration with Luisa Martinez-Pomares (Faculty of Medicine & Health Sciences, UoN) and Alan Salama (Faculty of Medical Sciences, UCL).
- [Professor David Pritchard](#) has been awarded an NIH Clinical Trial Planning grant for \$20k for hookworm production.
- [Professor Clive Roberts](#) has been awarded a Wellcome Trust Pathfinder grant for £102k for a project entitled "Nanoparticles for safer and efficient delivery of radionuclides for cancer diagnosis and therapy".

Student News

- Yamina Boukari, a PhD student principally supervised by [Professor Nashiru Billa](#), won the UNMC Research Showcase 2015 with her poster "Repair bones with one price of a needle". The competition was an opportunity for research students within UNMC to present their work in an easy to understand manner with appeal to the general public. The final round constituted the top 6 competitors from UNMC presenting to a panel of judges at the UK Graduate School via a video conference.
- Naim Hage, a PhD student principally supervised by Dr Franco Falcone, has been selected to receive a Postgraduate Prize for 2014/15 in recognition of his outstanding research progress and contribution to the postgraduate community. [The Andrew Hendry Postgraduate Scholarship](#) was founded in 1968 from subscriptions raised in memory of the late Mr Andrew Hendry, Bursar of the University, 1948-66. A small official ceremony was held on May 13th 2015.



Highlighted Papers

- **Label free imaging of drugs in cells with Time of Flight Secondary Ion Mass Spectrometry (ToF SIMS).**

With colleagues in NPL and GSK, Nottingham PhD student Carla Newman has demonstrated for the first time three-dimensional secondary ion mass spectrometry (SIMS) images of the cellular uptake of the phospholipidosis inducing pharmaceutical compound, amiodarone in an article recently accepted for publication in the *Journal of the American Chemical Society*. Images from this work won the GSK **Global Beautiful Biology Award** for Carla Newman, Peter Marshall and Andrew West.

Single-cell Analysis: Visualizing Pharmaceutical Compounds 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 Alexander and Colin T. Dollery ***Journal of the American Chemical Society*** (in press)

- **A novel polymer for cell manufacture**

James Smith (Centre for Biomolecular Sciences) and Adam Celiz (currently at Wyss Institute, Harvard) jointly first authored a paper recently accepted for publication in *Advanced Materials* which is a major collaboration with colleagues from the Wolfson Centre for Stem Cells (CBS), MIT, CSIRO Manufacturing Flagship (Melbourne), Cardiff School of Biosciences and the MRC Centre for Regenerative Medicine (Edinburgh). This EPSRC funded work produced a new polymer which is attracting interest from the regenerative medicine industry for expansion and manufacture of cells from human pluripotent stem cell lines which can be used off the shelf, without the need to use pre adsorption of proteins.

Discovery of a novel polymer for human pluripotent stem cell expansion and multi-lineage differentiation

Adam D. Celiz, James G. W. Smith, Asha K. Patel, Andrew L. Hook, Divja Rajamohan, Vinoj T. George, 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, Morgan R. Alexander. ***Advanced Materials*** (in press)

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

Paloma Benito-Gallo, Alessandro Franceschetto, Jonathan CM Wong, Maria Marlow, Vanessa Zann, Peter Scholes, and Pavel Gershkovich

DOI: 10.1016/j.ejpb.2015.04.027

The above article has been recently accepted for publication in Eur J Pharm Biopharm (IF 4.245), with Dr Gershkovich as a last and corresponding author, and is currently in press. The article describes an optimization of in vitro lipolysis model in order to assess a wider range of lipid-based formulations with diverse chain lengths of lipids. The in vitro lipolysis model is used to rank-order the performance of oral lipid-based drug delivery systems in fast and efficient manner without using laboratory animals for assessment. The model is currently established in a very few other laboratories in the world. Dr Gershkovich has previously established the lipolysis model in the University of British Columbia, and published in the past 3 research articles using that model (as first and corresponding, or as second author): Gershkovich et al., J Pharm Sci. 2012 Jan;101:291-300; Ibrahim et al., Eur J Pharm Sci. 2012 Aug 15;46:323-8; Zhao et al., Int J Pharm. 2012 Oct 15;436:707-10. These works are recent, but have been already cited, in total, 19 times.

However, this new article in Eur J Pharm Biopharm demonstrates recognition of a significant optimization and improvement of the in vitro lipolysis model that has been achieved as a result of establishment of the model in the Dr Gershkovich's laboratory in the University of Nottingham.