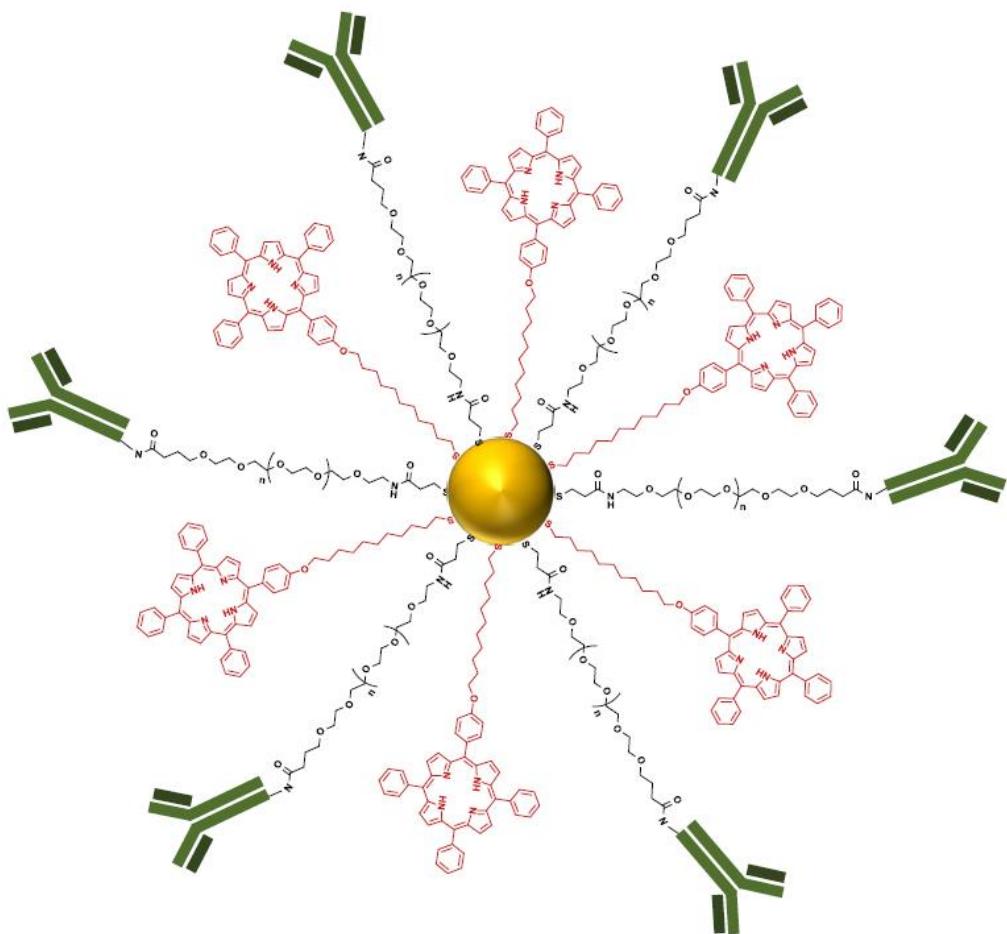


The School of Pharmacy

Journal

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May - July 2017

Foreword

Welcome to our latest edition of the School of Pharmacy Journal, a quarterly collection of publications and press releases from May to July 2017.

This edition continues to demonstrate the breadth and depth of the research undertaken across the School of Pharmacy in Nottingham and Malaysia. A particular highlight is a paper in *Science* authored by Adam Celiz of our Advanced Materials and Healthcare Technologies division titled “Tough Adhesives for Diverse Wet Surfaces” which reports the development and application of a ‘bioinspired’ multi-layered adhesive that permits non-harmful adhesion to a wet surfaces that will have wide-spread application in areas including tissue adhesives, wound dressings, and tissue repair.

The extent of interest in the work expressed through Social Media has been considerable and very pleasing. We continue to work to enable our research to make positive impact in healthcare, and this work of Adam is a fine example of our efforts.

The papers also exemplify our cross Institutional and collaborative research, with articles co-authored by colleagues in Chemistry, Engineering, Life Sciences, Medicine, Psychology, and Veterinary and Medical Sciences, and collaborators at Birmingham, Dublin, Leicester, Glasgow, Harvard, to name but a few.

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[**Controlled release of GAG-binding enhanced transduction \(GET\) peptides for sustained and highly efficient intracellular delivery**](#)

Hosam Al-Deen M. Abu-Awwad, Lalitha Thiagarajan and James E. Dixon

Acta Biomaterialia (2017) Vol 57, pp 225-237

DOI: 10.1016/j.actbio.2017.04.028

Raster-Mode Continuous-Flow Liquid Microjunction Mass Spectrometry Imaging of Proteins in Thin Tissue Sections

Rian L. Griffiths, Elizabeth C. Randall, Alan M. Race, Josephine Bunch and Helen J. Cooper

Analytical Chemistry (2017) Vol 89 (11) pp 5683-5687

DOI: 10.1012/acs.analchem.7b00977

A Design of Experiments (DoE) approach to identify the influencing parameters that determine poly-D, L-lactic acid (PDLLA) electrospun scaffold morphologies

Floor Agnes Andrea Ruiter, Cameron Alexander, Felicity Rose and Joel Segal
Biomedical Materials (2017)

DOI: 10.1088/1748-605X/aa7b54

Repurposed drugs targeting eIF2a-P-mediated translational repression prevent neurodegeneration in mice

Mark Halliday, Helios Radford, Karlijn A. M. Zents, Collin Molloy, Julie A. Moreno, Nicholas C. Verity, Ewan Smith, Catharine A. Ortoriu, David A. Barrett, Martin Bushell and Giovanna R. Mallucci

Brain (2017) Vol 140 (6) pp 1768-1783

DOI: 10.1093/brain/awx074

Expression of NAD(P)H quinone dehydrogenase 1 (NQO1) is increased in the endometrium of women with endometrial cancer and women with polycystic ovary syndrome

William Atiomo, Mohamad Nasir Shafiee, Caroline Chapman, Veronika M. Metzler, Jad Abouzeid, Ayşe Latif, Amy Chadwick, Sarah Kitson, Vanitha N. Sivalingam, Ian J. Stratford, Catrin S. Rutland, Jenny L. Persson, Niels Ødum, Pablo Fuentes-Utrillia, Jennie N. Jeyapalan, David M. Heery, Emma J. Crosbie, Nigel P. Mongan
Clinical Endocrinology (2017) pp 1-9
DOI: 10.1111/cen.13436

Association between medication adherence and clinical outcomes in patients with chronic kidney disease: a prospective cohort study

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

Clinical and Experimental Nephrology (2017) Vol 21 (3) pp 504-512

DOI: 10.1007/s10157-016-1312-6

Abnormal Clock Gene Expression and Locomotor Activity Rhythms in Two Month-Old Female APPSwe/PS1dE9 Mice

Olaide Oyegbami, Hilary M. Collins, Marie-Christine Pardon, Francis J.P. Ebling, David M. Heery and Paula M. Moran

Current Alzheimer Research (2017) Vol 14 (8) pp 850-860

DOI: 10.2174/1567205014666170317113159

Design, synthesis, and biological evaluation of NAD(P)H: Quinone oxidoreductase (NQO1)-targeted oridonin prodrugs possessing indolequinone moiety for hypoxia-selective activation

Shentao Xu, Hong Yao, Lingling Pei, Mei Hu, Dahong Li, Yangyi Qiu, Guangyu Wang, Liang Wu, Hequan Yao, Zheying Zhu and Jinyi Xu

European Journal of Medicinal Chemistry (2017) Vol 132, pp 310-321

DOI: 10.1016/j.ejmech.2017.03.055

Novel hybrids of natural β -elemene bearing isopropanolamine moieties: Synthesis, enhances anticancer profile, and improved aqueous solubility

Jichao Chen, Tianyu Wang, Shentao Xu, Aijun Lin, Hequan Yao, Weijia Xie, Zheying Zhu and Jinyi Xu

Fitoterapia (2017) Vol 120, pp 117-125

DOI: 10/1016/j.fitote.2017.05.002

Utility of iron nanoparticles and a solution-phase iron species for the N-demethylation of alkaloids

Jon Kyle Awalt, Raymond Lam, Barrie Kellam, Bim Graham, Peter J. Scammells and Robert D. Singer

Green Chemistry (2017) Vol 19 (11) pp 2587-2594

DOI: 10.1039/c7gc00436b

Antibacterial, Anticancer and Neuroprotective Activities of Rare Actinobacteria from Mangrove Forest Soils

Adzzie-Shazleen Azman, Iekhsan Othman, Chee-Mun Fang, Kok-Gan Chan, Bey-Hing Goh and Learn-Han Lee

Indian Journal of Microbiology (2017) Vol 57 (2) pp 177-187

DOI: 10.1007/s12088-016-0627-z

Identification, Characterization, and Quantification of Impurities of Safinamide Mesilate: Process-Related Impurities and Degradation Products

Liang Zou, Lili Sun, Hui Zhang, Wenkai Hui, Qiaogen Zou and Zheying Zhu
Journal of AOAC International (2017) Vol 100 (4) pp 1029-1037
DOI: 10.5740/jaoacint.16-0218

Water soluble, multifunctional antibody-porphyrin gold nanoparticles for targeted photodynamic therapy

Oriol Penon, Maria J. Marin, David A. Russell and Lluïsa Pérez-García
Journal of Colloid and Interface Science (2017) Vol 496 pp 100-110
DOI: 10.1016/j.jcis.2017.02.006

Upper critical solution temperature thermos-responsive polymer brushes and a mechanism for controlled cell attachment

Xuan Xue, Lalitha Thiagarajan, Shwana Braim, Brian R. Saunders, Kevin M. Shakesheff and Cameron Alexander
Journal of Materials Chemistry B (2017) Vol 5 (25) pp 4926-4933
DOI: 10.1039/c7tb00052a

Tailoring the Electrochemical Properties of Carbon Nanotube Modified Indium Tin Oxide via in Situ Grafting of Aryl Diazonium

Jacqueline M. Hicks, Zhi Yi Wong, David J. Scurr, Nigel Silman, Simon K. Jackson, Paula M. Mendes, Jonathan W. Aylott and Frankie J. Rawson
Langmuir (2017) Vol 33 (20) pp 4924-4933
DOI: 10.1021/acs.langmuir.7b00494

Rapid Nanogram Scale Screening Method of Microarrays to Evaluate Drug-Polymer Blends Using High-Throughput Printing Technology

Vincenzo Taresco, Iria Louzao, David Scurr, Jonathan booth, Kevin Treacher, James McGabe, Eleanor Turpin, Charles A. Laughton, Cameron Alexander, Jonathan C. Burley and Martin C. Garnett
Molecular Pharmaceutics (2017) Vol 14 (6) pp 2079-2087
DOI: 10.1021/acs.molpharmaceut.7b00182

Control of targeting ligand display by pH-responsive polymers on gold nanoparticles mediates selective entry into cancer cells

C. Brazzale, F. Mastrotto, P. Moody, P.D. Watson, A. Balasso, A. Malfanti, G. Mantovani, P. Caliceti, C. Alexander, A.T. Jones and S. Salmaso
Nanoscale (2017) Vol 9 (31) pp 11137-11147
DOI: 10.1039/c7nr02595E

Real-time measurement of the intracellular pH of yeast cells during glucose metabolism using ratiometric fluorescent nanosensors

Mohamed M. Elsutohy, Veeren M. Chauhan, Robert Markus, Mohammed Aref Kyyaly, Saul J.B. Tendler and Jonathan W. Aylott

Nanoscale (2017) Vol 9 (8) pp 5904-5911

DOI: 10.1039/c7nr00906b

Prevalence and Incidence Trends of Diagnosed Prescription Opioid Use Disorders in the United Kingdom

Andrew J. M. Cooper, Jenna Willis, Janice Fuller, Heike Benecke, James Leighton-Scott, Frank Andersohn, Joseph Kim, Christoph Maier and Roger D. Knaggs

Pain ad Therapy (2017) Vol 6 (1) pp 73-84

DOI: 10.1007/s40122-017-0070-9

The Properties of HPMC:PEO Extended Release Hydrophilic Matrices and their Response to Ionic Environments

Anran Hu, Chen Chen, Michael D. Mantle, Bettina Wolf, Lynn F. Gladden, Ali Rajabi-Siahboomi, Shahrzad Missaghi, Laura Mason and Colin D. Melia

Pharmaceutical Research (2017) Vol 34 (5) pp 941-956

DOI: 10.1007/s11095-016-2031-0

Androgen dependent mechanisms of pro-angiogenic networks in placental and tumor development

Veronika M. Metzler, Simone de Brot, Robert S. Robinson, Jennie N. Jeyapalan, Emad Rakha, Thomas Walton, David S. Gardner, Emma F. Lund, Jonathan Whitchurch, Daisy Haigh, Jack M. Lochray, Brian D. Robinson, Cinzia Allegrucci, Rupert G. Fray, Jenny L. Persson, Niels Ødum, Regina R. Miftakhova, Albert A. Rizvanov and Nigel P. Mongan

Placenta (2017) Vol 56, pp 79-85

DOI: 10.1016/j.placenta.2017.02.018

Unveiling a novel transient druggable pocket in BACE-1 through molecular simulations: Conformational analysis and binding mode of multisite inhibitors

Ornella Di Pietro, Jordi Juárez-Jiménez, Diego Muñoz-Torrero, Charles A. Laughton and F. Javier Luque

PLOS One (2017) Vol 12 (5)

DOI: 10.1371/journal.pone.0177683

Polymers for binding of the gram-positive oral pathogen *Streptococcus mutans*

Eugene P. Magennis, Nora Francini, Francesca Mastrotto, Rosa Catania, Martin Redhead, Francisco Fernandez-Trillo, David Bradshaw, David Churchley, Klaus Winzer, Cameron Alexander and Giuseppe Mantovani

PLOS One (2017) Vol 12 (7)

DOI: [10.1371/journal.pone.0180087](https://doi.org/10.1371/journal.pone.0180087)

Sterol 14 α -demethylase mutation leads to amphotericin B resistance in *Leishmania mexicana*

Roy Mwenechanya, Julie Kováčová, Nicholas J. Dickens, Manikhandan Mudaliar, Paweł Herzyk, Isabel M. Vincent, Stefan K. Weidt, Karl E. Burgess, Richard J.S. Burchmore, Andrew W. Pountain, Terry K. Smith, Darren J. Creek, Dong-Hyun Kim, Galina I. Lepesheva, Michael P. Barrett

PLOS Neglected Tropical Diseases (2017) Vol 11 (6)

DOI: [10.1371/journal.pntd.0005649](https://doi.org/10.1371/journal.pntd.0005649)

Tough adhesives for diverse wet surfaces

J. Li, A.D. Celiz, J. Yang, Q. Yang, I. Wamala, W. Whyte, B.R. Seo, N.V. Vasilyev, J.J. Vlassak, Z. Suo and D.J. Mooney

Science (2017) Vol 357 (6349) pp 378-381

DOI: [10.1126/science.aah6362](https://doi.org/10.1126/science.aah6362)

Image based Machine Learning for identification of macrophage subsets

Hassan M. Rostam, Paul M. Reynolds, Morgan R. Alexander, Nikolaj Gadegaard and Amir M. Ghaemmaghami

Scientific Reports (2017) Vol 7, Article 3521

DOI: [10.1038/s41598-017-03780-z](https://doi.org/10.1038/s41598-017-03780-z)

3D Microfabricated Scaffolds and Microfluidic Devices for Ocular Surface

Replacement: a Review

Elisabetta Prina, Pritesh Mistry, Laura E. Sidney, Jing Yang, Ricky D. Wildman, Marina Bertolin, Claudia Breda, Barbara Ferrari, Vanessa Barbaro, Andrew Hopkinson, Harminder S. Dua, Stefano Ferrari and Felicity R.A.J. Rose

Stem Cell Review and Reports (2017) Vol 13 (3) pp 430-441

DOI: [10.1007/s12015-017-9740-6](https://doi.org/10.1007/s12015-017-9740-6)

RECAST (Remote Ischemic Conditioning After Stroke Trial) A Pilot Randomized

Placebo Controlled Phase II Trial in Acute Ischemic Stroke

Timothy J. England, Amanda Hedstrom, Saoirse O'Sullivan, Richard Donnelly, David A. Barrett, Sarir Sarmad, Nikola Sprigg and Philip M. Bath
Stroke (2017) Vol 48 (5) pp 1412+
DOI: [10.1161/strokeaha.116.016429](https://doi.org/10.1161/strokeaha.116.016429)

Acoustic cavitation induced generation of stabilizer-free, extremely stable reduced graphene oxide nanodispersion for efficient delivery of paclitaxel in cancer cells

Renu Geetha Bai, Kasturi Muthoosamy, Fiona Natalia Shipton, Sivakumar Manickam
Ultrasonics Sonochemistry (2017) Vol 36, pp 129-138
DOI: [10.1016/j.ultsonch.2016.11.021](https://doi.org/10.1016/j.ultsonch.2016.11.021)

Staff Research News

- [Dr Mischa Zelzer](#) was an invited speaker at the 15th European Conference on Organised Film in Dresden on the 20th July 2017.
- [Dr New Siu Yee](#) was appointed as secretary of the 7th Asian Conference on Coordination Chemistry, and international biennial conference which will be held in Malaysia in 2019.
- [Dr New Siu Yee](#) was appointed as a member of the IKM Poster/Cartoon Competition Committee (IKM 50th Anniversary Celebrations), 2017.
- [Mr Tom Gray](#) has taken up the additional role of providing clinical leadership to support HEE develop pre-registration training and workforce development, specifically the use of e-portfolio and development of Pharmacy Competency Panels. Staff will remember that Gautam Paul was successfully appointed as one of the regional panel chairs last year.
- [Dr Michael Stocks](#) was appointed as the international expert for the 'Foreign Lecturer Teaching Programme' 2017 at the Shanghai University of Traditional Chinese Medicine. The topic chosen by Dr Stocks was Modern Day Drug Discovery and the lecture series was presented over five days, 12th-16th June.
- [Dr Franco Falcone](#) was invited to give a one hour talk at the Pathogen Host Interplay Club at the University of Muenster, Germany. The title of the talk was 'Hanging on for dear life: Molecular insights into the mechanism of adhesion of Helicobacter Pylori to the human gastric epithelium'.
- [Professor Clive Roberts](#) was invited to give the following talks:
 - Invited speaker at '2D and 3D Printing- A new trend in pharmaceutical manufacturing: hype or future?' in Berlin, Germany, May 2017.
 - Invited speaker at the '45th Interpharm Conference; Reverse engineering Shakespeare: Creating order and stability' in Stratford, May 2017.
 - Invited speaker at 'Association of Teaching Hospital Pharmacists' in Hull, June 2017.
 - Invited keynote speaker at 'International Conference on 3D Printing Technology and Innovations', Frankfurt, Germany, July 2017.

- Invited speaker at the 'International Conference on AM & 3DP', Nottingham, July 2017.
- [Professor Cameron Alexander](#) has been appointed to the EPSRC 'Big Ideas' Advisory Group
- [Professor Cameron Alexander](#) has been appointed by the EPSRC Governance and Planning to the Challenge-Led Research Ideas Working Group in May 2017.
- [Professor Cameron Alexander](#) took part in an Invited Overview at an EPSRC Targeted Therapeutics Workshop, 17 May, 2017.
- [Professor Cameron Alexander](#) was invited to give a talk entitled "Responsive polymers as probes and therapeutics" at the 3rd Functional Polymeric Materials Conference, 7-10 July 2017, Rome.
- [Professor Cameron Alexander](#) was invited to give a talk entitled "Synthetic polymers for disease detection, drug release and cell proliferation" at the Centre for Research in Molecular Medicine and Chronic Diseases (CiMUS), University of Santiago de Compostela, Spain, June 29th 2017.
- [Professor Cameron Alexander](#) acted as an External Jury Member at the University of Santiago di Compostela on 30 June 2017.
- [Dr Cornelia De Moor](#), [Dr Catherine Jopling](#), [Dr Anna Piccinini](#), [Dr Sebastian Winkler](#), [Dr Keith Spriggs](#) (and Professor Rupert Fray from Biosciences) organised this year's Translation UK conference (the national conference for our field of translation/protein synthesis), with support from the Biochemical Society.
- [Dr Franco Falcone](#) was invited to give a talk at the Pathogen Host Interplay Club at the University of Muenster, Germany, 5 July 2017 entitled "Hanging on for dear life: Molecular Insights into the mechanism of adhesion of Helicobacter pylori to the human gastric epithelium"
- [Dr Catherine Jopling](#) was invited to give a seminar entitled "Liver-specific microRNA-122: biogenesis and role in hepatitis C virus replication" at the Roslin Institute, Edinburgh, June 2017.
- [Dr Sadaf Ashraf](#) was awarded the best poster prize at the Bone Research Society Annual Meeting in Bristol, May 2017, for her work entitled "Cordycepin reduces established bone changes and pain in two animal models of osteoarthritis".

Grants/Studentships Awarded

- [Professor David Pritchard](#) has contributed to the GCRF Networks for Vaccine Research & Development consortium bid to the MRC/BBRC. This is now funded.
- [Dr New Siu Yee](#) was awarded RSC Mobility Fund, £4k for a research attachment in the University of Strathclyde.
- Rosa Catania, PhD student supervised by [Dr Giuseppe Mantovani](#), [Dr Snow Stolnik](#), [Dr Franco Falcone](#) and [Dr Cynthia Bosquillon](#), has been awarded a 2-Year EPSRC research fellowship as part of the prestigious University of Nottingham EPSRC Doctorial Prize 2017.
- A 5-year NIH R01 'Drugs from Bugs' Research grant has been awarded from the NIH to work on the therapeutic use of IPSE, a parasite-derived molecule for treatment of bladder hypersensitivity syndrome. (Principal Investigator: Michael Hsieh from Biomedical Research Institute, Rockville, MD, USA; Co-applicant: [Dr Franco Falcone](#)).
- Professors [Clive Roberts](#) and [Morgan Alexander](#) are Co-investigators on a recently awarded £5.9M EPSRC Programme Grant, Enabling Next Generation Additive Manufacturing Award. The PI is Prof Richard Hague (School of Engineering).
- [Dr Dong-Hyun Kim](#) has been awarded a British Mass Spectrometry Society Summer Studentship (£1,440) for June-August 2017.

Student News

- Maria Angelerou and Dr. Marta Alvarez-Paino (Post doc) were both awarded a £50.00 Amazon voucher for the best oral presentation at the School Conference 2017.
- Wai Jing Luen, student of Dr New Siu Yee, won the best poster award in the 3rd Annual Postgraduate Research Symposium, organised by the Department of Biomedical Science – 21st July 2017.
- Rosa Catania, PhD student in the School of Pharmacy, has been awarded the prestigious University of Nottingham EPSRC Doctoral Prize 2017, a 2-Year EPSRC research fellowship.
- Conor Bensley, MPharm student in the School of Pharmacy who did his 3rd year research project at the University of Angers, is an author on a paper published in the Journal of controlled Release entitled 'Lipid nanocapsules maintain full integrity after crossing a human intestinal epithelium model'.
- Congratulations to our MPharm prize winners, and a special mention to Ching-Wen Chen, who received her prize as Best Student in 5 Year MPharm at graduation on the 17th July. Ching Wen has been successful in securing a post as a rotational pharmacist at Nottingham University Hospitals NHS Trust. Two other 5 year students have secured NHS hospital jobs, whilst others are relocating back to Hong Kong.
- Tamara Mahmood, PhD student, won the Seah Prize in the UK Young Surface Analyst of the Year competition, hosted at the Pavilions Teignmouth. Her presentation and poster entitled 'Physiochemical Characterisation of a Fully Bioresorbable Stent with a Drug Eluting Coating' was judged the best in the field of 4 entrants from contestants based in academia and industry.



General News

- This year the [Division of Regenerative Medicine and Cellular Therapies](#) (RMCT) hosted the annual School of Pharmacy Conference on the 4th July. The event was well attended throughout the division and school, and provided a valuable showcase for what the RMCT has to offer. We were fortunate enough to hear talks and see poster presentations from across the divisional student and post doctorate spectrum. We were also very fortunate to be joined by external speakers; Professor Sheila MacNeil from the University of Sheffield, Dr Caroline Curtin from the Royal College of Surgeons in Ireland, and Dr Paul Roach from Loughborough University.

Highlighted Papers

- **3D Inkjet printing of tablets exploiting bespoke complex geometries for controlled and tuneable drug release**

Mary Kyobula, Aremu Adedeji, Morgan R. Alexander, Ehab Saleh, Ricky Wildman, Ian Ashcroft, Paul R. Gellert and Clive J. Roberts

Journal of Controlled Release, 261 (2017) 207-215

DOI: [10.1016/j.jconrel.2017.06.025](https://doi.org/10.1016/j.jconrel.2017.06.025)

This is the first paper showing printing of a tablet using hot-melt inkjet printing. The tablets have a complex honeycomb geometries that can be used to control and modify the release of the drug. An analytical model was also developed to allow the prediction of drug release. This information when combined with the range of achievable geometries could allow the bespoke production of optimized personalised medicines for a variety of delivery vehicles in addition to tablets, such as medical devices for example.

- **Versatile Routes to Functional RAFT Chain Transfer Agents through the Passerini Multicomponent Reaction**

Amanda K. Pearce, Alessandra Travanut, Benoit Couturaud, Vincenzo Taresco, Steven M. Howdle, Morgan R. Alexander and Cameron Alexander

ACS Macro Letters (2017) Vol 6 (7) pp 781-785

DOI: [10.1021/acsmacrolett.7b00415](https://doi.org/10.1021/acsmacrolett.7b00415)

First example of Multi-Component Reactions used to construct key polymer precursors. ACS Macro Letters is now the world's leading polymer chemistry journal. This paper opens up new routes to multi-functional materials and should facilitate rapid synthesis of a range of new biomedical polymers.