

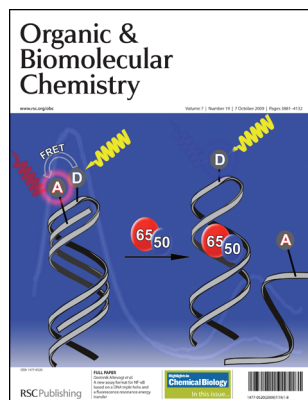
Organic & Biomolecular Chemistry

An international journal of synthetic, physical and biomolecular organic chemistry
www.rsc.org/obc

RSC Publishing is a not-for-profit publisher and a division of the Royal Society of Chemistry. Any surplus made is used to support charitable activities aimed at advancing the chemical sciences. Full details are available from www.rsc.org

IN THIS ISSUE

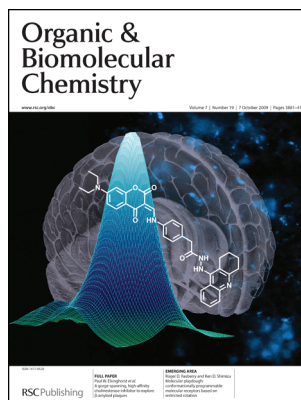
ISSN 1477-0520 CODEN OBCRAK 7(19) 3881–4132 (2009)



Cover

See Dominik Altevogt *et al.*, pp. 3934–3939.
Replacement of the third strand of a triple-helical DNA by NF- κ B, p50/p65, results in a decreased FRET and represents a new assay principle for DNA-binding proteins.

Image reproduced by permission of Irmgard Merfort from *Organic & Biomolecular Chemistry*, 2009, **7**, 3934.



Inside cover

See Paul W. Elsinghorst *et al.*, pp. 3940–3946.
A heterodimeric fluorescent tool with strong excitation–emission peak to successfully analyze β -amyloid plaques in brain samples from mice and humans.

Image reproduced by permission of Michael Gütschow from *Organic & Biomolecular Chemistry*, 2009, **7**, 3940.

HIGHLIGHTS IN CHEMICAL BIOLOGY

B73

Highlights in Chemical Biology provides a ‘snapshot’ of the latest developments in chemical biology from all RSC publications, showcasing newsworthy articles and significant scientific advances.

Highlights in
Chemical Biology

October 2009/Volume 4/Issue 10

www.rsc.org/highlightschembiol

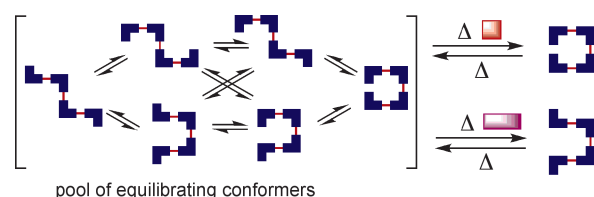
EMERGING AREA

3899

Molecular playdough: conformationally programmable molecular receptors based on restricted rotation

Roger D. Rasberry and Ken D. Shimizu*

Systems with molecular memory based on restricted rotation are reviewed with a focus on atropisomer N-arylimides.



EDITORIAL STAFF

Editor

Wikki Allen

Deputy editor

Richard Kelly

Assistant editor

Russell Johnson, Joanne Thomson

Publishing assistant

Jess Doherty

Assistant manager & Team leader, Informatics

Michelle Canning

Technical editors

David Barden, Nicola Burton, Frances Galvin,
Elinor Richards

Administration coordinator

Sonya Spring

Administration assistants

Aliya Anwar, Jane Orchard, Julie Thompson

Publisher

Emma Wilson

Organic & Biomolecular Chemistry (print: ISSN 1477-0520; electronic: ISSN 1477-0539) is published 24 times a year by the Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, UK CB4 0WF.

All orders, with cheques made payable to the Royal Society of Chemistry, should be sent to RSC Distribution Services, c/o Portland Customer Services, Commerce Way, Colchester, Essex, UK CO2 8HP. Tel +44 (0) 1206 226050; E-mail sales@rscdistribution.org

2009 Annual (print + electronic) subscription price: £2957; US\$5796. 2009 Annual (electronic) subscription price: £2661; US\$5216. Customers in Canada will be subject to a surcharge to cover GST. Customers in the EU subscribing to the electronic version only will be charged VAT.

If you take an institutional subscription to any RSC journal you are entitled to free, site-wide web access to that journal. You can arrange access *via* Internet Protocol (IP) address at www.rsc.org/ip. Customers should make payments by cheque in sterling payable on a UK clearing bank or in US dollars payable on a US clearing bank. Periodicals postage paid at Rahway, NJ, USA, and at additional mailing offices. Airfreight and mailing in the USA by Mercury Airfreight International Ltd., 365 Blair Road, Avenel, NJ 07001, USA.

US Postmaster: send address changes to Organic & Biomolecular Chemistry, c/o Mercury Airfreight International Ltd., 365 Blair Road, Avenel, NJ 07001. All despatches outside the UK by Consolidated Airfreight.

PRINTED IN THE UK

Advertisement sales: Tel +44 (0) 1223 432246; Fax +44 (0) 1223 426017; E-mail advertising@rsc.org

For marketing opportunities relating to this journal, contact marketing@rsc.org

Organic & Biomolecular Chemistry

An international journal of synthetic, physical and biomolecular organic chemistry

www.rsc.org/obc

Organic & Biomolecular Chemistry brings together molecular design, synthesis, structure, function and reactivity in one journal. It publishes fundamental work on synthetic, physical and biomolecular organic chemistry as well as all organic aspects of: chemical biology, medicinal chemistry, natural product chemistry, supramolecular chemistry, macromolecular chemistry, theoretical chemistry, and catalysis.

EDITORIAL BOARD

Chair

Professor Jay Siegel, Zürich, Switzerland

Professor Jeffrey Bode, Philadelphia, USA

Professor Margaret Brimble, Auckland, New Zealand

Professor Ben Davis, Oxford, UK
Dr Veronique Gouverneur, Oxford, UK
Professor David Leigh, Edinburgh, UK
Professor Mohamed Marahiel, Marburg, Germany
Professor Stefan Matile, Geneva, Switzerland
Professor Paolo Scrimin, Padova, Italy

Professor Brian Stoltz, Pasadena, USA
Professor Keisuke Suzuki, Tokyo, Japan

ADVISORY BOARD

Roger Alder, Bristol, UK
Jeffrey Bode, Philadelphia, USA
Helen Blackwell, Madison, USA
John S Carey, Tonbridge, UK
Barry Carpenter, Cardiff, UK
Michael Crimmins, Chapel Hill, USA
Antonio Echavaren, Tarragona, Spain
Jonathan Ellman, Berkeley, USA
Kurt Faber, Graz, Austria
Ben Feringa, Groningen, The Netherlands
Nobutaki Fujii, Kyoto, Japan
Jan Kihlberg, Umea, Sweden
Philip Kocienski, Leeds, UK

Steven V Ley, Cambridge, UK
Zhang Li-He, Beijing, China
Stephen Loeb, Ontario, Canada
Ilan Marek, Haifa, Israel
Manuel Martín Lomas, San Sebastián, Spain
Keiji Maruoka, Kyoto, Japan
Heather Maynard, Los Angeles, USA
E W 'Bert' Meijer, Eindhoven, The Netherlands
Eiichi Nakamura, Tokyo, Japan
Ryoji Noyori, Nagoya, Japan
Mark Rizzacasa, Melbourne, Australia

Oliver Seitz, Berlin, Germany
Bruce Turnbull, Leeds, UK
Chris Welch, Rahway, USA
Peter Wipf, Pittsburg, USA
Henry N C Wong, Hong Kong, China
Sam Zard, Ecole Polytechnique, France

INFORMATION FOR AUTHORS

Full details of how to submit material for publication in Organic & Biomolecular Chemistry are given in the Instructions for Authors (available from <http://www.rsc.org/authors>). Submissions should be sent *via* ReSource: <http://www.rsc.org/resource>

Authors may reproduce/republish portions of their published contribution without seeking permission from the RSC, provided that any such republication is accompanied by an acknowledgement in the form: (Original citation) – Reproduced by permission of the Royal Society of Chemistry.

© The Royal Society of Chemistry, 2009. Apart from fair dealing for the purposes of research or private study for non-commercial purposes, or criticism or review, as permitted under the Copyright, Designs and Patents Act 1988 and the Copyright and Related Rights Regulations 2003, this publication may only be reproduced, stored or transmitted, in any form or by any means, with

the prior permission in writing of the Publishers or in the case of reprographic reproduction in accordance with the terms of licences issued by the Copyright Licensing Agency in the UK. US copyright law is applicable to users in the USA.

The Royal Society of Chemistry takes reasonable care in the preparation of this publication but does not accept liability for the consequences of any errors or omissions.

Ⓢ The paper used in this publication meets the requirements of ANSI/NISO Z39.48-1992 (Permanence of Paper).

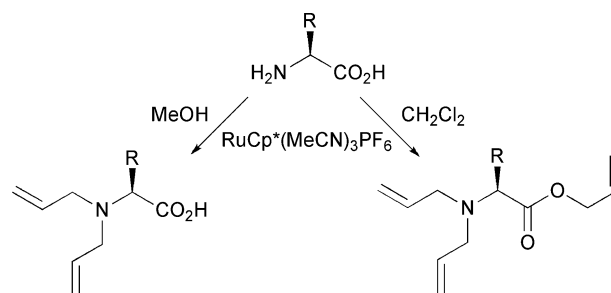
Royal Society of Chemistry: Registered Charity No. 207890

3906

Ruthenium-catalyzed selective *N,N*-diallylation- and *N,N,O*-triallylation of free amino acids

Basker Sundararaju, Mathieu Achard,
Gangavaram V. M. Sharma and Christian Bruneau*

Selective *N,N*-diallylation and *N,N,O*-triallylation of free amino acids in the presence of catalytic amounts of $\text{RuCp}^*(\text{MeCN})_3\text{PF}_6$.

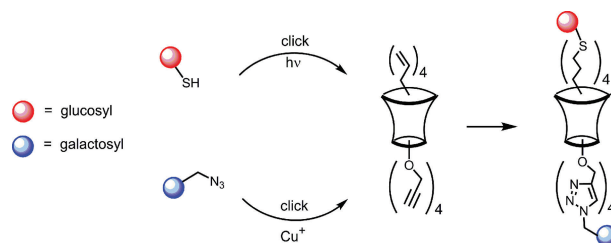


3910

Single and dual glycoside clustering around calix[4]arene scaffolds via click thiol–ene coupling and azide–alkyne cycloaddition

Michele Fiore, Angela Chambery, Alberto Marra* and
Alessandro Dondoni*

Calix[4]arene-based *S*-glycoclusters were prepared via photoinduced thiol–ene coupling (TEC). Dual glycosylation with different sugar residues was performed via sequential CuAAC and TEC.

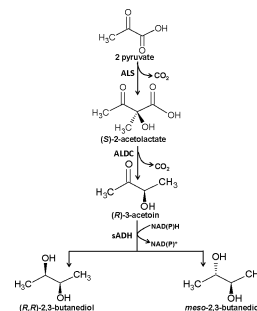


3914

Enantioselective synthesis of pure (*R,R*)-2,3-butanediol in *Escherichia coli* with stereospecific secondary alcohol dehydrogenases

Yajun Yan, Chia-Chi Lee and James C. Liao*

We characterized the activity and stereospecificity of four secondary alcohol dehydrogenases (sADHs) towards acetoin reduction and constructed synthetic pathways in *E. coli* to produce enantiomerically pure (*R,R*)-2,3-butanediol (2,3-BDO) from glucose with a titer of 6.1 g/L (enantio purity >99%), and yield of 0.31 g product/g glucose (62% of theoretical maximum).

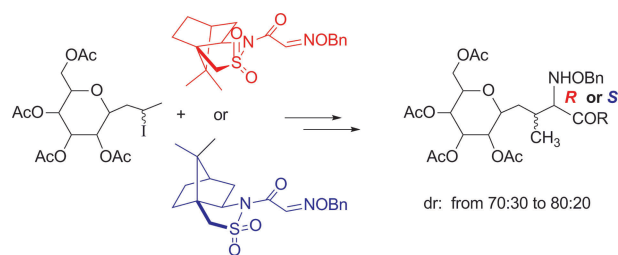


3918

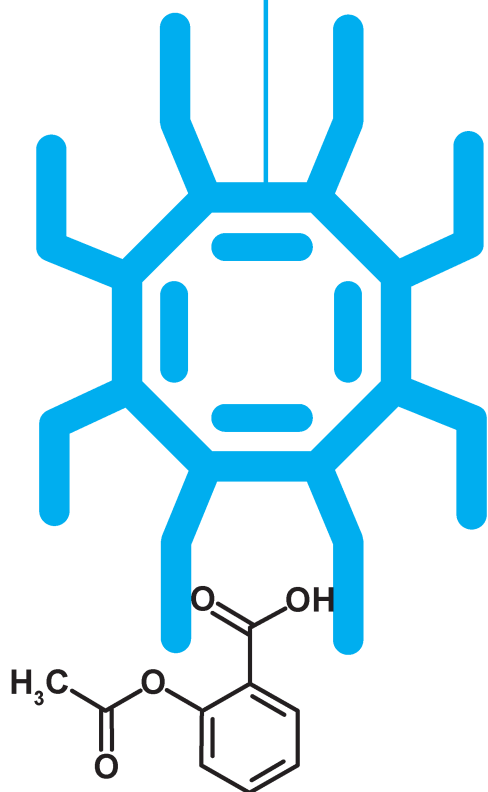
Diastereoselective addition of sugar radicals to camphorsultam glyoxilic oxime ether: a route toward *C*-glycosylthreonine and allothreonine

Nicolas Bragnier, Regis Guillot and
Marie-Christine Scherrmann*

A new application for a well-known chiral auxiliary paves the way for the preparation of novel *C*-glycosyl amino acids bearing two stereocenters in the aglycone moiety.



New adventures on the web



ChemSpider is a free online, structure centric community for chemists, providing fast access to millions of unique chemical entities, resources and information and the opportunity to collaborate with a world wide community of scientists. Rapidly becoming the richest single source of structure based chemistry information online, ChemSpider is a ground breaking initiative now supported by the RSC, the most innovative of chemical societies.

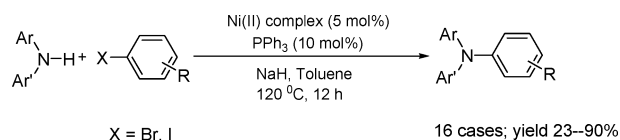
www.chemspider.com

3922

Nickel-catalyzed cross-coupling of diarylamines with haloarenes

Cai-Yan Gao, Xingbo Cao and Lian-Ming Yang*

The cross-coupling reaction of diarylamines with aryl bromides/iodides can be effected by the Ni(II)–(σ -aryl) complex/ PPh_3 / NaH system, and a preliminary investigation was conducted into the mechanism of this reaction.

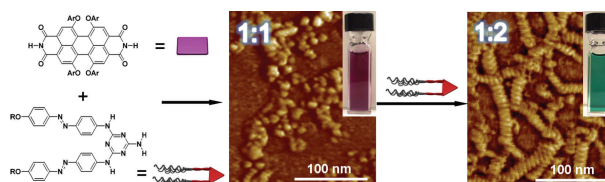


3926

Unconventional hydrogen-bond-directed hierarchical co-assembly between perylene bisimide and azobenzene-functionalized melamine

Shiki Yagai,* Saori Hamamura, Hao Wang, Vladimir Stepanenko, Tomohiro Seki, Kanako Unoike, Yoshihiro Kikkawa, Takashi Karatsu, Akihide Kitamura and Frank Würthner*

Co-assembly of ditopic perylene bisimide and azobenzene-functionalized melamine occurs with an unconventional stoichiometric ratio, providing well-defined nanostructures with a helical architecture.

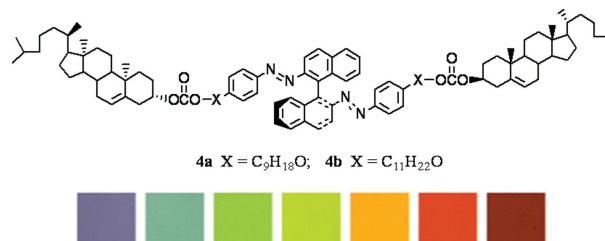


3930

Light-driven molecular switches with tetrahedral and axial chirality

Lisa Green, Yannian Li, Timothy White, Augustine Urbas, Timothy Bunning and Quan Li*

Two light-driven molecular switches with tetrahedral and axial chirality were synthesized, which can induce a helical superstructure in an achiral liquid crystal host and dynamically phototune it to achieve reversible reflection color.



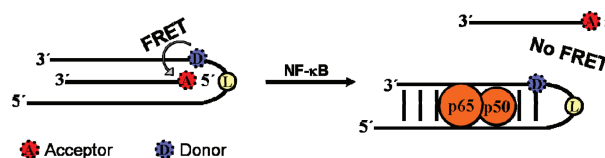
PAPERS

3934

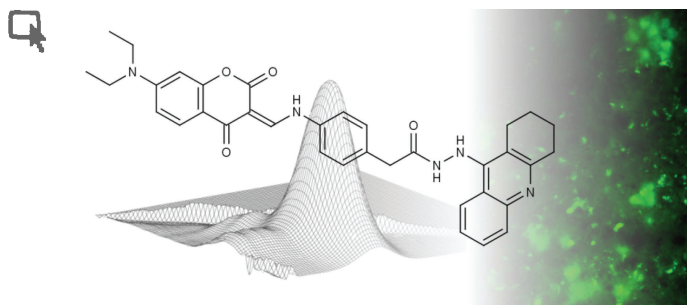
A new assay format for NF- κ B based on a DNA triple helix and a fluorescence resonance energy transfer

Dominik Altevoigt, Andrea Hrenn, Claudia Kern, Lilia Clima, Willi Bannwarth and Irmgard Merfort*

Herein we report a feasibility study for a new concept to detect DNA binding protein NF- κ B based on a DNA triple helix formation in combination with a fluorescence resonance energy transfer (FRET). The new principle avoids expensive antibodies and radioactivity and might have implications for assays of other DNA binding proteins.



3940

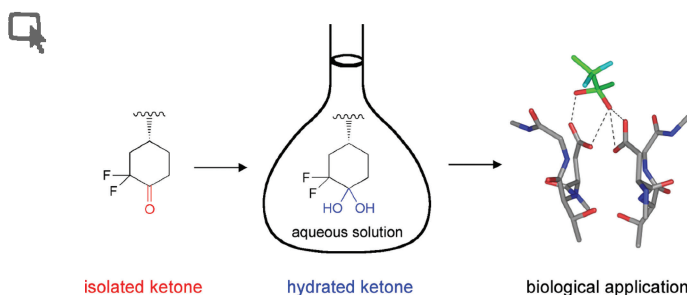


A gorge-spanning, high-affinity cholinesterase inhibitor to explore β -amyloid plaques

Paul W. Elsinghorst, Wolfgang Härtig, Simone Goldhammer, Jens Grosche and Michael Gütschow*

The preparation and characterization of a high-affinity, fluorescent cholinesterase inhibitor is presented. Its intriguing properties are highlighted by the discovery that it binds to amyloid structures in brain samples from mice and humans affected by Alzheimer's disease.

3947

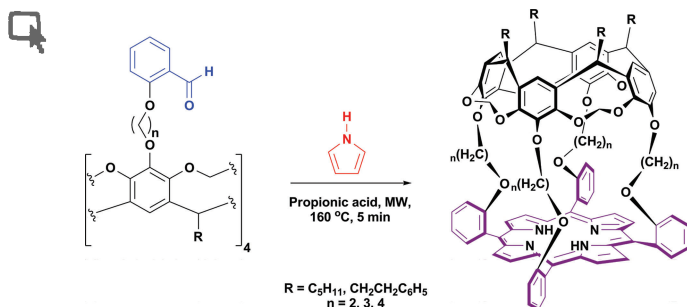


New organofluorine building blocks: inhibition of the malarial aspartic proteases plasmepsin II and IV by alicyclic α, α -difluoroketone hydrates

Christoph Fäh, Leo A. Hardegger, Lukas Baitsch, W. Bernd Schweizer, Solange Meyer, Daniel Bur and François Diederich*

Substituted α, α -difluorinated cyclohexanones were prepared and investigated as inhibitors of the aspartic protease plasmepsin II. The inhibitors bind to the enzyme in their hydrated form, which largely prevails in aqueous environments, and could be characterised by X-ray analysis.

3958

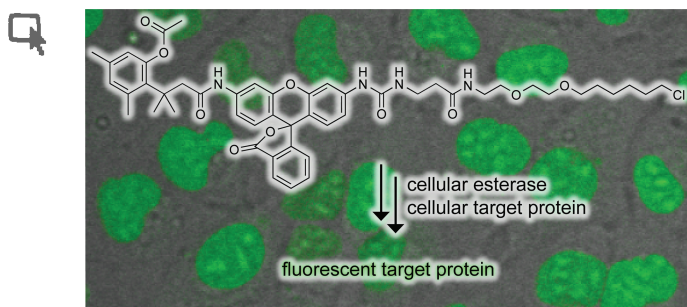


Microwave-assisted synthesis of a new series of resorcin[4]arene cavitand-capped porphyrin capsules

Michael G. McKay, Thandanani Cwele, Holger B. Friedrich and Glenn E. M. Maguire*

A new series of porphyrin capsules has been synthesised with the aid of microwave irradiation. Yields were significantly enhanced relative to reactions using traditional reaction protocols, and represent the first instance of the use of microwave heating to prepare supramolecularly capped porphyrin capsules.

3969



Fluorogenic affinity label for the facile, rapid imaging of proteins in live cells

Rex W. Watkins, Luke D. Lavis, Vanessa M. Kung, Georgyi V. Los and Ronald T. Raines*

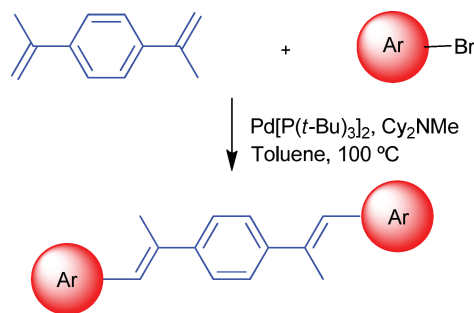
Intracellular esterases unmask a latent fluorophore that alkylates a haloalkane dehalogenase variant. Fluorescent labeling is rapid and specific, and background fluorescence is low.

3976

Introduction of methyl groups on vinylene segments of phenylene vinylene systems: synthesis and properties

Khai Leok Chan and Alan Sellinger*

A facile synthetic route towards phenylene vinylene systems with methyl substituents at the vinyl linkages is demonstrated through palladium catalyzed Heck coupling. The oxidative stability of these systems is surprisingly unaffected by the presence of allylic C-H bonds in the methyl substituents.

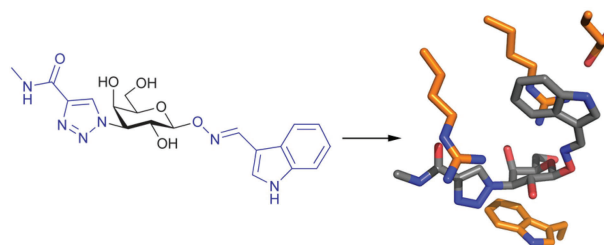


3982

Fragment-based development of triazole-substituted *O*-galactosyl aldoximes with fragment-induced affinity and selectivity for galectin-3

Johan Tejler, Bader Salameh, Hakon Leffler and Ulf J. Nilsson*

Combining a weak-binding galactose monosaccharide with an anomeric indolyl oxime and a C3-triazolyl group gives inhibitors with high affinity and excellent selectivity for galectin-3.

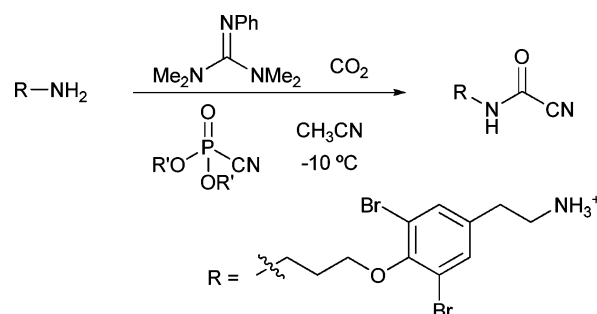


3991

Synthesis of cyanoformamides from primary amines and carbon dioxide under mild conditions. Synthesis of ceratinamine

Eduardo García-Egido, Jairo Paz, Beatriz Iglesias and Luis Muñoz*

Treatment of primary amines under carbon dioxide atmosphere with tetramethylphenylguanidine (PhTMG) and a cyanophosphonate at $-10\text{ }^{\circ}\text{C}$ provides cyanoformamides in very high to excellent yields. The marine natural product ceratinamine was efficiently synthesized.

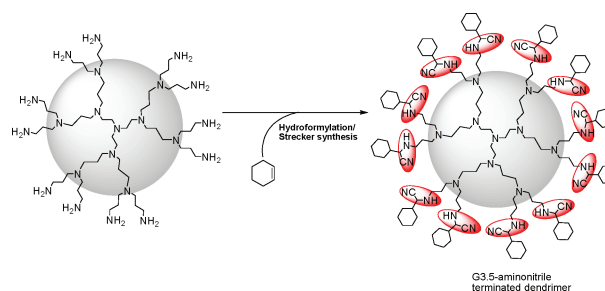


4000

A new one-pot hydroformylation/Strecker synthesis as a versatile synthetic tool for polyfunctional compounds and functionalization of dendrimers

Muhammad Afzal Subhani, Kai-Sven Müller, Fikret Koç and Peter Eilbracht*

A versatile and high yielding one-pot hydroformylation/Strecker synthesis is reported for the synthesis of various α -aminonitriles.



A new journal from RSC Publishing
Launching mid 2010

Rapid communication of research
in medicinal chemistry

MedChemComm



Official journal of:



A new, peer-reviewed journal publishing medicinal chemistry research, including new studies related to biologically-active chemical or biochemical entities that can act as pharmacological agents with therapeutic potential or relevance.

The journal will publish monthly issues from mid 2010 and will contain a mix of vibrant and concise research and review articles. *MedChemComm* will complement the existing RSC Publishing portfolio of bioscience journals, providing authors in the field with a dedicated subject-specific publication.

From launch, the current issue of *MedChemComm* will be freely available to all readers via the website. Free institutional online access to all 2010/2011 content will be available following a simple registration process at www.rsc.org/medchemcomm_registration

Co-Editor-in-Chief: Dr Anthony Wood, Pfizer, UK

Co-Editor-in-Chief: Professor Gregory Verdine, Harvard University, USA

Sign up for free access today!

RSC Publishing

www.rsc.org/medchemcomm

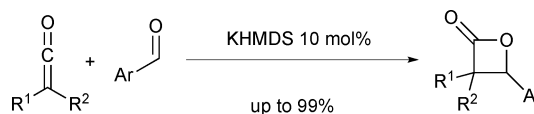
Registered Charity Number 207890

4009

Hindered Brønsted bases as Lewis base catalysts

Sobia Tabassum, Oksana Sereda, Peddiahgari Vasu Govardhana Reddy and René Wilhelm*

KHMDS and KO^tBu have been found to be highly active Lewis base catalysts for the formal [2+2] cycloaddition of ketenes with aldehydes or imines.

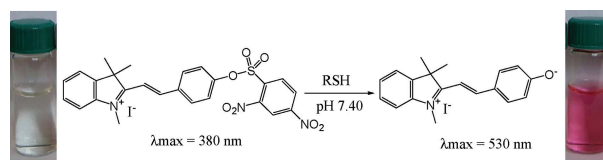


4017

A colorimetric and fluorescent merocyanine-based probe for biological thiols

Shu-Ping Wang, Wu-Jian Deng, Dan Sun, Min Yan, Hong Zheng* and Jin-Gou Xu

A new “dual-mode” chromogenic and fluorescent turn-on probe for the selective sensing of biological thiols is reported. In MeOH–H₂O at pH 7.40, biological thiols cleave the 2,4-dinitrobenzenesulfonyl group to release the chromo- and fluorophore merocyanine.

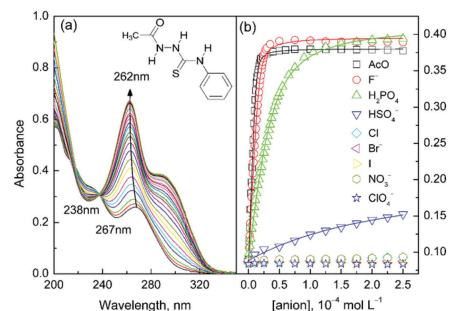


4021

N-(Acetamido)thiourea based simple neutral hydrogen-bonding receptors for anions

Wen-Xia Liu, Rui Yang, Ai-Fang Li, Zhao Li, Yu-Feng Gao, Xing-Xing Luo, Yi-Bin Ruan and Yun-Bao Jiang*

N-(α -Substituted-acetamido)thioureas were found to be highly efficient hydrogen-bonding based anion receptors and promising organocatalysts. It was made clear that N-amidothioureas in general are easily available frameworks for functional thioureas of high hydrogen-bonding ability.

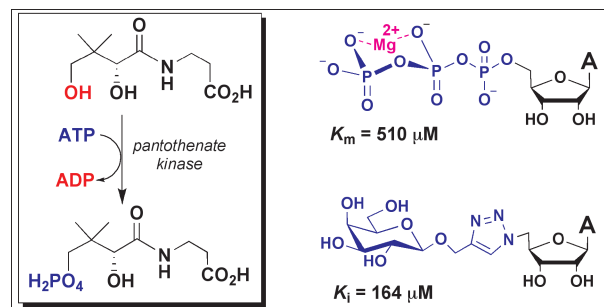


4029

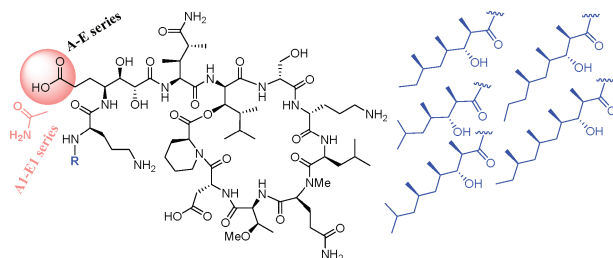
Nucleoside triphosphate mimicry: a sugar triazolyl nucleoside as an ATP-competitive inhibitor of *B. anthracis* pantothenate kinase

Andrew S. Rowan, Nathan I. Nicely, Nicola Cochrane, Wjatschesslaw A. Wlassoff, Al Claiborne and Chris J. Hamilton*

Sugar triazolyl nucleosides have been prepared as uncharged NTP mimics. A competitive inhibitor of *Bacillus anthracis* pantothenate kinase has been identified with a K_i value that is three-fold lower than the K_m value of the native ATP substrate.



4037

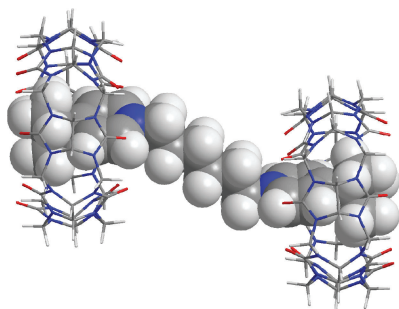


Homophymines B–E and A1–E1, a family of bioactive cyclodepsipeptides from the sponge *Homophymia* sp.

Angela Zampella, Valentina Sepe, Filomena Bellotta, Paolo Luciano, Maria Valeria D'Auria,* Thierry Cresteil, Cécile Debitus, Sylvain Petek, Christiane Poupat and Alain Ahond

New cyclodepsipeptides, homophymines B–E and A1–E1, were isolated from the sponge *Homophymia* sp. All metabolites displayed very potent antiproliferative activity (IC_{50} in the nM range) against human cancer cell lines.

4045

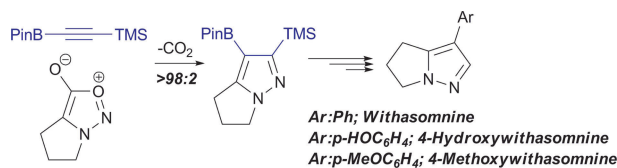


Cucurbit[7]uril host-guest and pseudorotaxane complexes with α,ω -bis(pyridinium)alkane dications

Ian W. Wyman and Donal H. Macartney*

Cucurbit[7]uril forms very stable 1:1 and 2:1 host-guest and [2]pseudorotaxane complexes in aqueous solution with a series of α,ω -bis(pyridinium)alkane dications bearing methyl, dimethylamino, and *tert*-butyl substituents and ethyl, hexyl, and *p*-xylyl linkers.

4052

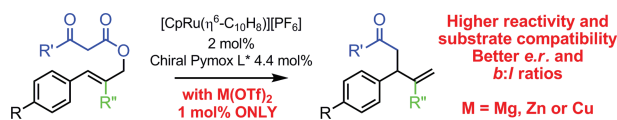


A divergent strategy to the withasomnines

Robert S. Foster, Jianhui Huang, Jérôme F. Vivat, Duncan L. Browne and Joseph P. A. Harrity*

A regioselective alkynylboronate–syndnone cycloaddition provides a pyrazole intermediate that has been employed in the first divergent synthesis of the withasommine family of alkaloids.

4057



Lewis acid/CpRu dual catalysis in the enantioselective decarboxylative allylation of ketone enolates

David Linder, Martina Austeri and Jérôme Lacour*

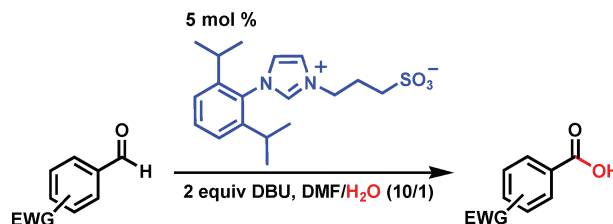
The addition of Mg(OTf)₂ as Lewis acid co-catalyst in the CpRu-catalyzed decarboxylative allylation of *in situ*-generated ketone enolates allows the reaction to proceed at lower temperature with higher regio- and enantioselectivity. Even so-far-unreactive substrates react.

4062

Oxidative carboxylation of arylaldehydes with water by a sulfoxylalkyl-substituted *N*-heterocyclic carbene catalyst

Masahiro Yoshida,* Yuki Katagiri, Wen-Bin Zhu and Kozo Shishido

The *N*-Heterocyclic carbene-catalysed oxidative carboxylation of arylaldehydes with water successfully proceeded when a sulfoxylalkyl-substituted imidazolium salt was used as the catalyst.

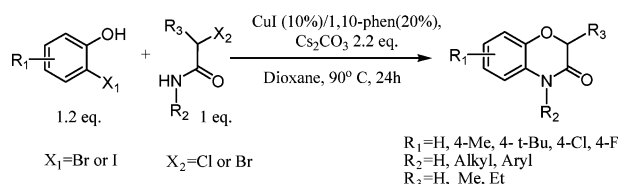


4067

An efficient cascade synthesis of various 2*H*-1,4-benzoxazin-3-(4*H*)-ones from *o*-halophenols and 2-halo-amides catalyzed by CuI

Dingben Chen, Guodong Shen and Weiliang Bao*

A novel and efficient one-pot cascade synthesis of 2*H*-1,4-benzoxazin-3-(4*H*)-ones has been developed through copper-catalyzed coupling of *o*-halophenols and 2-halo-amides. Various products with diversity at three substituents on their scaffold have been synthesized.

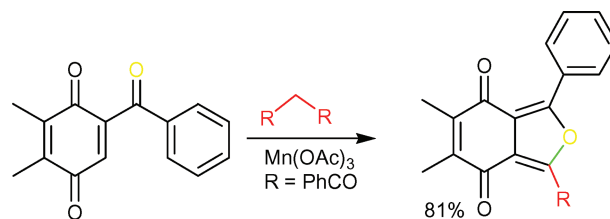


4074

Free radical reaction between 2-benzoyl-1,4-benzoquinones and 1,3-dicarbonyl compounds

Kuang-Po Chen, Hen-Qun Lee, Yu-Chih Cheng and Che-Ping Chuang*

Manganese(III)-mediated reactions of 2-benzoyl-1,4-benzoquinones are described. Benzo[*c*]furan-4,7-diones and anthracene-1,4-diones can be produced chemoselectively.

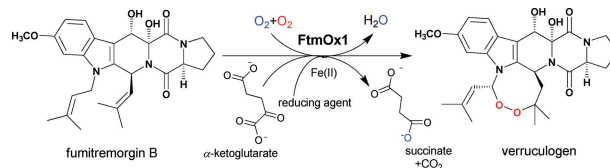


4082

FtmOx1, a non-heme Fe(II) and α -ketoglutarate-dependent dioxygenase, catalyses the endoperoxide formation of verruculogen in *Aspergillus fumigatus*

Nicola Steffan, Alexander Grundmann, Shamil Afiyatullo, Hanli Ruan and Shu-Ming Li*

The overproduced and purified recombinant FtmOx1 was found to be involved in the endoperoxide formation of verruculogen. The enzymatic reaction is dependent on the presence of Fe(II), α -ketoglutarate and ascorbate. It is demonstrated that both oxygen atoms of the endoperoxide bond are derived from a single O₂ molecule.



The RSC Drug Discovery Series

The new **RSC Drug Discovery Series** is a suite of professional reference books that will encourage learning in a range of different topics and provide an up-to-date perspective to scientists working outside of their own areas of expertise. The competitive advantage of the series is that it will provide comprehensive coverage of the drug discovery process with an emphasis on learning and critical evaluation.

**NEW SERIES
PUBLISHING
IN 2010**

Key Features

- Case studies to bring alive different aspects of the drug discovery process
- Structured to walk readers through different aspects in a logical fashion
- Sufficiently detailed not just with respect to theory but also practices and guidelines
- Comprehensive treatment with contributions from internationally recognised thought leaders

Readership

Advanced and postgraduate level students, medicinal chemists, scientists in pharmaceutical companies and university departments, in the areas of chemistry, pharmacy and the pharmaceutical sciences.

Editor-in-Chief: Professor David Thurston, London School of Pharmacy, UK

Series Editors: Dr David Fox, Pfizer Global Research and Development, Sandwich, UK | Professor Salvatore Guccione, University of Catania, Italy
Professor Ana Martinez, Universidad Complutense de Madrid, Spain
Dr David Rotella, Wyeth Research, USA

Advisor to the Board: Professor Robin Ganellin, University College London, UK

RSC Publishing

www.rsc.org/drugdiscovery

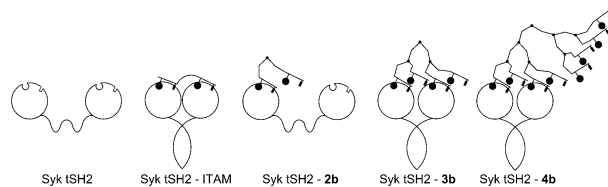
Registered Charity Number 207890

4088

ITAM-derived phosphopeptide-containing dendrimers as multivalent ligands for Syk tandem SH2 domain

Joeri Kuil, Hilbert M. Branderhorst, Roland J. Pieters, Nico J. de Mol* and Rob M. J. Liskamp

Spleen tyrosine kinase (Syk) is activated when its tandem SH2 domain (tSH2) binds to a diphosphorylated ITAM motif. From a series of ITAM-derived phosphopeptide-containing dendrimers, the tetra- and octavalent dendrimers were able to bind multivalently to Syk tSH2.

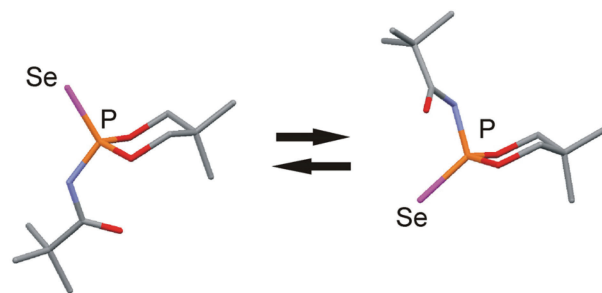


4095

Synthesis and structural investigation of *N*-acyl selenophosphoramides

Grzegorz Cholewinski, Jaroslaw Chojnacki, Jerzy Pikies and Janusz Rachon*

Selenophosphoric acid derivatives can crystallise as conformers with an equatorial or axial selenium atom. These results are rationalized in terms of the anomeric effect.

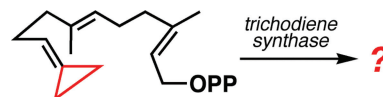


4101

Modes of inactivation of trichodiene synthase by a cyclopropane-containing farnesyl diphosphate analog

Young J. Hong and Dean J. Tantillo*

Quantum calculations reveal significant differences between the behavior of a cyclopropane-containing analog of farnesyl diphosphate (FPP) and FPP itself, pointing to new mechanisms by which this analog inactivates trichodiene synthase.

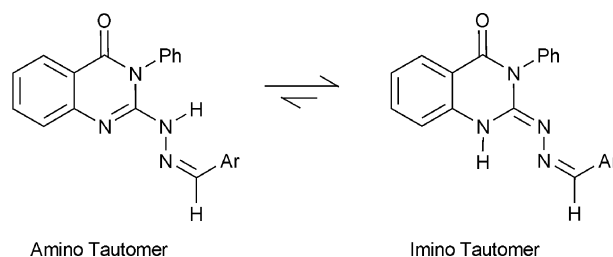


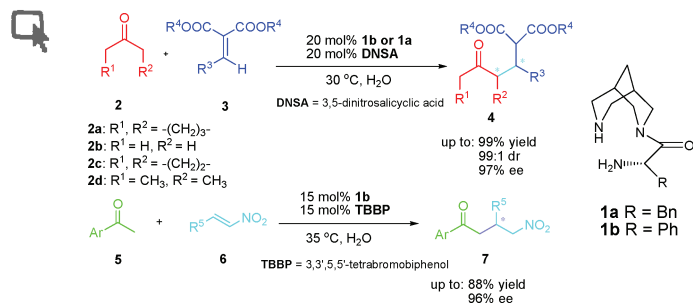
4110

Tautomerism of guanidines studied by ^{15}N NMR: 2-hydrazono-3-phenylquinazolin-4(3*H*)-ones and related compounds

Ion Ghiviriga,* Bahaa El-Dien M. El-Gendy, Peter J. Steel and Alan R. Katritzky*

2-Hydrazono-3-phenyl-3*H*-quinazolin-4-ones are shown by ^{15}N NMR at natural abundance to exist in DMSO solution predominantly as the imino tautomer and not the amino tautomer.





Organocatalyzed highly stereoselective Michael addition of ketones to alkylidene malonates and nitroolefins using chiral primary-secondary diamine catalysts based on bispidine

Jie Liu, Zhigang Yang, Xiaohua Liu, Zhen Wang, Yanling Liu, Sha Bai, Lili Lin and Xiaoming Feng*

Organocatalysts containing primary-secondary diamines based on bispidine have been further developed to catalyze the asymmetric Michael addition of ketones to alkylidene malonates and nitroalkenes. High yields and high stereoselectivities were obtained under mild conditions.

AUTHOR INDEX

- Achard, Mathieu, 3906
 Afiyatullo, Shamil, 4082
 Ahond, Alain, 4037
 Altevogt, Dominik, 3934
 Austeri, Martina, 4057
 Bai, Sha, 4120
 Baitsch, Lukas, 3947
 Bannwarth, Willi, 3934
 Bao, Weiliang, 4067
 Bellotta, Filomena, 4037
 Bragnier, Nicolas, 3918
 Branderhorst, Hilbert M., 4088
 Browne, Duncan L., 4052
 Bruneau, Christian, 3906
 Bunning, Timothy, 3930
 Bur, Daniel, 3947
 Cao, Xingbo, 3922
 Chambery, Angela, 3910
 Chan, Khai Leok, 3976
 Chen, Dingben, 4067
 Chen, Kuang-Po, 4074
 Cheng, Yu-Chih, 4074
 Chojnacki, Jaroslaw, 4095
 Cholewinski, Grzegorz, 4095
 Chuang, Che-Ping, 4074
 Claiborne, Al, 4029
 Clima, Lilia, 3934
 Cochrane, Nicola, 4029
 Cresteil, Thierry, 4037
 Cwele, Thandanani, 3958
 D'Auria, Maria Valeria, 4037
 de Mol, Nico J., 4088
 Debitus, Cécile, 4037
 Deng, Wu-Jian, 4017
 Diederich, François, 3947
 Dondoni, Alessandro, 3910
 Eilbracht, Peter, 4000
 El-Gendy, Bahaa El-Dien M., 4110
 Elsinghorst, Paul W., 3940
 Fähr, Christoph, 3947
 Feng, Xiaoming, 4120
- Fiore, Michele, 3910
 Foster, Robert S., 4052
 Friedrich, Holger B., 3958
 Gao, Cai-Yan, 3922
 Gao, Yu-Feng, 4021
 García-Egido, Eduardo, 3991
 Ghiviriga, Ion, 4110
 Goldhammer, Simone, 3940
 Green, Lisa, 3930
 Grosche, Jens, 3940
 Grundmann, Alexander, 4082
 Guillot, Régis, 3918
 Gütschow, Michael, 3940
 Hamamura, Saori, 3926
 Hamilton, Chris J., 4029
 Hardegger, Leo A., 3947
 Harrity, Joseph P. A., 4052
 Härtig, Wolfgang, 3940
 Hong, Young J., 4101
 Hrenn, Andrea, 3934
 Huang, Jianhui, 4052
 Iglesias, Beatriz, 3991
 Jiang, Yun-Bao, 4021
 Karatsu, Takashi, 3926
 Katagiri, Yuki, 4062
 Katritzky, Alan R., 4110
 Kern, Claudia, 3934
 Kikkawa, Yoshihiro, 3926
 Kitamura, Akihito, 3926
 Koç, Fikret, 4000
 Kuil, Joeri, 4088
 Kung, Vanessa M., 3969
 Lacour, Jérôme, 4057
 Lavis, Luke D., 3969
 Lee, Chia-Chi, 3914
 Lee, Hen-Qun, 4074
 Leffler, Hakon, 3982
 Li, Ai-Fang, 4021
 Li, Quan, 3930
 Li, Shu-Ming, 4082
 Li, Yannian, 3930
- Li, Zhao, 4021
 Liao, James C., 3914
 Lin, Lili, 4120
 Linder, David, 4057
 Liskamp, Rob M. J., 4088
 Liu, Jie, 4120
 Liu, Wen-Xia, 4021
 Liu, Xiaohua, 4120
 Liu, Yanling, 4120
 Los, Georgyi V., 3969
 Luciano, Paolo, 4037
 Luo, Xing-Xing, 4021
 Macartney, Donal H., 4045
 Maguire, Glenn E. M., 3958
 Marra, Alberto, 3910
 McKay, Michael G., 3958
 Merfort, Irmgard, 3934
 Meyer, Solange, 3947
 Müller, Kai-Sven, 4000
 Muñoz, Luis, 3991
 Nicely, Nathan I., 4029
 Nilsson, Ulf J., 3982
 Paz, Jairo, 3991
 Petek, Sylvain, 4037
 Pieters, Roland J., 4088
 Pikies, Jerzy, 4095
 Poupat, Christiane, 4037
 Rachon, Janusz, 4095
 Raines, Ronald T., 3969
 Raspberry, Roger D., 3899
 Reddy, Peddiahgari Vasu Govardhana, 4009
 Rowan, Andrew S., 4029
 Ruan, Hanli, 4082
 Ruan, Yi-Bin, 4021
 Salameh, Bader, 3982
 Scherrmann, Marie-Christine, 3918
 Schweizer, W. Bernd, 3947
 Seki, Tomohiro, 3926
 Sellinger, Alan, 3976
- Sepe, Valentina, 4037
 Sereda, Oksana, 4009
 Sharma, Gangavaram V. M., 3906
 Shen, Guodong, 4067
 Shimizu, Ken D., 3899
 Shishido, Kozo, 4062
 Steel, Peter J., 4110
 Steffan, Nicola, 4082
 Stepanenko, Vladimir, 3926
 Subhani, Muhammad Afzal, 4000
 Sun, Dan, 4017
 Sundararaju, Basker, 3906
 Tabassum, Sobia, 4009
 Tantillo, Dean J., 4101
 Tejler, Johan, 3982
 Unoike, Kanako, 3926
 Urbas, Augustine, 3930
 Vivat, Jérôme F., 4052
 Wang, Hao, 3926
 Wang, Shu-Ping, 4017
 Wang, Zhen, 4120
 Watkins, Rex W., 3969
 White, Timothy, 3930
 Wilhelm, René, 4009
 Wlassoff, Wjatscheslaw A., 4029
 Würthner, Frank, 3926
 Wyman, Ian W., 4045
 Xu, Jin-Gou, 4017
 Yagai, Shiki, 3926
 Yan, Min, 4017
 Yan, Yajun, 3914
 Yang, Lian-Ming, 3922
 Yang, Rui, 4021
 Yang, Zhigang, 4120
 Yoshida, Masahiro, 4062
 Zampella, Angela, 4037
 Zheng, Hong, 4017
 Zhu, Wen-Bin, 4062

FREE E-MAIL ALERTS AND RSS FEEDS

Contents lists in advance of publication are available on the web *via* www.rsc.org/obc – or take advantage of our free e-mail alerting service (www.rsc.org/ej.alert) to receive notification each time a new list becomes available.



Try our RSS feeds for up-to-the-minute news of the latest research. By setting up RSS feeds, preferably using feed reader software, you can be alerted to the latest Advance Articles published on the RSC web site. Visit www.rsc.org/publishing/technology/rss.asp for details.

ADVANCE ARTICLES AND ELECTRONIC JOURNAL

Free site-wide access to Advance Articles and the electronic form of this journal is provided with a full-rate institutional subscription. See www.rsc.org/ejs for more information.

* Indicates the author for correspondence: see article for details.



Electronic supplementary information (ESI) is available *via* the online article (see <http://www.rsc.org/esi> for general information about ESI).

Get straight to the point



Highlights in
Chemical Technology
www.rsc.org/highlightschemtech

Highlights in
Chemical Biology
www.rsc.org/highlightschembiol

Highlights in
Chemical Science
www.rsc.org/highlightschemsci

Keep track of the latest developments from across the chemical sciences with succinct newsworthy accounts

Online access to *Highlights in Chemical Technology*, *Highlights in Chemical Science* and *Highlights in Chemical Biology* is completely free. With *Research highlights* showcasing articles published across the breadth of RSC journals, *Instant insights* offering whirlwind tours of exciting research areas and leading scientists sharing their opinions in specialist *Interviews*, the magazines are an essential tool for scientists wishing to stay on top of the news and developments in their field and related areas. And all journal articles covered in the news magazines have free online access for a period of eight weeks. Go online now to find out more!

RSC Publishing

www.rsc.org/journals

Registered Charity Number 207890

ChemComm

Indexed
in MEDLINE

Effective promotion of authors and articles


High impact factor 5.340

Fastest for publishing chemical communications

Stay informed...

Keep up to date with the latest developments from *ChemComm* in 4 easy ways:

- 1. On the web** – visit the *ChemComm* website to view advance articles, high profile author interviews, the latest issue of *ChemComm*, the *ChemComm* archive and much, much more...
- 2. "ChemComm Chronicle"** – the new monthly free e-newsletter featuring up to date news, hot topics and the latest activities of the *ChemComm* team and board members. Sign up today
- 3. RSS feeds** – preview the latest advance articles from the journals you choose to receive
- 4. Table of contents** – sign up for e-alerts with articles from the latest issue of *ChemComm*



ChemComm Chronicle
Communicating high quality news from across the chemical sciences

Working with ChemComm
ChemComm has received huge support from the science community; submissions and readership have grown significantly while the impact factor has grown by 29% over the last 3 years. With an impact factor of 5.14, ChemComm attracts submissions from all over the world, making it truly international both in readership and authorship. Interested in submitting your work? Click [here](#) to find out how.

Meet the people behind ChemComm
It is the outstanding contributions that ChemComm receives from its authors, that makes the journal as successful as it is. Read about one of our most recent authors, [Enrique Alvarez-Salas](#), who was interviewed by ChemComm about his research and why he became a scientist. Also, [Jonathan Sessler](#), ChemComm associate editor for Supramolecular Chemistry in the US, talks to Michael Brown, assistant editor for ChemComm, about what motivated him to discover teoxaphyrin and about the aims of the companies he co-founded. Submit papers to Jonathan Sessler via [ReSource](#), our homepage for authors and referees.

Third ChemComm International Symposium
China 2009
ChemComm enhances its international presence in China
Building on the success of the first and second symposia, the Third ChemComm International Symposium, on the subject of **Organic Chemistry**, will be returning to China from 16-20th February 2009. The three free meetings will be held in Beijing, Chengdu and Shanghai. Check out our list of [international key note speakers](#) at this event, who will share their research findings and expertise with the audience.

Did you know... Articles submitted to ChemComm benefit from award-winning [RSC Prospect](#). This innovative technology links together related articles by subject ontologies and identified compounds. RSC Prospect enhanced HTML articles also provide definitions, synonyms, structures and RSS feeds.

RSC Publishing www.rsc.org/chemcomm
Registered Charity Number 207890

886090

Go online today...

RSC Publishing

www.rsc.org/chemcomm

Registered Charity Number 207890

Highlights in Chemical Biology

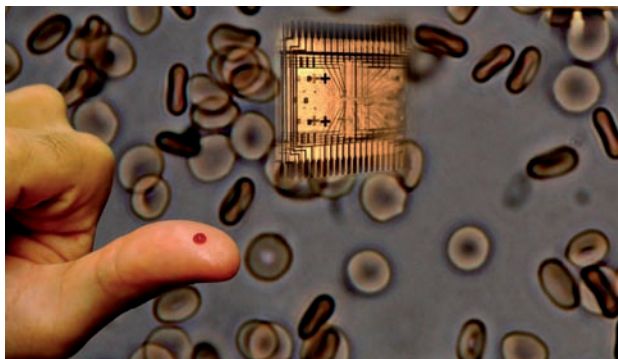
Numerous applications offered by time- and money-saving gadget

Potential for bedside medical diagnostics

A handheld device which could offer point-of-care blood cell analysis is being developed by scientists in the UK. Team members David Holmes and Hywel Morgan, from the University of Southampton, suggest their system could find a range of applications in diagnostics.

Holmes explains that the microfluidic set-up uses electrodes to measure each blood cell's electrical properties as it flows through the device's channels. From these measurements it is possible to distinguish and count the different types of cell, providing information used in the diagnosis and treatment monitoring of numerous diseases.

To verify their results the researchers mounted their device on a fluorescence microscope. This allowed them to observe the cells optically and confirm that the electrical data correlated with the correct identification of each cell. The system can identify three types of white blood cells: T lymphocytes, monocytes and neutrophils.



Currently routine blood analysis uses flow cytometry which requires expensive reagents and fluorescent antibodies as well as bulky and fragile equipment. It is also time consuming. In comparison, Holmes and Morgan's method requires only that the red blood cells are removed from the sample, which takes just 8 seconds. This step has the added benefit of enhancing the discrimination between the white cells.

Yuri Feldman, head of the Dielectric Spectroscopy Laboratory

Blood cells are identified as they flow through a microfluidic device

Reference
D Holmes *et al*, *Lab Chip*, 2009, DOI: 10.1039/b910053a

at the Hebrew University of Jerusalem, Israel, points out that the group's combination of microfluidics, optics and impedance spectroscopy implemented on the single cell level is unique. 'It opens new avenues for effective use in modern medical diagnostics,' he says.

The next step for the team is to integrate the red blood cell removal step into the device. Further down the line they plan to develop power-free microfluidics, using capillary forces to pull the blood, or other samples, through the system. 'There is a lot of opportunity for developing the system further,' says Holmes.

The team's eventual aim is to produce a handheld device which would be available for around £1000 which would use disposable chips costing a few pence each. They say that uses for the device would not be restricted to blood cell analysis but could range from cancer and HIV monitoring to the examination of drinking water.

Jennifer Newton

In this issue

Find us on... twitter

Anti-terror antibodies

Immunological detector finds potential biological warfare agents in food in contamination scenario

Targeting the androgen receptor

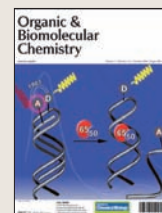
Computer-aided design yields miniproteins that bind prostate cancer linked receptor

Lighting up biology

Jellyfish have changed science. Mark Zimmer explains in October's Instant insight

Making soft matter

Martien Cohen Stuart on soft matter, music and fruit trees



The point of access to chemical biology news and research from across RSC Publishing

Research highlights

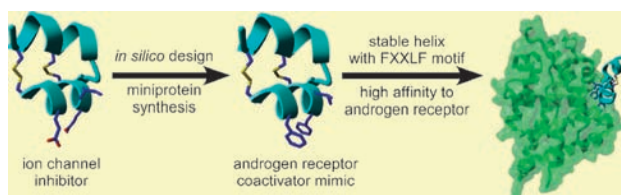
Computer-aided design yields miniproteins that bind prostate cancer linked receptor

Targeting the androgen receptor

European researchers have used computers to find proteins that bind a receptor linked to prostate cancer.

Luc Brunsveld, of the Eindhoven University of Technology, and colleagues from the Netherlands and Germany have used computational methods to probe the protein–protein interactions involved in androgen receptor activation. The receptor controls many of the processes that are associated with male sexual characteristics and is a potential target for prostate cancer treatment.

Whilst the androgen receptor is activated by hormones, its behaviour is modulated by proteins called coactivators. Brunsveld's team has studied how these coactivators bind to the receptor, with the eventual aim of finding new inhibitors. Knowing that a helical peptide sequence with an FXXLF motif (F = phenylalanine, L = leucine, X = unspecified) is key to receptor binding, the team looked at how variations in these peptides' structures affect their binding.



Computer modelling of mutant miniproteins aids inhibitor discovery

The researchers selected miniproteins with helices of differing lengths from the Protein Data Bank repository and modelled them computationally. They then substituted amino acids in each protein to introduce the FXXLF motif and simulated the binding of these mutants to the androgen receptor. In this way the team could identify candidate proteins, which they then synthesised and evaluated in experimental binding studies with the real receptor.

The binding studies identified several miniproteins with micromolar binding affinities, making them comparable with one of the best peptide binders currently

known for the androgen receptor.

Brunsveld says that by performing point mutations on their unoptimised protein sequences he hopes to obtain miniproteins with even stronger binding affinities. He stresses that while the miniproteins are unlikely to be suitable for use as therapeutics, 'what we try to learn with these miniproteins is the minimum motif that we need for binding to these receptors, so we can design small molecules based on these motifs.'

Kip Guy of St Jude Children's Research Hospital, Memphis, US, an expert in the fields of protein interactions and transcriptional activation complexes agrees. 'This work will have important implications for building better assays for detecting small molecule inhibitors,' he says. 'It could shed light on the specific details of the adaptation of [the ligand binding] site on the androgen receptor during binding that would allow much better design of inhibitors.' David Sharpe

Reference

B Vaz et al, *Chem. Commun.*, 2009, 5377 (DOI: 10.1039/b910677d)

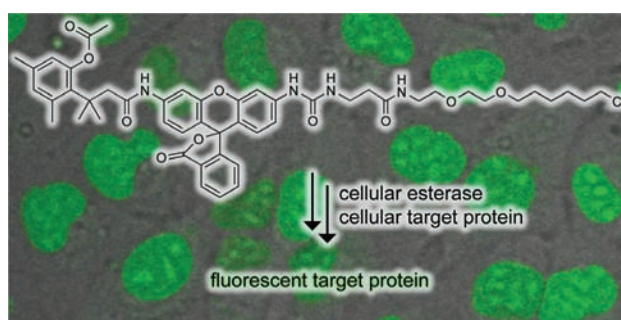
Enzymes activate fluorescent tag for in-cell protein labelling

Harnessing enzymes for protein tagging

Protein-probing molecules that work only inside cells have been developed by US scientists. Ron Raines, from the University of Wisconsin–Madison, and colleagues designed a small molecule containing a fluorophore and used it to label and image a target protein in cells. The team's approach relies on enzymes to activate the fluorophore and fuse it to the protein.

Raines's label doesn't fluoresce until it is activated by an esterase which is found only inside cells. This means the system has minimal background fluorescence even when high concentrations of label are used, removing the need to wash the cells before monitoring their fluorescence. Wash steps used to rinse away excess fluorescent label are 'time consuming and tedious,' comments Raines.

Along with the esterase-cleavable fragment, the new fluorescent label also contains a haloalkane functional group. This allows the



Two enzyme-catalysed steps are needed before the latent fluorophore labels its target protein

researchers to tag the fluorophore to the protein target using a system called HaloTag. This system uses a variant of a haloalkane dehalogenase – an enzyme that usually catalyses haloalkane hydrolysis. But the variant dehalogenase cannot complete the hydrolysis and halts once the fluorophore is covalently attached to the enzyme, therefore labelling the system. The team says that by using recombinant DNA technology to

attach the haloalkane dehalogenase to other cell proteins it will be possible to study a range of proteins inside live cells.

Raines's system has several advantages as the fluorophore activation and covalent labelling steps are both catalysed by enzymes – meaning they are highly selective and efficient. Also, the fluorescent label is based on a modular system which allows you to change the fluorophore. Spencer Williams, an expert in chemical biology at the University of Melbourne, Australia, explains that 'the benefit of chemical dyes over fluorescent proteins is the relative ease with which the colour may be tuned.' By tagging a protein with different coloured fluorophores at different times the researchers suggest they could conduct time-dependent studies, which isn't possible using fluorescent proteins. Russell Johnson

Reference

R W Watkins et al, *Org. Biomol. Chem.*, 2009, DOI: 10.1039/b907664f

Microfluidic device mimics the conditions kidney cells experience in the body

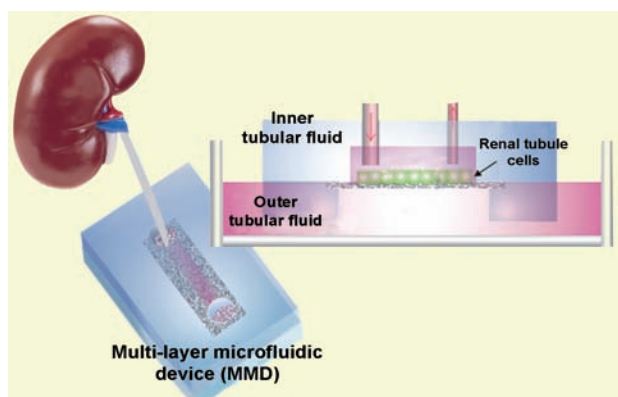
Kidney on a chip

Scientists in Korea are mimicking the conditions kidney cells experience in the body to grow the cells in a microfluidic device.

Cell culture using microfluidics is an expanding research area, as scientists work to create models that are physiologically relevant. Such cell cultures can lead to new insights into cell and organ function and be used for drug screening. Now, Kyung-Jin Jang and Kahp-Yang Suh from Seoul National University have used the method to grow renal tubular cells.

Renal tubules are structures in the kidney that are involved in filtering the blood and producing urine. Renal tubular cells are important to study as many drugs are secreted into the kidneys via these cells. The cells also play pivotal roles in many kidney diseases, which are often due to the tubules being damaged or reacting to various molecules.

However, the flow of blood and



Renal tubular cells grow on a support between fluids resembling blood (outer fluid) and precursor urine (inner)

Reference

K-J Jang and K-Y Suh, *Lab Chip*, 2009, DOI: 10.1039/b907515a

urine means that renal tubular cells are exposed to shear stresses and the effect of this flow on the cells is not yet understood. It also brings challenges to making physiologically relevant models using the cells. To counter this Jang and Suh developed a multilayer microfluidic device and optimised the growth conditions

for the renal tubular cells. The cells are grown on a permeable support that is placed over a well containing fluid playing the role of blood whilst a continuous stream of a precursor urine mimic is passed over the cells. This leads to the cells growing and functioning as they would in the body.

Jang and Suh were able to use their device to show that hormone stimulation causes protein movement within the cells. 'This suggests that our device can be used as a simple drug screening tool,' Suh explains.

Shuichi Takayama of the University of Michigan, Ann Arbor, US, who also uses microfluidics towards understanding cell function, agrees that the device could potentially lead to better tests for drugs. He adds that because this model more accurately mimics how the cells respond in vivo, the approach 'can lead to a more relevant understanding of cellular mechanisms of disease.' *Laura Howes*

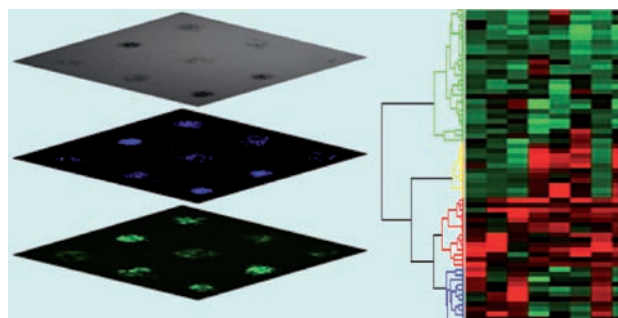
Array system tests hundreds of conditions to find which lead to liver damage

Revealing the factors behind liver disease

More effective treatments for liver disease may be a step closer, thanks to an array to test the conditions that lead to liver damage.

Shu Chien and colleagues at the University of California, San Diego, US, have demonstrated a system that can identify the biological components that lead to or alleviate liver disease. The array works by controlling the range of environments surrounding an array of star-shaped liver cells – hepatic stellate cells or HSCs. HSCs make up five to ten per cent of the liver and are normally in a resting state but when the liver is diseased, they begin to proliferate. This can lead to a build-up of connective tissue, which can impair liver function.

Current approaches to identify the factors affecting HSC biology typically focus on each factor individually, ignoring the complex cross-talk between the many components acting on the cells. 'How these factors interact with



The array system determines which combinations of factors promote cell activation, and which do not

Reference

D A Brafman et al, *Integr. Biol.*, 2009, 1, 513 (DOI: 10.1039/b912926j)

each other to affect HSC activation remains unclear,' Chien explains. 'To overcome the shortcomings of traditional assays, we developed a system for the simultaneous screening of hundreds of physicochemical parameters on HSC behaviour.' By exposing cell arrays to different protein mixtures the system allows the researchers to rapidly identify the conditions that either promote HSC activation or maintain the resting state. 'We could systematically assess the complex

relationships between the cells and their microenvironment,' says Chien.

The US team found that certain proteins are critical in regulating HSC activation and that the proteins influence one another's action on the cells. 'In the future, such approaches will yield insight into the role of microenvironment components in vivo,' says Chien, 'and will lay the foundation for identifying more efficient antifibrotic therapies.'

Bill Murphy, of the University of Wisconsin–Madison, US, studies how environment affects stem cell behaviour. He says that Chien's work is 'an elegant example of the potential of array-based strategies in biology and medicine. Emerging approaches like this may ultimately lead to a more advanced understanding of natural microenvironments,' adds Murphy, 'as well as identification of new microenvironments that elicit specific cell behaviors, such as tissue regeneration.'

Michael Spencelayh

Immunological detector finds toxins in food in contamination scenario

Anti-terror antibodies

European scientists have developed a method to detect potential biological warfare agents in food.

A possible scenario for a bioterrorism attack could involve food contamination with protein toxins, such as ricin and botulinum neurotoxins, says Brigitte Dorner, researcher into microbial toxins, of the Robert Koch Institute in Berlin. However, until now detecting toxins in such complex samples has been difficult. Dorner and colleagues in Germany and Switzerland have devised a highly sensitive system that can detect trace amounts of the toxins in foods such as milk, baby food and yoghurt.

Protein toxins are detected most effectively using immunological techniques, since antibodies bind to their targets with very high affinity. However, current methods for raising antibodies against toxins without causing animal poisoning are time consuming and labour intensive. Dorner and coworkers have used an alternative technique, immobilising the toxins on microbeads to reduce their toxicity, allowing the team to generate antibodies quickly *in vivo*.

The researchers then modified a commercially available system to analyse complex food samples using



Castor bean protein ricin inhibits protein synthesis in the body

the antibodies. In Luminex xMAP technology, antibodies are covalently coupled to beads embedded with dyes that generate signals in response to different targets – in this case the toxins. Dorner explains: ‘We further developed the Luminex xMAP technology to incorporate magnetic beads to allow us to analyse complex matrices.’ The magnetic property means that the beads can be easily removed from food samples and can undergo automated washings. This makes toxin detection in foods possible where many other technologies have failed due to interference of sample components with binding agents or technical

equipment.

Using the bead array, the researchers simultaneously detected trace amounts of five toxins, including ricin and botulinum neurotoxins, in food at lower concentrations than commercially available systems. Dorner says the technique has very good sensitivity. ‘We are able to detect toxins down to a level of picograms per millilitre which, as far as I know, is superior to any limit published for other multiplex detection systems,’ she says.

Phillipe Thullier from the Research Centre for Armed Forces’ Health in La Tronche, France, is an expert in the field of immunological techniques for toxin detection and neutralisation. He comments: ‘The sensitivities are quite unique and to a large extent are made possible by the beads. In the future,’ he adds, ‘we could see more of these nano objects in biology, used for several purposes.’

Dorner anticipates a possible commercial application for the technique. ‘A further step would be introduction of a mobile device using the bead array,’ she says, ‘and a very nice use of the technique would be large scale screening of the food supply chain.’ *Victoria Steven*

Reference

D Pauly *et al*, *Analyst*, 2009, DOI: 10.1039/b911525k

In the current issue of Research Articles...



Gastrins, iron and colorectal cancer

Graham S Baldwin, *Metalomics*, 2009, **1**, 370 (DOI: 10.1039/b909112m)

Proteome research in food science

Monika Pischetsrieder and Rainer Baeuerlein, *Chem. Soc. Rev.*, 2009, **38**, 2600 (DOI: 10.1039/b817898b)

A novel strategy for surface modification of superparamagnetic iron oxide nanoparticles for lung cancer imaging

Gang Huang *et al*, *J. Mater. Chem.*, 2009, **19**, 6367 (DOI: 10.1039/b902538e)

Site specific protein labeling by enzymatic posttranslational modification

Murat Sunbul and Jun Yin, *Org. Biomol. Chem.*, 2009, **7**, 3361 (DOI: 10.1039/b908687k)

Single-cell transcript analysis of human embryonic stem cells

Jason D Gibson *et al*, *Integr. Biol.*, 2009, **1**, 540 (DOI: 10.1039/b908276j)

Assessment of helical interfaces in protein–protein interactions

Andrea L Jochim and Paramjit S Arora, *Mol. BioSyst.*, 2009, **5**, 924 (DOI: 10.1039/b903202a)

Diamond standard in diagnostics: nanodiamond biolabels make their mark

Amanda S Barnard, *Analyst*, 2009, **134**, 1751 (DOI: 10.1039/b908532g)

Immunotherapy for cancer: synthetic carbohydrate-based vaccines

Therese Buskas *et al*, *Chem. Commun.*, 2009, 5335 (DOI: 10.1039/b908664c)

Elasticity mapping of apical cell membranes

Tamir Fine *et al*, *Soft Matter*, 2009, **5**, 3262 (DOI: 10.1039/b901714c)

Electrophoretic separation of DNA in gels and nanostructures

G B Salieb-Beugelaar *et al*, *Lab Chip*, 2009, **9**, 2508 (DOI: 10.1039/b905448k)

Read more at www.rsc.org/highlightschembiol

Interview

Making soft matter

Martien Cohen Stuart talks to Alexandra Haywood about soft matter, music and fruit trees



Martien Cohen Stuart

Martien Cohen Stuart is professor and chair of physical chemistry and colloid science at Wageningen University in the Netherlands and is the new chair of the *Soft Matter* editorial board. He has received numerous awards, including the Akzo Nobel Science Award in 2008. Martien has a broad range of research interests in the field of soft condensed matter, including surfactants, emulsions, self-assembly, interfaces, wetting and the physics of macromolecules in living cells.

Who or what inspired you to become a scientist?

I think it happened relatively late in my life. I was a curious person with an interest in biology as a school kid but there was not a clear sign I would become a scientist. Then I studied chemistry as a student. When I graduated the economic situation was rather bad and it was not easy to get a normal job so I decided then to go for a PhD. I joined the university, where I am now, to do a PhD just to see what it was like. It happened to be a very good place which was really inspiring – I had very interesting and very clever fellow PhD students who I learnt a lot from. The staff in the lab were excellent and so I got a taste for it and that's where it really started.

How would you define soft matter and what motivated you to work in this field?

What I see as soft matter is the collective behaviour of molecules and particles. So not just one single particle but the way that they interact together, the structures they form and the way they organise. The role of the forces and energies controlling such systems that bring out the structure and the function is also part of this field. It is also very important to understand why these structures form. So those two aspects I think are key to soft matter, not just to know how, but to know why. That's where the science is.

What projects are you working on at the moment?

I've got a big group with a broad spectrum of activities but the important theme is self assembly driven by electrostatic attraction - how charge particles come together to form objects. Another theme is self assembling gels, some of them based on synthetic polymers but also some of them based on biosynthetic polymers. For example, proteins that are not natural but are designed, coded in DNA and then produced by cells. I think that's a very fascinating area.

What's going to be next big thing in your field?

That's hard to say. I think from the view point of the needs for society, soft matter has got a lot to offer in the area of energy harvesting,

photovoltaics and perhaps in understanding the mechanisms of photosynthesis in plants and biomimetic approaches to the same things. So I think and hope that soft matter is going to be important in the future.

Collaborations form a large part of modern scientific research. Which scientist, past or present, would you really like to work with?

Well the one person that I very much admire and I would like to work with is the late Pierre Gilles de Gennes, a physicist from France. I happened to spend a year in his lab as a postdoc and that was an absolutely fascinating time. Of course I can't work any more with him, nobody can, but I think that his legacy is carried forth by a couple of people.

Other people that I would like to work with for a while are Mike Cates and Wilson Poon in Edinburgh. It's a very interesting place where I could learn a lot and join in with their modelling and experimental work.

Welcome to the *Soft Matter* editorial board. What excites you most about your new role?

Two things, one is that I get a look behind the scenes at what's going on in publishing and what's going on in soft matter which I find interesting. The other thing is that I get to meet many people in the area that play a role in this field of science.

What do you enjoy doing when you're not working?

I have a great hobby which is music. I play the bassoon myself and with a small ensemble and if I have time that's what I like to do. I also like outdoor life and hobby farming. I have a place in Normandy, France where I go to grow my fruit trees.

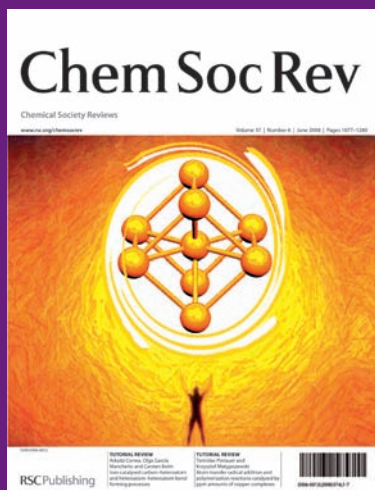
And finally, if you weren't a scientist, what would you do?

I think I could have been a professional musician. There was a deciding moment in my life when I had taken the entrance exam to a music conservatoire and had been offered a place to do a PhD. In the end I decided I'd prefer to be a happy amateur rather than a frustrated professional in music and I went for science.

First in its class

"I attribute this success to the quality of the authors that the editor and editorial board have been able to recruit..."

Professor Jonathan Sessler,
The University of Texas, USA



Chemical Society Reviews (Chem Soc Rev) publishes the largest number of chemical review articles, making it **first in its class for chemical scientists***. With an impact factor of 17.419 and the highest immediacy index for a chemical reviews journal at 3.668**, this impressive result underlines the continuing success of the journal.

Chem Soc Rev supplies high quality and highly cited articles, covering topical areas of interest across the chemical sciences. Published monthly, it includes themed issues reviewing new research areas, and edited by a specialist guest editor.

* 2008 ISI Web of Knowledge report

** 2008 Thomson Scientific (ISI) Journal Citations Reports

Find out more...

RSC Publishing

www.rsc.org/chemsocrev/firstclass

Registered Charity Number 207890

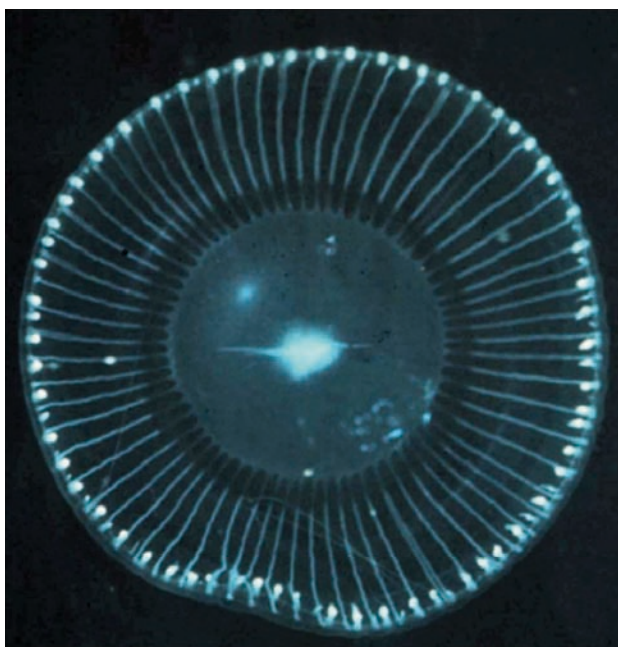
Lighting up biology

Jellyfish have changed science. Marc Zimmer of Connecticut College, New London, US, explains

Over a period of thirty years Osamu Shimomura caught at least 800 000 jellyfish. Although this feat did not get him into the *Guinness World Records*, his jellyfish research did earn him a third of 2008's Nobel Prize in Chemistry. The prize was well deserved, for the product of the research has been cited in more than 20 000 publications. Shimomura found that in the jellyfish, *Aequorea victoria*, a protein called aequorin produces blue light. However, instead of emitting blue light the light is absorbed by green fluorescent protein (GFP) and emitted as green light.

GFP belongs to a unique class of proteins. Once expressed it folds into a soda-can shape and attacks itself to form the chromophore that is responsible for its green fluorescence. It is this self-propagating characteristic that makes GFP and GFP-like proteins so very useful. No matter which organism or cell type it is expressed in, GFP can form its fluorescent chromophore.

Applying Shimomura's findings, Martin Chalfie was the first to make use of known promoters – DNA regions that assist gene expression – to express GFP in *Escherichia coli* and in neurons of *Caenorhabditis elegans*. That work led to Chalfie being awarded his share of the Nobel Prize. Soon after it was shown that fusion proteins could be created between GFP and proteins whose genes were known, thereby allowing researchers to monitor a fusion protein's production and movement in a living cell. Surprisingly, the proteins still function despite being attached to the 238 amino acid long GFP.



Fluorescent protein aequorin produces blue light in jellyfish *Aequorea victoria*

The Nobel triumvirate was completed by Roger Tsien. He was the first to create a wavelength mutant of GFP (a blue fluorescent protein); the first to use fluorescence energy transfer (FRET) measurements between fluorescent proteins; and the first to find an enhanced mutant of GFP (EGFP) and to crystallise it. In 2004 Tsien also produced the mFruits, a palette of new fluorescent proteins, and created a series of genetically encoded FRET sensors to detect calcium, protease, phosphorylation and cAMP (cyclic adenosine monophosphate – a signalling molecule used in many biological processes).

GFP has developed into a tremendously useful molecule

with applications in many areas of science and medicine. It is a molecular microscope that allows scientists to follow in vivo processes that were hidden before the advent of GFP-based techniques. These methods include the cell cycle indicator FUCCI (fluorescent, ubiquitination-based cell cycle indicator); Brainbow, which allows researchers to follow individual neurons in the neuronal spaghetti that is the brain; and the optical highlighters that have resulted in super resolution microscopy techniques. Fluorescent proteins have become routine in many laboratories, and like optical microscopes and spectroscopic methods, descriptions of their use are now relegated to the experimental section of publications.

Yet in some cases fluorescent proteins can propel scientific publications into the public arena. It is not surprising that news of Ruppy, the ruby fluorescent cloned beagles, circulated the globe earlier this year. So too did reports of the marmoset monkeys that pass GFP expressing ability onto their offspring. These futurist applications and the beautiful images that fluorescent proteins can trigger create an excellent opportunity for scientists to inform the public about new advances in cloning, stem cell technology and creating genetically modified organisms, and to initiate a debate about the responsible use of these techniques.

Read more in a themed issue on the topic of green fluorescent protein (GFP) in issue 10, 2009 of Chemical Society Reviews.

References

- 1 M Zimmer, *Chem. Soc. Rev.*, 2009, DOI: 10.1039/b904023d
- 2 <http://gfp.conncoll.edu>

Essential elements

New journal *Chemical Science*

The recent ACS Fall 2009 National Meeting in Washington was the occasion for the release of some exciting news for researchers from across the chemical sciences: invitations were distributed, an audience gathered, a few words were spoken and then the ribbon was cut, revealing the news that in 2010 a new journal – *Chemical Science* – would join the RSC portfolio.

Editorial director, James Milne, describes this new venture as a milestone in the development of the RSC publishing portfolio. 'During recent years, RSC journals have attracted significant growth in submissions, while impact factors have increased to lead the field. The launch of *Chemical Science* will truly complement RSC Publishing's world renowned communications and



David MacMillan cuts the ribbon to reveal RSC's new journal, *Chemical Science*

review flagship titles.'

At the forefront of the most exciting developments, and helping to define the important areas by publishing the most significant cutting-edge research,

Chemical Science will be a dedicated home for findings of exceptional significance from across ALL the chemical sciences.

Editor-in-chief David MacMillan of Princeton, US, will lead a dynamic international team of associate editors who will drive the scientific development and make decisions on the content. 'I am extremely honoured and excited to be working with the RSC on the launch and development of *Chemical Science*,' he says. 'This is an opportunity to bring forward a very new type of journal and a new way of disseminating edge publications from the world of chemistry. I look forward to being part of this new approach to publishing the world's most pioneering studies in the chemical sciences.'

Free access to Chemical Science will be available – find out more at www.rsc.org/chemicalscience

Further news...

October sees the publication of the 100th issue of the *Journal of Environmental Monitoring (JEM)*. Editor Harp Minhas, announced it a milestone event, as the journal undergoes a significant change in its subject approach. Minhas explains: 'The impact of environmental research is of special concern to our readers. From now on all submitted articles will provide a statement explaining how the research impacts the environment directly and how the work provides insight into environmental processes.'

www.rsc.org/jem

In a separate journal development, new titles *Nanoscale* and *Analytical Methods* have published their first articles online, just months after the initial launch announcement in March.

Nanoscale, a collaborative venture with the National Center for Nanoscience and Technology, Beijing, China, publishes experimental and theoretical work across the breadth of nanoscience and nanotechnology, while *Analytical Methods* will appeal to scientists with an interest in the latest research methods demonstrating the link between fundamental and applied analytical science.

*Read the articles for free at www.rsc.org/methods and www.rsc.org/nanoscale. Register for free online access to all *Nanoscale* and *Analytical Methods* content throughout 2009 and 2010 at www.rsc.org/free_access_registration*

MedChemComm coming soon

MedChemComm, a new, peer-reviewed journal from RSC Publishing was announced recently at the 3rd International Symposium on Advances in Synthetic and Medicinal Chemistry in Kiev, Ukraine, and the ACS Fall 2009 National Meeting and Exposition in Washington DC, US. Launching in mid 2010, the journal will focus on medicinal chemistry research, including new studies related to biologically-active chemical or biochemical entities that can act as pharmacological agents with therapeutic potential or

relevance.

The new journal will be owned by RSC Publishing and will be the official journal of the European Federation for Medicinal Chemistry (EFMC). It will complement the existing RSC Publishing portfolio of bioscience journals, providing authors in the field with a dedicated subject-specific publication. Monthly issues will contain a mix of vibrant and concise research and review articles.

The co-editors-in-chief will be Gregory Verdine, Harvard University, US, and Anthony

Wood, Pfizer, UK. Wood comments: '*MedChemComm* is very important, especially when one considers the mission of the journal is to emphasise the role of chemistry as a powerful vehicle to conceptualise new understanding of biological systems and processes. It is a means to design new tools to modulate these selectively by exploring multiple modalities of intervention.'

Free access to MedChemComm will be available for 2010 and 2011. Find out more at www.rsc.org/medchemcomm

Highlights in Chemical Biology (ISSN: 2041-5842) is published monthly by the Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge UK CB4 0WF. It is distributed free with *Chemical Communications*, *Organic & Biomolecular Chemistry*, *Lab on a Chip*, *Integrative Biology*, *Metallomics*, *Molecular BioSystems*, *Natural Product Reports*, *Dalton Transactions* and *Photochemical & Photobiological Sciences*. *Highlights in Chemical Biology* can also be purchased separately. 2009 annual subscription rate: £199; US \$396. All orders accompanied by payment should be sent to Sales and Customer Services, RSC (address above). Tel +44 (0) 1223 432360, Fax +44 (0) 1223 426017. Email: sales@rsc.org

Editor: Celia Gitterman
Deputy editor: Sarah Dixon
Associate editors: Elinor Richards, Joanne Thomson
Interviews editor: Ruth Doherty
Web editors: Rebecca Brodie, Michael Brown, Tanya Smekal, Linda Warncke
Essential elements: Valerie Simpson, Daniel Bradnam, Kathryn Lees, Kathrin Hilpert
Publishing assistant: Christina Ableman
Publisher: Emma Wilson

Apart from fair dealing for the purposes of research or private study for non-commercial purposes, or criticism or review, as permitted under the Copyright, Designs and Patents Act 1988 and the copyright and Related Rights Regulations 2003, this publication may only be reproduced, stored or transmitted, in any form or by any means, with the prior permission of the Publisher or in the case of reprographic reproduction in accordance with the terms of licences issued by the Copyright Licensing Agency in the UK.

US copyright law is applicable to users in the USA.

The Royal Society of Chemistry takes reasonable care in the preparation of this publication but does not accept liability for the consequences of any errors or omissions.

The RSC is not responsible for individual opinions expressed in *Highlights in Chemical Biology*. Content does not necessarily express the views or recommendations of the RSC.

Royal Society of Chemistry: Registered Charity No. 207890.

RSC Publishing