ISSN 1477-0520 CODEN OBCRAK 3(20) 3597-3832 (2005)

In this issue...

Palladium catalysed aryl amination reactions The catalytic amination of aryl bromides and chlorides with *N*-silylanilines is carried out in supercritical carbon dioxide to give excellent yield. See Holmes *et al.* pp. 3767-3781.



Chemical biology articles published in this journal also appear in the *Chemical Biology Virtual Journal:* www.rsc.org/chembiol



Cover

See Mattijs G. J. ten Cate, Merdan Omerović, Gennady V. Oshovsky, Mercedes Crego-Calama and David N. Reinhoudt, pp. 3727–3733. Hydrogen-bonded double rosette nanoparticles "swimming" in water, reflecting their high stability in polar solvents.

Image reproduced by permission of Mercedes Crego-Calama.

EMERGING AREA

3607

Synthetic mimics of mammalian cell surface receptors: prosthetic molecules that augment living cells

Blake R. Peterson*

A new approach to the synthesis of small molecules that control and probe cellular biology.



COMMUNICATIONS

3613

A facile domino metathetic route to a thapsigargin skeleton

Krishna P. Kaliappan* and Rahul S. Nandurdikar

A facile synthesis of a 5,7,5-fused ring system that is present in thapsigargins belonging to a novel family of sesquiterpene lactones, guainanolides, using domino enyne–RCM is reported here.



EDITORIAL STAFF

Editor Vikki Allen

Deputy editor Richard Kelly

Assistant editor

Crystallographic data editor Kirsty Anderson

Publishing assistant Emma Crisp

Team leader, serials production Kathryn Lees

Technical editors

Susan Askey, David Barden, Nicola Burton, Jane Crawshaw, Elinor Richards, Michael Spencelayh, Joanna Stevens

Administration Coordinator Sonya Spring

Editorial secretaries

Lynne Braybrook, Rebecca Gotobed, Julie Thompson

Publisher

Adrian Kybett

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

2005 Annual (print + electronic) subscription price: £2400; US\$3960. 2005 Annual (electronic) subscription price: £2160; US\$3656. 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 432243; Fax +44 (0) 1223 426017; E-mail advertising@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 Ben Feringa, Groningen

Professor Chris Abell, Cambridge Professor Varinder Aggarwal, Bristol Professor Donna Blackmond, London Professor Thomas Carell, Munich Professor Andrew Hamilton, Yale Professor Karl Jørgensen, Aarhus Professor Karl Jørgensen, Aarhus Professor Shu Kobayashi, Tokyo Professor Shu Kobayashi, Tokyo Professor Jag Siegel, Zürich Professor Itamar Willner, Jerusalem

Professor Peter Wipf, Pittsburgh

Associate editor for North America

Professor Peter Wipf Department of Chemistry, University of Pittsburgh Pittsburgh, PA 15260, USA

Tel +1 412 624 8606

E-mail pwipf@pitt.edu

INTERNATIONAL ADVISORY EDITORIAL BOARD

Roger Alder, Bristol, UK Vincenzo Balzani, Bologna, Italy Barry Carpenter, Cornell, USA Andre Charette, Montreal, Canada Peter Chen, ETH, Switzerland Jonathan Ellman, Berkeley, USA Kurt Faber, Graz, Austria Malcolm Forbes, North Carolina, USA

Sam Gellman, Wisconsin, USA Jan Kihlberg, Umea, Sweden Philip Kocienski, Leeds, UK Steven V Ley, Cambridge, UK Manuel Martín Lomas, Seville, Spain

Zhang Li-He, Beijing, China Michael Martinelli, Amgen, USA Keiji Maruoka, Kyoto, Japan

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, 2005. 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

EW'Bert'Meijer, Eindhoven, The Netherlands Eiichi Nakamura, Tokyo, Japan Rvoji Novori, Nagova, Japan Mark Rizzacasa, Melbourne, Australia Alanna Schepartz, Yale, USA Oliver Seitz, Berlin, Germany Kevan Shokat, UC San Francisco; UC Berkeley, USA Steve Street, Pfizer, UK Suzanne Walker, Harvard, USA Jon Waltho, Sheffield, UK James D White Oregon USA Henry N. C. Wong, Hong Kong, China Sam Zard, Ecole Polytechnique, France

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.

Generation State (a) → Constraints (a) → Constraints (b) → Constraints (b) → Constraints (c) → Con

Royal Society of Chemistry: Registered Charity No. 207890



Membrane composition determines the fate of aggregated vesicles

Simon J. Webb,* Laurent Trembleau, Robert J. Mart and Xi Wang

Vesicles incorporating a fluorescent metal-chelating lipid have been linked together by addition of copper(II) and poly-L-histidine, but the stability of adhering vesicles towards fusion depends upon membrane composition.



Poly-L-Histidine



ARTICLES

3618

Neighbouring group processes in the deamination of protonated phenylalanine derivatives

Hadi Lioe and Richard A. J. O'Hair*

Low energy collision-induced dissociation of protonated phenylalanine derivatives is influenced by the nature of a ring substituent. Electron-withdrawing groups favour loss of $H_2O + CO$, while electron-donating groups favour loss of NH_3 .



3629

Design and synthesis of aromatic inhibitors of anthranilate synthase

Richard J. Payne, Esther M. M. Bulloch, Andrew D. Abell and Chris Abell*

Docking of aromatic chorismate analogue containing a C-4 hydroxymethyl substituent into the active site of *Serratia marcescens* anthranilate synthase.

3636

Total synthesis of milbemycins: a synthesis of (6*R*)-6-hydroxy-3,4-dihydromilbemycin E

Madeleine Helliwell, Sufia Karim, Emma R. Parmee and Eric J. Thomas*

A synthesis of the racemic hydroxy butenolide **37** and its conversion into (6R)-6-hydroxy-3,4-dihydromil bemycin E **77** is described.

3654

A total synthesis of milbertycin G: approaches to the C(1)-C(10)-fragment and completion of the synthesis

Simon Bailey, Madeleine Helliwell, Aphiwat Teerawutgulrag and Eric J. Thomas*

The hydroxybutenolide (-)-**6** was synthesized and used to complete a total synthesis of milbertycin G.









3686



3695

Q



3701



3707



GT11 Dihydroceramide desaturase inhibitor Analogs of GT11 Dihydroceramide desaturase and acid ceramidase inhibitors

Parallel synthesis and *in vitro* activity of novel anthranilic hydroxamate-based inhibitors of the prostaglandin H₂ synthase peroxidase activity

Jean Lee, Anthony J. Chubb, Edelmiro Moman, Brian M. McLoughlin, Caroline T. Sharkey, John G. Kelly, Kevin B. Nolan, Marc Devocelle* and Desmond J. Fitzgerald*

29 Anthranilic hydroxamic acid derivatives were prepared and tested for inhibition of the peroxidase activity of prostaglandin H2 synthase.

Baylis–Hillman reactions of *N*-tosyl aldimines and aryl aldehydes with 3-methylpenta-3,4-dien-2-one

Gui-Ling Zhao and Min Shi*

The attempted Baylis–Hillman reactions of *N*-tosyl aldimines and aryl aldehydes with 3-methylpenta-3,4-dien-2-one gave the Baylis–Hillman adducts in moderate to good yields in the presence of DMAP in DMSO.

Micellar aggregates and hydrogels from phosphonobile salts

Ponnusamy Babu, D. Chopra, T. N. Guru Row and Uday Maitra*

Micellar aggregates formed by novel phosphonobile salts were studied by fluorescence and ³¹P NMR. An unprecedented, pH sensitive hydrogel formation by phosphonocholates, and the development of a reversible thermochromic gel are reported.

Excited state tautomerization of azaindole

Michael T. Cash, Peter R. Schreiner and Robert S. Phillips

Azaindoles, the chromophoric moieties of fluorescent tryptophan analogs, are investigated for their potential as fluorescent probes through computational and experimental methods.

Analogs of the dihydroceramide desaturase inhibitor GT11 modified at the amide function: synthesis and biological activities

Carmen Bedia, Gemma Triola, Josefina Casas, Amadeu Llebaria and Gemma Fabriàs*

Biological effects of chemical modification of the GT11 amide linkage are reported: urea and thiourea analogs of GT11, as well as three α -ketoamides, inhibited the desaturation of *N*-octanoylsphinganine to *N*-octanoylsphingosine.

Structure-activity relationships in 3-isothiazolones

John O. Morley,* A. Jayne Oliver Kapur and Michael H. Charlton

The biological activity of 3-isothiazolones shows a reasonable correlation with their structural features and calculated solvation energies.



3720

Aziridine carboxylate from D-glucose: synthesis of polyhydroxylated piperidine, pyrrolidine alkaloids and study of their glycosidase inhibition

Dilip D. Dhavale,* K. S. Ajish Kumar, Vinod D. Chaudhari, Tarun Sharma, Sushma G. Sabharwal and J. PrakashaReddy

An efficient synthesis of piperidine and pyrrolidine alkaloids using aziridine carboxylate derived from D-glucose and their glycosidase inhibitory activity is presented.

3727

Self-assembly and stability of double rosette nanostructures with biological functionalities

Mattijs G. J. ten Cate, Merdan Omerović, Gennady V. Oshovsky, Mercedes Crego-Calama* and David N. Reinhoudt*

The synthesis of synthetic hydrogen-bonded receptors bearing sugars, amino acids, and small peptides and their stability in polar solvents is presented.

3734

Chirality transfer in the aza-[2,3]-Wittig sigmatropic rearrangement

James C. Anderson,* J. Gair Ford and Matthew Whiting

Chiral rearrangement precursors show that the stereoselectivity of the aza-[2,3]-Wittig rearrangement can be controlled if the stereogenic centre is greater in steric bulk than a methyl substituent.







R=*i*-Pr, 66%, 91% *E*, 85% chirality transfer R=CH₂OMOM, 65%, 91% *E*, 88% chirality transfer



Stereoselective β-hydroxy-α-amino acid synthesis *via* an ether-directed, palladium-catalysed aza-Claisen rearrangement

Kate N. Fanning, Andrew G. Jamieson and Andrew Sutherland*

We describe a new approach for the highly stereoselective synthesis of β -hydroxy- α -amino acids using an ether-directed, Pd(II)-catalysed aza-Claisen rearrangement.



This journal is © The Royal Society of Chemistry 2005

G



3767



Oligofunctional amphiphiles featuring geometric core group preorganization: synthesis and study of Langmuir and Langmuir–Blodgett films

Petra U. Müller, Edwin Weber,* Gerd Rheinwald and Wilhelm Seichter

A new type of preorganized oligofunctional amphiphile featuring a well-defined central unit with different numbers of attached amphiphilic segment groups proved useful in the formation of Langmuir and Langmuir–Blodgett films.

Palladium catalysed aryl amination reactions in supercritical carbon dioxide

Catherine J. Smith,* Melanie W. S. Tsang, Andrew B. Holmes,* Rick L. Danheiser and Jefferson W. Tester

Palladium catalysed *N*-arylation of *N*-silylanilines, *N*-silyldiarylamines, *N*-silylazoles and *N*-silylsulfonamides with aryl bromides and chlorides in supercritical carbon dioxide is described.

3782



3788



3794



Z² = 2', 3' or 4'-F, 4'-Br, 3',4'-OMe, 4⁻-CN X = OMe; Y = OEt, OMe, NHiPr, NH-CH(Ph)Et

Synthesis of structures corresponding to the capsular polysaccharide of *Neisseria meningitidis* group A

Rikard Slättegård, Peter Teodorovic, Henok Hadgu Kinfe, Neil Ravenscroft, David W. Gammon and Stefan Oscarson*

Four differently substituted trimers of the CPS repeating unit have been synthesised to investigate the dependence on oligosaccharide size, and acetylation and phosphorylation mode of conjugate vaccines against *N. meningitidis* group A.

From uncharged to decacationic molecules: syntheses and spectroscopic properties of heteroarenium-substituted pyridines

Andreas Schmidt,* Thorsten Mordhorst and Martin Nieger

Reactions of pentachloropyridine are presented which afford oligocationic pyridines bearing up to ten positive charges within a common π -electron system.

Rapid synthesis of quinoline-4-carboxylic acid derivatives from arylimines and 2-substituted acrylates or acrylamides under indium(III) chloride and microwave activations. Scope and limitations of the reaction

Dorothée Duvelleroy, Cécile Perrio,* Olivier Parisel and Marie-Claire Lasne*

Reaction of 2-methoxyacrylic acid derivatives with *N*-arylbenzaldimines in acetonitrile under InCl₃ catalysis and microwave irradiation afforded substituted quinoline-4-carboxylic acids in isolated yields up to 57% within 3 min. The role of Lewis acid was specified using ¹³C NMR data and model theoretical studies.

ARTICLES

3805

The diazo route to diazonamide A: studies on the tyrosine-derived fragment

Francine N. Palmer, Franck Lach, Cyril Poriel, Adrian G. Pepper, Mark C. Bagley, Alexandra M. Z. Slawin and Christopher J. Moody*

A number of routes to potentially useful intermediates for the synthesis of the tyrosine-derived fragment of the marine natural product diazonamide A are described.

3812

Studies towards the synthesis of epothilone A via organoboranes

P. Veeraraghavan Ramachandran,* J. Subash Chandra, Bodhuri Prabhudas, Debarshi Pratihar and M.Venkat Ram Reddy

Synthesis of all of the subunits of epothilone A has been achieved *via* dimethylallyl-, alkoxyallyl- and crotylboranes derived from α -pinene.

ADDITIONS AND CORRECTIONS

3825

Synthesis of (6*R*)- and (6*S*)-5,10-dideazatetrahydrofolate oligo- γ -glutamates: Kinetics of multiple glutamate ligations catalyzed by folylpoly- γ -glutamate synthetase

John W. Tomsho, John J. McGuire and James K. Coward

3826

New pyrazolo[3,4-*b*]pyridones as selective A₁ adenosine receptor antagonists: synthesis, biological evaluation and molecular modelling studies

Paola Fossa, Marco Pestarino, Giulia Menozzi, Luisa Mosti, Silvia Schenone, Angelo Ranise, Francesco Bondavalli, M. Letizia Trincavelli, Antonio Lucacchini and Claudia Martini

SOFT MATTER & MOLECULAR BIOSYSTEMS - EXPLORING NEW HORIZONS

As a subscriber to Organic & Biomolecular Chemistry, you have free online access to the two new interdisciplinary journals from the RSC:

Soft Matter – looking at interfaces with physics, biology and materials science

Molecular BioSystems – focussing on the interfaces between chemistry and the -omic sciences and systems biology

Go online to read the latest issues today!



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.

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



www.molecularbiosystems.org

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.



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



AUTHOR INDEX

Abell, Andrew D., 3629 Abell, Chris, 3629 Anderson, James C., 3734 Babu, Ponnusamy, 3695 Bagley, Mark C., 3805 Bailey, Simon, 3654 Bedia, Carmen, 3707 Bondavalli, Francesco, 3826 Bulloch, Esther M. M., 3629 Casas, Josefina, 3707 Cash, Michael T., 3701 Chandra, J. Subash, 3812 Charlton, Michael H., 3713 Chaudhari, Vinod D., 3720 Chopra, D., 3695 Chubb, Anthony J., 3678 Coward, James K., 3825 Crego-Calama, Mercedes, 3727 Danheiser, Rick L., 3767 Devocelle, Marc, 3678 Dhavale, Dilip D., 3720 Duvelleroy, Dorothée, 3794 Fabriàs, Gemma, 3707 Fanning, Kate N., 3749 Fitzgerald, Desmond J., 3678 Ford, J. Gair, 3734 Fossa, Paola, 3826 Gammon, David W., 3782

Hadgu Kinfe, Henok, 3782 Helliwell, Madeleine, 3636, 3654 Holmes, Andrew B., 3767 Jamieson, Andrew G., 3749 Kaliappan, Krishna P., 3613 Karim, Sufia, 3636 Kelly, John G., 3678 Kumar, K. S. Ajish, 3720 Lach, Franck, 3805 Lasne, Marie-Claire, 3794 Lee, Jean, 3678 Lioe, Hadi, 3618 Llebaria, Amadeu, 3707 Lucacchini, Antonio, 3826 Maitra, Uday, 3695 Mart, Robert J., 3615 Martini, Claudia, 3826 McGuire, John J., 3825 McLoughlin, Brian M., 3678 Menozzi, Giulia, 3826 Moman, Edelmiro, 3678 Moody, Christopher J., 3805 Mordhorst, Thorsten, 3788 Morley, John O., 3713 Mosti, Luisa, 3826 Müller, Petra U., 3757 Nandurdikar, Rahul S., 3613 Nieger, Martin, 3788

Nolan, Kevin B., 3678 O'Hair, Richard A. J., 3618 Oliver Kapur, A. Jayne, 3713 Omerović, Merdan, 3727 Oscarson, Stefan, 3782 Oshovsky, Gennady V., 3727 Palmer, Francine N., 3805 Parisel, Olivier, 3794 Parmee, Emma R., 3636 Payne, Richard J., 3629 Pepper, Adrian G., 3805 Perrio, Cécile, 3794 Pestarino, Marco, 3826 Peterson, Blake R., 3607 Phillips, Robert S., 3701 Poriel, Cyril, 3805 Prabhudas, Bodhuri, 3812 PrakashaReddy, J., 3720 Pratihar Debarshi 3812 Ramachandran, P. Veeraraghavan, 3812 Ranise, Angelo, 3826 Ravenscroft, Neil, 3782 Reddy, M.Venkat Ram, 3812 Reinhoudt, David N., 3727 Rheinwald, Gerd, 3757 Row, T. N. Guru, 3695 Sabharwal, Sushma G., 3720

Schenone, Silvia, 3826 Schmidt, Andreas, 3788 Schreiner, Peter R., 3701 Seichter, Wilhelm, 3757 Sharkey, Caroline T., 3678 Sharma, Tarun, 3720 Shi, Min, 3686 Slättegård, Rikard, 3782 Slawin, Alexandra M. Z., 3805 Smith, Catherine J., 3767 Sutherland, Andrew, 3749 Teerawutgulrag, Aphiwat, 3654 ten Cate, Mattiis G. J., 3727 Teodorovic, Peter, 3782 Tester, Jefferson W., 3767 Thomas, Eric J., 3636, 3654 Tomsho, John W., 3825 Trembleau, Laurent, 3615 Trincavelli M Letizia 3826 Triola, Gemma, 3707 Tsang, Melanie W. S., 3767 Wang, Xi, 3615 Webb, Simon J., 3615 Weber, Edwin, 3757 Whiting, Matthew, 3734 Zhao, Gui-Ling, 3686

FORTHCOMING ARTICLES

Perspective: Oligo- and poly-nucleotides: 50 years of chemical synthesis

Colin B. Reese (DOI: 10.1039/b510458k)

Communication: Positive ion pair cooperativity exhibited for the binding of phosphate under physiological conditions Patrick Gunning (**DOI**: 10.1039/b510262f)

Communication: Recognition of septanose carbohydrates by concanavalin A

Steve Castro, Michael Duff, Nicole L. Snyder, Martha Morton, C. V. Kumar and Mark W. Peczuh (**DOI**: 10.1039/b509243d)

C-terminal properties are important for ring-fused 2-pyridones that interfere with chaperone function in uropathogenic *E. coli*

Veronica Åberg, Mattias Hedenström, Jerome S. Pinkner, S. J. Hultgren and Fredrik Almqvist (DOI: 10.1039/b509376g)

3-(2-Pyridyl)-[1,2,3]triazolo[1,5-a]pyridines. An experimental and theoretical (DFT) study of the ring-chain isomerization

Belén Abarca, Ibon Alkorta, Rafael Ballesteros, Fernando Blanco, Mimoun Chadlaoui, José Elguero and Fatemeh Mojarrad (**DOI**: 10.1039/b510535h)

Kinetic and thermodynamic stereocontrol in the atroposelective formation of sulfoxides by oxidation of 2-sulfanyl-1-naphthamides

Mark S. Betson, Jonathan Clayden, Madeleine Helliwell and David Mitjans (DOI: 10.1039/b511452g)

Citations reported with a DOI instead of page numbers (*e.g.* A. N. Author, *Org. Biomol. Chem.*, 2005, **DOI**: 10.1039/b417644h) can be easily located from the article finder at the bottom of each journal homepage (*e.g.* www.rsc.org/obc) or from http://xlink.rsc.org/?DOI=xxxxxxx where xxxxxxx is replaced by the last eight characters of the DOI (*e.g.* http://xlink.rsc.org/?DOI=b417644h).