

Professor Robert A. Field

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Personal Details

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Education and Research Experience

B.Sc. (Hons) Biology and Chemistry.
University of East Anglia, 1986, Class 2i

Sandwich placement, Lipid Chemistry,
Institute of Food Research, Norwich, 1984,
(D. Coxon)

Ph.D. Glycosidase Inhibition Studies.
University of East Anglia, 1989 (A.H. Haines)

PDRA, Penicillin Biosynthesis.
University of Oxford, 1989-1991
(J.E. Baldwin FRS)

PDRA, Chemical Glycobiology.
University of Dundee, 1992-1994
(M.A.J. Ferguson FRS and S.W. Homans)

PDRA, Glycoside Chemistry.
University of Alberta, 1994 (O. Hindsgaul)

Lecturer/Reader/Professor in Chemistry,
University of St Andrews, 1994-00

Professor of Chemistry,
University of East Anglia, 2001-07

Project Leader, Biological Chemistry
John Innes Centre, Norwich, 2007-

Honorary Professor in Chemistry,
University of East Anglia, 2008-

Editor in Chief,
Carbohydrate Research, 2014-

Co-Director, BBSRC IBCarb Network in
Industrial Biotechnology and Bioenergy,
2014-

Co-Founder, Director and CEO,
Iceni Diagnostics, 2014-

President-elect, RSC Chemistry-Biology
Interface Division

Awards: Royal Society of Chemistry Carbohydrate Award, sponsored by Dextra, 1996

Research Theme: Chemical Glycobiology

Keywords: Carbohydrate chemistry; Enzymology; Carbohydrate materials;
Medicinal chemistry; Chemical biology; Chemical genomics.

Current Research Profile

Research in the Field group is focused on developing and exploiting chemical tools and principles to address questions in plant and microbial carbohydrate metabolism. Our activities are firmly chemistry-based, although our skill set reaches well beyond the classical chemistry boundaries. We collaborate *extensively*, with both chemists and biologists. Our approach is to reach out and embrace biology and in so doing to contribute to setting the biology agenda, rather than merely responding to it. Projects typically involve some combination of chemical and enzymatic synthesis, inhibitor design and assessment, biochemistry, structural biology, metabolomic, proteomic and transcriptomic analysis. From a biology perspective, we work cross-Kingdom: Arabidopsis, barley, potatoes, Euglena, Streptomyces, *E. coli*, flu virus, the African and American trypanosome, Xenopus and man.

Current research group and alumni

The Field group is international and currently consists of a mix of 14 chemists, biochemists, microbiologists and plant scientists, comprising core senior research associates (2), postdocs (5), PhD (5) students, interns and visitors (2). Of the ~30 PhD students to graduate from the Field group to date, and a similar number of postdocs, all have remained in science, taking up positions around the world in academia and medicine, in industry or in school teaching.

Grant funding

ca £36M in total to date, of which ca £12M as PI. Current and recent grant funding includes:

- Innovate UK Industrial Biotechnology Catalyst Early Stage Translation, New Enzymatically Produced Interpenetrating Starch-Cellulose Gels £2.8M, JIC £400K, 2016-20, JIC PI
- BBSRC sLola, Glycoengineering Veterinary Vaccines £5.5M, JIC £480K, 2016-21, JIC PI
- BBSRC/Iceni Diagnostics iCASE, Controlling Anti-Microbial Action Spectrum with Sugars, £120K, 2015-19, PI
- BBSRC-Newton Fund Probiotics for Sustainable Aquaculture in the Developing World £1.7M, JIC £400K, 2016-19, JIC PI
- Innovate UK Industrial Biotechnology Catalyst Early Stage Translation, Glycoenzymes for Bioindustries £3.4M, JIC £750K, 2015-20, JIC PI
- BBSRC/Iceni Diagnostics iCASE, Controlling Anti-Bacterial Action £110K, 2015-19, PI
- BBSRC/EU ERA-CAPS, Designing starch €1.2M, JIC €450K, 2015-18, JIC PI
- BBSRC Open Plant Syn Bio Centre, Engineering digestion-resistant starch in potato ca £11M, £500K to this project, 2015-17, Col
- BBSRC Follow-on Fund, Glyconanoparticle diagnostics for influenza infection £240K, 2015-16, Joint PI with Russell (UEA)
- BBSRC NIBB, IBCarb Network in Industrial Biotech and Bioenergy £2M, 2014-18, Joint PI with Flitsch (Manchester)
- BBSRC/Mologic iCASE, Molecular address tags for vaccines £120K, 2014-18, PI
- NRP Translational Fund, Clinical assessment of glyconanoparticle flu sensors £50K, 2014-15, Joint PI with Russell (UEA)
- BBSRC/Environment Agency iCASE, Algal Blooms on the Norfolk Broads £100K, 2013-17, PI
- Norwich Research Park, Natural Product Toxins from Algal Blooms, £100K, 2013-17, PI
- BBSRC Institute Strategic Program on Understanding and Exploiting Metabolism – component on Chemical Glycobiology £1.07M, 2012-17, PI

National/International Committees (last 5 years)

- May 2016 – Member, BBSRC-FAPESP Advanced Biofuels panel
- June 2015 – Chair, EPSRC Chemistry panel
- 2013-2015 – Chair, Royal Society of Chemistry Carbohydrate Group
- 2013 – Member, EPSRC panel to review Chemical Biology and Biological Chemistry portfolio
- 2007-2013 – Glycan Array/Carbohydrate Library Sub-committee of the US Consortium for Functional Glycomics
- 2009 onwards – BBSRC Pool of Experts, attending Panel B, C and D, as required

Selected research lectures

From ca 190 invited lectures to date, highlights from the past 5 years include:

- June 2016 – University of Dundee
- Dec 2015 - Universite de Rennes, France
- Oct 2015 - A-Star Bioprocessing Technology Institute, Singapore
- Oct 2015 - Naresuan University, Phitsanulok, Thailand
- Sept 2015 - Manchester Biomolecular
- Aug 2015 - Eurocarb 18, Moscow, Russia
- June 2015 - Carbohydrates Gordon Research Conference, New England, US
- March 2015 - SelectBio Advances in Microarray Technologies, Berlin, Germany
- Oct 2014 - Fire blight workshop, Bolzano, Italy
- May 2014 - Beilstein Symposium on Chemistry and Time, Chiemsee, Germany
- May 2014 - USP Ribeirao Preto, Brazil
- May 2014 - FAPESP-SGC-Nature conference on Molecular Probes, Campinas, Brazil

- May 2014 - Academia Sinica, Taiwan
- May 2014 - Shanghai Institute of Organic Chemistry, China
- March 2014 - University of Oxford
- Jan 2014 - 27th International Carbohydrate Symposium, Bangalore, India
- Jan 2014 - Emerging Trends in Glycoscience and Glycotechnology. IIT, Dehli, India
- July 2013 - East China University of Science and Technology, Shanghai, China
- June 2013 - 22nd International Glycoconjugate Symposium, Dalian, China
- June 2013 - 3rd Beilstein Symposium on Glyco-Bioinformatics, Potsdam, Germany
- May 2013 - University of Copenhagen
- Dec 2012 - University of Namur, Belgium
- Oct 2012 - CERMAV, Grenoble, France
- Oct 2012 - Nordic Starch Network Symposium, Carlsberg Laboratory, Denmark
- Apr 2012 - Shanghai Institute for Plant Physiology and Ecology, China
- Apr 2012 - Royal Golden Jubilee Congress XIII, Bangkok, Thailand

Publications (2010-2016)

http://scholar.google.co.uk/citations?user=0d_SVTEAAA&hl=en

207. Cell wall degradation is required for normal starch mobilisation in barley endosperm. V. M. E. Andriotis, M. Rejzek, E. Barclay, M. D. Rugen, R. A. Field, A. M. Smith, *Sci. Rep.*, under revision.
206. Contemporary glycoconjugation chemistry. G. Pergolizzi, S. Dedola, R. A. Field, *Specialist Periodical Reports - Carbohydrate Chemistry*, in press.
205. Gene Discovery for Synthetic Biology: Exploring the Novel Natural Product Biosynthetic Capacity of Eukaryotic Microalgae. E. C. O'Neill, G. Saalbach, R. A. Field, *Methods in Enzymology*, 2016, doi:10.1016/bs.mie.2016.03.005.
204. Low inhibitory potency of the canonical galectin carbohydrate binding site by modified citrus pectins and plant 1,4- β -D-galactomannan. J. Stegmayr, A. Lepur, B. Kahl-Knutson, M. Aguilar Moncayo, A. A. Klyosov, R. A. Field, S. Oredsson, U. J. Nilsson, H. Leffler, *J. Biol. Chem.*, 2016, doi: 10.1074/jbc.M116.721464.
203. CuAAC click chemistry with *N*-propargyl 1,5-dideoxy-1,5-imino-D-gulitol and *N*-propargyl 1,6-dideoxy-1,6-imino-D-mannitol provides access to triazole-linked piperidine and azepane pseudo-disaccharide iminosugars displaying glycosidase inhibitory properties. L. O. B. Zamoner, V. Aragão-Leoneti, S. P. Mantoani, M. Rugen, S. A. Nepogodiev, R. A. Field, I. Carvalho, *Carbohydr. Res.*, 2016, 429, 29-37.
202. Carbohydrate CuAAC click chemistry for therapy and diagnosis. X.-P. He, Y. Zang, J. Li, R. A. Field, G.-R. Chen, *Carbohydr. Res.*, 2016, 429, 1-22.
201. The Maltase Involved in Starch Metabolism in Barley Endosperm Is Encoded by a Single Gene. V. M. E. Andriotis, G. Saalbach, R. Waugh, R. A. Field, A. M. Smith, *PLoS One*, 2016, 11, e0151642.
200. Iminosugar inhibitors of carbohydrate active enzymes underpinning cereal grain germination and cell wall metabolism. V. M. E. Andriotis, M. Rejzek, M. D. Rugen, B. Svensson, A. M. Smith, R. A. Field, *Biochem. Soc. Trans.*, 2016, 44, 159-165.
199. Vaccines based on hepatitis b core antigens. M. A. Whelan and R. A. Field. Publication number: WO 2015124919 A1. Application number: PCT/GB2015/050460. Publication date: 27 Aug 2015.
198. Structural Dissection of the Maltodextrin Disproportionation Cycle of the *Arabidopsis* Plastidial Enzyme DPE1. E. C. O'Neill, C. E. M. Stevenson, K. Tantanarat, D. Latousakis, M. I. Donaldson, M. Rejzek, S. A. Nepogodiev, T. Limpaseni, R. A. Field, D. M. Lawson, *J. Biol. Chem.*, 2015, 290, 29834-29853.
197. Differential Toll-like receptor signalling of *Burkholderia pseudomallei* lipopolysaccharide in murine and human models, T. A. F. Weehuizen, J. L. Prior, T. W. van der Vaart, S. A. Ngugi, S. A. Nepogodiev, R. A. Field, L. M. Kager, C. van't Veer, A. F. de Vos, T. van der Poll, W. J. Wiersinga, *PLoS One*, 2015, 10, e0145397.
196. *Euglena* in time: evolution, control of central metabolic processes and multi-domain proteins in carbohydrate and natural product biochemistry. E. C. O'Neill, R. A. Field, *Perspectives in Science*, 2015, 6, 84-93.
195. Underpinning starch biology with *in vitro* studies on carbohydrate active enzymes and biosynthetic glycomaterials, E. C. O'Neill, R. A. Field, *Frontiers in Bioengineering and Biotechnology*, 2015, 3, 136 doi:10.3389/fbioe.2015.00136
194. The transcriptome of *Euglena gracilis* reveals unexpected metabolic capabilities for carbohydrate and natural product biochemistry. E. C. O'Neill, M. Trick, L. Hill, M. Rejzek, R. G. Dusi, C. J. Hamilton, P. V. Zimba, B. Henrissat, R. A. Field, *Molecular Biosystems*, 2015, 11, 2808-2820.
193. Standards for Plant Synthetic Biology: A Common Syntax for Exchange of DNA. Patron, N.; Orzaez, D.; Marillonnet, S.; Warzecha, H.; Matthewman, C.; Youles, M.; Raitskin, O.; Leveau, A.; Farre-Martinez, G.; Rogers, C.; Smith, A.; Hibberd, J.; Webb, A.; Locke, J.; Schornack, S.; Ajioka, J.; Baulcombe, D.; Zipfel, C.; Kamoun, S.; Jones, J.; Kuhn, H.; Robatzek, S.; Van Esse, H. P.; Oldroyd, G.; Sanders, D.; Martin, C.; Field, R.; O'Connor, S.; Fox, S.; Wulff, B.; Miller, B.; Breakspear, A.; Radhakrishnan, G.; Delaux, P.-M.; Loque, D.; Granell, A.; Tissier, A.; Shih, P.; Brutnell, T.; Quick, P.; Rischer, H.; Fraser, P.; Aharoni, A.; Raines, C.; South, P.; Ané, J.-M.; Hamberger, B.; Langdale, J.; Stougaard, J.; Bouwmeester, H.; Udvardi, M.; Murray, J.; Ntoukakis, V.; Schafer, P.; Denby, K.; Edwards, K.; Osbourn, A.; Haseloff, J., *New Phytologist*, 2015, 208, 13-19.

192. Analysis of Surface Binding Sites (SBS) within GH62, GH13 and GH77. C. Wilkens, D. Cockburn, S. Andersen, B. O. Petersen, C. Ruzanski, R. A. Field, O. Hindsgaul, H. Nakai, B. McCleary, A. M. Smith, M. Abou Hachem, B. Svensson, *J. Appl. Glycosci.*, 2015, 62, 87-93.
191. Crystal structure of a novel two domain GH78 family α -rhamnosidase from *Klebsiella oxytoca* with rhamnose bound. E. C. O'Neill, C. E. M. Stevenson, M. J. Paterson, M. Rejzek, A.-L. Chauvin, D. M. Lawson, R. A. Field, *Proteins: Structure, Function and Bioinformatics*, 2015, 83, 1742-1749.
190. Click chemistry oligomerisation of azido-alkyne-functionalized galactose accesses linear triazole-linked oligomers and macrocycles that inhibit *Trypanosoma cruzi* invasion of macrophages. V. L. Campo, I. Ivanova, I. Carvalho, C. Duque Lopes, S. Schenkman, Z. A. Carneiro, G. Saalbach, J. Santana da Silva, S. A. Nepogodiev, R. A. Field, *Tetrahedron*, 2015, 71, 7344-7353.
189. Base-modified NAD and AMP derivatives and their activity against bacterial DNA ligases. G. Pergolizzi, M. M. D. Cominetti, J. N. Butt, R. A. Field, R. Bowater, G. K. Wagner, *Org. Biomol. Chem.*, 2015, 13, 6380-6398.
188. Enzymatic synthesis of nucleobase-modified UDP-sugars: scope and limitations. B. A. Wagstaff, M. Rejzek, T. Pesnot, L. M. Tedaldi, L. Caputi, E. C. O'Neill, S. Benini, G. K. Wagner, R. A. Field, *Carbohydr. Res.*, 2015, 404, 17-25.
187. Glycoside synthesis with phosphorylases. E. C. O'Neill and R. A. Field, *Carbohydr. Res.*, 2015, 403, 23-37.
186. Glyconanoparticles for colorimetric bioassays. M. J. Marín, C. L. Schofield, R. A. Field, D. A. Russell, *Analyst*, 2015, 140, 59-70.
185. Analysis of surface binding sites (SBS) in carbohydrate active enzymes with focus on glycoside hydrolase families 13 and 77 - A mini-review. D. Cockburn, C. Wilkens, C. Ruzanski, S. Anderson, J. W. Nielsen, A. M. Smith, R. A. Field, M. Millemoes, M. Abou Hachem, B. Svensson, *Biologia*, 2014, 69, 705-712.
184. Cloning and expression of 4- α -glucanotransferase genes from *Manihot esculenta* Crantz and *Arabidopsis thaliana* and their production of cycloamyloses. K. Tantanarat, E. C. O'Neill, M. Rejzek, R. A. Field, T. Limpaseni, *Process Biochemistry*, 2014, 49, 84-89.
183. Discrimination of epimeric glycans and glycopeptides using ion-mobility mass spectrometry: towards a comprehensive carbohydrate sequencing strategy. P. Both, A. P. Green, C. Gray, R. Šardžik, J. Voglmeir, C. Fontana, M. Austeri, M. Rejzek, D. Richardson, R. A. Field, G. Widmalm, S. L. Flitsch, C. E. Eyers, *Nature Chemistry*, 2014, 6, 65-74.
182. Sugar-coated sensor chip and nanoparticle surfaces for the *in vitro* enzymatic synthesis of starch-like materials. E. C. O'Neill, A. Rashid, C. E. M. Stevenson, A.-C. Hetru, A. P. Gunning, M. Rejzek, S. A. Nepogodiev, S. Bornemann, D. M. Lawson, R. A. Field, *Chem. Sci.*, 2014, 5, 341-350.
181. Biomolecular characterization of the levansucrase of *Erwinia amylovora*, the causal pathogen of fire blight. L. Caputi, S. A. Nepogodiev, M. Malnoy, M. Rejzek, R. A. Field, S. Benini, *J. Agric. Food Chem.*, 2013, 61, 12265-12273.
180. A simple bacterial glucanotransferase can complement *Arabidopsis* mutants defective in cytosolic maltose metabolism. C. Ruzanski, J. Smirnova, M. Rejzek, D. Cockburn, H. L. Pedersen, M. Pike, W. G. T. Willats, B. Svensson, M. Steup, A. M. Smith, R. A. Field, *J. Biol. Chem.*, 2013, 288, 28581-28598.
179. Glyconanoparticles for the plasmonic detection and discrimination between human and avian influenza virus. M. J. Marín, A. Rashid, M. Rejzek, S. A. Fairhurst, S. A. Wharton, S. Martin, J. W. McCauley, T. Wileman, R. A. Field, D. A. Russell, *Org. Biomol. Chem.*, 2013, 11, 7101-7107.
178. A one-pot enzymatic approach to the *O*-fluoroglucoside of *N*-methylantranilate. L. Caputi, M. Rejzek, T. Louveau, E. C. O'Neill, L. Hill, A. Osbourn, R. A. Field, *Bioorg. Med. Chem.*, 2013, 21, 4762-4767.
177. Blocking bacterial defences, E. C. O'Neill, R. A. Field, *Nature Chemistry*, 2013, 5, 642-643.
176. United Kingdom Patent Application No. 1313201.4. Applicant: University Of East Anglia. Title: Virus Detection. M. J. Marín, A. Rashid, M. Rejzek, R. A. Field, D. A. Russell. July 2013.
175. *Trans*-sialidase activity stimulates G protein regulation of *eat-me* signal for entry into epithelial cells. C. E. Butler, T. M. U. de Carvalho, E. C. Grisard, R. A. Field, K. M. Tyler, *Traffic*, 2013, 14, 853-869.
174. Flux Through Trehalose Synthase Flows from Trehalose to the Alpha Anomer of Maltose in Mycobacteria. F. Miah, H. Koliwer-Brandl, M. Rejzek, R. A. Field, R. Kalscheuer, S. Bornemann, *Chem. Biol.*, 2013, 20, 487-493.
173. Application of a novel microtitre plate-based assay for the discovery of novel inhibitors of DNA gyrase and DNA topoisomerase VI. J. A Taylor, L. A. Mitchenall, M. Rejzek, R. A. Field; A. Maxwell, *PLoS One*, 2013, 8, e58010.
172. Glycosyltransferases from oat (*Avena*) implicated in the acylation of avenacins. A. Owatworakit, B. Townsend, T. Louveau, H. Jenner, M. Rejzek, R. K. Hughes, G. Saalbach, X. Qi, S. Bakht, A. D. Roy, S. T. Mugford, R. J. M. Goss, R. A. Field, A. Osbourn, *J. Biol. Chem.*, 2013, 288, 3696-3704.
171. Allosteric Competitive Inhibitors of the Glucose-1-Phosphate Thymidyltransferase (RmlA) from *Pseudomonas aeruginosa*. M. S. Alphey, L. Pirrie, L. S. Torrie, W. A. Boulkeroua, M. Gardiner, A. Sarkar, M. Maringer, W. Oehlmann, R. Brenk, M. S. Scherman, M. McNeil, M. Rejzek, R. A. Field, M. Singh, D. Gray, N. J. Westwood, J. H. Naismith, *ACS Chem. Biol.*, 2013, 8, 387-396.
170. Versatile oligosaccharide microarrays for plant glycobiology and cell wall research. H. Petersen, J. Fangel, B. McCleary, C. Ruzanski, M. Rydahl, M.-C. Ralet, V. Farkas, L. von Schantz, S. Marcus, M. Andersen, R. Field, M. Ohlin, P. Knox, M. Clausen, W. Willats, *J. Biol. Chem.*, 2012, 287, 39429-39438.
169. 'TamiGold': Phospha-Oseltamivir-Stabilised Gold Nanoparticles as Basis for Influenza Therapeutics and Diagnostics Targeting the Neuraminidase (instead of the Hemagglutinin). M. Stanley, N. Cattle, J. McCauley, S. R. Martin, A. Rashid, R. A. Field, B. Carbain, H. Streicher, *MedChemComm*, 2012, 3, 1373-1376.

168. An expedient enzymatic route to isomeric 2-, 3- and 6-monodeoxy-monofluoro-maltose derivatives. K. Tantanarat, M. Rejzek, E. O'Neill, C. Ruzanski, L. Hill, S. A. Fairhurst, T. Limpaseni, R. A. Field, *Carbohydr. Res.*, 2012, **358**, 12-18.
167. Phenotypic screens with model organisms. G. N. Wheeler, R. A. Field, M. L. Tomlinson, in: *Chemical Genomics*. H. Fu Ed. Cambridge University Press, 2012.
166. Synthetic Glycans, Glycoarrays and Glyconanoparticles to Investigate Host Infection by *Trypanosoma cruzi*. R. A. Field, P. Andrade, V. L. Campo, I. Carvalho, B. Y. M. Collet, P. R. Crocker, M. Fais, R. Karamanska, B. Mukhopadhyay, S. A. Nepogodiev, A. Rashid, M. Rejzek, D. A. Russell, C. L. Schofield, R. M. van Well, in *Petite and Sweet: Glyco-Nanotechnology as a Bridge to New Medicines*; Huang, X., Barchi, J.; ACS Symposium Series; American Chemical Society: Washington, DC, 2011, chapter 9, 143-159.
165. Structure of *Streptomyces coelicolor* maltosyltransferase GlgE: A homologue of a genetically validated anti-tuberculosis target. K. Syson, C. E. M. Stevenson, M. Rejzek, S. A. Fairhurst, A. Nair, C. J. Bruton, R. A. Field, K. F. Chater, D. M. Lawson, S. Bornemann, *J. Biol. Chem.*, 2011, **286**, 38298-38310.
164. Glycobiology - challenging reaction equilibria. R. A. Field, *Nature Chem. Biol.*, 2011, **7**, 658-659.
163. Synthesis of apiose-containing oligosaccharide fragments of side chain A and B of rhamnogalacturonan II and apiogalacturonan. S. A. Nepogodiev, M. Fais, D. L. Hughes and R. A. Field, *Org. Biomol. Chem.*, 2011, **9**, 6670-6684.
162. Surface plasmon resonance imaging of glycoarrays identifies novel carbohydrate-based ligands for potential ricin sensor development. M. Fais, R. Karamanska, S. Allman, S. A. Fairhurst, P. Innocenti, A. J. Fairbanks, T. J. Donohoe, B. G. Davis, D. A. Russell, R. A. Field, *Chem. Sci.*, 2011, **2**, 1952-1959.
161. Glycoclusters presenting lactose on calix[4]arene cores display trypanocidal activity. E. Galante, C. Geraci, V. L. Campo, R. Sesti-Costa, P. M. M. Guedes, J. S. Silva, L. Hill, S. A. Nepogodiev, R. A. Field, *Tetrahedron*, 2011, **67**, 2901-2912.
160. The saponins - polar isoprenoids with important and diverse biological activities. A. E. Osbourn, R. J. M. Goss, R. A. Field, *Nat. Prod. Rep.*, 2011, **28**, 1261-1268.
159. Synthesis of fluorescently labelled rhamnosides: probes for the evaluation of rhamnogalacturonan II biosynthetic enzymes. E. Prifti, S. Goetz, S. A. Nepogodiev, R. A. Field, *Carbohydr. Res.*, 2011, **346**, 1617-1621.
158. A versatile expression system for genome-wide screening of secreted and type 1 membrane proteins for glycan and protein interactions. D. M. E. Otto, M. A. Campanero-Rhodes, R. Karamanska, A. K. Powell, N. Bovin, J. E. Turnbull, R. A. Field, J. M. Blackburn, T. Feizi, P. R. Crocker, *Analytical Biochem.*, 2011, **411**, 261-270.
157. The role of α -glucosidase in germinating barley grains. D. Stanley, M. Rejzek, H. Naested, M. Smedley, S. Otero Pérez, B. Fahy, F. Thorpe, R. J. Nash, W. Harwood, B. Svensson, K. Denyer, R. A. Field, A. M. Smith, *Plant Physiol.*, 2011, **155**, 932-943.
156. Probing the acceptor substrate binding site of *Trypanosoma cruzi* *trans*-sialidase with systematically modified substrates and glycoside libraries. J. A. Harrison, K. P. R. Kartha, E. J. L. Fournier, T. L. Lowary, C. Malet, U. J. Nilsson, O. Hindsgaul, S. Schenkman, J. H. Naismith, R. A. Field, *Org. Biomol. Chem.*, 2011, **9**, 1653-1660.
155. Chemical genetics and cereal starch metabolism: structural basis of the non-covalent and covalent inhibition of barley β -amylase. M. Rejzek, C. E. Stevenson, A. M. Southard, D. Stanley, K. Denyer, A. M. Smith, M. J. Naldrett, D. M. Lawson, R. A. Field, *Mol. Biosyst.*, 2011, **7**, 718-730.
154. Chemical strategies and tools for organic synthesis of pectic fragments. S. A. Nepogodiev, R. A. Field and I. Damager, in *Plant Polysaccharides, Biosynthesis and Bioengineering*, P. Ulsov Ed., *Annual Plant Reviews*, 2011, **41**, 65-92.
153. Application of copper(I)-catalyzed azide-alkyne cycloaddition (CuAAC) "click chemistry" in carbohydrate drug and neoglycopolymer synthesis. V. Aragão-Leoneti, V. L. Campo, A. S. Gomes, R. A. Field, I. Carvalho, *Tetrahedron*, 2010, **66**, 9475-9492.
152. Cyclooligomerisation of azido-alkyne-functionalised sugars: synthesis of 1,6-linked cyclic *pseudo*-galactooligosaccharides and assesment of their sialylation by *Trypanosoma cruzi* *trans*-sialidase. V. L. Campo, I. Carvalho, C. H. T. P. Da Silva, S. Schenkman, L. Hill, S. A. Nepogodiev, R. A. Field, *Chem. Sci.*, 2010, **1**, 507-514.
151. Synthesis and anti-HIV activity of triterpene 3-O-galactopyranosides, analogs of glycyrrhizic acid. L. A. Baltina, Jr., L. A. Baltina, R. M. Kondratenko, O. A. Plyasunova, S. A. Nepogodiev, R. A. Field, *Chemistry of Natural Compounds*, 2010, **46**, 576-582.
150. Synthesis of a 'manno-Gb₃' analogue as a potential Shiga toxin/Verotoxin inhibitor. K. P. R. Kartha, S. W. Homans, R. A. Field, *Trends Carb. Res.*, 2010, **2**, 14-19.
149. Synthesis of α - and β -D-glucopyranosyl triazoles by CuAAC "click chemistry": reactant tolerance, reaction rate, product structure and glucosidase inhibitory properties. S. Dedola, D. L. Hughes, S. A. Nepogodiev, M. Rejzek, R. A. Field, *Carbohydr. Res.*, 2010, **345**, 1123-1134.
148. "Click chemistry" synthesis of a library of 1,2,3-triazole-substituted galactose derivatives and their evaluation against *Trypanosoma cruzi* and its cell surface *trans*-sialidase. I. Carvalho, P. Andrade, V. L. Campo, P. M. M. Guedes, R. Sesti-Costa, J. S. Silva, S. Schenkman, S. Dedola, L. Hill, M. Rejzek, S. A. Nepogodiev, R. A. Field, *Bioorg. Med. Chem.*, 2010, **18**, 2412-2427.
147. Peracetylated α -D-glucopyranosyl fluoride and peracetylated α -maltosyl fluoride. S. Dedola, D. L. Hughes, R. A. Field, *Acta Cryst.*, 2010, **C66**, o124-o127.
146. Detection of enzyme-catalyzed polysaccharide synthesis on surfaces. C. Cle, C. Martin, R. A. Field, P. Kuzmic, S. Bornemann, *Biocat. Biotrans.*, 2010, **28**, 64-71.