

Professor Robert A. Field

Department of Biological Chemistry, John Innes Centre, Colney Lane, Norwich, NR4 7UH UK

<http://www.jic.ac.uk/staff/Rob-Field/index.htm>

Publications to November 2010

2011

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. Ulaskov Ed., *Annu. Plant Rev.*, 2011, **41**, 65-92.

2010

154. 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. BioSys.*, DOI:10.1039/C0MB00204F **in press**.

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 assesement 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, *Biotrans.*, 2010, **28**, 64-71.

2009

145. Synthesis of starch fragments. S. A. Nepogodiev, R. A. Field, in *Progress in the synthesis of complex carbohydrate chains of plant and microbial polysaccharides*. N. Nifantiev Ed., Transworld Research Network, 37/661 (2), Fort P.O., Trivandrum-695 023, Kerala, India. ISBN: 978-81-7895-424-0. 2009, Chapter 6, pp 155-180.

144. Synthesis of oligosaccharide fragments of pectic polysaccharides. S. A. Nepogodiev, I. Damager, R. A. Field, in *Progress in the synthesis of complex carbohydrate chains of plant and microbial polysaccharides*. N. Nifantiev Ed., Transworld Research Network, 37/661 (2), Fort P.O., Trivandrum-695 023, Kerala, India. ISBN: 978-81-7895-424-0. 2009, Chapter 2, pp33-60.

143. Lectin and carbohydrate microarrays: New high through-put methods for glycoprotein, carbohydrate-binding protein and carbohydrate-active enzyme analysis. M. Fais, R. Karamanska, D. A. Russell, R. A. Field, *J. Cereal Sci.*, 2009, **50**, 306-311.

142. Synthesis of a tetrasaccharide related to the repeating unit of the O antigen from *Escherichia coli* K-12. B. Roy, R. A. Field, B. Mukhopadhyay, *Carbohydr. Res.*, 2009, **344**, 2311-2316

141. A simple method of synthesis of triterpene glycosides similar to glycyrrhizic acid and their hepatoprotective activity *in vitro*. L. R. Mikhailova, L. A. Baltina Jr., L. A. Baltina, R. M. Kondratenko, S. A. Nepogodiev, R. A. Field, O. Kunert, M. Ch. Yin, *Russ. J. Bioorg. Chem.*, 2009, **35**, 619-627.

140. A survey of chemical methods for sugar-nucleotide synthesis. G. K. Wagner, T. Pesnot, R. A. Field, *Nat. Prod. Rep.*, 2009, **26**, 1172-1194.

139. Carbohydrate signalling molecules. R. A. Field in *Plant-derived natural products: Synthesis, function and*

application, A. E. Osbourn and V. Lanzotti Eds, Springer, 2009.

138. Synthesis of prospective disaccharide ligands for *Escherichia coli* O157 verotoxin. C. Bernlind, S. W. Homans, R. A. Field, *Tetrahedron Lett.*, 50th Anniversary issue, 2009, 50, 3397-3399.

137. A sugar aminoacid for the development of multivalent ligands for *Escherichia coli* O157 verotoxin. D. Gibson, S. W. Homans, R. A. Field, *Tetrahedron-Asymmetry*, 2009, 20, 730-732.

136. Characterization of WbpB, WbpE, and WbpD, and reconstitution of a pathway for the biosynthesis of UDP-2,3-diacetamido-2,3-dideoxy-D-mannuronic acid in *Pseudomonas aeruginosa*. E. L. Westman, D. J. McNally, A. Charchoglyan, D. Brewer, R. A. Field, J. S. Lam, *J. Biol. Chem.*, 2009, 284, 11854-11862

135. Chemical genomics identifies compounds affecting *Xenopus laevis* pigment cell development. M. L. Tomlinson, M. Fidock, M. Rejzek, R. A. Field, G. N. Wheeler, *Mol. BioSys.*, 2009, 5, 376-384.

134. Chemical synthesis of uridine 5'-diphospho 2,3-diacetamido-2,3-dideoxy-D-glucuronic acid (UDP- α -D-Glc-2,3-diNAcA), a key intermediate in cell surface O antigen polysaccharide biosynthesis in the human respiratory pathogens *Bordetella pertussis* and *Pseudomonas aeruginosa*. M. Rejzek, V. Sri Kannathasan, C. Wing, A. Preston, E. L. Westman, J. S. Lam, J. H. Naismith, D. J. Maskell, R. A. Field, *Org. Biomol. Chem.*, 2009, 7, 1203-1210.

133. Sugar nucleotide recognition by *Klebsiella pneumoniae* UDP-galactopyranose mutase: fluorinated substrates, kinetics and equilibria. J. C. Errey, M. C. Mann, S. A. Fairhurst, L. Hill, M. R. McNeil, J. H. Naismith, J. M. Percy, C. Whitfield, R. A. Field, *Org. Biomol. Chem.*, 2009, 7, 1009-1016.

132. Developing an asymmetric, stereodivergent route to selected 6-deoxy-6-fluoro-hexoses. A. Caravano, R. A. Field, J. M. Percy, G. Rinaudo, R. Roig, K. Singh, *Org. Biomol. Chem.*, 2009, 7, 996-1008.

131. A chemical genetic approach identifies matrix metalloproteinases as playing an essential and specific role in *Xenopus melanophore* migration. M. L. Tomlinson, P. Guan, R. J. Morris, M. Fidock, M. Rejzek, R. A. Field and G. N. Wheeler, *Chemistry & Biology*, 2009, 16, 93-104.

130. Bacterial detection using carbohydrate-functionalised CdS quantum dots: A model study exploiting *E. coli* recognition of mannosides. B. Mukhopadhyay, M. B. Martins, R. Karamanska, D. A. Russell, R. A. Field, *Tetrahedron Lett.*, 2009, 50, 886-889.

2008

129. Biofuels and the plant cell wall: Opportunities and challenges for synthetic carbohydrate chemistry. R. A. Field, Carbohydrate Newsletter of the Association of Carbohydrate Chemists & Technologists (India), Dec 2008.

128. Detection of transglucosidase-catalyzed polysaccharide synthesis on a surface in real-time using surface plasmon resonance spectroscopy. C. Clé, A. P. Gunning, K. Syson, L. Bowater, R. A. Field, S. Bornemann, *J. Am. Chem. Soc.*, 2008, 130, 15234-15235.

127. Biosynthesis of a rare di-N-acetylated sugar in the lipopolysaccharide of both *Pseudomonas aeruginosa* and *Bordetella pertussis* occurs via an identical scheme despite different gene clusters. E. L. Westman, A. Preston, R. A. Field, J. S. Lam, *J. Bacteriol.*, 2008, 190, 6060-6069.

126. Synthesis of mucin glycans from the protozoan parasite *Trypanosoma cruzi*. R. M. van Well, B. Y. M. Collet, R. A. Field, *Synlett*, 2008, J. E. Baldwin special issue, 2175-2177.

125. Iodine-mediated glycosylation *en route* to mucin-related glyco-aminoacids and glycopeptides, T. S. Kärkkäinen, K. P. R. Kartha, D. MacMillan and R. A. Field, *Carbohydr. Res.*, 2008, 343, 1830-1834.

124. 2,3,4,6-Tetra-O-acetyl- α -D-glucopyranosyl azide. S. Dedola, S. A. Nepogodiev, D. L. Hughes, R. A. Field, *Acta Cryst. C*, 2008, C64, o445-o446.

123. A versatile gold surface approach for fabrication and interrogation of glycoarrays. Z. -L. Zhi, N. Laurent, A. K. Powell, R. Karamanska, M. Fais, J. Voglmeir, A. Wright, J. M. Blackburn, P. R. Crocker, D. A. Russell, S. L. Flitsch, R. A. Field, J. E. Turnbull, *ChemBioChem*, 2008, 9, 1568-1575.

122. Tyl1a, a TDP-6-deoxy-D-xylo-4-hexulose 3,4-isomerase from *Streptomyces fradiae*, appears to operate via an RmlC-like sugar epimerase mechanism. M. Tello, M. Rejzek, B. Wilkinson, D. M. Lawson, R. A. Field, *ChemBioChem*, 2008, 9, 1295-1302. **Selected for front cover artwork.**



121. Colorimetric detection of *Ricinus communis* agglutinin 120 using optimally presented carbohydrate stabilised gold nanoparticles. C. L. Schofield, B. Mukhopadhyay, S. M. Hardy, M. B. McDonnell, R. A. Field, D. A. Russell, *Analyst*,

2008, 133, 626-634.

120. R. A. Field, Chapter 4d: Selenoglycosides in *Handbook of Chemical Glycosylation. Advances in Stereoselectivity and Therapeutic relevance*, Ed. A. V. Demchenko, Wiley-VCH. 2008.

119. Surface plasmon resonance imaging for real time, label-free analysis of protein interactions with carbohydrate microarrays. R. Karamanska, J. Clarke, O. Blixt, J. I. MacRae, J. Q. Zhang, P. R. Crocker, N. Laurent, A. Wright, S. L. Flitsch, D. A. Russell, R. A. Field, *Glycoconj. J.*, 2008, 25, 69-74.

118. Indirect approach to C-3 branched 1,2-*cis*-glycofuranosides: synthesis of aceric acid glycoside analogues. M. T. de Oliveira, D. L. Hughes, S. A. Nepogodiev, R. A. Field, *Carbohydr. Res.*, 2008, 343, 211-220.

2007

117. Predicting protein function from structure - the roles of short chain dehydrogenase/reductase enzymes in *Bordetella* O antigen biosynthesis. J. D. King, N. J. Harmer, A. Preston, C. Palmer, M. Rejzek, R. A. Field, T. L. Blundell, D. J. Maskell, *J. Mol. Biol.*, 2007, 374, 749-63.

116. Chemoenzymatic synthesis with distinct *Pasteurella* heparosan synthases: monodisperse polymers and unnatural structures. A. E. Sismey-Ragatz, D. E. Green, M. Rejzek, R. A. Field, P. L. DeAngelis, *J. Biol. Chem.*, 2007, 282, 28321-28327.

115. Method for the detection of ricin. D. A. Russell, R. A. Field, C. L. Schofield and A. H. Haines, UK patent application PCT GB0711953.0.

114. Chemical and chemoenzymatic synthesis of glycosyl-amino acids and glycopeptides related to *Trypanosoma cruzi* mucins. V. L. Campo, I. Carvalho, S. Allman, B. G. Davis, R. A. Field, *Org. Biomol. Chem.*, 2007, 5, 2645-2657. Selected by the RSC as a 'Hot Article'. Featured in *Chemistry World*, 2007, 4, C67.

113. Identification and biochemical characterization of two novel UDP-2,3-diacetamido-2,3-dideoxy- α -D-glucuronic acid 2-epimerases from respiratory pathogens. E. L. Westman, D. J. McNally, M. Rejzek, W. L. Miller, R. A. Field, A. G. Preston, J. -R. Brisson, J. S. Lam, *Biochem. J.*, 2007, 405, 123-130.

112. Recent applications of the Cu^I-catalysed Huisgen azide-alkyne 1,3-dipolar cycloaddition reaction in carbohydrate chemistry. S. Dedola, S. A. Nepogodiev, R. A. Field. *Org. Biomol. Chem.*, 2007, 5, 1006-1017.

111. New mercaptopyrazolo[3,4-d]pyrimidine derivatives as anti-mycobacterial agents. L. Ballell, R. J. Young, G. A. C. Chung, R. A. Field, *Bioorg. Med. Chem. Lett.*, 2007, 17, 1736-1740.

110. Glyconanoparticles for the colorimetric detection of cholera toxin. C. L. Schofield, R. A. Field, D. A. Russell, *Analytical Chem.*, 2007, 79, 1356-1361.

109. Emerging glycomics technologies. J. E. Turnbull, R. A. Field, *Nature Chem. Biol.*, 2007, 3, 74-77.

108. Synthesis of triazole-linked *pseudo*-starch fragments. S. A. Nepogodiev, S. Dedola, L. Marmuse, M. T. de Oliveira, R. A. Field, *Carbohydr. Res.*, 2007, 342, 529-540.

107. Direct oxidation of sugar-nucleotides to the corresponding uronic acids: TEMPO and platinum-based procedures. M. Rejzek, B. Mukhopadhyay, C. Q. Wenzel, J. S. Lam, R. A. Field, *Carbohydr. Res.*, 2007, 342, 460-466.

106. Plant cell wall glycans: chemical synthesis of the branched sugar aceric acid. S. A. Nepogodiev, N. A. Jones, R. A. Field, *ACS Symp. Ser., Contemporary Carbohydrate Chemistry*, 2007, 980, 34-49.

105. RmlC, a C3' and C5' carbohydrate epimerase, appears to operate via an intermediate with an unusual twist boat conformation. C. Dong, L. L. Major, V. Srikannathasan, J. C. Errey, D. Philp, M. Asuncion, M. -F. Giraud, J. S. Lam, M. Graninger, P. Messner, M. R. McNeil, R. A. Field, C. Whitfield, J. H. Naismith, *J. Mol. Biol.*, 2007, 365, 146-159.

2006

104. Expression and initial characterization of Wbbl, a putative D-Galf: α -D-Glc β -1,6-galactofuranosyltransferase from *Escherichia coli* K-12. C. Wing, J. C. Errey, B. Mukhopadhyay, J. S. Blanchard, R. A. Field, *Org. Biomol. Chem.*, 2006, 4, 3945-3950.

103. Silver and gold glyconanoparticles for colorimetric bioassays. C. L. Schofield, A. H. Haines, R. A. Field, D. A. Russell, *Langmuir*, 2006, 22, 6707-6711.

102. Contrasting reactivity of thioglucoside and selenoglucoside donors towards promoters: implications for glycosylation stereocontrol. R. M. van Well, T. S. Kärkkäinen, K. P. R. Kartha, R. A. Field, *Carbohydr. Res.*, 2006, 341, 1391-1397.

101. Convergent synthesis of a trisaccharide as its 2-(trimethylsilyl)ethyl glycoside related to the flavonoid triglycoside from *Gymnema sylvestri*. B. Mukhopadhyay, R. A. Field, *Carbohydr. Res.*, 2006, 341, 1697-1701.

100. Direct synthesis of chiral aziridines from *N*-*tert*-butyl-sulfinylketimines. D. Morton, D. Pearson, R. A. Field, R. A.

Stockman, *Chem. Commun.*, 2006, 1833–1835.

99. The 1.5 Å resolution crystal structure of NovW: a 4-keto-6-deoxy sugar epimerase from the novobiocin biosynthetic gene cluster of *Streptomyces spheroides*. P. Jakimowicz, M. Tello, C. L. Freil Meyers, C. T. Walsh, M. J. Buttner, R. A. Field, D. M. Lawson, *Proteins: Structure, Function and Bioinformatics*, 2006, 63, 261-265.

98. Characterisation of *Streptomyces spheroides* NovW and revision of its functional assignment. to a dTDP-6-deoxy-D-xylo-4-hexulose 3-epimerase, M. Tello, P. Jakimowicz, J. C. Errey, C. L. Freil Meyers, C. T. Walsh, M. J. Buttner, D. M. Lawson, R. A. Field, *Chem. Commun.*, 2006, 1079-1081.

2005

97. From solution phase to 'on-column' glycosylation: trichloroacetimidate-based glycosylation promoted by perchloric acid-silica. B. Mukhopadhyay, S. V. Maurer, N. Rudolph, R. M. van Well, D. A. Russell, R. A. Field, *J. Org. Chem.*, 2005, 70, 9059-9062.

96. Synthesis of the branched-chain sugar aceric acid: a unique component of the pectic polysaccharide rhamnogalacturonan II. N. A. Jones, S. A. Nepogodiev, C. J. McDonald, D. L. Hughes, R. A. Field, *J. Org. Chem.*, 2005, 70, 8556-8559.

95. Glycosylation with *in situ* separation: carbohydrate chemistry on a tlc plate. B. Mukhopadhyay, P. Cura, K. P. R. Kartha, C. H. Botting, R. A. Field, *Org. Biomol. Chem.*, 2005, 3, 3468-3470.

94. *Xenopus* as a model organism in developmental chemical genetic screens. M. L. Tomlinson, R. A. Field, G. N. Wheeler, *Molecular Biosystems*, 2005, 1, 223-228. Selected by the RSC as a 'Hot Article'. Featured in *Chemistry World*, 2005, 2 (October), 16.

93. Efficient synthesis of lycotetraose, the tetrasaccharide constituent of the plant defence glycoalkaloid α -tomatine. N. A. Jones, S. A. Nepogodiev, R. A. Field, *Org. Biomol. Chem.*, 2005, 3, 3201-3206. Selected by the RSC as a 'Hot Article'. Artwork forms the Front Cover of the *OBC* issue (issue 17; 7 September). Featured in *Chemistry World*, 2005, 2 (September), 19.



92. Iodine promoted glycosylation with glycosyl iodides: α -glycoside synthesis. R. M. van Well, K. P. R. Kartha, R. A. Field, *J. Carbohydr. Chem.*, 2005, 24, 463-474.

91. Glycosylation reactions with 'disarmed' thioglycoside donors promoted by *N*-iodosuccinimide and HClO₄-silica. B. Mukhopadhyay, B. Collet, R. A. Field, *Tetrahedron. Lett.*, 2005, 46, 5923-5925.

90. Probing the specificity of macrolide glycosyltransferases: *in vitro* remodelling of a polyketide antibiotic creates active bacterial uptake and enhances potency. M. Yang, M. R. Proctor, D. N. Bolam, J. C. Errey, R. A. Field, H. J. Gilbert, B. G. Davis, *J. Am. Chem. Soc.*, 2005, 127, 9336-9337.

89. Thioctic acid amides: convenient tethers for achieving low non-specific protein binding to carbohydrates presented on gold surfaces. R. Karamanska, B. Mukhopadhyay, D. A. Russell R. A. Field, *Chem. Commun*, 2005, 3334-3336.

88. "Click chemistry" *en route* to pseudo-starch. L. Marmuse, S. A. Nepogodiev, R. A. Field, *Org. Biomol. Chem.*, 2005, 3, 2225-2227. **Selected by the RSC as a 'Hot Article'. Featured in *Chemistry World*, 2005, 2 (July), 26.**

87. New small molecule anti-mycobacterials. L. Ballell, R. A. Field, K. Duncan, R. J. Young, *Antimicrob. Agents. Chemother.*, 2005, 49, 2153-2163.

86. Facile one-pot synthesis of acetylated sugars and glycosides, acetal protected per-*O*-acetylated *O*-glycosides and thioglycosides employing perchloric acid immobilised on silica. B. Mukhopadhyay, D. A. Russell, R. A. Field, *Carbohydr. Res.*, 2005, 340, 1075-1080.

85. Synthesis and evaluation of mimetics of UDP and UDP- α -D-galactose, dTDP and dTDP- α -D-glucose with monosaccharides replacing the key pyrophosphate unit. L. Ballell, R. J. Young, R. A. Field, *Org. Biomol. Chem.*, 2005, 3, 1109-1115.

84. Exploiting an aromatic aglycone as a reporter of glycosylation stereochemistry in the synthesis of 1,6-linked maltooligosaccharides. L. Marmuse, S. A. Nepogodiev, R. A. Field, *Tetrahedron Asymmetry*, 2005, 16, 477–485.

83. Synthesis of a 2,3,4-triglycosylated rhamnoside fragment of rhamnogalacturonan-II side chain A using a late stage oxidation approach. A. Chauvin, S. A. Nepogodiev, R. A. Field, *J. Org. Chem.*, 2005, 70, 960-966.

2004

82. Iodine monobromide - update. R. A. Field and B. Mukhopadhyay in *Encyclopedia of Reagents in Organic Synthesis*,

L. Paquette, P. Fuchs, D. Crich and P. Wipf Eds., John Wiley and Sons Ltd, 2004.

81. Streamlined synthesis of per-O-acetylated sugars, glycosyl iodides or thioglycosides from unprotected reducing sugars. B. Mukhopadhyay, K. P. R. Kartha, D. A. Russell, R. A. Field, *J. Org. Chem.*, 2004, **69**, 7758-7760.

80. Flexible enzymatic and chemoenzymatic approaches to a broad range of uridine-diphospho-sugars. J. C. Errey, B. Mukhopadhyay, K. P. R. Kartha, R. A. Field, *Chem. Commun.*, 2004, 2796-2707.

79. Enzymatic liberation of lycotetraose from the *Solanum* glycoalkaloid α -tomatine. K. Woods, C. J. Hamilton, R. A. Field, *Carbohydr. Res.*, 2004, **339**, 2325-2328.

78. The position of a key tyrosine in dTDP-4-keto-6-deoxy-D-glucose-5-epimerase (EvaD) alters the substrate profile for this RmlC-like enzyme. A. B. Merkel, L. L. Major, J. C. Errey, M. D. Burkart, R. A. Field, C. T. Walsh, J. H. Naismith, *J. Biol. Chem.*, 2004, **279**, 32684-32691.

77. A convenient synthesis of chiral nonracemic aziridines. D. Morton, R. A. Field, D. Pearson, R. A. Stockman, *Org. Lett.*, 2004, **6**, 2377-2380.

76. Synthesis of L-arabinose-containing fragments of the oat root saponin Avenacin A-1. B. Mukhopadhyay, R. A. Field, *Carbohydr. Res.*, 2004, **339**, 1285-1291.

75. Practical de-O-acylation reactions promoted by molecular sieves. K. P. R. Kartha, B. Mukhopadhyay, R. A. Field, *Carbohydr. Res.*, 2004, **339**, 729-732.

74. Rationalising the effect of reducing agent on the oxazaborolidine-mediated asymmetric reduction of *N*-substituted imines. E. H. M. Kirton, G. Tughan, R. E. Morris, R. A. Field, *Tetrahedron Lett.*, 2004, **45**, 853-855.

73. Synthesis of an apiose-containing disaccharide fragment of rhamnogalacturonan-II and some analogues. A-L. Chauvin, S. A. Nepogodiev, R. A. Field, *Carbohydr. Res.*, 2004, **339**, 21-27.

2003

72. Corey-Chaykovsky reaction of chiral sulfinyl imines: a convenient procedure for formation of chiral aziridines. D. Morton, D. Pearson, R.A. Field, R.A. Stockman, *Synlett.*, 2003, 1985-1988.

71. Observations on iodine-promoted β -mannosylation. S.J. Marsh, K. P. R. Kartha, R.A. Field' *Synlett*, 2003, 1376-1379.

70. The structural basis of the mechanism of bacterial sugar-nucleotide modifying enzymes. R.A. Field, J.H. Naismith, *Biochemistry*, 2003, **42**, 7637-7647.

69. A simple one-pot method for the synthesis of partially protected mono- and disaccharide building blocks using an orthoesterification-benylation-orthoester rearrangement approach. B. Mukhopadhyay, R.A. Field, *Carbohydr. Res.*, 2003, **338**, 2149-2152.

68. C.J. Hamilton and R.A. Field, Royal Society of Chemistry Specialist Periodical Reports. Carbohydrate Chemistry. Volume 34. Chapter 20. Enzymes in Carbohydrate Chemistry

67. R.A. Field, Royal Society of Chemistry Specialist Periodical Reports. Carbohydrate Chemistry. Volume 34. Chapter 1. General Aspects.

66. Preparation, X-ray structure and reactivity of a stable glycosyl iodide. J. Bickley, J.A. Cottrell, R.A. Field, D.L. Hughes, K.P.R. Kartha, F. Scheinmann, A.V. Stachulski, *Chem. Commun.*, 2003, 1266-1267.

65. Synthesis and activation of carbohydrate donors: thioglycosides and sulfoxides. K.P.R. Kartha and R.A. Field in *Best Synthetic Methods: Carbohydrates*. pp 121-145 Ed. H.M.I. Osborn. 2003, Elsevier Science Ltd, Amsterdam.

64. Practical synthesis of 2-acetamido-3,4,6-tri-O-acetyl-2-deoxy- β -D-glucosides of Fmoc-serine and Fmoc-threonine. I. Carvalho, S.L. Scheuerl, K.P.R. Kartha, R.A. Field, *Carbohydr. Res.*, 2003, **338**, 1039-1043.

2002

63. R.A. Field, Royal Society of Chemistry Specialist Periodical Reports. Carbohydrate Chemistry. Volume 33. Chapter 21. NMR Spectroscopy and Conformational Features. Royal Society of Chemistry, 2002.

62. Observations on chemical and enzymatic approaches to α -2,3-sialylated octyl β -lactoside. W.B. Turnbull, J.A. Harrison, K.P.R. Kartha, S. Schenkman and R.A. Field, *Tetrahedron*, 2002, **58**, 3207-3216.

2001

61. Iodine and its Interhalogen Compounds: Versatile Reagents in Carbohydrate Chemistry XIII. General Activation of 'Armed' Glycosyl Donors. K.P.R. Kartha, T.S. Kärkkäinen, S.J. Marsh and R.A. Field, *Synlett*, 2001, 260-262.

60. Hydrolase and Sialyltransferase Activities of *Trypanosoma cruzi* trans-Sialidase Towards NeuAc- α -2,3-Gal- β -O-

PNP: J.A. Harrison, K.P.R. Kartha, W.B. Turnbull, S.L. Scheuerl, J.H. Naismith, S. Schenkman and R.A. Field, *Bioorg. Med. Chem. Lett.*, 2001, 11, 141-144.

59. Stereospecific synthesis of 5-phospho- α -D-arabinosyl-C-phosphonophosphate (pACpp): a stable analogue of the putative mycobacterial cell wall biosynthetic intermediate 5-phospho-D-arabinosyl pyrophosphate (pApp). P. McGurk, G.X. Chang, T.L. Lowary, M. McNeil and R.A. Field, *Tetrahedron Lett.*, 2001, 42, 2231-2234.

58. Iodine and its Interhalogen Compounds: Versatile Reagents in Carbohydrate Chemistry XIV. Glycosylated Amino Acid Synthesis. K.P.R. Kartha, L. Ballell, J. Bilke, M. McNeil and R.A. Field, *J. Chem. Soc., Perkin Trans 1*, 2001, 770-772.

57. R.A. Field, Specialist Periodical Reports. Carbohydrate Chemistry. Volume 32. Chapter 21. NMR Spectroscopy and Conformational Features. Royal Society of Chemistry, 2001.

56. R.A. Field, Specialist Periodical Reports. Carbohydrate Chemistry. Volume 32. Chapter 22. Other Physical Methods. Royal Society of Chemistry, 2001.

55. R.A. Field, Specialist Periodical Reports. Carbohydrate Chemistry. Volume 32. Chapter 23. Separatory and Analytical Methods. Royal Society of Chemistry, 2001.

54. Synthetic mannosides act as acceptors for mycobacterial 1-6 mannosyltransferase, J.R. Brown, R.A. Field, A. Barker, M. Guy, R. Grewal, K-H. Khoo, P.J. Brennan, G.S. Besra and D. Chatterjee, *Bioorg. Med. Chem.*, 2001, 9, 815-824.

53. Over-expression, purification, crystallization and data collection on the *Bordetella pertussis* *wlbD* gene product, a putative UDP-GlcNAc 2'-epimerase. V. Sri Kannathasan, A.G. Staines, C.J. Dong, R.A. Field, A.G. Preston, D.J. Maskell and J.H. Naismith, *Acta Cryst.*, 2001, D57, 1310-1312.

2000

52. Iodine, a Versatile Reagent in Carbohydrate Chemistry: Activation of Thioglycosides and Glycosyl Sulfoxides. K.P.R. Kartha, M. Aloui, P. Cura, S.J. Marsh and R.A. Field, *Advances in Sulfur Chemistry Volume 2*, 2000, C.M. Rayner Ed., JAI Press, US, 37-56.

51. Observations on the Activation of Methyl Thioglycosides with Iodine, Iodine Monobromide and Iodine Monochloride. K.P.R. Kartha, P. Cura, M. Aloui, S.K. Readman, T.J. Rutherford and R.A. Field, *Tetrahedron Asymm.*, 2000, 11, 581-593.

50. RmlC, The Third Enzyme of the dTDP-L-Rhamnose Pathway, is a New Class of Epimerase. M-F. Giraud, G.A. Leonard, R.A. Field, C. Bernlind and J.H. Naismith, *Nature Struct. Biol.*, 2000, 7, 398-402.

49. Thio-oligosaccharides of Sialic acid - Synthesis of an $\alpha(2-3)$ Sialyl Galactoside via a Gulofuranose / Gulopyranose Approach. W.B. Turnbull and R.A. Field, *J. Chem. Soc., Perkin Trans. 1*, 2000, 1859-1866.

48. Iodine and its Interhalogen Compounds: Versatile Reagents in Carbohydrate Chemistry XII. Tuning Promoter Reactivity for Thioglycoside Activation. P. Cura, M. Aloui, K.P.R. Kartha and R.A. Field, *Synlett.*, 2000, 1279-1280.

1999

47. *N*-Substituted Analogues of *S*-Nitroso-*N*-acetyl-D,L-Penicillamine: Chemical Stability and Prolonged Nitric Oxide Mediated Vasodilation in Isolated Rat Femoral Arteries. I.L. Megson, S. Morton, I.R. Greig, F.A. Mazzei, R.A. Field, A.R. Butler, G. Caron, A. Gasco, R. Fruttero and D.J. Webb, *British J. Pharmacol.*, 1999, 129, 639-648.

46. Adaptation of an NMR Signal Suppression Pulse Sequence for the Selective Removal of Benzylic Methylene Signals of Benzyl Ether-Protected Carbohydrates. T.J. Rutherford, K.P.R. Kartha, S.K. Readman, P. Cura and R.A. Field, *Tetrahedron Lett.*, 1999, 40, 2025-2028.

45. Iodine and its Interhalogen Compounds: Versatile Reagents in Carbohydrate Chemistry IX. A Mild and Selective Deprotection of *tert*-Butyldimethylsilyl (TBDMS) Ethers in the Presence of Various Protecting Groups Using Iodine Monobromide. K.P.R. Kartha and R.A. Field, *SYNLETT*, 1999, 311-312.

44. Stable Isotope Assisted Transferred NOE Studies on ^{13}C -Enriched Sialyl Lewis x Bound in Solution and Bound to E-Selectin. R. Harris, G.R. Kiddle, R.A. Field, B. Ernst, J.L. Magnani and S.W. Homans, *J. Am. Chem. Soc.*, 1999, 121, 2546-2551.

43. Man α 1-2 Man α OME - Concanavalin A Complex Reveals a Balance of Forces Involved in Carbohydrate Recognition. D.N. Mootoo, B. Cannan, R.A. Field and J.H. Naismith, *Glycobiology*, 1999, 9, 539-545.

42. The GPI Biosynthetic Pathway as a Therapeutic Target for African Sleeping Sickness. M.A.J. Ferguson, J.S. Brimacombe, J.R. Brown, A. Crossman, A. Dix, R.A. Field, M.L.S. Güther, K.G. Milne, D.K. Sharma and T.K. Smith, *Biochim. Biophys. Acta*, 1999, 1455, 327-340.

1998

41. New Conformational Constraints in Isotopically ^{13}C -Enriched Oligosaccharides. M.J. Milton, R. Harris, M.A. Probert, R.A. Field and S.W. Homans, *Glycobiology*, 1998, 8, 147-153.
40. Iodine and its Interhalogen Compounds : Versatile Reagents in Carbohydrate Chemistry V. Synthesis of 1,2-*trans*-Linked 1-Thioglycosides From Per-*O*-Acetylated Glycoses. K.P.R. Kartha and R.A. Field, *J. Carbohydr. Chem.*, 1998, 17, 693-702.
39. Methyl 2-*O*- α -D-Galactopyranosyl- α -D-mannopyranoside - Coffee Bean α -Galactosidase Sensitivity of a Synthetic Fragment of a *Trypanosoma brucei* GPI Anchor. J.R. Brown, K.P.R. Kartha, M.A.J. Ferguson and R.A. Field, *Carbohydr. Lett.*, 1998, 3, 97-100.
38. Chemical Synthesis of ^{13}C -Labelled Ganglioside Gb₃ Trisaccharide from [U- ^{13}C]-D-Glucose. H. Shimizu, J.M. Brown, S.W. Homans and R.A. Field, *Tetrahedron*, 1998, 54, 9489-9506.
37. Probing Carbohydrate-Protein Interactions by High-Resolution NMR Spectroscopy. S.W. Homans, R.A. Field, M.J. Milton, M.A. Probert and J.M. Richardson, *Adv. Exp. Med. Biol.*, 1998, 435, 29-38.
36. Synthetic GPI Anchor Fragments as Substrates for *Trypanosoma brucei* α -Galactosyltransferases. J.R. Brown, T.K. Smith, M.A.J. Ferguson and R.A. Field, *Bioorg. Med. Chem. Lett.*, 1998, 8, 2051-2054.
35. Solution Structure of the Complex Between the B-Subunit Homopentamer of Verotoxin VT-1 from *E. coli* and the Trisaccharide Moiety of Globotriaosylceramide. H. Shimizu, R.A. Field, S.W. Homans and A. Donohue-Rolfe, *Biochemistry*, 1998, 37, 11078-11082.
34. Iodine and its Interhalogen Compounds: Versatile Reagents in Carbohydrate Chemistry VIII. A Simple, Practical Method for the Preparation of Glycosyl Iodides From Per-*O*-Acetyl or Other Derivatives of Carbohydrates. K.P.R. Kartha and R.A. Field, *Carbohydr. Lett.*, 1998, 3, 179-186.
33. Synthesis of ^{13}C -Labelled Methyl α -D-Mannopyranosyl(1-2)- α -D-Mannopyranoside from [U- ^{13}C]-D-Glucose. A.K. Misra, J.M. Brown, S.W. Homans and R.A. Field, *Carbohydr. Lett.*, 1998, 3, 217-222.

1997

32. Structure of a Glycoconjugate in Solution and in Complex with an Antibody Fv Fragment. D.G. Low, M.A. Probert, G. Embleton, K. Sheshadri, R.A. Field, S.W. Homans, J. Windust and P.J. Davis, *Glycobiology*, 1997, 7, 373-381.
31. Synthetic Mannosides as Potential Substrates for the GPI Biosynthetic Pathway in *Trypanosoma brucei*. J.R. Brown, M.L.S. Güther, R.A. Field and M.A.J. Ferguson, *Glycobiology*, 1997, 7, 549-558.
30. An Examination of Some Derivatives of S-Nitroso-1-thiosugars as Vasodilators. A.R. Butler, R.A. Field, I.R. Greig, F.W. Flitney, S.K. Bisland, F. Khan and J.J.F. Belch, *Nitric Oxide: Biology and Chemistry*, 1997, 1, 211-217.
29. The Development of a High Through-put Spectrophotometric Assay to Monitor *Trypanosoma cruzi* *trans*-Sialidase. J.A. Harrison, K.P.R. Kartha, S.L. Smith, J.H. Naismith, S. Schenkman and R.A. Field, *Biochem. Soc. Trans.*, 1997, 25, 424S.
28. On the Role of Manganese Cation in the Mechanism of α -1,3-Fucosyltransferase. S.L. Smith, C.A. Compston, M.M. Palcic, M.J. Bamford, C.J. Britten and R.A. Field, *Biochem. Soc. Trans.*, 1997, 25, S630.
27. Chemoenzymatic Synthesis of GM₃, Lewis x and Sialyl Lewis x Oligosaccharides in ^{13}C -Enriched Form. M.A. Probert, M.J. Milton, R. Harris, S. Schenkman, J.M. Brown, S.W. Homans and R.A. Field, *Tetrahedron Lett.*, 1997, 38, 5861-5864.
26. Iodine: A Versatile Reagent in Carbohydrate Chemistry IV. Per-*O*-Acetylation, Regioselective Acylation and Acetolysis. K.P.R. Kartha and R.A. Field, *Tetrahedron*, 1997, 53, 11753-11766.
25. Glycosylation Chemistry Promoted by Iodine Monobromide: Efficient Synthesis of Glycosyl Bromides from Thioglycosides and *O*-Glycosides from Glycosyl Bromides. K.P.R. Kartha and R.A. Field, *Tetrahedron Lett.*, 1997, 38, 8233-8237.

1996

24. Structural Basis of Trimannoside Recognition by Concanavalin A. J.H. Naismith and R.A. Field, *J. Biol. Chem.*, 1996, 271, 972-976.
23. Purification and Initial Characterization of Proline 4-Hydroxylase from *Streptomyces griseoviridis* P8648; a 2-Oxoacid, Ferrous Dependent Dioxygenase Involved in Etamycin Biosynthesis. C.C. Lawrence, W.J. Sobey, R.A. Field, J.E. Baldwin and C.J. Schofield, *Biochem. J.*, 1996, 383, 185-191.
22. Iodine: A Versatile Reagent in Carbohydrate Chemistry II. Efficient Chemoselective Activation of Thioglycosides.

K.P.R. Kartha, M. Aloui and R.A. Field, *Tetrahedron Lett.*, 1996, 37, 5175-5178.

21. Iodine : A Versatile Reagent in Carbohydrate Chemistry III. Efficient Activation of Glycosyl Halides in Combination with DDQ. K.P.R. Kartha, M. Aloui and R.A. Field, *Tetrahedron Lett.*, 1996, 37, 8807-8810.

1995

20. Hydrophobic Glycosides of *N*-Acetylglucosamine Can Act as Primers of Polyglucosamine Synthesis and Can Affect Glycolipid Synthesis *in vivo*. D.C.A. Neville, R.A. Field and M.A.J. Ferguson, *Biochem. J.*, 1995, 307, 791-797.

19. Benzyl 2-Acetamido-4-azido-3-*O*-benzoyl-6-*O*-(*tert*-butyldiphenylsilyl)-2,4-dideoxy- β -D-glucopyranoside. J.C. Barnes and R.A. Field, *Acta Cryst.*, 1995, C51, 1018-1020.

18. The Hydrophobic Mannoside Man- α -1,6-Man- α -S-(CH₂)₇CH₃ Acts as an Acceptor for the UDP-Gal:GPI Anchor α -1,3-Galactosyl transferase of *Trypanosoma brucei*. S. Pingel, R.A. Field, M. Dushenko, M.L.S. Güther and M.A.J. Ferguson, *Biochem. J.*, 1995, 309, 877-882.

17. Synthesis and ¹H NMR Characterization of the Six Isomeric Mono-*O*-Sulfates of 8-Methoxycarbonyloct-1-yl O- β -D-Galactopyranosyl-(1,4)-2-acetamido-2-deoxy- β -D-glucopyranoside. R.A. Field, A. Otter, W. Fu and O. Hindsgaul, *Carbohydr. Res.*, 1995, 276, 347-363.

1994

16. Acceptor Analogues as Potential Inhibitors of Bovine β -1,4-Galactosyl Transferase. R.A. Field, D.C.A. Neville, R.W. Smith and M.A.J. Ferguson, *Bioorg. Med. Chem. Lett.*, 1994, 4, 391-394.

15. Partial Purification and Characterization of the GlcNAc-PI De-*N*-acetylase of Glycosyl-phosphatidylinositol Anchor Biosynthesis in African Trypanosomes. K.G. Milne, R.A. Field, W.J. Masterson, S. Cottaz, J.S. Brimacombe and M.A.J. Ferguson, *J. Biol. Chem.*, 1994, 269, 16403-16408.

14. Glycosyl-phosphatidylinositol Molecules of the Parasite and the Host. M.A.J. Ferguson, J.S. Brimacombe, S. Cottaz, R.A. Field, M.L.S. Güther, S.W. Homans, M.J. McConville, A. Mehlert, K.G. Milne, J.E. Ralton, Y.A. Roy, P. Schneider and N. Zitzmann, *Parasitology*, 1994, 108, S45-S54.

13. Substrate Specificity of Proline 4-Hydroxylase: Chemical and Enzymatic Synthesis of 2*S*,3*R*,4*S*-Epoxyproline. J.E. Baldwin, R.A. Field, C.C. Lawrence, V. Lee, J.K. Robinson and C.J. Schofield, *Tetrahedron Lett.*, 1994, 35, 4649-4652.

1993

12. Exchange of Valine 2-H in the Biosynthesis of δ -(L- α -Aminoadipoyl)-L-cysteinyl-D-valine. J.E. Baldwin, M.F. Byford, R.A. Field, C-Y. Xiaou, W.J. Sobey and C.J. Schofield, *Tetrahedron*, 1993, 49, 3221-3226.

11. Isolation and Partial Characterization of ACV Synthetase from *Cephalosporium acremonium* and *Streptomyces clavuligerus*. J.E. Baldwin, J.W. Bird, R.A. Field, N.M. O'Callaghan, C.J. Schofield and A.C. Willis, in *50 Years of Penicillin Application: History and Trends*, Public Ltd., Berlin, 1993.

10. The Mechanism of Inhibition of Glycosylphosphatidylinositol Anchor Biosynthesis in *Trypanosoma brucei* by Mannosamine. J.E. Ralton, K.G. Milne, M.L.S. Güther, R.A. Field and M.A.J. Ferguson, *J. Biol. Chem.*, 1993, 268, 24183-24189.

9. Biosynthesis of Glycosyl-Phosphatidylinositol Protein Anchors in African Trypanosomes. K.G. Milne, R.A. Field, and M.A.J. Ferguson, in *New Developments in Lipid-Protein Interactions and Receptor Function*, NATO/FEBS ASI Proceedings, 1993.

8. Proline 4-Hydroxylase: Stereochemical Course of the Reaction. J.E. Baldwin, R.A. Field, C.C. Lawrence, K.D. Merritt and C.J. Schofield, *Tetrahedron Lett.*, 1993, 34, 7489-7492.

1992

7. Studies on the Exchange of Valine-Oxygen During the Biosynthesis of δ -(L- α -Aminoadipoyl)-L-cysteinyl-D-valine. J.E. Baldwin, R.M. Adlington, J.W. Bird, R.A. Field, N.M. O'Callaghan and C.J. Schofield, *Tetrahedron*, 1992, 48, 1099-1108.

1991

6. Histidines, Histamines, and Imidazoles as Glycosidase Inhibitors. R.A. Field, A.H. Haines, E.J.T. Chrystal and M.C. Luszniak, *Biochem. J.*, 1991, 274, 885-889.

5. ACV Synthetase from *Cephalosporium acremonium* and *Streptomyces clavuligerus*. Evidence for the Presence of Phosphopantothenate. J.E. Baldwin, J.W. Bird, R.A. Field, N.M. O'Callaghan, C.J. Schofield and A.C. Willis, *J. Antibiot.*, 1991, 44, 241-248.

4. Exchange of Valine-Oxygen During the Biosynthesis of δ -(L- α -Aminoadipoyl)-L-cysteinyl-D-valine. J.E. Baldwin, R.A. Field and C.J. Schofield, *J.Chem.Soc., Chem.Commun.*, 1991, 1531-1532.

3. The Interaction of Anhydroalditols with Sweet Almond β -Glucosidase and *Escherichia coli* β -Galactosidase:

Implications for the Design of Potent Glycosidase Inhibitors. R.A. Field, A.H. Haines and E.J.T. Chrystal, *Bioorg. Med. Chem. Lett.*, 1991, 1, 667-672.

1990

2. Purification and Partial Characterization of ACV Synthetase from *Cephalosporium acremonium* and *Streptomyces clavuligerus*. J.E. Baldwin, J.W. Bird, R.A. Field, N.M. O'Callaghan, C.J. Schofield and A.C. Willis, *J. Antibiot.*, 1990, 43, 1055-1507.

1987

1. A Comparison by Magnetic Circular Dichroism of Compound X and Compound II of Horseradish Peroxidase. N. Foote, P.M.A. Gadsby, R.A. Field, C. Greenwood and A.J. Thomson, *FEBS Lett.*, 1987, 214, 347-350.