Professor Richard J. K. Taylor *

Recipient of the RSC 1999–2000 Tilden Medal and Lectureship

COVER FEATURE
PERKIN 1

Career

Richard Taylor is a native of Lincolnshire who studied at West Bridgford Grammar School, Nottingham before reading Chemistry at the University of Sheffield. Postgraduate research was carried out at Sheffield under the supervision of Dr D. Neville Jones. Postdoctoral research spells at Syntex in California (with Dr Ian Harrison) and University College London (Professor Franz Sondheimer) were followed by appointment to a lectureship at the Open University in Milton Keynes in 1975. Marriage (to Ginny) and children (Rebecca, Catherine and Philip) followed. In 1979 he moved to the University of East Anglia, first as a Lecturer and then as a Senior Lecturer and Reader. In 1993, he moved to a Chair of Organic Chemistry at the University of York.

Taylor's major awards are the Royal Society of Chemistry's Hickinbottom Fellowship for independent creativity in experimental organic chemistry (1985–1987) and the Tilden Medal and Lectureship (1999–2000). He is currently UK Regional Editor of the international journal *Tetrahedron* and a member of the executive board of Tetrahedron Publications.

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Research

Taylor's research interests centre on the synthesis of bioactive natural products and related compounds of pharmaceutical/agrochemical interest coupled to the design and development of new synthetic methodology. Early targets were analogues of prostaglandins, prostacyclins and thromboxanes,[1–3] and as details of the arachidonic acid biosynthetic cascade were elucidated, the group also became interested in leukotriene synthesis. A research programme was initiated to develop novel organometallic procedures for the stereoselective synthesis of (*E*,*E*)-, (*E*,*Z*)- and (*Z*,*Z*)-polyenes.[4] This chemistry was successfully utilised to synthesise leukotriene B_4 methyl ester[5] and then extended to prepare a range of other bioactive polyenes such as the navel orangeworm pheromone[6] (Fig. 1). The group also became interested in polyunsaturated marine metabolites and prepared lignarenone A[7] and (−)-umbraculumin A[8] amongst others. The involvement in the total synthesis of natural products of marine origin continues, laureatin[9] and kainic acid[10] being of current interest.

A second major natural product programme concerns the development of synthetic routes to naturally occurring anticancer and antibiotic agents. Representative examples are shown in Fig. 2; the synthetic route devised to prepare the antileukaemic natural product rocaglamide[11] has subsequently been used industrially to prepare a range of analogues for biological screening.

A major part of this programme to date has centred on the epoxycyclohexane family of natural products. In collaboration with Sandy McKillop (UEA) and Norman Lewis (SmithKline Beecham), a biomimetic synthesis of aranorosin was developed which commenced from tyrosine.[12] This target stimulated interests in stereoselective epoxidation procedures and amino acid

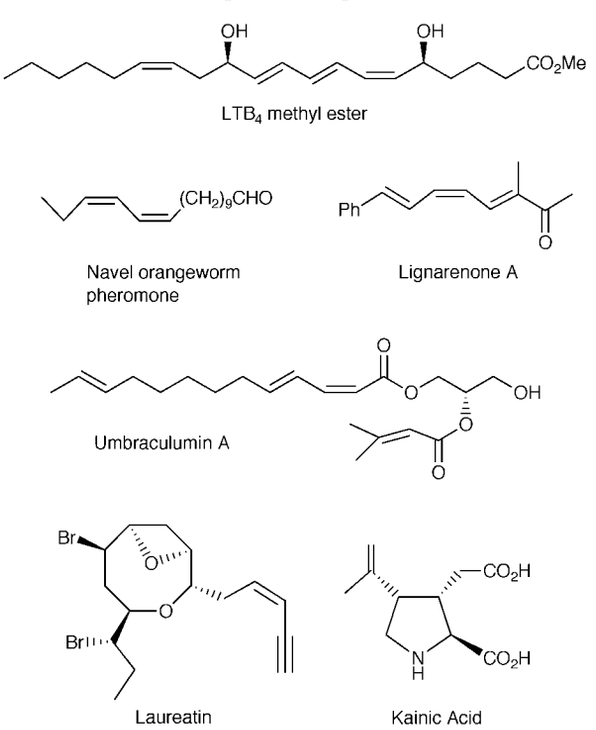

Fig. 1

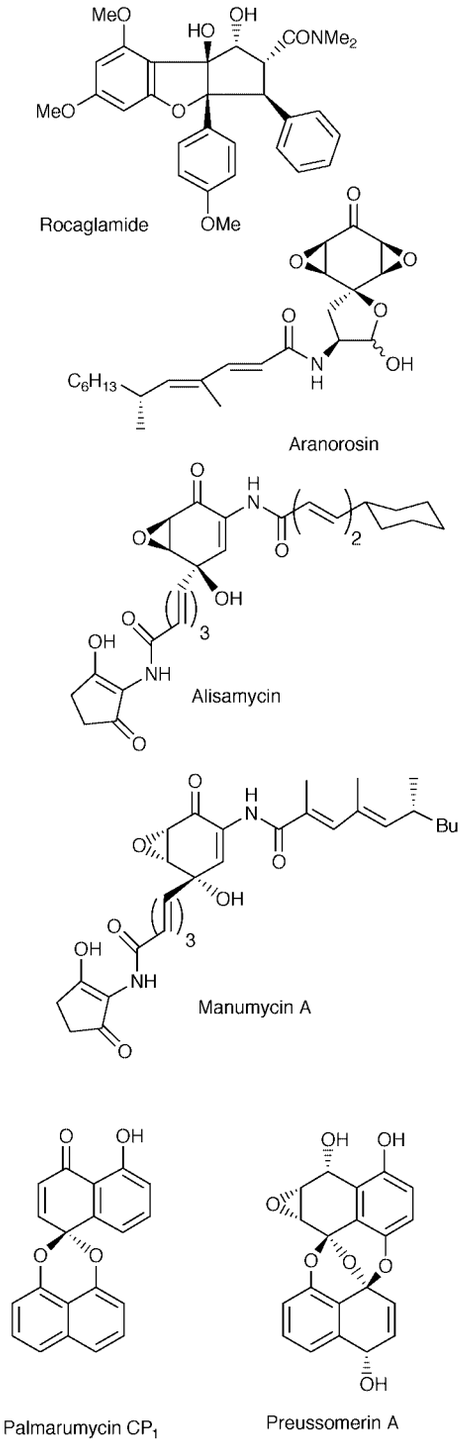

Fig. 2

chemistry[13,14] that still continue within the group. Routes to the manumycin family of antibiotics were devised next. Novel cyclohexane elaboration and Stille coupling procedures were developed and successfully applied to the synthesis of (±)-alisamycin and other members of the family in racemic form.[15] In the search for an asymmetric variant, Wynberg's chiral phase transfer epoxidation technology was utilised to prepare (+)-manumycin A.[16,17] This synthesis resulted in a revision of the stereochemical assignment: the structure originally published by Zeeck *et al.*[18] had an *anti*-hydroxy epoxide whereas the York synthesis indicated that manumycin A (and presumably all other members of the manumycin family) possess a *syn*-hydroxy epoxide arrangement as shown in Fig. 2.[17] Manumycin A is a potent inhibitor of the enzyme ras farnesyltransferase and has great potential in cancer chemotherapy. Current

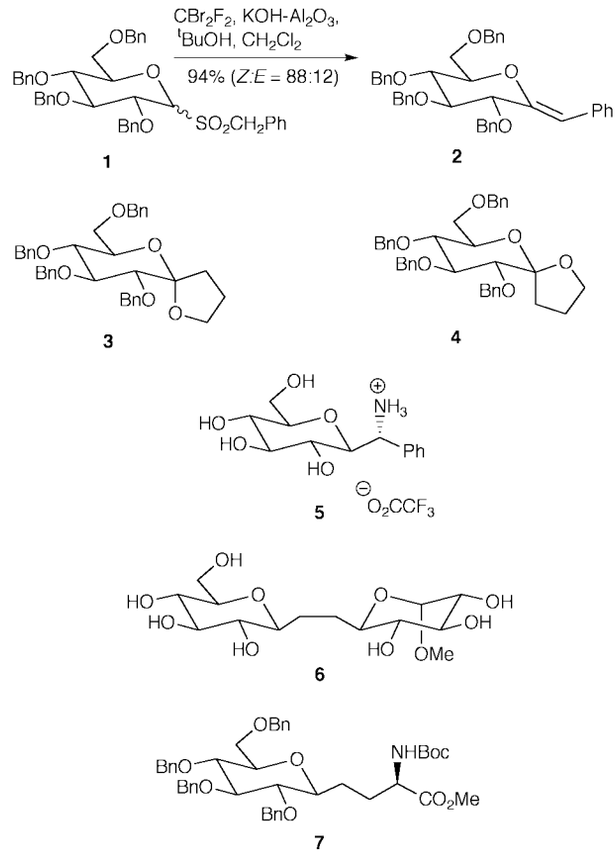

Fig. 3

research involves the design and preparation of a range of manumycin analogues for antitumour and enzyme inhibition assays. In addition, other naturally occurring ras farnesyltransferase inhibitors are being prepared and evaluated. Examples include palmarumycin CP_1 and preussomerin A (Fig. 2).[19] These projects have also led to the initiation of a new methodological programme to design efficient procedures for the enantioselective epoxidation of cyclic enones.[20]

In terms of synthetic methodology, organometallic reagents feature prominently: many of the targets referred to above were prepared using organometallic procedures developed by the Taylor group. Thus, for example, organotitanium chemistry was utilised to prepare kainic acid,[10] Stille coupling methodology to prepare the manumycins,[17,21] and organocopper technology to obtain the navel orangeworm pheromone.[6] Indeed, synthetic applications of organocopper chemistry have been a longstanding interest.[22] Novel transformations based on organosulfur chemistry have also been a continuing theme. Most attention has concentrated on synthetic applications of the Ramberg–Bäcklund rearrangement and the intermediate episulfones.[23] In this area, the Taylor group provided the first unambiguous proof that episulfones are formed as intermediates in the Ramberg–Bäcklund rearrangement,[24] and also devised the first procedure for the preparation of episulfones by the oxidation of episulfides.[25] New variants of the Ramberg–Bäcklund process have also been devised.[26,27]

The Ramberg–Bäcklund rearrangement has been utilised to prepare a number of bioactive targets including tetrahydrodicranenone B,[28] *trans*-carbovir,[29] and protected allyl glycine derivatives.[33] Current attention in this area is concentrating on applications of the Ramberg–Bäcklund methodology to *exo*-glycal and *C*-glycoside synthesis (Fig. 3). Thus, readily available protected *S*-glycoside dioxides **1** have been efficiently converted into *exo*-glycals **2** using an *in situ* halogenation—Ramberg–Bäcklund procedure.[31] This methodology has recently been extended to prepare spiroacetals **3** and **4**,[32] a key intermediate in

the synthesis of glycosidase inhibitor **5**,[32] *C*-linked disaccharides such as methyl *C*-gentiobioside **6**,[33] and *C*-linked glycosyl amino acids such as the glycosyl serine analogue **7**.[34]

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