10.1071/CHv57n9toc Volume 57, Number 9, 2004, xxxiii

The cover shows the MshB enzyme from the tuberculosis-causing bacteria, one topic of many researched in New Zealand.

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Foreword

Chemistry at the Interface

Andrew D. Abell

Aust. J. Chem. **2004**, *57*, 819.

This issue compiles some of the outstanding science presented at the NZIC 'Chemistry at the Interface' conference, named aptly for the interface of chemistry and biology, the interface of chemistry with the commercial sector, and the interface of chemistry with materials and nanotechnology.

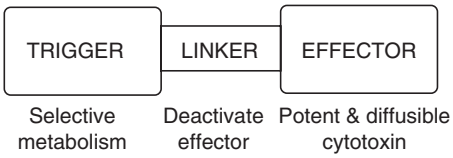
Reviews

The Design of Drugs that Target Tumour Hypoxia

William A. Denny

Aust. J. Chem. **2004**, *57*, 821–828.

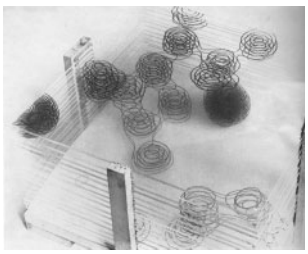
This review highlights the vital role synthetic chemistry has played in anticancer drug development. In particular, the design issues of hypoxia-activated prodrugs (hypoxia being a tumour-specific physiological phenomenon) are addressed. The general modular design of a prodrug is shown in the graphic.



From Penicillin to the Ribosome: Revolutions in the Determination and Use of Molecular Structure in Chemistry and Biology

Edward N. Baker

Aust. J. Chem. **2004**, *57*, 829–836.

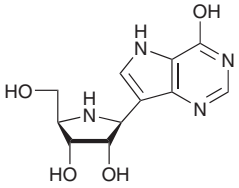


At the interface of chemistry and biology a revolution in our understanding of structure and activity is underway. Core to this advance is the detailed structural data made available by the complementary techniques of NMR spectroscopy and X-ray crystallography. This review concentrates on the effects the latter has had on modern structure–activity studies. The photograph shows an early structural study of penicillin.

The Synthesis of *N*-Ribosyl Transferase Inhibitors Based on a Transition State Blueprint

Gary B. Evans

Aust. J. Chem. **2004**, *57*, 837–854.



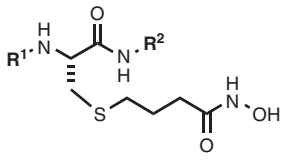
This review, which is the result of a ten-year investigation into metabolically important *N*-ribosyl transferase inhibitors, highlights the power of transition state modelling and its application in enzyme inhibitor design. Of particular note is the discovery of the inhibitor depicted, which is currently in phase II clinical trials for refractory T-cell leukemia.

Current Chemistry

Small Molecules that Mimic Components of Bioactive Protein Surfaces

David P. Fairlie

Aust. J. Chem. **2004**, *57*, 855–857.



Small synthetic molecules capable of structurally mimicking bioactive surfaces of a protein are frequently able to reproduce functional responses shown by proteins. This emerging field of study is illustrated here, by a selection of simple new mimics of peptide strands, turns, helices, and (for the compound pictured) amino acids.

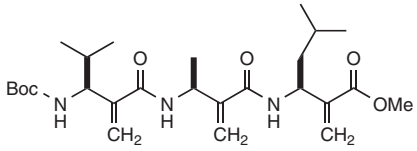
Full Papers

Synthesis and Spectroscopic Characterization of β-Di-, β-Tri-, and β-Hexapeptides Built with (*S*)-2-Methylene-3-aminoalkanoic Acids Derived from Alanine, Valine, and Leucine

Daniel J. Bierbaum, Dieter Seebach

Aust. J. Chem. **2004**, *57*, 859–863.

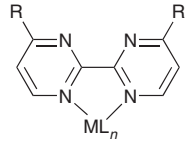
The authors describe the synthesis of a novel type of β-peptides, carrying an α-methylene group in each and every amino acid residue (dimer, trimer, hexamer with Val, Ala, and Leu side chains). CD and NMR measurements do not reveal the presence of a secondary structure in solution—on the time scales of these two spectroscopies.



Chiral Heterocyclic Ligands. X. Synthesis and Metal Complexes of Hindered and Chiral 2,2′-Bipyrimidines

Alison J. Downard, Ian G. Phillips, Peter J. Steel

Aust. J. Chem. **2004**, *57*, 865–868.



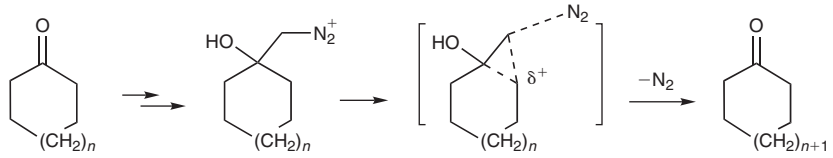
The synthesis and characterization of the first examples of 2,2′-bipyrimidine ligands incorporating bulky or chiral substituents are reported here. The ligands were prepared by nickel(0)-mediated homo-coupling reactions of chloropyrimidines and were found to coordinate through the less hindered *N*-donors (shown in the graphic).

The Silicon-Directed Tiffeneau–Demjanov Reaction: Some Theoretical Studies

Melanie McClure, Carl Schiesser, Jonathan White

Aust. J. Chem. **2004**, *57*, 869–876.

The authors modelled the Tiffeneau–Demjanov chain extension reaction using the B3LYP/6-31G* basis set for both diazonium and water leaving groups. Their results suggest that greater selectivity in the silicon-directed Tiffeneau–Demjanov reaction might be achieved by using a less reactive leaving group.

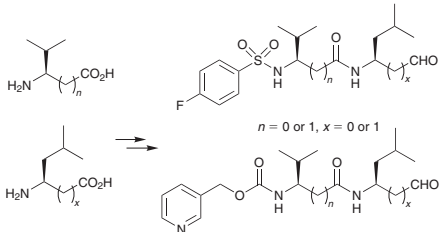


Peptidic Aldehydes Based on α- and β-Amino Acids: Synthesis, Inhibition of m-Calpain, and Anti-Cataract Properties

Richard J. Payne, Karina M. Brown, James M. Coxon, James D. Morton, Hannah Yun-Young Lee, Andrew D. Abell

Aust. J. Chem. **2004**, *57*, 877–884.

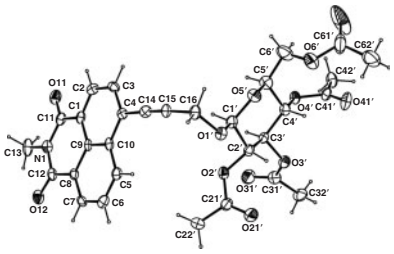
The development of cataract has recently been associated with the cysteine protease m-calpain. Although a potent m-calpain inhibitor with anticataract properties has been patented, it has limited therapeutic potential because of its poor stability, solubility, and selectivity. In their search to overcome this shortcoming, the authors present results of a systematic study on the introduction of β-amino acids into this α-dipeptidic aldehyde, where the residues are known to increase the biostability of peptide-based drugs.



Fluorescent Sugar and Uridine Conjugates of 1,8-Naphthalimides with Methyl and Ferrocenyl Headgroups

Giorgio Cavigiolio, Joy L. Morgan, Brian H. Robinson, Jim Simpson

Aust. J. Chem. **2004**, *57*, 885–894.



Over the last two decades, there has been considerable development of fluorescent oligonucleotides with non-nucleotide linkers as probes for DNA sequencing. The authors here describe the synthesis and characterization of fluorescent molecules incorporating naphthalimide fluorescent centres linked to sugar and uridine substituents.

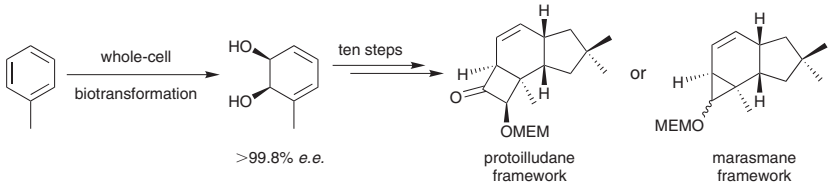
Rapid Communication

A Chemoenzymatic and Enantioselective Route to the Tricyclic Frameworks Associated with the Protoilludane and Marasmane Classes of Sesquiterpene

Martin G. Banwell, Gwion J. Harfoot

Aust. J. Chem. **2004**, *57*, 895–897.

The illustrated and enantiomerically pure *cis*-1,2-dihydrocatechol obtained through whole-cell biotransformation of toluene has been converted into the illustrated tricyclic products which embody key elements of the protoilludane and marasmane frameworks.



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