

Platinum Metals in Biological and Medicinal Chemistry

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The Eighth International Conference on the Chemistry of the Platinum Group Metals provided an ideal opportunity for researchers to report their latest results on research and development in the field of biological and medicinal chemistry with respect to the platinum metals. A number of exciting new directions have emerged in this field, and these are summarised below.

Professor J. K. Barton (Caltech, U.S.A.) opened the proceedings, describing the elegant use of metal-intercalators to probe charge migration through DNA. DNA base mismatches and drug lesions (including those from cisplatin) on DNA can be characterised using this method. Her research group is currently embarking on exciting *in vitro* cell studies using these novel probes.

The current status of several platinum drugs in clinical studies was reviewed by L. R. Kelland (St. George's Hospital Medical School, London, U.K.) who described the challenge of drug resistance that needs to be faced in future drug development. While cisplatin and oxaliplatin remain successful in the clinic, novel drugs such as JM216 and BBR3464 are currently under evaluation. Professor T. G. Appleton (University of Queensland, Australia) described the complex reactions with endogenous thiols that contribute to tumour resistance, and their examination using NMR techniques.

While platinum drugs are the major research

thrust of platinum metals in medicinal chemistry, the emergence of several promising ruthenium complexes with antimetastatic and antitumour activity was described by Professors G. Sava (University of Trieste, Italy) and P. J. Sadler (University of Edinburgh, U.K.), respectively. Complexes trialled by Sava have been shown to localise in the lung basement membranes, not in DNA like many platinum drugs, thus preventing lung cancer metastasis. Sadler described the development of Ru(II) arene complexes with reduced toxicity, non-cross-resistance and a different spectrum of activity to platinum compounds. Structure-activity relationships have been developed and highly selective DNA binding has been demonstrated. While it is clear that the development of further platinum chemotherapeutics is an ongoing endeavour, the emergence of active ruthenium compounds with the potential to enter clinical trials demonstrates that the medicinal chemistry of the platinum metals now has even wider potential.

The Author

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Matt Hall is the joint winner of the *Platinum Metals Review* PGM8 conference student article competition.

liquid crystals could act as templates for the synthesis of heterogeneous metal catalysts based on mesoporous silicas. Jan Bäckvall (University of Stockholm, Sweden) demonstrated the use of allenes as nucleophiles in palladium-catalysed coupling reactions, and the emphasis of palladium mediated C–C coupling reactions was continued by Hans de Vries (DSM Research, Geleen, The Netherlands) who presented thoughtful developments of Heck reactions. An alternative approach to C–C coupling, namely hydroformylation, was also stressed, with Kyoko Nozaki (University of

Tokyo, Japan) describing very effective asymmetric hydroformylation catalyst systems, and Eric Hope (University of Leicester, U.K.) showing how fluororganic groups can be exploited in green chemistry: to enhance the solubility of rhodium and ruthenium complexes in supercritical CO₂, and also utilising fluorous phases themselves as supercritical solvents.

More detailed fundamental studies relating to homogeneous catalytic processes were a feature of the programme. The elegant and penetrating studies of Bob Bergman (University of California,