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CARES Visiting Scientist Seminar Series:

Unexpectedly stable formally platinum(III) complexes produced by electrochemical oxidation of platinum(II) anti-cancer drugs

Professor Alan M. Bond, Monash University

Thursday 17 May, 5.00pm - 6.00pm

CREATE Theatrette, Level 2, CREATE Tower

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Abstract: In this lecture, the synthesis, characterisation and biological activity of some new anti-cancer organoamidoplatinum (II) Class 2 drugs will be presented along with an introduction to the chemistry of their oxidised Pt(III) analogues. In the case of [Pt{(pYC6F4)NCH2CH2NEt2}X(py)] (Y= H, Br; and X= Cl, Br, I), structural isomers have been isolated and crystallographic properties including agostic interactions, inter and intramolecular H-bonding and other supramolecular interactions have been explored that may be relevant to their DNA-binding properties. In vitro testing of the anticancer behaviour against MCF-7 and HT-29 cell lines revealed the high activity of these drugs. Chemical oxidation with hydrogen peroxide provides new ligand oxidised platinum (II) complexes that represent another potential source of anti-cancer drugs. In contrast, electrochemical conditions have been identified that favour the generation of formally metal centre oxidised platinum(III) rather than ligand oxidised species. EPR, UV-Vis and IR and XFAS methods have been used to characterise the unexpectedly stable platinum(III) species. Slow rearrangement of some of the monomeric platinum(III) species to their ligand oxidised counterparts formed by peroxided oxidation has been probed by 1H, 19F and 195Pt NMR and UV-Vis spectroscopy.The Pt^{II} organoenamineamide isolated by chemical oxidation gives a completely stable monomeric platinum(III) cation upon electrochemical oxidation for reasons that will be outlined.

Biography: Professor Bond is Emeritus Professor at Monash University, having previously been the R.L. Martin Distinguished Professor of Chemistry, Professor of Chemistry and Head of School at that institution. Over the period 1978-1990, he was Foundation Professor of Chemistry at Deakin University, and for the period 1990-1995, Professor of Chemistry, La Trobe University, Victoria, Australia. He received his Ph.D. (1971) and D.Sc. (1977) degrees from the University of Melbourne, where he held teaching and research positions. He also held visiting Professorships at Northwestern University (1972, 1976), the University of Southampton (1983) and Oxford University (1988, 1991, 1998 and 2003). Professor Bond's major research interests involve the development and application of modern electroanalytical techniques, and he is the author or co-author of over 800 papers, patents and books on this subject as well as the recipient of several senior awards from the Royal Australian Chemical Institute and the Royal Society of Chemistry. Most recently he has been the recipient of the Charles N. Reilley Award from The Society for Electroanalytical Chemistry (USA) and the Gold Medal Award from the International Society of Electrochemistry.

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