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Coupling of micro-electrochemical reaction cell to Electrospray MS (EC-ESI MS) for investigation of redox reaction products of cytotoxic metallocomplexes

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Metallocomplexes are increasingly important in the search for more effective anticancer remedies. As hybrids of inorganic and organic components, metal complexes tend to assemble the advantages of inorganic and organic drugs, such as treating a broad range of tumors and a selective mode of action. A promising examples, indazolium trans-[tetrachlorobis(1H-indazole)ruthenate(III)], auranofin (2,3,4,6-tetra-O-acetyl-1-thio-β-D-glucopyranosato-S-(triethyl-phosphine) gold(I) or Au(III)bipyc ([bipydmb-H)Au(OH)][PF₆] (where bipydmb-H = deprotonated 6-(1,1-dimethylbenzyl)-2,2'-bipyridine)) are now appreciably progressing in clinical studies, with the outcome of few side effects and evidence of clinical activity. To explore the mechanism of the drug metabolism, its behavior in simulated physiological conditions should be examined. Studies carried out *in vivo* or even *in vitro* can be economically and time consuming, especially that oxidation or reduction can be induced by addition of specific reactive species which may interfere ESI MS signals. Another method – without interfering chemical composition – is application of electrochemical reaction chamber Antec's Roxy Reactor Cell (EC), which allows to obtain redox reaction at varied potentials. Structures of metallo-species obtained at the varied redox potential applied in EC have been studied by ESI MS. The metallodrug analysis was performed in a buffered solution of ammonium formate at the physiological pH of blood and at pH of gastric juice. Auranofin was found to be activated by loss of the glucose moieties, ruthenium complex by reduction of Ru(III) to Ru(II) and Au(III) complex by oxidation of pyridines. Obtained results are in agreement with present state of knowledge and make electrochemical chamber an interesting technique for studies of metallocomplexes metabolism.

Biography

Katarzyna Pawlak has completed her PhD in the field of Analytical Chemistry from Warsaw University of Technology (WUT) and Postdoctoral studies from Centre National de la Recherche Scientifique (CNRS, France) and Gdańsk University of Technology. She is the Director of School of Liquid Chromatography and Hyphenated Techniques at WUT, Vice-President of Polish Society of Mass Spectrometry and expert of National Council of Supplemental and Nutritional Products. She has published more than 45 papers in reputed journals and has been serving as an Editorial Board Member of *repute*.

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