Title: Cytotoxic effects of organometallic rhenium complexes

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Abstract:

After the discovery of the anticancer properties of cisplatin, a myriad of platinum metals, transition metals and non-transition metal complexes have been synthesized to study their anticancer properties. Many of these complexes have been found to be extremely cytotoxic against numerous cancer cell lines. There are two major problems with these complexes (drugs) – severe side effects and drug resistance. It seems that rhenium metal complexes are relatively less toxic and they do not exhibit drug resistance. With this background in mind, we have synthesized numerous organometallic rhenium compounds of the type, *fac*-$(CO)_3(N\sim N)ReZ$, where, N~N are polypyridyls and Z are anionic ligands such as carboxylates, sulfonates, chloride, perrhenate, etc. from the reactions of the corresponding pentylcarbonato complexes, *fac*-$(CO)_3(N\sim N)ReOC(O)OC_5H_{11}$ with carboxylic acids, sulfonic acids, hydrochloric acid, perrhenic acid, etc. We studied their cytotoxic properties against a variety of cancer cell lines including breast, prostate, lungs, colon, and pancreatic cancers and lymphoma. Recently we have synthesized two groups of novel rhenium compounds including rhenium acetylsalicylate and perrhenate complexes. We have found that the rhenium complexes bearing the neocuproine, bathophenanthroline and bathocuproine ligands are stronger cytotoxic agents than other polypyridyl complexes. The IC-50 values of the highly potent complexes range from 1.0 – 2.0 μM. Because many metallodrugs bind to DNA, we studied the DNA binding properties of the rhenium complexes. The UV titration of the complexes with CT-DNA suggest that some complexes bind to DNA intercalatively and some bind to DNA minor groove. We studied the DNA binding properties with cyclic voltammetry as well as viscosity.

Biography:

Saroj K. Pramanik is currently an Associate Professor of Biology at Morgan State University, Baltimore, Maryland, USA. He obtained his PhD in Biochemistry from Indian Agricultural Research Institute, New Delhi, India. He did his postdoctoral research work at Memorial University of Newfoundland, Faculty of Medicine, St. John's, and University of Guelph, Canada. There he worked on "Myoblast Differentiation and Protein Synthesis". Since after that he worked on cancer related research at various institutes including Medical University of South Carolina, Henry Ford Hospital, USA. He has published more than 40 scientific papers and served as mentor for graduate and undergraduate students. In collaboration with Prof. Santosh K. Mandal at Morgan State University, Department of Chemistry we developed rhenium based anticancer compounds