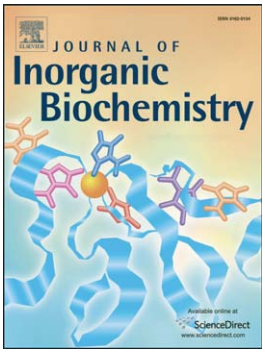

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Ru(II)/clotrimazole/diphenylphosphine/bipyridine complexes: Interaction with DNA, BSA and biological potencial against tumor cell lines and *Mycobacterium tuberculosis*

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Abstract

Three ruthenium complexes [RuCl(CTZ)(bipy)(P-P)]PF_6 [P-P =1,2-bis(diphenylphosphino)ethane (dppe-**1**), 1,4-bis(diphenylphosphino)butane (dppb-**2**) and 1,1'-bis(diphenylphosphino)ferrocene (dppf-**3**), bipy= 2,2'-bipiridine and clotrimazole (CTZ) 1-[(2-chlorophenyl)diphenylmethyl]-1*H*-imidazole] were synthesized. These complexes were characterized by a combination of elemental analysis, molar conductivity, infrared and UV–vis spectroscopy, ^{1}H, $^{13}C\{^{1}H\}$ and $^{31}P\{^{1}H\}$ nuclear magnetic resonance techniques, cyclic voltammetry and mass spectroscopy. Bovine serum albumin binding constants, which were in the range of 1.30–36.00 x 10^4 M^{-1}, and thermodynamic parameters suggest spontaneous interactions with this protein by electrostatic forces due to the positive charge of the complexes. DNA interactions studied by spectroscopic titration, viscosity measurements, gel electrophoresis, circular dichroism, ethidium bromide displacement and reactions with guanosine and guanosine monophosphate indicated the DNA binding affinity primarily through non-covalent interactions. All complexes **1–3** were tested against the human carcinoma cell lines MCF-7 (breast), A549 (lung) and DU-145 (prostate) presenting promising IC_{50} values, between 0.50 to 14.00 μM, in some cases lower than the IC_{50} for the reference drug (cisplatin). The antimicrobial activity assays of the complexes provided evidence that they are potential agents against mycobacterial infections, specifically against *M. tuberculosis* H37Rv.

Keywords: Ruthenium-bisdiphenylphosphine, Clotrimazole, antitumor and anti-*Mycobacterium tuberculosis*