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Ruthenium(II) Phosphinic Complex with Acyltiourea: Characterization and Interaction with Albumin

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Over the years, the number of new cancer cases has drastically increased worldwide[1]. A promising strategy is to design new anticancer agents by synthesizing metal complexes bound to bioactive molecules, aiming to maximize their effects[2]. Synthesizing such complexes by coordinating bioactive organic molecules with ruthenium can be a promising approach for the development of metallodrugs. One class of molecules with interesting properties is acylthioureas, which possess significant biological activities such as antifungal, antibacterial, anticancer, and antiviral activities[3]. In this work, a ruthenium(II) complex with the formula $[Ru(DFBTh)(dppm)_2]PF_6$ where DFBTh = N,N-(diphenyl)-N'-benzoylthiourea, and dppm = bis(diphenylphosphino)methane, was synthesized. The obtained complex was characterized by molar conductivity, infrared (IR) absorption spectroscopy, ultraviolet-visible (UV-Vis) spectroscopy, nuclear magnetic resonance (NMR) ($^{31}P\{1H\}$, ^{1}H, and ^{13}C), cyclic voltammetry and X-ray crystallography. The interaction of the complex with HSA (Human Serum Albumin) was evaluated, as binding to this protein can lead to an improvement or reduction of its biological properties. Through the Stern-Volmer constant (K_{sv}), a static mechanism for the interaction of the complex with HSA was indicated, and the magnitude (10^5 mol^{-1}) of the binding constant (Kb) suggested a moderate interaction between the protein and the complex. A negative value of ΔGº was obtained, indicating that the interaction is spontaneous. Positive values of ΔHº and ΔSº were also obtained, indicating hydrophobic forces for the interaction between the complex and HSA.

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