XXI Brazilian Meeting on Inorganic Chemistry · X Brazilian Meeting on Rare Earths · III Workshop on Theoretical Bioinorganic Chemistry
Belo Horizonte, September 12 - 15th 2024

Ru(II)/Phosphine Complex with NSAID Ligand: Insights into Albumin and DNA Binding

Alvaro Reis O. Queiroz[1], Gabriel H. Ribeiro[2], Rodrigo S. Correa[3], Katia M. Oliveira[1]

[1]Institute of Chemistry, University of Brasília (UnB), Brasília – DF, Brazil
[2]Departament of Chemistry, Federal University of São Carlos (UFSCar), São Carlos – SP, Brazil
[3]Departament of Chemistry, Federal University of Ouro Preto (UFOP), Ouro Preto – MG, Brazil
E-mail: alvaroreisdeoliveiraqueiroz@gmail.com

Thematic Area: Biological Inorganic Chemistry

Keywords: Ruthenium complex, NSAID, albumin

Cancer is a condition of global concern, and therefore the development of new, efficient chemotherapeutics for its treatment has been widely studied. Ruthenium complexes have emerged as particularly promising due to their potent antitumor properties [1]. Combining non-steroidal anti-inflammatory drugs (NSAIDs) with ruthenium is a promising strategy for obtaining new complexes with potential cytotoxic activity. Fenamic acid, in particular, has gained attention for its therapeutical properties, including anti-inflammatory, antibacterial, antitumoral, antiproliferative, and analgesic effects[2][3]. In this work, a new Ru(II) complex with the formula $[Ru(fe)(dppm)_2]PF_6$ was obtained, where fe = fenamic acid and dppm = bis(diphenylphosphino)methane. The complex was characterized by molar conductivity, elemental analysis, infrared (IR) absorption spectroscopy, ultraviolet-visible (UV-Vis) spectroscopy, 1D and 2D Nuclear Magnetic Ressonance (NMR), cyclic voltammetry, as well as single-crystal X-ray diffraction. The interaction of the complex with bovine serum albumin (BSA) was analyzed using fluoresce emission spectroscopy. The Stern-Volmer constant (Ksv) indicated the involvement of a static quenching mechanism, and the binding constant (Kb), with the order of magnitude of 10^3 mol^{-1} L, revealed a weak interaction between the protein and the Ru(II) complex. Additionally, the interaction of the ruthenium complex with CT-DNA was analyzed using Hoechst 33258 and thiazole orange displacement assays. The results indicated a prevalence of interaction through the grooves of CT-DNA.

Acknowledgments: FAPDF (Proc. 00193-00002088/2023-42)

References

[1]Thota, S.; Rodrigues, D. A.; Crans, D. C.; Barreiro, E. J. Journal of Medicinal Chemistry, **61**, 5805 (2018).
[2]Banti,C. N.; Hadjikakou, S. K. European Journal of Inorganic Chemistry, **2016**, 3048 (2016).
[3]Khan, H. Y.; Parveen, S.; Yousuf, I.; Tabassum, S.; Arjmand, F. Coordination Chemistry Reviews, **453**, 214316 (2022)