Nanostructured Lipid Systems as a Strategy to Improve the *in Vitro* Cytotoxicity of Ruthenium(II) Compounds

Silva, P.B.[1], Freitas, E.S.[2], Chorilli, M.[1], Batista, A.A.[3], Lopes, E.O.[2], Silva, M.M.[3], Leite, C.Q.F.[2] and Pavan, F.R.[2]

[1] Departamento de Fármacos e Medicamentos, Faculdade de Ciências Farmacêuticas, Universidade Estadual Paulista, Araraquara, São Paulo 14801-902, Brazil
[2] Departamento de Ciências Biológicas, Faculdade de Ciências Farmacêuticas, Universidade Estadual Paulista, Araraquara, São Paulo 14801-902, Brazil
[3] Departamento de Química, Universidade Federal de São Carlos, São Carlos, São Paulo 13565-905, Brazil

Background: Tuberculosis (TB) is an ancient disease that is still present as a global public health problem. Our group has been investigating new molecules with anti-TB activity. In this context, inorganic chemistry has been a quite promising source of such molecules, with excellent results seen with ruthenium compounds. Nanostructured lipid systems may potentiate the action of drugs by reducing the required dosage and side effects and improving the antimicrobial effects. **Objective:** The aim of this study was to develop a nanostructured lipid system and then characterize and apply these encapsulated compounds (**SCARs 1**, **2** and **4**) with the goal of improving their activity by decreasing the Minimum Inhibitory Concentration (MIC_{90}) and reducing the cytotoxicity (IC_{50}). **Material and Methods:** The synthesis of the complexes [Ru(pic)(dppb)(bipy)]PF_6 (**SCAR1**), [Ru(pic)(dppb)(Me-bipy)]PF_6 (**SCAR2**), [Ru(pic)(dppb)(phen)]PF_6 (**SCAR4**) was performed according to the methodology described by Pavan et al, 2010. The nanostructured system was composed of 10% phase oil (cholesterol), 10% surfactant (soy oleate, soy phosphatidylcholine and Eumulgin®) and 80% aqueous phase (phosphate buffer pH = 7.4). The anti-*Mycobacterium tuberculosis* activity of the compounds was determined using the Resazurin Microtiter Assay (REMA) method according to Palomino et al 2002. The cytotoxicity of the complexes diluted in DMSO and in nanostructured in lipid systems was measured on normal epithelial cells (VERO ATCC CCL -81) as described by Pavan et al, 2010. **Results and Discussion:** The ruthenium compounds **SCARs 1**–**4** have met some of the criteria that a new drug against tuberculosis must fulfill; however, they have considerable cellular toxicity. In this work involving nanoencapsulation, there was a decrease in their cytotoxicity while maintaining their activity against *M. tuberculosis*. These results make this new family of drugs against tuberculosis even more promising.

Keywords: Anti-TB drugs; Ruthenium; Nanostructured Lipid Systems

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