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Investigation of cytotoxicity and DNA binding modes of Ruthenium(II)-phosphine-naphthoquinone complexes

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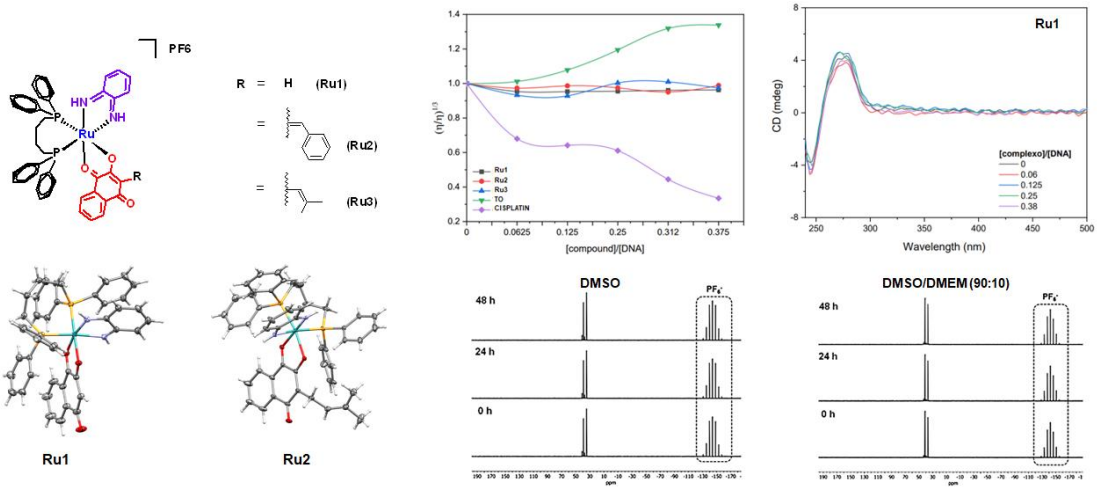
Highlights

Three novel ruthenium-phosphine-naphthoquinone complexes were obtained and the modes of interaction with DNA were investigated.

Resumo/Abstract

The coordination of biological molecules to a metal center seems to be a promising strategy to develop new compounds with increased anticancer properties. In this direction, ruthenium arises as an alternative to conventional platinum drugs to obtain new cytotoxic metal-based compounds with lower side effects. In this work, we investigate three novel ruthenium-phosphine-naphthoquinone complexes [Ru(NQ1)(dppb)(bdqi)PF_6 (**Ru1**), [Ru(NQ2)(dppb)(bdqi)PF_6 (**Ru2**) and [Ru(NQ3)(dppb)(bdqi)PF_6 (**Ru3**)], where NQ1 = Lausone, NQ2 = Lapachol and NQ3 = 3-styryl-lausone in their deprotonated forms, dppb = 1,4-Bis(diphenylphosphino)butane and bdqi is o-phenylenediamine. The complexes were synthesized and characterized *via* MS-q TOF. The purity of the complexes was assessed *via* elemental analysis and mass spectrometry. Additionally, the structure of the complexes were confirmed by X-ray diffraction. Molar conductivity revealed 1:1 species. The presence of the PF_6^- counterion was confirmed by IR spectroscopy (bands at 842 and 557 cm^{-1}) and by $^{31}P\{^1H\}$ NMR (signal at -144 ppm). All complexes demonstrated to be stable in DMSO and DMSO/DMEM (90:10) solutions, over 48 hours. To obtain more insights of main DNA binding modes, circular dichroism, viscosity and fluorescence competition experiments were employed. Taken together, our results revealed the interaction between **Ru1-Ru3** and DNA is driven by weak forces. *In vitro* cytotoxicity experiments using different cancer and non-cancerous cell lines are ongoing and will be presented.



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