

Synthesis, physicochemical characterization and antiproliferative activity of phosphino Ru(II) and Ir(III) complexes

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Streszczenie

Herein, we present the synthesis of new complexes based on ruthenium(II) ($\text{Ru}(\eta^6\text{-p-cymene})\text{Cl}_2\text{PPh}_2\text{CH}_2\text{OH}$ (**RuPOH**) and $\text{Ru}(\eta^6\text{-p-cymene})\text{Cl}_2\text{P}(\text{p-OCH}_3\text{Ph})_2\text{CH}_2\text{OH}$ (**RuMPOH**)) and iridium(III) ($\text{Ir}(\eta^5\text{-Cp}^*)\text{Cl}_2\text{P}(\text{p-OCH}_3\text{Ph})_2\text{CH}_2\text{OH}$ (**IrMPOH**) and $\text{Ir}(\eta^5\text{-Cp}^*)\text{Cl}_2\text{PPh}_2\text{CH}_2\text{OH}$ (**IrPOH**)) containing phosphine ligands with/without methoxy motifs on phenyl rings ($\text{P}(\text{p-OCH}_3\text{Ph})_2\text{CH}_2\text{OH}$ (**MPOH**) and $\text{PPh}_2\text{CH}_2\text{OH}$ (**POH**)). The complexes were characterized by mass spectrometry, NMR spectroscopy (1D: ^1H , $^{13}\text{C}\{^1\text{H}\}$, and $^{31}\text{P}\{^1\text{H}\}$ and 2D: HMQC, HMBC, and COSY NMR) and elemental analysis. All the complexes were structurally identified by single-crystal X-ray diffraction analysis. The Ru(II) and Ir(III) complexes have a typical piano-stool geometry with an η^6 -coordinated arene (Ru^{II} complexes) or η^5 -coordinated (Ir^{III} compounds) and three additional sites of ligation occupied by two chloride ligands and the phosphine ligand. Oxidation of NADH to NAD^+ with high efficiency was catalyzed by complexes containing $\text{P}(\text{p-OCH}_3\text{Ph})_2\text{CH}_2\text{OH}$ (**IrMPOH** and **RuMPOH**). The catalytic property might have important future applications in biological and medical fields like production of reactive oxygen species (ROS). Furthermore, the redox activity of the complexes was confirmed by cyclic voltamperometry. Biochemical assays demonstrated the ability of Ir(III) and Ru(II) complexes to induce significant cytotoxicity in various cancer cell lines. Furthermore, we found that **RuPOH** and **RuMPOH** selectively inhibit the proliferation of skin cancer cells (WM266-4; IC_{50} , after 24 h: av. 48.3 μM ; after 72 h: av. 10.2 μM) while Ir(III) complexes were found to be moderate against prostate cancer cells (DU145).

Adres publiczny

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