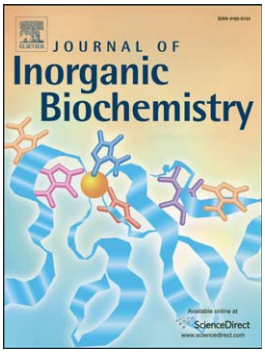

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A Novel Dual-Functioning Ruthenium(II)-Arene Complex of an Anti-microbial Ciprofloxacin Derivative – Anti-proliferative and Anti-microbial Activity

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Keywords: Ruthenium(II); ruthenium(II)-arene; ciprofloxacin; anti-cancer; anti-microbial; crystal structure

Abstract

7-(4-(Decanoyl)piperazin-1-yl)-ciprofloxacin, CipA, (**1**) which is an analogue of the antibiotic ciprofloxacin, and its ruthenium(II) complex [Ru(η^6-*p*-cymene)(CipA$_{-H}$)Cl], (**2**) have been synthesised and the x-ray crystal structures of **1**·1.3H_2O·0.6CH_3OH and **2**·CH_3OH·0.5H_2O determined. The complex adopts a typical pseudo-octahedral 'piano-stool' geometry, with Ru(II) π-bonded to the *p*-cymene ring and σ-bonded to a chloride and two oxygen atoms of the chelated fluoroquinolone ligand. The complex is highly cytotoxic in the low μM range and is as potent as the clinical drug cisplatin against the human cancer cell lines A2780, A549, HCT116, PC3. It is also highly cytotoxic against cisplatin- and oxaliplatin-resistant cell lines suggesting a different mechanism of action. The complex also retained low μM cytotoxicity against the human colon cancer cell line HCT116p53 in which the tumour suppressor p53 had been knocked out, suggesting that the potent anti-proliferative properties associated with this complex are