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Title:	DNA binding, antitubercular, antibacterial and anticancer studies of newly designed piano-stool ruthenium(ii) complexes
Authors:	Choudhury, Angshuman Roy (/jspui/browse?type=author&value=Choudhury%2C+Angshuman+Roy)
Keywords:	DNA binding, antibacterial piano-stool ruthenium(ii) complexes antitubercular,
Issue Date:	2022
Publisher:	Royal Society of Chemistry
Citation:	Dalton Transactions, 51(42), 16371- 16382.
Abstract:	The chemotherapeutic potential of ruthenium(II) complexes has recently attracted researchers' interest as antibacterial and anticancer agents. In this study, two novel half-sandwich imine-based Ru complexes ([Ru(p-cymene)Cl(L-1)][PF <sub>6</sub> ] (Ru-1) and [Ru(p-cymene)Cl(L-2)][PF <sub>6</sub> ] (Ru-2)) were reported for their deoxyribonucleic acid (DNA) binding and antitubercular, antibacterial, and anticancer activities. The molecular structure of Ru-2 was obtained by single-crystal X-ray crystallography. DNA interaction studies were conducted by UV-Vis absorbance and fluorescence spectral titration which gave rise to DNA binding constants (K <sub>b</sub> ) of 1.32 × 10 <sup>6</sup> and 1.82 × 10 <sup>6</sup> for Ru-1 and Ru-2, respectively and the Stern–Volmer binding constant (K <sub>SV</sub> ) values for Ru-1 and Ru-2 were 1.7763 × 10 <sup>4</sup> M <sup>-1</sup> and 7.6 × 10 <sup>3</sup> M <sup>-1</sup> , respectively. The in vitro antitubercular activity was evaluated against Mycobacterium tuberculosis H37Ra. The antibacterial potential of both the Ru-complexes was examined against Gram-negative (Escherichia coli and Pseudomonas aeruginosa) and Gram-positive (Staphylococcus aureus and Bacillus subtilis) bacteria. The half-maximal inhibitory concentration (IC <sub>50</sub> ) values for the antitubercular activity of Ru-1 and Ru-2 were 4.87 ± 1.32 μM and 5.78 ± 0.54 μM, respectively. A cytotoxic study of these complexes was performed against the human breast cancer cell line (MCF-7) and the human embryonic kidney cell line (HEK293) (normal cells). The study revealed meaningful activity of the Ru-1 complex against (cancer) MCF-7 cells, while the viability of HEK293 (normal) cells in the presence of Ru-2 was higher as compared to a reference drug 5FU. We suggest that these kinds of Ru-complexes could have potential for application in metallopharmaceuticals.
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