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Half-sandwich ruthenium-arene complex containing heterocyclic thiosemicarbazone: The X-ray crystal structures and DNA interactions

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The organoruthenium complex $[(\eta^6\text{-p-cym})\text{Ru}(\eta^1\text{-S-TSC})\text{Cl}_2]$, (1) and (2-acetyl-5-methyl-thiophene thiosemicarbazone) TSC ligand were investigated *in vitro* for their properties as prospective anti-tumour agents. The complex and TSC have been characterized by elemental analysis, UV-Vis, FT-IR and ¹H NMR spectroscopy. The crystal structures of TSC and (1) have been determined by X-ray crystallography and (1) represented as the first structurally characterized arene-ruthenium half-sandwich complex with a monodentate S coordinated TSC ligand. It is revealed that TSC, crystallized in the monoclinic space group P21/c and complex (1) shows a distorted octahedral geometry around the Ru centre. The mononuclear complex adopts a typical three legged piano-stool geometry with the metal centre coordinated by two chlorides and a TSC ligand. The cytotoxic activity of the complex against human ovarian (A2780, SKOV-3 and OVCAR-3) and colon (DLD, CCD-18Co, Caco-2) cell lines was investigated. The complex exhibit higher cytotoxicity in three cancer cell lines than in normal cell (CCD-18Co). The Caco-2 cell was especially susceptible to the complex, with an IC₅₀ value (0.18 µM) lower than cisplatin (64.72 µM). The cytotoxic values of (1) treated A2780 cells (1.15 µM) was also lower than cisplatin treated (10.08 µM). The results showed that the complex exhibits the higher cytotoxicity against colon cell lines than ovarian cell lines. The cellular uptake and localization suggest that (1) can be successfully taken up by the all studied cells, and the complex can enter into the cytoplasm and accumulate in the cell nuclei. The cell cycle distribution shows that the complex inhibits the cell growth in the generally G0/G1 and/or G2/M phases arrest. These results show that the complex may be a potential anticancer drug.

Biography

Elif Subaşı has completed her MSc from University of Reading, England in 1996 and PhD from Ege University, Turkey in 2003 and postdoctoral studies from University College London, England. She works at Dokuz Eylul University from 2003 and she is a professor from 2012. She has published more than 25 papers in reputed journals.

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