

Synthesis, structural, and cytotoxic properties of new water-soluble copper(II) complexes based on 2,9-dimethyl-1,10-phenanthroline and their one derivative containing 1,3,5-triaza-7-phosphaadamantane-7-oxide.

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Streszczenie

A series of water-soluble copper(II) complexes based on 2,9-dimethyl-1,10-phenanthroline (dmphen) and mixed-ligands, containing PTA=O (1,3,5-triaza-7-phosphaadamantane-7-oxide) have been synthesized and fully characterized. Two types of complexes have been obtained, monocationic $[\text{Cu}(\text{NO}_3)(\text{O-PTA=O})(\text{dmphen})][\text{PF}_6]$ (1), $[\text{Cu}(\text{Cl})(\text{dmphen})_2][\text{PF}_6]$ (2), and neutral $[\text{Cu}(\text{NO}_3)_2(\text{dmphen})]$ (3). The solid-state structures of all complexes have been determined by single-crystal X-ray diffraction. Magnetic studies for the complex 1–3 indicated a very weak antiferromagnetic interaction between copper(II) ions in crystal lattice. Complexes were successfully evaluated for their cytotoxic activities on the normal human dermal fibroblast (NHDF) cell line and the antitumor activity using the human lung carcinoma (A549), epithelioid cervix carcinoma (HeLa), colon (LoVo), and breast adenocarcinoma (MCF-7) cell lines. Complexes 1 and 3 revealed lower toxicity to NHDF than A549 and HeLa cells, meanwhile compound 2 appeared to be more toxic to NHDF cell line in comparison to all cancer lines. Additionally, interactions between the complexes and human apo-transferrin (apo-Tf) using fluorescence and circular dichroism (CD) spectroscopy were also investigated. All compounds interacted with apo-transferrin, causing same changes of the protein conformation. Electrostatic interactions dominate in the 1/2 – apo- Tf systems and hydrophobic and ionic interactions in the case of 3.

Słowa kluczowe

copper(II), discrete complexes, 2,9-dimethyl-1,10-phenanthroline, 1,3,5-triaza-7-phosphaadamantane-7-oxide, antitumor activity, cytotoxic activity

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