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Abstract

Silver(I) complexes as potential anticancer drugs: synthesis, characterization, and *in vitro* studies

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Abstract: To address the challenge of mitigating the adverse effects and drug resistance associated with Pt(II) chemotherapeutic compounds, significant efforts have been devoted to designing metal-based drugs with diverse anticancer mechanisms. Exploring alternative organometallic complexes, such as those incorporating silver, is an interesting approach in the pursuit of more effective and safe treatments.

This study aims to develop a new family of silver(I) complexes with nitrogen donor ligands that exhibit antitumor properties, and to determine the mechanism by which these compounds induce cell death, such as the generation of reactive oxygen species (ROS)."

A novel family of eight silver complexes was synthesized using a newly developed imine, (E)-N-(3,5-bis(trifluoromethyl)benzyl)-1-(4-(piperidin-1-yl)phenyl)methanamine, which was formed by condensing two pharmacophores. This study employed two tumor cell lines: cervical cancer (HeLa) and hepatocellular carcinoma (Hep-G2). To assess their antitumor potential, MTT assays were conducted. Additionally, the generation of ROS in HeLa cells was measured as possible mechanism of action to understand their effects.

The results indicate that, with one exception, new compounds exhibit activity against both assayed lines. Higher cytotoxic activity of the compounds was observed against the HeLa cell line, except for compound ZAG-14.2, which showed greater efficacy against Hep-G2. Regarding the production of ROS, it was observed that exposure to the compounds increased ROS levels in HeLa cells compared to control cells.

The potential of these new complexes as anticancer drugs is evident through their significant cytotoxic activity in both cell lines. Further studies are needed to fully understand their mechanism of action.

Keywords: Ag (I) complexes, cytotoxicity, ROS.

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