Cu(II) complexes of hydrazone Schiff base ligands: synthesis, characterization, DNA and topoisomerase i enzyme interactions

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Small inorganic complexes that can interact with DNA or other biological molecules have tremendous conservation. Because such compounds can pass the inhibitions that large molecules cannot pass through to show desired activities. It is a known phenomenon that transition metal complexes oxidize or bind to DNA in the presence or absence of reductants. Therefore, it is important to understand the structure activity relationship especially in the antitumor action mechanism of metal complexes that can bind to DNA under physiological conditions and specifically cleave DNA. In particular, Cu(II) complexes containing Schiff base are much more attractive as they can enter into the bases of DNA. The interaction of DNA with metal complexes is closely related to the design of synthetic restorative enzymes and chemotherapeutic drugs. Transitional metal complexes play a key role in the formation of newly bound complexes in the DNA domain, although structural flexibility and variable dimensionality are taken into consideration. In recent years, the use of certain chemotherapy drugs by interfering with topoisomerases in cancer cells has focused on the enzyme topoisomerase I in the development of anticancer drugs. In this study, new cationic hydrazone Schiff bases and their coordination compounds with Cu(II) have been synthesized and characterized. Firstly, various p-substituted benzohydrazine derivatives were reacted with cationic acetophenone derivatives, which were served as a chelating bridge, in order to prepare hydrazone Schiff base ligands. In the second step of this study, coordination compounds of the synthesized ligands with biologically important transition metal Cu(II) were isolated and characterized. Then, inhibitory activities of topoisomerase I enzyme and DNA binding and cleavage activities was examined for the compounds. The effect of the factors such as ligand and geometry tetrahedral square-planar, octahedral, etc. on the activity where be defined. That the synthesis of some Schiff base derivatives bearing functional groups such as -OH and -NH_2 increasing the pharmacological activities was discussed in this study. Consequently, novel and effective agents interacting with DNA, showing topoisomerase inhibitions activity have been revealed.

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