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Platinum(IV) prodrugs based on carboplatin with biological approaches to improve drug delivery

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Abstract

Carboplatin is a derivative of cisplatin; with a similar intercellular mechanism and different structure and cytotoxicity. It was approved by the FDA in the 1980s and since then it has been widely used to treat various types of tumors. However, there are serious inconveniences as some patients develop resistance during treatment, limiting the full potential of the drug. Consequently, the discovery of novel metallodrugs with different structural and mechanistic profiles for drug development plays an important role in cancer drug discovery. [1-3]

In this study, a new binuclear carboplatin (IV) derivative was synthesized using diamine as a bridging ligand and then characterized by spectroscopic methods. The reduction behavior in the presence of ascorbic acid was investigated by using electronic absorption monitoring. Regarding *in-vitro* evaluation of this new carboplatin derivative, more toxicity has been shown against MCF-7 cell lines than carboplatin. The cell death mechanism's activity was investigated by using Flow cytometry which determined apoptosis cell death. In addition, DNA interaction and molecular docking display groove binding on sites of the DNA skeleton as a main target in chemotherapy.

Keywords: Binuclear Pt(IV) complex, Anticancer drug, DNA binding, Molecular docking.

References

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