



***In vitro* cytotoxicity studies of parent and nano-encapsulated Terbium-2,9-dimethyl-1,10-phenanthroline complex toward FS-DNA and BSA binding properties**

Zahra Aramesh-Boroujeni*, Abdol-Khalegh Bordbar*

Department of Chemistry, University of Isfahan, Isfahan 81746-73441, Iran

*E-mail address: akbordbar@gmail.com, z.aramesh890@gmail.com

ABSTRACT

In this paper, the interaction of terbium(III) complex including 2, 9-dimethyl-1,10-phenanthroline, also it called Neocuproine (Neo), [Tb(Neo)₂Cl₃.H₂O], as fluorescence probe with Fish-Salmon-DNA (FS-DNA) and BSA is studied during experimental investigations. Multi-spectroscopic methods are utilized to determine the affinity binding constants (K_b) of complex-FS-DNA and complex-BSA. There are different approaches, including iodide quenching assay, salt effect and thermodynamical assessment to determine the features of the binding mode between Tb-complex with FS-DNA and BSA. Moreover, molecular docking study indicated that this complex bind to the minor groove of DNA and to polar and apolar residues located in the subdomain IB of BSA (site 3). Also, the parent and starch and lipid nanoencapsulated Tb-complex, as potent antitumor candidates, were synthesized. The main structure of Tb-complex is maintained after encapsulation using starch and lipid nanoparticles. MTT method was used to assess the anticancer properties of Tb-complex and its encapsulated forms on human cancer cell lines of human lung carcinoma cell line and Breast cancer cell line. In conclusion, these compounds could be considered as new antitumor candidates

Keywords: Terbium(III) complex, FS-DNA-binding property, BSA-binding property, Molecular docking; Antimicrobial and Cytotoxicity