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The progress of nano metallic drug conjugate in cancer chemotherapy

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Metallic drug nano conjugate chemistry is an interdisciplinary thrust area of cancer biology research; is currently much more known for its many applications in drug delivery and also has enormous potential to act as diagnostic agent. Development of new drug design and therapeutic strategies that could target cancer cells leaving normal cells unaffected still continues to be a challenge. Series of new metallic drug nano conjugate were designed, synthesized and characterized by, TEM, SEM and various spectroscopic methods. *In vitro* DNA binding studies of the compounds investigated by absorption and emission titration methods which revealed that compounds recognizes the minor groove of DNA in accordance with molecular docking studies with the DNA. Gel electrophoretic assay demonstrates the ability of compounds to cleave pBR322 DNA through hydrolytic/oxidative process which was further validated by T4 religation assay. To understand the metallic nano drug–protein interaction of which ultimate molecular target was DNA, the affinity of compounds towards HSA was also investigated by the spectroscopic and molecular modeling techniques which showed hydrophobic interaction in the subdomain IIA of HSA. Furthermore, nano conjugate showed high inhibitory activity against Topo-Iα suggesting that new nano conjugate is an efficient DNA cleaving agent. *In vitro* studies on the anticancer activity against the cancer cell lines revealed that nano conjugates have the capability to kill the cancer cell. The efficiency of new nano conjugates is higher than the earlier reported.

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