

A DNA-based nanocarrier for efficient cancer therapy

Muhammad Abbas

Nanjing University, China.

Short Communication

ABSTRACT

The study aimed to achieve enhanced targeted cytotoxicity, and cell-internalization of Cisplatin loaded Deoxyribonucleic acid-Nanohybrid (CPT-DNA-NT), mediated by scavenger receptors into HeLa cells. DNA-NT was developed with stiff-topology utilizing circular-scaffold to encapsulate CPT. Atomic force microscopy (AFM) characterization of the DNA-NT showed uniformity in the structure with a diameter of 50–150 nm and length, 300–600 nm. The successful fabrication of the DNA-NT was confirmed through native-PAGE analysis, as large the molecular-weight (polymeric) DNA-NT did not split into constituting strands under applied current and voltage. The results of cell viability confirmed that blank DNA-NT had the least cytotoxicity at the highest concentration (512 nM) with a viability of 92% as evidence of its biocompatibility for drug delivery. MTT assay showed superior cytotoxicity of CPT-DNA-NT than the free CPT due to the depot release of CPT after DNA-NT internalization. The DNA-NT exhibited targeted cell internalizations with the controlled intracellular release of CPT (from DNANT), as illustrated in confocal images. Therefore, in vitro cytotoxicity assessment through flow cytometry showed enhanced apoptosis (72.7%) with CPT-DNA-NT (compared to free CPT; 64.4%). CPT-DNA-NT, being poly-anionic, showed enhanced endocytosis via scavenger receptors.

Biography

Muhammad Abbas, male, doctoral candidate. Abbas's research interests mainly include Nanotechnology, Observational and Interventional research. So far, he has published more than 35 papers in SCI journals.