



A DNA-Based Nano Carrier for Efficient Cancer Therapy

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Abstract:

The study aimed to achieve enhanced targeted cytotoxicity, and cell-internalization of Cisplatin loaded Deoxy-ribonucleic acid-Nanothread (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 DNA NT), 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.



Publication of speakers:

1. Abbas, Muhammad, et al. "Clinical evaluation of carcinoembryonic and carbohydrate antigens as cancer biomarkers to monitor palliative chemotherapy in advanced stage gastric cancer." *Current problems in cancer* 43.1 (2019): 5-17.
2. Abbas, Muhammad, et al. "Clinical Evaluation of Serum Tumor Markers in Patients With Advanced-Stage Non-Small Cell Lung Cancer Treated With Palliative Chemotherapy in China." *Frontiers in Oncology* 10 (2020).
3. Abbas, Muhammad, et al. "Clinical Evaluation of Plasma Coagulation Parameters in Patients with Advanced-stage Non-small cell Lung Cancer Treated with Palliative Chemotherapy in China." *International Journal of Clinical Practice* (2020): e13619.5.
4. Abbas, Muhammad, et al. "Clinical Evaluation of Plasma Coagulation Parameters in Patients with Advanced-stage Non-small cell Lung Cancer Treated with Palliative Chemotherapy in China." *International Journal of Clinical Practice* (2020): e13619.5.

Webinar on Drug Delivery and Toxicology | October 5, 2020 | London, UK

Citation: Muhammad Abbas; A DNA-Based Nano Carrier for Efficient Cancer Therapy; Drug Delivery 2020; October 5, 2020; London, UK