



Editorial

Theme: NIPTE Research and Perspective: Advances in Nanotechnology-Based Drug Delivery
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National Institute for Pharmaceutical Technology & Education (NIPTE) Research and Perspective: Advances in Nanotechnology-Based Drug Delivery

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For more than a decade, the National Institute for Pharmaceutical Technology & Education (NIPTE) has collaborated with industry, academia, and government on the world's pharmaceutical challenges. NIPTE's current membership includes seventeen US Universities with high-ranking Pharmaceutical Education and Research Programs. NIPTE has several focus groups including (1) Advanced Manufacturing, (2) Biologics & Biosimilars, (3) Translational Biomarkers, and (4) Nanotechnology. Nanotechnology has the potential to improve the formulation characteristics of drugs, improve targeting of drugs to target diseases, and reduce the adverse side effects of drugs by shifting the distribution of drugs to the target diseases. Nanotechnology also has the potential to be utilized for improved imaging of drug distribution for guiding drug delivery and disease treatment. Notably, cancer therapy and lately gene and vaccine delivery have benefited from nanotechnology. In this special theme issue, we present a collection of papers from NIPTE members focused on nanotechnology-based drug delivery and formulation research. The theme issue includes a review from Ryan Pearson and colleagues on nanoparticle-based delivery to improve the treatment of spinal cord injuries with a focus on how the implementation of multifactorial approaches to address the proinflammatory and complex immune dysfunction in spinal cord injury offers significant potential to improve outcomes (1). Chalet Tan and colleagues present research on the use of thermosensitive hydrogels for subcutaneous delivery of albumin. These hydrogels are prepared

from solutions of poloxamer 407 and poly(lactide-co-glycolide)-block-poly(ethylene glycol)-block-poly(lactide-co-glycolide) (2). Wiwatchitawee *et al.* present a review on glioblastoma multiforme (GBM) treatment strategies, summarizing current options and providing details on preclinical findings with nanoparticle-based approaches aimed at improving tumor targeting and enhancing therapeutic outcomes for GBM patients (3). Swayam Prabha and colleagues review various strategies that have been utilized for the introduction of synthetic targets in tumor tissues (4). Devika Manickam and colleagues demonstrate extracellular vesicles derived from a human brain endothelial cell line increase cellular ATP levels (5). O'Reilly Beringhs *et al.* present research on a nanocapsule-based platform that is promising for image-guided tumor therapy with enhanced contrastability and optimal colloidal stability (6). The research articles and reviews presented from NIPTE faculty members in this theme issue span the spectrum of drug targeting to sustained delivery and theranostics, representing important advances in nanotechnology-based drug delivery.

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