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Editorial

NanoDDS 2018: The 16th International Nanomedicine & Drug Delivery Symposium

The 16th International Drug Delivery and Nanomedicine Symposium was held in Portland OR between Sep 21-23rd in Portland, Oregon. This conference was Chaired by Prof. (s) Gaurav Sahay, Conroy Sun, Oleh Taratula, Adam Alani and Olena Taratula. We had **25** invited speakers in the area of nanomedicine, including scientific luminaries, young investigators, and academic and industrial scientists. The program spanned six sessions that highlight groundbreaking and revolutionary ideas in nanomedicine and drug delivery. Broad topics from cancer nanotechnology, nucleic acid delivery, tissue engineering, commercialization of academic discoveries and treatment for rare disorders were discussed. This meeting has always centered on fostering the growth of the next generation scientists and exposed trainees to the latest developments in our field and for this reason two panel discussions on the Future of Nanomedicine and Careers in Science was introduced. We received over 110 posters from around the world and approximately 200 people participated in the program. To further provide a platform for young investigators, we selected six late breaking topics and gave six poster awards with the opportunity to give talks. We additionally, provided six travel awards for students and trainees. This special issue contains thirteen articles contributed by invited speakers, young investigators, conference chairs and poster award winners.

This special issue begins with **Alexander Kabanov** describing the synthesis and characterization of a novel poly (2-oxazoline)-based block copolymer (POX) with the aromatic heterocyclic side chains in one block. These polymers self-assemble to form micelles that showed unprecedented capacity to solubilize hydrophobic drugs in their core. **Robert Luxenhofer** reports the use of POX based materials to solubilize curcumin, a hydrophobic drug and achieved drug loading of $> 50\%$ while maintaining small size (< 50nm) and showed activity of these nanoformulations in 2D and 3D cancer models. **Adam Alani** formed micellar nanostructures by exploiting diblock copolymer nanoplatforms of methoxy poly (ethylene glycol)$_{2000}$-*block*-poly (lactic acid)$_{1800}$ (mPEG$_{2000}$-b-PLA$_{1800}$) and (mPEG$_{4000}$-b-PLA$_{2200}$). They used a combinatorial approach and targeted the mTOR and HIF pathway for anticancer activity. **Glen Kwon** synthesized a prodrug of paclitaxel using oligo (lactic acid) as a novel pro-moiety. These drugs were loaded on the PEG-PLA based micelles and show more stable circulation of paclitaxel and enhanced anti-tumor activity. **Tatiana Bronich** showed that pluronic block *co*-polymers can be overcome acquired and tumor microenvironment-mediated resistance to proteasome inhibitors thereby achieving enhanced anti-myleoma activity in animals treated with these inhibitors. **Laird Forrest** used a polymeric nanosuspension to deliver Resiquimod (R848) a immunostimulator for anti-tumor activity. A pro-drug conjugate of R848 was attached to hyaluronic acid and the resulting nanosuspension was delivered subcutaneously which resulted in immune activation that achieved 67% tumor remission in a canine model of mast cell tumor.

The issue continues with liposomal platforms that are used for variety of applications. **Avi Schroeder** screened lipids in a liposomal formulation by altering different segment of the molecule and tested effects on cellular uptake and viability. They report a structure-internalization correlation which can be used to tune liposomal formulation for effective subcellular delivery. **Christine Allen** exploited the use of thermosensitive liposome that can be triggered to deliver drugs when tumors are heated. This platform was able to deliver a combination of drugs with similar efficiency causing delivery of a synergistic dose to tumor cells *in-vivo*. **Leonid Kagan** showed that PEGylated liposomes reduced peripeheral neuropathy that is associated with treatment of paclitaxel and had showed less toxicity to neuronal cells. **Tamara Minko** engineered liposomal nanostructures that can be inhaled for the treatment of cystic fibrosis. These liposomal formulations contained two FDA approved drugs Lumcaftor and Ivacftor that trigger membrane localization and opening of the channel, respectively. Through packaging these drugs together restoration of expression and function was achieved while minimizing off-target effects due to localized delivery. **Gaurav Sahay** showed that lipid-based nanoparticles can be used to deliver messenger RNA to the retina and identified key structural features of these nanoparticles that are essential for gene delivery to the back of the eye.

Alessandro Grattoni developed a nanofluidic device that can deliver antiretroviral therapy. A cyclodextrin derivative was used to solubilize the antiretroviral drug which were then incorporated in a device that can be implanted *in-vivo* and leads to sustained release of the drug that can achieve plasma drug concentrations that are needed to reduce HIV titers in the blood. Finally, **Hamid Ghandehari**, demonstrated that size and porosity of silica nanoparticles can have distinct toxicity profiles. Porous silica nanoparticles with sizes from 50 to 500 nm can be more toxic in acute conditions while show less subchronic toxicity when compared with large non porous nanoparticles.

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