



Theme: Rising Stars in Drug Delivery and Novel Carriers

The AAPS Journal Theme Issue: Rising Stars in Drug Delivery and Novel Carriers

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In 2020, at the height of the COVID-19 pandemic and during a period of restricted travel, Drs. Nguyen and Ainslie established an online seminar series titled “Rising Stars in Drug Delivery and Novel Carriers” through the University of North Carolina at Chapel Hill, Eshelman School of Pharmacy. The goal of this series was to provide a platform for outstanding emerging scientists in drug delivery to present research from their growing programs. The seminar program was well attended from scientists across the USA and the world. Invited speakers in the 2020–2021 seminar series included Drs. Blanka Sharma, Evan Scott, Aaron Anselmo, Anita Shukla, Daniel Gallego Perez, Ester Kwon, Jeremiah Gassensmith, Tara Deans, Markita Landry, Leo Chou, Eimear Dolan, John Wilson, Edward Bahnson, Vincent Venditto, Yevgeny Brudno, Joy Wolfram, Christopher Alabi, Jennifer Fiegel, Raman Bahal, Devika Manickam, Ronit Freeman, Ryan Pearson, Jacob Brenner, Eun Ji Chung, and Kevin McHugh. This special theme issue presents selected articles from these individuals. Dr. Anselmo presents research on modulating oral delivery and gastrointestinal kinetics of recombinant proteins via engineered fungi and establishes the fundamental pharmacokinetics which will be essential in controlling downstream therapeutic response for this new delivery modality [1]. Dr. Kwon presents research on the pharmacokinetic analysis of peptide-modified nanoparticles with engineered physicochemical properties in a

mouse model of traumatic brain injury (TBI). This study showed that after intravenous administration in a TBI mouse model, positively charged peptide-modified nanoparticles accumulated more in off-target organs, including the heart, lung, and kidneys, than zwitterionic, neutral, or negatively charged peptide-modified nanoparticles [2]. Dr. Brenner presents a review on how complement achieves its blockade of nanomedicine, which nanocarrier material properties best avoid complement, and current and future strategies to control complement to unleash nanomedicine’s potential [3]. Dr. Chung provides a review that summarizes the current understanding of exosome biogenesis and uptake and discusses atherogenic and atheroprotective functions of exosomes secreted from vascular endothelial cells, vascular smooth muscle cells, immune cells, and platelets [4]. Dr. McHugh presents a review that discusses recent advances in the development of TLR7/8 agonist delivery systems and provides a perspective on promising future directions [5]. Dr. Gallego-Perez describes several nanotechnology-based cell therapies in regenerative medicine [6]. Dr. Fiegel reports on zwitterionic polymer coatings that enhance gold nanoparticle stability and uptake in various biological environments. This study showed that differences in the composition of the fluids result in differing impacts on particle fate [7]. Dr. Manickam reports on the optimization of lipidoid nanoparticles for delivery of therapeutic siRNAs to neural cells [8]. Finally, Dr. Pearson reports on a controlled and reproducible method for the formulation of nanoparticles using microfluidics and their formulation-dependent inherent anti-inflammatory immunomodulatory properties [9]. Overall, the webinar series as well as the research works published in this special theme issue highlight the bright future of drug delivery and novel carriers.

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