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Preface

Guest Editorial Title: Nanomedicine: past, present, and future

The 15th International Nanomedicine and Drug Delivery Symposium (NanoDDS 2017) was held at the University of Michigan, Ann Arbor on September 22–24, 2017. The meeting was co-chaired by Steve Schwendeman, James Moon, and Anna Schwendeman, and other organizing committee members included James Baker, Jr., Mark Banaszak-Holl, Lola Eniola-Adefeso, Beata Chertok, Sharon Glotzer, Nick Kotov, Joerg Lahann, Ariella Shikanov, Lonnie Shea, and Duxin Sun. Thirty-four leaders from the field of biomaterials, nanomedicine, and drug delivery were invited as speakers who discussed recent breakthroughs in nanotherapeutics and led active discussions on the pathway forward for clinical translation of nanomedicine. The symposium hosted over 260 participants from the United States and around the world. There were 128 poster presentations, among which six presenters were recognized with Poster Awards, including Michael Deci (University at Buffalo), Allison DuRoss (Oregon State University), Di Gao (City University of Hong Kong), Pouya Hadipour (University of Utah), Dan Li (University of Michigan, Ann Arbor), and Ashwani Kumar Narayana (Oregon State University).

In this themed issue of ADDR, nine of the invited speakers share their vision for overcoming major obstacles faced by the field of nanomedicine and present their perspectives on the past, present, and future of nanomedicine. The authors present a thorough overview on *in vivo* targeting, cancer nanomedicine, systemic toxicity and safety profiles of nanomedicines, and emerging nano-formulations for biomedical applications.

This themed issue begins with two insightful perspectives. **You Han Bae** presents the design principles of cancer nanomedicine and discusses the past and ongoing clinical trials of experimental nanomedicine [1]. He offers a guidance on future research directions for expediting clinical translation of nano-therapeutics. **Molly Stevens** discusses the merits of extracellular vesicles, their use in delivery applications for small molecules, nanoparticles, proteins and oligonucleotides [2]. She describes their key practical and biological limitations that need to be addressed for their successful clinical translation. These perspectives are followed by 7 review articles on topics of in vivo targeting, safety, and biomedical applications of nanomedicine.

In his review, **Twan Lammers** argues that heterogeneity of the enhanced permeability and retention (EPR) effect in cancer patients is the main cause of heterogeneous outcomes of clinical trials with nanomedicine [3]. He describes emerging strategies to enhance, combine, bypass and image EPR-based tumor targeting and provides future directions on how to design nanomedicine to improve patient responses. **Suzie Pun** examines how drug delivery can be improved by targeting ligands [4]. She describes in vivo panning technologies as a powerful method for identification of novel target ligands and shares her vision for applying these technologies to next-generation drug delivery strategies. **Andre Nel** and **Huan Meng** focus on pancreatic cancer and discuss how nanomedicine may improve outcomes of pancreatic cancer patients [5]. They describe the role of stroma in chemotherapy resistance among pancreatic cancer patients and provide a guidance on overcoming this barrier with nanocarriers. **Shaoqin Gong** provides an overview on polymeric unimolecular nanoparticles and discusses their salient features, opportunities, and limitations for various biomedical applications [6]. **Craig Duvall** presents albumin as a drug carrier for a wide range of therapeutics, including traditional cancer chemotherapeutics and new classes of biologics [7]. He discusses advantages, applications, and challenges of utilizing albumin as a drug delivery system. This is followed by a review by **Vladimir Muzykantov, Jacob S. Brenner,** and **Hamideh Parhiz**, who report side effects and toxicity of submicron drug delivery systems [8]. They argue that the field of nanomedicine has to devote more resources and energy to understand the precise interactions between drug delivery systems and the host defenses so that the fundamental knowledge gained from these studies can contribute towards the development of safer therapeutic interventions. Lastly, **Anna Schwendeman** and **Steve Schwendeman** survey drug delivery strategies for glucagon-like peptide-1 receptor agonists, focusing on how half-life extending strategies impact their pharmacokinetics, pharmacodynamics, safety, patient usability, and eventual commercial success [9]. They argue that this specific case study can be readily generalized towards rational design of other peptide-based therapeutics.

We hope that these perspectives and reviews provide an authoritative overview on the current status of nanomedicine and provide a working roadmap for translating nanomedicine to the clinic in the near future.

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