Journal of Controlled Release 282 (2018) 1–2

Contents lists available at ScienceDirect

Journal of Controlled Release

journal homepage: www.elsevier.com/locate/jconrel

Editorial

NanoDDS 2017: The 15th International Nanomedicine & Drug Delivery Symposium

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. The main goal of NanoDDS'17 was to disseminate recent breakthroughs in the rapidly evolving area of nanotherapeutics and to discuss the pathway forward for clinical translation of nanomedicine. Thirty-four leaders in the field of biomaterials, nanomedicine, and drug delivery were invited as speakers. 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. Contributions of some of the speakers and poster award winners are reflected in this special issue.

The special issue begins with a couple of insightful reviews. **Jean-Christophe Leroux** provides an overview of the role of peritoneal dialysis beyond kidney failure and provides guidance on potential future development of peritoneal dialysis [1]. **Vladimir Muzykantov** and **Makan Khoshnejad** reviews ferritin-based drug delivery systems with a particular emphasis on functionalization of ferritin nanoparticles via chemical and genetic means to enable its utility in vascular drug delivery applications [2]. These review articles are followed by 13 research articles on topics of nanomedicine for gene delivery, tumor targeting, intracellular drug delivery, and immunoengineering applications.

Twan Lammers shows that normalization of tumor vasculature mediated by histidine-rich glycoprotein improves the enhanced permeability and retention (EPR) effect, enhancing the accumulation and penetration of 10–20 nm-sized polymeric drug carriers into tumors [3]. **Christine Allen** describes the use of mild hyperthermia to trigger release of cisplatin from thermosensitive liposomes in the vasculature of human triple negative breast cancer tumors implanted orthotopically in mice [4]. **Pui-Chi Lo** reports the development of a series of polymeric micelles encapsulating doxorubicin and zinc(II) phthalocyanine for dual chemotherapy and photodynamic therapy [5]. **Hamidreza Ghandehari** presents a structural difference-based selective etching strategy for synthesis of glutathione (GSH)-sensitive hollow mesoporous silica nanoparticles and their applications for intracellular delivery of doxorubicin [6]. **Gaurav Sahay** describes a sequential ligation of peptide building blocks that allowed self-assembly of peptide nanomaterials (CSPNs) into "nanodrill-like structures" with the capability to translocate inside cells [7]. **Evan Scott** reports the rational design and synthesis of oxidation-responsive shell-crosslinked polymersomes with capability for the controlled, sequential release of encapsulated hydrophilic molecules and hydrogels [8]. **Wim Hennink** presents a comprehensive study on surface conjugation of model ligands (i.e., the peptide cRGDfK and the nanobody 11A4) on maleimide-functionalized poly(lactide-co-glycolide) (PLGA) nanoparticles and investigates how the maleimide-thiol reaction efficiency is impacted by the nanoparticle preparation method, storage conditions, and the molar ratio of maleimide to ligand [9]. **Craig Duvall** and **Colleen Brophy** describe how excipients influences the effects of lyophilization on peptide-polymer nano-polyplex morphology, cellular uptake, and bioactivity, and report that among different excipients tested, lactosucrose improves the uptake and therapeutic efficacy of peptide-polymer nanoparticles post-lyophilization relative to freshly-made formulations [10].

This is followed by a series of articles focused on immunoengineering, gene delivery, and wound healing applications. **Joel Collier** and **Anita Chong** explore intranasal vaccination against influenza using self-assembled peptide nanofibers and report that compared to subcutaneously delivered nanofibers, intranasally delivered peptide nanofibers significantly increases the number of antigen-specific tissue resident memory CD8+ T cells in the lung, allowing for a more rapid response to infection [11]. **James Moon** and **Anna Schwendeman** describe the development of synthetic high-density lipoprotein nanodiscs for co-delivery of multiple immunostimulatory agents, showing their wide applicability for T-cell activation against cardiovascular and cancer targets [12]. In a contribution by **Suzie Pun**, a panel of cationic pHEMA-g-pDMAEMA polymers is investigated for gene delivery to both cultured and primary human T cells, leading to an optimized nanosystem that can transfect both CD4+ and CD8+ primary human T cells with messenger RNA and plasmid DNA at efficiencies up to 25 and 18% [13]. **Shaoqin Gong** and **Kefeng Dou** report a new gene delivery strategy based on NIR-to-UV upconversion nanoparticles for intracellular delivery of siRNA and NIR-controlled gene silencing, showing their efficacy in both a 2D monolayer cell model and a 3D multicellular tumor spheroid model [14]. Lastly, **Segura Tatiana** shows that a star-shaped amphiphilic block copolymer comprising poly(ethylene glycol) and poly (propylene sulfide) can self-assemble into a physically stable 3D hydrogel in vivo and effectively deliver hydrophobic molecules, such as a BRAF inhibitor, to promote cellular infiltration, reduce inflammation, and wound closure [15].

There were six poster award winners for the NanoDDS 2017: Michael Deci (University at Buffalo), Allison DuRoss (Oregon State

https://doi.org/10.1016/j.jconrel.2018.06.009

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).

The organizers gratefully acknowledge the invaluable contributions of Ms. Patrina Hardy and Ms. Jenn Rohl, who took excellent care of all logistics, financial, and administrative issues. We thank the following generous sponsors of the 15th International Nanomedicine and Drug Delivery Symposium: The University of Michigan (UM) College of Pharmacy, Department of Pharmaceutical Sciences (UM), Biointerfaces Institute (UM), Department of Biomedical Engineering (UM), Avanti Polar Lipids, Inc., Gemphire Therapeutics, Dendritech, Inc., IMRA, Charles River, Esperion, ACS NANO, Alnylam Pharmaceuticals, Amneal Pharmaceuticals, Advanced Polymer Materials, Inc., Bristol-Myers Squibb, Advanced Drug Delivery Reviews, Elsevier, Fuji Film, Visual Sonics, GenScript, Malvern, PANalytical, Lipoid, Microfluidics, Molecular Pharmaceutics, Journal of Controlled Release, Nano Letters, Precision Nanosystems, Springer Nature, Thermo Fisher Scientific, TSRL, Inc., Velesco Pharma, University of North Carolina Center for Nanotechnology in Drug Delivery, Waters, Nanomedicine: Nanotechnology, Biology and Medicine, OpenNano, BACHEM, IZON, and NanoComposix.

References

[1] A. Pratsinis, O. Devuyst, J.C. Leroux, Peritoneal dialysis beyond kidney failure? J. Control Release (2018) .
[2] M. Khoshnejad, H. Parhiz, V.V. Shuvaev, I.J. Dmochowski, V.R. Muzykantov, Ferritin-based drug delivery systems: hybrid nanocarriers for vascular immunotargeting, J. Control Release (2018) .
[3] B. Theek, M. Baues, F. Gremse, R. Pola, M. Pechar, I. Negwer, K. Koynov, B. Weber, M. Barz, W. Jahnen-Dechent, G. Storm, F. Kiessling, T. Lammers, Histidine-rich glycoprotein-induced vascular normalization improves EPR-mediated drug targeting to and into tumors, J. Control Release (2018) .
[4] M. Dunne, Y.N. Dou, D.M. Drake, T. Spence, S.M.L. Gontijo, P.G. Wells, C. Allen, Hyperthermia-mediated drug delivery induces biological effects at the tumor and molecular levels that improve cisplatin efficacy in triple negative breast cancer, J. Control Release (2018) .
[5] D. Gao, P.C. Lo, Polymeric micelles encapsulating pH-responsive doxorubicin prodrug and glutathione-activated zinc(II) phthalocyanine for combined chemotherapy and photodynamic therapy, J. Control Release (2018) .
[6] S.P. Hadipour Moghaddam, M. Yazdimamaghani, H. Ghandehari, Glutathione-sensitive hollow mesoporous silica nanoparticles for controlled drug delivery, J. Control Release (2018) .
[7] N. Ashwanikumar, J.S. Plaut, B. Mostofian, S. Patel, P. Kwak, C. Sun, K. McPhail, D.M. Zuckerman, S.C. Esener, G. Sahay, Supramolecular self assembly of nanodrill-like structures for intracellular delivery, J. Control Release (2018) .
[8] F. Du, S. Bobbala, S. Yi, E.A. Scott, Sequential intracellular release of water-soluble cargos from Shell-crosslinked polymersomes, J. Control Release (2018) .
[9] L. Martinez-Jothar, S. Doulkeridou, R.M. Schiffelers, J. Sastre Torano, S. Oliveira, C.F. van Nostrum, W.E. Hennink, Insights into maleimide-thiol conjugation chemistry: Conditions for efficient surface functionalization of nanoparticles for receptor targeting, J. Control Release (2018) .
[10] A.J. Mukalel, B.C. Evans, K.V. Kilchrist, E.A. Dailing, B. Burdette, J. Cheung-Flynn, C.M. Brophy, C.L. Duvall, Excipients for the lyoprotection of MAPKAP kinase 2 inhibitory peptide nano-polyplexes, J. Control Release (2018) .
[11] Y. Si, Y. Wen, S.H. Kelly, A.S. Chong, J.H. Collier, Intranasal delivery of adjuvant-free peptide nanofibers elicits resident CD8(+) T cell responses, J. Control Release (2018) .
[12] R. Kuai, X. Sun, W. Yuan, L.J. Ochyl, Y. Xu, A. Hassani Najafabadi, L. Scheetz, M.Z. Yu, I. Balwani, A. Schwendeman, J.J. Moon, Dual TLR agonist nanodiscs as a strong adjuvant system for vaccines and immunotherapy, J. Control Release (2018).
[13] B.R. Olden, Y. Cheng, J.L. Yu, S.H. Pun, Cationic polymers for non-viral gene delivery to human T cells, J. Control Release (2018) .
[14] G. Chen, B. Ma, R. Xie, Y. Wang, K. Dou, S. Gong, NIR-induced spatiotemporally controlled gene silencing by upconversion nanoparticle-based siRNA nanocarrier, J. Control Release (2017) .
[15] S. Zhu, S. Li, H. Escuin-Ordinas, R. Dimatteo, W. Xi, A. Ribas, T. Segura, Accelerated wound healing by injectable star poly(ethylene glycol)-b-poly(propylene sulfide) scaffolds loaded with poorly water-soluble drugs, J. Control Release (2018) .

Guest editor
James J. Moon
Department of Pharmaceutical Sciences, Department of Biomedical Engineering, Biointerfaces Institute, University of Michigan, Ann Arbor, Michigan, USA

Guest editor
Wim E. Hennink
Department of Pharmaceutics, Utrecht Institute for Pharmaceutical, Sciences, Utrecht University, 3584 CG Utrecht, Utrecht, Enschede, The Netherlands

Guest editor
Steven P. Schwendeman
Department of Pharmaceutical Sciences, Department of Biomedical Engineering, Biointerfaces Institute, University of Michigan, Ann Arbor, Michigan, USA

Guest editor
Anna Schwendeman
Department of Pharmaceutical Sciences, Biointerfaces Institute, University of Michigan, Ann Arbor, Michigan, USA