International Symposium on Intelligent Drug Delivery Systems – South Korea

Published: June 22, 2007

The *2007 International Symposium on Intelligent Drug Delivery Systems (ISIDDS*) was held May 10 and 11, 2007, at the Korea Institute of Science and Technology (KIST) in Seoul, South Korea. The symposium was supported by the Korea Ministry of Science and Technology and Korea Biotech R&D Group as a next-generation national growth core technology development project. Founded in 1966, KIST develops core technology in the Korean sciences covering broad industrial and academic areas. KIST, as a member of the Korea Research Council of Fundamental Science and Technology (KRCFST) under the Office of the Prime Minister, is composed of 5 main research divisions: Future Technology Research; Materials Sciences and Technology; Systems Technology; Environment and Process Technology; and Life Sciences. KIST has been strengthening international relationships by promoting joint research through the exchange of human resources and information and currently has cooperative agreements with 51 research institutes in 24 countries. KIST also has interest in transferring its technology and experience with developing countries.

The Symposium began with opening remarks from distinguished peoples: Dr Dong Hwa Kum, KIST president; Dr Sang Mok Lee, Korea Ministry of Science and Technology; Dr Young Seek Lee, Korea Biotech R&D Group; and Dr Sung Wan Kim, Utah University. After a keynote lecture by Dr. Allan Hoffman, University of Washington, 9 renowned scientists invited from the USA, China, Japan, and Germany and 9 Korean speakers gave presentations covering topics in polymeric materials in macro- and nano-scales, general drug delivery and targeting, and protein and gene delivery systems. The discussions were focused mainly on the future of drug delivery system development. The speakers and their topics follow:

- **Allan S. Hoffman,** University of Washington, USA
  History of the evolution of "Controlled" drug delivery systems from macroscopic to microscopic to nano-scale. This lecture reviewed the historical evolution of "controlled" drug delivery devices, implants and formulations during the past 50 years.
- **Thomas Kissel,** Philipps-Universität, Germany
  Biodegradable nano-carriers based on branched polyesters: A platform for nanoscale drug delivery? Poly(2-sulfobutyl vinyl alcohol)-g-poly(lactide-co-glycolide), SB-PVAL-g-PLGA were investigated for the preparation of nanospheres and self-aggregating colloidal systems with defined surface properties.
- **Ick Chan Kwon,** KIST, South Korea
  Intelligent targeting system equipped with homing peptide. Novel peptide ligands that target specific organs, tumors, and tumor blood vessels by using phage display was presented as a mean to improve therapeutic efficacies of drug carriers for disease therapy.
- **Patrick P. DeLuca,** University of Kentucky, USA
  Microparticulate drug delivery systems for parenteral administration. Examples of this technology included the sustained delivery of an LHRH agonist, a bone-inducing protein, insulin and an atypical antipsychotic agent.
- **Thomas E. Carey**, University of Michigan, USA
  Biomarkers of treatment response: Can we individualize treatment to improve outcome? The use of biomarkers should lead to increased treatment effectiveness and decreased treatment morbidity by specifically identifying those tumors most likely to respond to current treatment regimens and those patients whose tumors will require targeted therapy.
- **Sang Yoon Kim,** University of Ulsan, South Korea
  In vivo tumor targeting and radionuclide imaging with self-assembled nanoparticles: *mechanism, key factors and their implications.* To shuttle radionuclide and or drugs into tumors and to investigate the mechanisms, various self-assembled nanoparticles were prepared by combining different hydrophobic moieties and hydrophilic polymer backbones and, their in vivo distributions in tumor-bearing mice were studied by radionuclide imaging.
- **You Han Bae,** University of Utah, USA
  *Polymeric nanosystems for tumor pH_e targeting and multidrug resistance. T*o overcome multidrug resistance in solid tumors, doxorubicin loaded pH-sensitive micelles of which the surface was decorated with folate (PHSM/f) were evaluated in both in vitro and in vivo experiments.
- **Xiaoyuan (Shawn) Chen**, Stanford University, USA
  Nanotube platform for targeted drug delivery. Single-walled nanotubes (SWNTs) was studied as a platform for targeted drug delivery and preliminary data showed that the treatment efficacy of doxorubicin loaded SWNTs was significantly higher than free doxorubicin in several xenograft models.
- **Han-Gon Choi,** Yeungnam University, South Korea
  Design of novel solid dispersion containing poorly water-soluble drugs. To achieve an improvement in solubility, dissolution rate, and bioavailability of ibuprofen

(IBU), poloxamer 188 was used to prepare binary solid dispersions (BSDs), and the phase solubility behavior of IBU in the presence of various molar concentrations of P188 was determined.

- **Zhiyuan Zhong,** Soochow University, China
  Fast in situ forming biodegradable hydrogels: design, synthesis and protein delivery application. Proteins could be loaded into the hydrogels by mixing protein containing aqueous solutions with PEG-PLLA and PEG-PDLA star block copolymers to form stereocomplexed hydrogels.
- **Soo-Chang Song,** KIST, South Korea
  Thermosensitive polyphosphazene hydrogels for controlled drug delivery. Thermosensitive biodegradable poly(organophosphazene) hydrogels were prepared and their advantages for anticancer drug delivery systems were discussed in terms of local delivery and controlled release of drugs.
- **Kyung Dall Lee**, University of Michigan, USA
  Targeted subcellular delivery of macromolecular drug. Unique targeted cytosolic delivery systems were developed utilizing the cell-invasion mechanism of an intracellular bacterium, Listeria monocytogenes, to mediate escape from the endocytic compartment into the cytosol of target cells.
- **Soon Hong Yuk**, Hannam University, South Korea
  Polymeric nanoparticles for protein delivery. To achieve an optimum therapeutic effect by sustained release of the protein drugs, core/shell nanoparticles were designed and evaluated.
- **Hirofumi Takeuchi**, Gifu University, Japan
  Novel particle design for drug delivery. The basic concept of polymer-coating liposome particles was reviewed as one of the typical colloidal drug carriers and the drug-delivery performance of these carriers with mucoadhesive was studied for oral administration of peptide drugs.
- **Kang Choon Lee**, Sungkyunkwan University, South Korea
  PEGylated insulinotropic peptides for type 2 diabetic therapy. The application of this PEGylation technique for GLP-1-related antidiabetic peptide delivery system was shown to offer a novel strategy in developing long-acting GLP-1 receptor agonists with improved therapeutic potentials.
- **Yong-Hee Kim**, Hanyang University, South Korea
  Targeted drug delivery systems of fusion proteins for the treatment of ischemic heart disease. The model protein, FITC-BSA, was incorporated into gelatin nanoparticles based on the recombinant human gelatin and natural origin cross linker and shown to release in a biphasic and sustained pattern without initial burst.
- **Xuesi Chen**, Changchun Institute of Applied Chemistry, China
  Hyperbranched PEI grafted by hydrophobic amino acids for a highly effective, low toxicity gene delivery. Hyperbranched PEI with hydrophobic amino acid segments or residues at their chain ends have been designed and, MTT assay and transfection experiments were performed to evaluate cytotoxicity and potential as a gene carrier.
- **Yu-Kyoung Oh**, Korea University, South Korea
  Development of dual-armed liposomes for combination therapy. Novel biocompatible cationic lipids were synthesized which can deliver gene-based medicines into cells in an effective and safe manner.
- **Tae Gwan Park**, KAIST, South Korea
  siRNA nanomedicine for cancer therapy. To overcome the delivery problems of siRNA, siRNA-s-s-PEG conjugates were used to prepare siRNA PEG micelles by interacting with PEI. The suppression of VEGF expression and tumor growth by VEGF siRNA-s-s-PEG/PEI formulation was evaluated in vitro and in vivo.

The Symposium was a huge success,, attended by 400 scientists, many of whom were students and early-career scientists. For additional information about the Symposium and KIST, please contact the chair of the symposium, Dr. **Soo-Chang Song** (scsong@kist.re.kr).