

**THE 16TH U.S.-KOREA FORUM ON NANOTECHNOLOGY:
NANOMEDICINE FOCUSING ON SINGLE CELL LEVEL AND SENSORS RELATED TO HUMAN COGNITION
AND BRAIN RESEARCH
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**PEPTIDE-TARGETED POROUS SILICON NANOPARTICLES FOR IN VIVO
DRUG DELIVERY AND SENSING**

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Abstract

This presentation aims to identify and describe key design features needed for nanoscale vehicles to achieve effective delivery of biologics, to signal their location, and to report on their status *in vivo*. Here we will emphasize biologic therapeutics such as proteins and siRNA-mediated gene silencing agents, and luminescent porous silicon nanoparticle delivery agents. We break the problem into four elements: (1) protection of the biologic from degradation and clearance; (2) selective homing to target cell types; and (3) release of the biologic payload with the correct temporal concentration profile to maximize efficacy; and (4) real-time reporting of the status of the delivery vehicle via time-gated photoluminescence imaging. Applications in targeting of tumors, brain injuries, and peripheral nervous system repair will be highlighted.