

BIOGRAPHICAL SKETCH

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NAME CHOI, HAK SOO	POSITION TITLE Research Fellow		
eRA COMMONS USER NAME hchoi			
EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)			
INSTITUTION AND LOCATION	DEGREE (if applicable)	YEAR(s)	FIELD OF STUDY
Chonbuk National University, South Korea	B.S.	1993-1997	Polymer Chemistry
Chonbuk National University, South Korea	M.S.	1999-2001	Biomaterials & Drug Delivery
Japan Advanced Institute of Science and Technology (JAIST), Japan	Ph.D.	2001-2004	Supramolecular Chemistry & Gene Delivery

A. Positions and Honors.

- Mar. 1997 – Jul. 1999 Military Officer (R.O.T.C.), Platoon leader (1st Lieutenant), South Korea
Aug. 1999 – Sep. 2001 Research Assistant, Biomaterials & Tissue Engineering Lab, Korea Research Institute of Chemical Technology (KRICT), South Korea
Sep. 2000 – Sep. 2001 Research Assistant, Pharmacokinetics & in vivo study, Pharmacokinetics Lab, Korea Institute of Toxicology (KITox), South Korea
Jun. 2003 – Mar. 2004 TA/RA, School of Materials Science, JAIST, Japan
Oct. 2003 – Sep. 2004 Postdoc Fellow, Gene delivery using biofunctional polycations, Lab of Pharmaceutical Molecular Design, Hokkaido University, Japan
Oct. 2004 – Sep. 2005 Postdoc Fellow, The 21st Century Center of Excellence (COE) program “Scientific Knowledge Creation Based on Knowledge Science”, JAIST, Japan
Oct. 2005 – Present Postdoc Fellow, Department of Medicine, Beth Israel Deaconess Medical Center (BIDMC), Harvard Medical School (HMS), Boston, MA, USA

Honors and Awards.

- Japanese Government Scholarship (2001–2004, Full Cover for Ph.D. Degree), Japan
Conference Support for Young Researchers, Inoue Foundation for Science, Tokyo, Japan (France, May 24, 2004)
JAIST Foundation Research Grant for Students, JAIST, Ishikawa, Japan (Jul. 1, 2004)
The Excellent Ph.D. Degree Award of the Year, “Design of Stimuli-Responsive Supramolecular Assembly Based on Cooperative Host-Guest Interactions for Biomedical Applications”, JAIST, Ishikawa, Japan (Sep. 22, 2004)
The 21st COE Program Fellowship, JAIST, Ishikawa, Japan (Oct. 2004 – Sep. 2005)
Conference Support for Young Scientists, The Naito Foundation, Tokyo, Japan (USA, Aug. 29, 2005)
Inoue Young Scientist Award, Inoue Foundation for Science, Tokyo, Japan (Feb. 3, 2006)
Travel Stipend Award, The Society for Molecular Imaging, Kerrville, TX, USA (Hawaii, Sep. 2, 2006)
Charles A. King Trust Research Fellowship Award (2007–2009), “PSMA-Targeted NIR Fluorescent Quantum Dots for Prostate Cancer Surgery” The Medical Foundation, Boston, USA (Jul. 1, 2007)

B. Selected peer-reviewed publications (in chronological order).

1. H.S. Choi, H.-C. Shin, G. Khang, J.M. Rhee, H.B. Lee, Quantitative analysis of fentanyl in rat plasma by gas chromatography with nitrogen-phosphorous detection, *J. Chromatography B* **2001**, 765, 63-69.
2. H.S. Choi, S.W. Kim, D.I. Yun, G. Khang, J.M. Rhee, H.B. Lee, Preparation of biodegradable PHBV devices containing gentamicin sulfate, *Polymer-Korea* **2001**, 25, 334-342.
3. S.A. Seo, H.S. Choi, J.C. Cho, G. Khang, J.M. Rhee, H.B. Lee, Influence of processing variables on fentanyl citrate-loaded PLGA microspheres by novel W/O/O solvent evaporation method, *Biomaterials Research* **2001**, 5, 35-41.
4. S.A. Seo, H.S. Choi, D.H. Lee, G. Khang, J.M. Rhee, H.B. Lee, Characteristics of nifedipine loaded PLGA wafer,

Polymer-Korea **2001**, *25*, 884-892.

5. H.S. Choi, S.A. Seo, G. Khang, H.C. Shin, J.M. Rhee, H.B. Lee, Preparation and characterization of fentanyl-loaded PLGA microspheres: in vitro release profiles, *Int. J. Pharm.* **2002**, *234*, 195-203.
6. H.S. Choi, K. Kontani, K.M. Huh, S. Sasaki, T. Ooya, W.K. Lee, N. Yui, Rapid induction of thermoreversible hydrogel formation based on a poly(propylene glycol)-grafted dextran inclusion complex, *Macromol. Biosci.* **2002**, *2*, 298-303.
7. S.A. Seo, H.S. Choi, G. Khang, J.M. Rhee, H.B. Lee, A local delivery system for fentanyl based on biodegradable poly(L-lactide-co-glicolide) oligomer, *Int. J. Pharm.* **2002**, *239*, 93-101.
8. G. Khang, S.A. Seo, H.S. Choi, J.M. Rhee, H.B. Lee, Evaluation of in vitro release profiles of fentanyl-loaded PLGA oligomer microspheres, *Macromol. Res.* **2002**, *10*, 246-252.
9. H.S. Choi, K.M. Huh, T. Ooya, N. Yui, pH- and thermosensitive supramolecular assembling system: rapidly responsive properties of β -cyclodextrin-conjugated poly(ϵ -lysine), *J. Am. Chem. Soc.* **2003**, *125*, 6350-6351.
10. H.S. Choi, T. Ooya, S. Sasaki, N. Yui, Control of rapid phase transition induced by supramolecular complexation of β -cyclodextrin-conjugated poly(ϵ -lysine) with a specific guest, *Macromolecules* **2003**, *36*, 5342-5347.
11. H.S. Choi, T. Ooya, S. Sasaki, N. Yui, Y. Ohya, T. Nakai, T. Ouchi, Preparation and characterization of polypseudorotaxanes based on biodegradable poly(L-lactide)/poly(ethylene glycol) triblock copolymers, *Macromolecules* **2003**, *36*, 9313-9318.
12. H.S. Choi, S.C. Lee, T. Ooya, S. Sasaki, M. Kurisawa, H. Uyama, N. Yui, pH dependence of polypseudorotaxane formation between cationic linear polyethylenimine and cyclodextrins, *Macromolecules* **2004**, *37*, 6705-6710.
13. H.S. Choi, T. Ooya, S. Sasaki, N. Yui, M. Kurisawa, H. Uyama, Spontaneous change of physical states from hydrogels to crystal precipitates during polypseudorotaxane formation, *ChemPhysChem* **2004**, *5*, 1431-1434.
14. H.S. Choi, A. Takahashi, T. Ooya, N. Yui, Structural role of guest molecules in rapid and sensitive supramolecular assembling system based on β -cyclodextrin-conjugated poly(ϵ -lysine), *Macromolecules* **2004**, *37*, 10036-10041.
15. S.C. Lee, H.S. Choi, T. Ooya, N. Yui, Block-selective polypseudorotaxane formation in PEI-*b*-PEG-*b*-PEI copolymers via pH variation, *Macromolecules* **2004**, *37*, 7464-7468.
16. H.S. Choi, K. M. Huh, T. Ooya, N. Yui, Stimuli-responsive inclusion property of cyclodextrin-conjugated poly(ϵ -lysine)s in aqueous media, *J. Phys. Chem. B* **2004**, *108*, 7646-7650.
17. H.S. Choi, A. Yamashita, T. Ooya, N. Yui, H. Akita, K. Kogure, R. Ito, H. Harashima, Sunflower-shaped CDPL polyplex as a controlled intracellular trafficking device, *ChemBioChem* **2005**, *6*, 1986-1990.
18. H.S. Choi, S.C. Lee, K. Yamamoto, N. Yui, Block-selective movement of α -cyclodextrins in polyrotaxanes of PEI-*b*-PEG-*b*-PEI copolymer, *Macromolecules* **2005**, *38*(23), 9878-9881.
19. H.S. Choi, T. Ooya, K.M. Huh, N. Yui. pH-triggered changes in assembling properties of β -cyclodextrin-conjugated poly(ϵ -lysine) complexes, *Biomacromolecules* **2005**, *6*, 1200-1204.
20. H.S. Choi, Y. Kaori, T. Ooya, N. Yui, Synthesis of poly(ϵ -lysine)-grafted dextrans and their pH- and thermosensitive hydrogelation with cyclodextrins, *ChemPhysChem* **2005**, *6*, 1-6.
21. H.S. Choi, N. Yui. Review: Design of rapidly assembling supramolecular systems responsive to synchronized stimuli based on cyclodextrin-conjugated poly(ϵ -lysine), *Prog. Polym. Sci.* **2006**, *31*, 121-144.
22. T. Ooya, H.S. Choi, A. Yamashita, N. Yui, Y. Sugaya, A. Karino, A. Maruyama, H. Akita, R. Ito, K. Kogure, H. Harashima, Biocleavable polyrotaxane-plasmid DNA polyplex for enhanced gene delivery, *J. Am. Chem. Soc.* **2006**, *128*(12), 3852-3853.
23. A. Yamashita, H.S. Choi, T. Ooya, N. Yui, H. Akita, K. Kogure, H. Harashima, Improved cell viability of linear polyethylenimine via γ -cyclodextrin inclusion for effective gene delivery, *ChemBioChem* **2006**, *7*(2), 297-302.
24. S. Loethen, T. Ooya, H.S. Choi, N. Yui, D.H. Thompson, Synthesis, characterization, and pH-triggered dethreading of α -cyclodextrin-PEG polyrotaxanes bearing cleavable endcaps, *Biomacromolecules* **2006**, *7*(9), 2501-2506.
25. H.S. Choi, A. Takahashi, T. Ooya, N. Yui, Molecular recognition and binding property of cyclodextrin-conjugated polyrotaxane, *ChemPhysChem* **2006**, *7*(8), 1668-1670.
26. T. Ooya, D. Inoue, H.S. Choi, Y. Kobayashi, S. Loethen, D. Thompson, Y.H. Ko, K. Kim, N. Yui, pH-Responsive movement of CB[7] in a diblock polypseudorotaxane containing β -DMCD and CB[7], *Org. Lett.* **2006**, *8*, 3159-3162.
27. H.S. Choi, A. Hirasawa, T. Ooya, D. Kajihara, T. Hoshaka, N. Yui, pH-sensitive locomotion of cyclodextrins in a block-selective mobile polyrotaxane, *ChemPhysChem* **2006**, *7*(8), 1671-1673.
28. H.S. Choi, T. Ooya, N. Yui, One-pot synthesis of polyrotaxane using selective threading of PEI-*b*-PEG-*b*-PEI copolymer, *Macromol. Biosci.* **2006**, *6*, 420-424.
29. E. Tanaka, H.S. Choi, H. Fujii, M.G. Bawendi, J.V. Frangioni, Image-guided oncologic surgery using invisible light: completed pre-clinical development for sentinel lymph node mapping, *Ann. Surg. Onc.* **2006**, *13*(12), 1671-1681.

30. H.S. Choi, W. Liu, P. Misra, E. Tanaka, J.P. Zimmer, B. Itty Ipe, M.G. Bawendi, J.V. Frangioni, Renal clearance of nanoparticles, *Nat. Biotech.* **2007**, *in press*.
31. W. Liu, H.S. Choi, J.P. Zimmer, J.V. Frangioni, M.G. Bawendi, Compact cysteine coated CdSe(ZnCdS) QDs for in vivo applications, *J. Am. Chem. Soc.* **2007**, *in press*.

Presentations at International Conferences:

1. H.S. Choi, K. Nasr, P. Misra, V. Kianzad, J. Frangioni, Biodistribution and clearance of PEGylated small molecules as a function of size, charge density, and hydrophobicity, *The 6th Annual Meeting of the Society for Molecular Imaging*, Rhode Island, Sep. 9-11, **2007**.
2. H.S. Choi, P. Misra, E. Tanaka, C. Vooght, K. Nasr, J. Frangioni, Rapid screening of cancer-specific small molecule ligands using living cells in the context of warm serum, *The 6th Annual Meeting of the Society for Molecular Imaging*, Rhode Island, Sep. 9-11, **2007**.
3. H.S. Choi, J. Zimmer, W. Liu, E. Tanaka, Preeti Misra, M. Bawendi, J. Frangioni, Noninvasive in vivo imaging with quantum dots for tumor targeting, *The 16th Annual Meeting of the Society of Biomedical Research*, Gaithersburg, MD, Oct. 25-27, **2006**.
4. H.S. Choi, J. Zimmer, W. Liu, E. Tanaka, M. Bawendi, J. Frangioni, Renally-cleared quantum dots for biomedical imaging, *The 5th Annual Meeting of the Society for Molecular Imaging*, Hawaii, Aug 29-Sep 2, **2006**.
5. H.S. Choi, A. Takahashi, T. Ooya, N. Yui, Y. Molecular recognition of mobile cyclodextrin-linked pH-sensitive polyrotaxane, *The 230th ACS National Meeting*, in Washington, DC, Aug 28-Sept 1, **2005**.
6. T. Ooya, H.S. Choi, A. Yamashita, N. Yui, A. Maruyama, H. Akita, R. Ito, K. Kogure, H. Harashima, *The 5th Anniversary International Symposium for Gene Design and Delivery*, May 20, **2005**, Univ. of Tokyo, Japan.
7. H.S. Choi, T. Ooya, N. Yui, "Design of stimuli-responsive supramolecular assembly based on cooperative host-guest interactions," *The 229th ACS National Meeting*, Polymer Preprints **2005**, 46(1), 135-136.
8. H.S. Choi, K. Yamamoto, T. Ooya, N. Yui, "Synthesis of poly(ϵ -lysine)-grafted dextrans and their pH- and thermosensitive hydrogelation with cyclodextrins," *The 229th ACS National Meeting*, Polymer Preprints **2005**, 46(1), 170-171.
9. Y.K. Joung, H.S. Choi, T. Ooya, N. Yui, "Synthesis of amphiphilic PEG-*b*-PEI copolymers for supramolecular assembling system," *The 229th ACS National Meeting*, Proceedings **2005**, Coll-641.
10. H.S. Choi, A. Takahashi, T. Ooya, N. Yui, Y. "Structural role of guest molecules in fast assembling supramolecular hydrogels based on β -CDPL," *The 4th Asian International Symposium on Biomaterials*, Proceedings **2004**, P-136.
11. H.S. Choi, T. Ooya, S. Sasaki, N. Yui, Y. Ohya, T. Nakai, T. Ouchi, "Polypseudorotaxanes based on biodegradable PLLA/PEG multiblock copolymers," *The 227th ACS National Meeting*, Proceedings **2004**, Coll-191.
12. H.S. Choi, T. Ooya, S.C. Lee, M. Kurisawa, N. Yui, "Design of supramolecular guest molecules for stimuli-responsive hydrogels," *International Conference on Bioengineering and Nanotechnology*, Proceedings **2004**, #17.
13. H.S. Choi, T. Ooya, N. Yui, "Rapidly assembling supramolecular systems in response to synchronized stimuli based on cyclodextrin-conjugated poly(ϵ -lysine)," *The 40th IUPAC World Polymer Congress*, Proceedings **2004**. #I-1922.
14. S.C. Lee, H.S. Choi, T. Ooya, N. Yui, "pH-Dependent inclusion complexation of α -cyclodextrin with ABA triblock copolymers of polyethylenimine and poly(ethylene glycol)," *The 40th IUPAC World Polymer Congress*, Proceedings **2004**. #I-1905.
15. H.S. Choi, T. Ooya, S.C. Lee, K.M. Huh, N. Yui, "Conformational geometry changes of supramolecular assembling systems via pH variation," *The 43rd Microsymposium of P.M.M.*, Proceedings **2004**, #PC 33.
16. A. Takahashi, H.S. Choi, T. Ooya, N. Yui, "Molecular recognition system controlled by thermosensitive complexation using cyclodextrin-conjugated poly(ϵ -lysine)s," *The 2004 International Conference on MEMS, NANO, and Smart Systems*, IEEE-CSPress, Aug 25-27, **2004**, Banff, Alberta, Canada.
17. H.S. Choi, T. Ooya, S. Sasaki, N. Yui, "Self-assembling nanoparticles induced by inclusion complexation of cyclodextrin-containing polymers," *International Congress on Bio-Nanointerface*, **2003**, #168.
18. H.S. Choi, T. Ooya, S. Sasaki, N. Yui, "Control of rapid phase transition induced by supramolecular complexation of β -CD-conjugated poly(ϵ -lysine) with a specific guest," *Advanced Polymeric Materials and Technology*, Proceedings **2003**, #5-07.
19. H.S. Choi, T. Ooya, N. Yui, "Thermodynamic study of a supramolecular assembly based on inclusion complexation of cationic cyclodextrin-conjugated polymer," *ISSP International Workshop, The 5th Gel Symposium*, Proceedings **2003**, #96.
20. H.S. Choi, K. Kontani, K.M. Huh, S. Sasaki, T. Ooya, W.K. Lee, N. Yui, "Preparation of thermoreversible hydrogel based

on inclusion complexation between poly(propylene oxide)-grafted dextran and β -cyclodextrin," *The 29th Annual Meeting of the Controlled Release Society, Proceedings 2002*, #232.

D. Research Support

Ongoing Research Support

PSMA-Targeted NIR Fluorescent Quantum Dots for Prostate Cancer Surgery, Charles A. King Trust Research Grant (Jul. 1, 2007)

Role: To develop NIR fluorescent QDs that have the properties of prostate-specific targeting, rapid renal clearance, and high fluorescence yield.