

# Curriculum Vitae



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## Professional Experience

Associate Professor, KAIST

2020. 9 ~ Present

Assistant Professor, KAIST

2014. 8 ~ 2020. 8

## Education

Ph.D in Bioengineering, KAIST

2007. 2 ~ 2010. 8

Department of Biological Sciences (*Advisor: Prof. Tae Gwan Park*)

M.S. in Bioengineering, KAIST

2005. 3 ~ 2007. 1

Department of Biological Sciences (*Advisor: Prof. Tae Gwan Park*)

B.S. in Biological Sciences, KAIST

2001. 3 ~ 2005. 2

## Research Experience

Post-doctoral Research Fellow, Harvard Medical School

2011. 1 ~ 2014. 7

Center for Systems Biology, Massachusetts General Hospital (*Advisor: Prof. Ralph Weissleder*)

Visiting Student, MIT

2008.10 ~ 2009.3

Department of Chemical Engineering (*Advisor: Prof. Robert S. Langer & Daniel G. Anderson*)

## Publications (\*Corresponding author)

1. H. N. Lee, J. Lee, Y. K. Kang, J. H. Lee, S. Yang, **H. J. Chung\***, A Lateral Flow Assay for Nucleic Acid Detection Based on Rolling Circle Amplification Using Capture Ligand-Modified Oligonucleotides, **BioChip Journal**, accepted.
2. H. J. Jo, J. S. Ryu, A. I. Robby, Y. S. Kim\*, **H. J. Chung\***, S. Y. Park\*, Rapid and Selective Electrochemical Sensing of Bacterial Pneumonia in Human Sputum Based On Conductive Polymer Dot Electrodes, **Sensors & Actuators: B. Chemical** 368, 132084 (2022).
3. G. Kim, D. Ahn, M. Kang, J. Park, D. H. Ryu, Y. J. Jo, J. Song, J. S. Ryu, G. Choi, **H. J. Chung**, K. Kim, D. R. Chung, I. Y. Yoo, H. J. Huh, H. Min, N. Y. Lee, Y. K. Park, Rapid species identification of pathogenic bacteria from a minute quantity exploiting three-dimensional quantitative phase imaging and artificial neural network, **Light: Science & Applications** 11, 190 (2022).
4. M. J. Shin, S. H. Im, W. Kim, H. Ahn, T. J. Shin, **H. J. Chung\***, D. K. Yoon\*, Recyclable Periodic Nanostructure Formed by Sublimable Liquid Crystals for Robust Cell Alignment, **Langmuir** 38, 3765-3774 (2022).
5. J. Lee, Y. K. Kang, E. Oh, J. Jeong, S. H. Im, D. K. Kim, H. Lee, S. G. Kim, K. Jung\*, **H. J. Chung\***, Nano-Assembly of Chemically Tailored Cas9 Ribonucleoprotein for *In Vivo* Gene Editing and Cancer Immunotherapy, **Chemistry of Materials** 34, 547-561 (2022).

6. Y. K. Kang, J. Lee, S. H. Im, J. H. Lee, J. Jeong, D. K. Kim, S. Y. Yang, K. Jung\*, S. G. Kim\*, **H. J. Chung\***, Cas9 conjugate complex delivering donor DNA for efficient gene editing by homology-directed repair, **Journal of Industrial & Engineering Chemistry** 102, 241-250 (2021).
7. M. J. Beha, J. S. Ryu, Y. S. Kim, **H. J. Chung\***, Delivery of Antisense Oligonucleotides Using Multi-layer Coated Gold Nanoparticles to Methicillin-Resistant *S. aureus* for Combinatorial Treatment, **Materials Science & Engineering C** 126, 112167 (2021).
8. J. H. Lee, J. S. Ryu, Y. K. Kang, H. Lee\*, **H. J. Chung\***, Polydopamine Sensors of Bacterial Hypoxia via Fluorescence Coupling, **Advanced Functional Materials** 31, 2007993 (2021) (Front Cover).
9. Y. K. Kang, S. H. Im, J. S. Ryu, J. Lee, **H. J. Chung\***, Simple Visualized Readout of Suppressed Coffee Ring Patterns for Rapid and Isothermal Genetic Testing of Antibacterial Resistance, **Biosensors and Bioelectronics** 168, 112566 (2020).
10. J. S. Ryu, S. H. Im, Y. K. Kang, Y. S. Kim, **H. J. Chung\***, Ultra-Fast and Universal Detection of Gram-Negative Bacteria in Complex Samples Based on Colistin Derivatives, **Biomaterials Science** 8, 2111-2119 (2020) (Front Cover).
11. J. Oh, J. S. Ryu, M. Lee, J. Jung, S. Han, **H. J. Chung\***, Y. Park\*, Three-Dimensional Label-Free Observation of Individual Bacteria Upon Antibiotic Treatment Using Optical Diffraction Tomography, **Biomedical Optics Express**, 11, 1257-1267 (2020). \*Co-corresponding authors.
12. J. C. Park, S. Y. Choi, M. Y. Yang, L. Nan, H. Na, H. N. Lee, **H. J. Chung**, C. A. Hong, Y. S. Nam, Subnanomolar FRET-Based DNA Assay Using Thermally Stable Phosphorothioated DNA-Functionalized Quantum Dots, **ACS Applied Materials and Interfaces** 11, 33525-34 (2019).
13. S. Kim, S. Lee, J. K. Kim, **H. J. Chung**, J. S. Jeon, Microfluidic-Based Observation of Local Bacterial Density Under Antimicrobial Concentration Gradient for Rapid Antibiotic Susceptibility Testing, **Biomicrofluidics** 13, 014108 (2019).
14. S. Kim, M. Fahim, J. K. Kim, **H. J. Chung**, J. S. Jeon, On-Chip Phenotypic Investigation of Combinatory Antibiotic Effects by Generating Orthogonal Concentration Gradients, **Lab on a Chip** 19, 959-973 (2019).
15. K. Choi, C. Shin, T. Kim, **H. J. Chung**, H. J. Suk, Awakening Effects of Blue-Enriched Morning Light Exposure on University Students' Physiological and Subjective Responses, **Scientific Reports** 9, 345 (2019).
16. C. Shin, H. N. Lee, J. S. Ryu, **H. J. Chung\***, Rapid Naked-Eye Detection of Gram-Positive Bacteria by Vancomycin-Based Nano-Aggregation, **RSC Advances** 8, 25094 (2018).
17. J. K. Kim, H. A. Lee, H. Lee\*, **H. J. Chung\***, Phenolic Pyrogallol Fluorogen for Red Fluorescence Development in a PAS Domain Protein, **Chemistry of Materials** 30, 1467-1471 (2018). \*Co-corresponding authors.
18. H. N. Lee, J. S. Ryu, C. Shin, **H. J. Chung\***, A Carbon Dot-Based Fluorescent Nanosensor for Simple Visualization of Bacterial Nucleic Acids, **Macromolecular Bioscience** 17, 1700086 (2017).
19. Y. K. Kang, K. Kwon, J. S. Ryu, H. N. Lee, C. Park, **H. J. Chung\***, Nonviral Genome Editing Based on a Polymer-Derivatized CRISPR Nanocomplex for Targeting Bacterial Pathogens and Antibiotic Resistance, **Bioconjugate Chemistry** 28, 957-967 (2017).
20. K. S. Park#, **H. J. Chung#**, F. Khanam, H. Lee, R. Rashu, T. Bhuiyan, J. B. Harris, S. B. Calderwood, E. T. Ryan, F. Qadri, R. Weissleder, R. C. Charles, A Magneto-DNA Nanoparticle System for the Rapid and Sensitive Diagnosis of Enteric Fever, **Scientific**

- Reports** 6, 32878 (2016). #Equal contribution.
21. **H. J. Chung**, K. Pellegrini, J. H. Chung, K. Wanigasuriya, I. Jayawardene, K. Lee, H. Lee, V. Vaidya, R. Weissleder, Nanoparticle Detection of Urinary Markers for Point-of-care Diagnosis of Kidney Injury, **PLoS ONE** 10(7), e0133417 (2015).
  22. **H. J. Chung**, C. M. Castro, H. Im, H. Lee, R. Weissleder, A Magneto-DNA Nanoparticle System for Rapid Detection and Phenotyping of Bacteria, **Nature Nanotechnology** 8, 369-375 (2013) (Featured in News and Views in the issue; Mass General News, and Science Daily).
  23. D. Issadore#, **H. J. Chung**#, G. Budin, R. Weissleder, H. Lee,  $\mu$ Hall Chip for Sensitive Detection of Bacteria, **Advanced Healthcare Materials** 2, 1224-1228 (2013). #Equal contribution.
  24. G. Budin#, **H. J. Chung**#, H. Lee, R. Weissleder, A Magnetic Gram Stain for Bacterial Detection, **Angewandte Chemie International Edition** 51, 7752-7755 (2012) (Featured as Hot Paper in the issue). #Equal contribution.
  25. S. S. Agasti, M. Liong, C. Tassa, **H. J. Chung**, S. Y. Shaw, H. Lee, R. Weissleder, Supramolecular Host-Guest Interaction for Labeling and Detection of Cellular Biomarkers, **Angewandte Chemie International Edition** 50, 1-6 (2011).
  26. **H. J. Chung**, T. Reiner, G. Budin, C. Min, M. Liong, D. Issadore, H. Lee, R. Weissleder, Ubiquitous Detection of Gram-Positive Bacteria with Bioorthogonal Magnetofluorescent Nanoparticles, **ACS Nano** 5, 8834-8841 (2011).
  27. **H. J. Chung**, H. Lee, K. H. Bae, Y. Lee, J. N. Park, S. W. Cho, J. Y. Hwang, H. Park, R. Langer, D. G. Anderson, T. G. Park, A Facile Synthetic Route for Surface Functionalized Magnetic Nanoparticles: Cell Labeling and Magnetic Resonance Imaging Studies, **ACS Nano** 5, 4329-4336 (2011).
  28. K. H. Bae, **H. J. Chung**, T. G. Park, Nanomaterials for Cancer Therapeutics and Imaging, **Molecules and Cells** 31, 295-302 (2011).
  29. **H. J. Chung**, C. A. Hong, S. H. Lee, S. D. Jo, T. G. Park, Reducible siRNA Dimeric Conjugates for Efficient Cellular Uptake and Gene Silencing, **Bioconjugate Chemistry** 22, 299-306 (2011).
  30. **H. J. Chung**, J. S. Jung, T. G. Park, Fabrication of Adipose-derived Mesenchymal Stem Cell Aggregates using Biodegradable Porous Microspheres for Injectable Adipose Tissue Regeneration, **Journal of Biomaterials Science, Polymer Edition** 22, 107-122 (2011).
  31. T. G. Kim, S. H. Park, **H. J. Chung**, D. Y. Yang, T. G. Park, Microstructured Scaffold Coated with Hydroxyapatite/Collagen Nanocomposite Multilayer for Enhanced Osteogenic Induction of Human Mesenchymal Stem Cells, **Journal of Materials Chemistry** 20, 8927-8933 (2010).
  32. T. G. Kim, S. Park, **H. J. Chung**, D. Yang, T. G. Park, Hierarchically Assembled Mesenchymal Stem Cell Spheroids Using Bio-mimicking Nanofilaments and Micro-structured Scaffolds for Vascularized Adipose Tissue Engineering, **Advanced Functional Materials** 20, 2303-2309 (2010).
  33. S. Jung, S. H. Lee, H. Mok, **H. J. Chung**, T. G. Park, Gene Silencing Efficiency of siRNA-PEG Conjugates: Effect of PEGylation Site and PEG Molecular Weight, **Journal of Controlled Release** 144, 306-313 (2010).
  34. Y. Lee, **H. J. Chung**, S. Yeo, C. H. Ahn, H. Lee, P. Messersmith, T. G. Park, Thermo-sensitive, Injectable, and Tissue Adhesive Sol-Gel Transition Hyaluronic acid/Pluronic

- Composite Hydrogels Prepared from Bio-inspired Catechol-Thiol Reaction, **Soft Matter** **6**, 977-983 (2010).
35. **H. J. Chung**, T. G. Park, Self-assembled and Nanostructured Hydrogels for Drug Delivery and Tissue Engineering, **Nano Today** **4**, 429-437 (2009).
  36. **H. J. Chung**, T. G. Park, Injectable Cellular Aggregates Prepared from Biodegradable Porous Microspheres for Adipose Tissue Engineering, **Tissue Engineering** **15**, 1391-1400 (2009).
  37. T. G. Kim, **H. J. Chung**, T. G. Park, Macroporous and Nanofibrous Hyaluronic Acid/Collagen Hybrid Scaffold Fabricated by Concurrent Electrospinning and Deposition/Leaching of Salt Particles, **Acta Biomaterialia** **4**, 1611-1619 (2008).
  38. S. Y. Park, **H. J. Chung**, Y. Lee, T. G. Park, Injectable and Sustained Delivery of Human Growth Hormone Using Chemically Modified Pluronic Copolymer Hydrogels, **Biotechnology Journal** **3**, 669-675 (2008).
  39. **H. J. Chung**, I. K. Kim, T. G. Kim, T. G. Park, Highly Open Porous Biodegradable Microcarriers: In vitro Cultivation of Chondrocytes for Injectable Delivery, **Tissue Engineering**, **14**, 607-615 (2008) (Cover article in the issue and Biopreservation and Biobanking **8**, 2010).
  40. **H. J. Chung**, Y. Lee, T. G. Park, Thermo-sensitive and Biodegradable Hydrogels Based on Stereocomplexed Pluronic Multi-block Copolymers for Controlled Protein Delivery, **Journal of Controlled Release** **127**, 22-30 (2008).
  41. **H. J. Chung**, T. G. Park, Surface Engineered and Drug Releasing Pre-fabricated Scaffolds for Tissue Engineering, **Advanced Drug Delivery Reviews** **59**, 249-262 (2007) (Cover article in the issue).
  42. J. J. Yoon, **H. J. Chung**, T. G. Park, Photo-crosslinkable and Biodegradable Pluronic/Heparin Hydrogels for Local and Sustained Delivery of Angiogenic Growth Factor, **Journal of Biomedical Materials Research, Part A** **83**, 597-605 (2007).
  43. H. J. Lee, **H. J. Chung**, T. G. Park, Perspectives On: Local and Sustained Delivery of Angiogenic Growth factors, **Journal of Bioactive and Compatible Polymers** **22**, 89-114 (2007).
  44. Y. Lee, S. Y. Park, **H. J. Chung**, T. G. Park, New Sol-Gel Transition Hydrogels Based on Pluronic-mimicking Copolymers Grafted with Oligo(lactic acids), **Macromolecular Symposia** **249-250**, 130-136 (2007).
  45. **H. J. Chung**, H. K. Kim, J. J. Yoon, T. G. Park, Heparin Immobilized Porous PLGA Microspheres for Angiogenic Growth Factor Delivery, **Pharmaceutical Research** **23**, 1835-1841 (2006).
  46. J. J. Yoon, **H. J. Chung**, H. J. Lee, T. G. Park, Heparin-immobilized Biodegradable Scaffolds for Local and Sustained Release of Angiogenic Growth Factor, **Journal of Biomedical Materials Research Part A** **79**, 934-942 (2006).
  47. H. K. Kim, **H. J. Chung**, T. G. Park, Biodegradable Polymeric Microspheres with "Open/Closed" Pores for Sustained Release of Human Growth Hormone, **Journal of Controlled Release** **112**, 167-174 (2006).
  48. K. C. Cho, J. H. Jeong, **H. J. Chung**, C. O. Joe, S. W. Kim, T. G. Park, Folate Receptor-mediated Intracellular Delivery of Recombinant Caspase-3 for Inducing Apoptosis, **Journal of Controlled Release** **108**, 121-131 (2005).

## **Patents**

1. **H. J. Chung**, Y. K. Kang, Nonviral Genome Editing CRISPR Nanocomplex and Fabrication Method Thereof, KR 10-2017-0075053, AU 2017390080 (2021).
2. **H. J. Chung**, H. N. Lee, J. S. Ryu, Carbon dot-based fluorescent nanosensor and nucleic acid detection method using the same, Korean Patent 10-2203280 (2021).
3. **H. J. Chung**, G. Budin, R. Weissleder, H. Lee, Magnetic Labeling of Bacteria, US Patent 20,274,490 (2019).
4. **H. J. Chung**, H. Lee, M. Kim, Method for Solvent Transfer of Superparamagnetic Nanoparticles Using Branched-Poly(ethylene glycol), Korean Patent 10-2011-0050933 (2015).
5. **H. J. Chung**, T. G. Park, Y. Lee, Stereocomplexed Poly(ethylene oxide)-poly(propylene oxide)-poly (ethylene oxide) Multi-block Copolymers, Hydrogel for Sustained Delivery of Macromolecular Drugs Using the Same, and Method of Fabricating Thereof, Korean Patent 10-0953170 (2010).
6. **H. J. Chung**, T. G. Park, T. G. Kim, Porous Biodegradable Microcarriers for Cell Culture and Delivery and Fabrication Method Thereof, Korean Patent 10-0801194 (2008).

## **Book Chapters**

1. **H. J. Chung**, T. G. Park, Regenerative Medicine, Chapter 29, Controlled Release Systems for Regenerative Medicine, Goonja Publishing Inc (2006).
2. J. B. Lee, **H. J. Chung**, S. Kongmuang, T. G. Park, Controlled Release of Indomethacin from Spray-Dried Chitosan Microspheres Containing Microemulsion, Chapter 4, New Delivery System for Controlled Drug Release from Naturally Occurring Materials, Edited by N. Parris, L. Liu, C. Song, V. P. Shastri, ACS Symposium Series 992, 57-67 (2008).

## **Awards & Honors**

1. Korea Loreal-UNESCO For Women in Science Awards Fellowship, Women's Bioscience Forum (2019)
2. Young Investigator Award, Korean Society of Industrial and Engineering Chemistry (2017)