Urara Hasegawa

Department of Chemical Engineering, Kansas State University
Address: 1005 Durland Hall, Manhattan, KS 66506, USA
Tel.: 785-532-5486
E-mail: hasegawa@ksu.edu

Research fields
Polymer synthesis, Drug delivery systems, Biomaterials, Bioactive gas

Education

2004 – 2007	Ph.D. in Science, Graduate School of Biomedical Science, Tokyo Medical and Dental University (Tokyo, Japan) Thesis title: Nanogel-based Drug-Delivery Systems: Design and Applications Supervisor: Professor Kazunari Akiyoshi
2002 – 2004	M.Eng. in Applied Chemistry, Department of Applied Chemistry, Waseda University (Tokyo, Japan) Thesis title: Development of photo-responsive artificial gill system Supervisor: Professor Kiyotaka Sakai
1998 – 2002	B.S. in Applied Chemistry, Department of Applied Chemistry, Waseda University (Tokyo, Japan)

Research experiences

2017 – present	Assistant Professor, Department of Chemical Engineering, Kansas State University (USA)
2011 – 2016	Assistant Professor, Frontier Research Base for Global Young Researchers, Department of Applied Chemistry, Graduate School of Engineering, Osaka University (Japan)
2007 – 2011	Postdoctoral fellow, Laboratory for Regenerative Medicine & Pharmacobiology (LMRP), Institut de Bioingenierie (IBI), École Polytechnique Fédérale de Lausanne (EPFL) (Switzerland), Advisor: Prof. Jeffrey A. Hubbell
2007 – 2007	Postdoctoral fellow, Laboratory of Organic Materials, Institute of Biomaterials and Bioengineering, Tokyo Medical and Dental University (Japan), Advisor: Prof. Kazunari Akiyoshi

Fellowships

2006 – 2008	Japan Society for the Promotion of Science (JSPS) Research Fellow
2004 – 2006	Tokyo Medical and Dental University 21st Century Center of Excellence Program Super Student

Awards

July, 2015	Osaka University Presidential Award for Encouragement (Japan)
August, 2010	Poster Award of the third international NanoBio conference 2010 (Switzerland)
August, 2006	Student Award of Gordon Research Conference on Drug Carriers in Medicine & Biology (USA)
March, 2005	Student Award of the Chemical Society of Japan (Japan)
January, 2005	Institute of Biomaterials and Bioengineering (IBB) Biofuture Research Encouragement Prize Award, Doctor Student Section (Japan)

Grants

1. KSU Mentoring Fellowship, Kansas State University (2017)
2. Grant-in-Aid for Challenging Exploratory Research, No. 26560241, from the Japan Society for the Promotion of Science (JSPS) (April 2014-March 2016)
3. Research Grant from the Ogasawara Foundation for the Promotion of Science and Engineering, Japan (December 2013)
4. Grant-in-Aid for Young Scientists (B), No. 24700482, the Japan Society for the Promotion of Science (JSPS) (April 2012-March 2014)

Professional and Synergistic Activities

Manuscript reviews

Chemical Communications, Biomaterials, Biomacromolecules, ACS Medicinal Chemistry, Nanoscale, Journal of Materials Chemistry B, Journal of Bioactive and Compatible Polymers, Molecules, Polymer Journal, Drug Development and Industrial Pharmacy, Central European Journal of Immunology, ACS Macro Letters

Proposal reviews

NSF, DMR Polymer Program, Ad hoc reviewer, 2017

Meeting committee

2011- 2016 Member of the organizing committee for the Kansai Biomaterials Society for Young Researchers, Japan

Editorial Board

2017- present Associate Editor, Nanomedicine & Nanotechnology Open Access

Teaching experience

Lectures, Kansas State University, USA

1. CHE520 Chemical Engineering Thermodynamics I (Spring, 2017&2018)
2. CHE521 Chamical Engineering Thermodynamics II (Fall, 2017)

Lectures, experiment and exercise courses, Osaka University, Japan

1. Chemistry of Biomaterials, Chemical Science Course (2016)
2. Materials Chemistry, Osaka University Short-Term Student Exchange Program (2014)
3. Basic Seminar, Chemistry-Biology Combined Major Program, Osaka University International College (2011, 2015).
4. Inorganic Chemistry Experiment Course, General Education Program (2012-2014)
5. Physical Chemistry Exercise Course, Department of Applied Chemistry (2012, 2015, 2016)
6. Physical Chemistry Experiment Course, Department of Applied Chemistry (2012, 2015)
7. Organic Chemistry Experiment Course, Department of Applied Chemistry (2015)

Research supervision

2017- present Supervision for two PhD thesis projects, Kansas State University

2011- 2016 Supervision for two PhD, five master and eight bachelor thesis projects, Osaka University

2009-2010 Supervision support for two master thesis projects, EPFL

2005 Supervision support for one bachelor thesis project, Tokyo Medical and Dental University

List of publications

Research articles (Corresponding author(s))*

1. F. Taba, A. Onoda*, U. Hasegawa, T. Enoki, Y. Ooyama, J. Ohshita, T. Hayashi*, Mitochondrial-targeting Polyamine−Protoporphyrin Conjugates for Photodynamic Therapy. ChemMedChem, 13 (2018) 15-19. ***Selected as a cover image.***
2. T. Takatani-Nakase,* M. Katayama, C. Matsui, K. Hanaoka, A. J. van der Vlies, K. Takahashi, I. Nakase*, U. Hasegawa*, Hydrogen sulfide donor micelles protect cardiomyocytes from ischemic cell death. *Molecular Biosystems*, 13 (2017) 1705-1708. ***Selected as a cover image.***
3. A. J. van der Vlies, R. Inubushi, H. Uyama, U. Hasegawa*, Polymeric Framboidal Nanoparticles Loaded with a Carbon Monoxide Donor via Phenylboronic Acid-Catechol Complexation. *Bioconjugate Chemistry*, 27 (6) (2016) 1500-1508. ***Selected as a cover image.***
4. U. Hasegawa*, T. Wang, J. J. Y. Chen, H. Uyama and A. J. van der Vlies, Furoxan-Bearing Micelles for Nitric Oxide Delivery. *Macromolecular Bioscience*, 16 (7) (2016) 1009-1018. ***Selected as a cover image.***
5. U. Hasegawa*, T. Wang, H. Uyama and A. J. van der Vlies, Copper Removal from Polymers by Diethyldithiocarbamate Complexation. *Chemistry Letters*, 45(4) (2016) 400-402.
6. Y. Xin, J. Sakamoto, U. Hasegawa, A. J. van der Vlies, H. Uyama*, Data in support of preparation and functionalization of a clickable polycarbonate monolith. *Data in Brief*, 7 (2016) 183-187.
7. U. Hasegawa*, R. Inubushi, H. Uyama, T. Uematsu, S. Kuwabata and A. J. van der Vlies, Mannose-Displaying Fluorescent Framboidal Nanoparticles Containing Phenylboronic Acid Groups as a Potential Drug Carrier for Macrophage Targeting. *Colloids and Surfaces B: Biointerfaces*, 36 (2015) 1174-1181.
8. T. Wang, A. J. van der Vlies, H. Uyama and U. Hasegawa*, Nitric Oxide-Releasing Polymeric Furoxan Conjugates. *Polymer Chemistry*, 6 (2015) 7737 - 7748.
9. U. Hasegawa*, T. Nishida, and A. J. van der Vlies, Dual Stimuli-Responsive Phenylboronic Acid-Containing Framboidal Nanoparticles by One-Step Aqueous Dispersion Polymerization. *Macromolecules*, 48(13) (2015) 4388-4393.
10. U. Hasegawa*, N. Tateishi, H. Uyama and A. J. van der Vlies, Hydrolysis-Sensitive Dithiolethione Prodrug Micelles. *Macromolecular Bioscience*, 15(11) (2015) 1512-1522. ***Selected as a cover image. Featured by Materials Views, "An Old Drug in a New Form: Dithiolethione Prodrug Micelles".***
11. U. Hasegawa*, M. Moriyama, S. Metzger, A. J. van der Vlies, H. Uyama and M. Ehrbar, Catechol-Bearing Polymeric Nanoparticles for Antioxidant Therapy. *MRS Proceedings*, 1797 (2015) mrss15-2132870, doi:10.1557/opl.2015.506.
12. U. Hasegawa*, M. Moriyama, H. Uyama and A. J. van der Vlies, Catechol-Bearing Block Copolymer Micelles: Structural Characterization and Antioxidant Activity. *Polymer*, 66 (2015) 1-7.
13. U. Hasegawa*, M. Moriyama, H. Uyama and A. J. van der Vlies, NMR Spectra and Electrochemical Behavior of Catechol-Bearing Block Copolymer Micelles. *Data in Brief*, 4 (2015) 1-6.
14. Y. Xin, J. Sakamoto, U. Hasegawa, A. J. van der Vlies, Hiroshi Uyama*, Phase Separation Approach to a Reactive Polycarbonate Monolith for "Click" Modifications. *Polymer*, 66 (2015) 52-57.
15. U. Hasegawa*, M. Moriyama, H. Uyama and A. J. van der Vlies, Antioxidant Micelles for Bortezomib Delivery. *Colloid and Polymer Science*, 293(7) (2015) 1887-1892.

16. M. Moriyama, H. Uyama, A. J. van der Vlies and U. Hasegawa*, Crosslinked Catechol-Bearing Poly(γ-Glutamic Acid) Self-Aggregates with Antioxidant Activity. *Colloid and Polymer Science*, 293(4) (2015) 1245-1251.
17. U. Hasegawa*, A. J. van der Vlies, Polymeric Micelles for Hydrogen Sulfide Delivery. *Medicinal Chemistry Communications*, 6 (2015) 273-276. ***The most-read articles published in 2015.***
18. M. Moriyama, S. Metzger, A.J. van der Vlies, H. Uyama, M. Ehrbar, and U. Hasegawa*, Inhibition of Angiogenesis by Antioxidant Micelles. *Advanced Healthcare Materials*, 4(4) (2015) 569-575. ***Selected as a cover image.***
19. W. Han, M. Yamauchi, U. Hasegawa, M. Noda, K. Fukui, A. J. van der Vlies, S. Uchiyama, H. Uyama*, Pepsin immobilization on an aldehyde-modified polymethacrylate monolith and its application for protein analysis, *Journal of Bioscience and Bioengineering*, 119(5) (2015) 505-510.
20. S.-B. Park, U. Hasegawa, A. J. van der Vlies, M.-H. Sung, H. Uyama*, Preparation of Poly(gamma-glutamic acid)/Hydroxyapatite Monolith via Biomineralization for Bone Tissue Engineering. *Journal of Biomaterials Science: Polymer Edition*, 25(17) (2014) 1875-90.
21. U. Hasegawa*, A. J. van der Vlies, Design and Synthesis of Polymeric Hydrogen Sulfide Donors. *Bioconjugate Chemistry*, 25 (2014) 1290-1300. ***Featured by Global Medical Discovery.***
22. W. Han, Y. Xin, U. Hasegawa, H. Uyama*, Enzyme immobilization on polymethacrylate-based monolith fabricated via thermally induced phase separation. *Polymer Degradation and Stability*, 109 (2014) 362-366.
23. S. Yoneda, W. Han, U. Hasegawa, H. Uyama*, Facile fabrication of poly(methyl methacrylate) monolith via thermally induced phase separation by utilizing unique cosolvency. *Polymer*, 55(15) (2014) 3212-3216.
24. A.J. van der Vlies, W. Han, H. Uyama, U. Hasegawa*, Dextran acetate-based sponge as cell scaffold for tissue engineering. *Journal of Biomaterials and Tissue Engineering*, 4 (2014) 28-36.
25. U. Hasegawa, A. J. van der Vlies, C. Wandrey, J.A. Hubbell*, Preparation of Well-Defined Ibuprofen Prodrug Micelles by RAFT Polymerization. *Biomacromolecules*, 14 (2013) 3314-3320.
26. A. J. van der Vlies, U. Hasegawa*, Polymeric micelles for controlled delivery of hydrogen sulfide. *Nitric Oxide*, 31(2) (2013) S58.
27. A. J. van der Vlies, U. Hasegawa, J.A. Hubbell*, Reduction-sensitive tioguanine prodrug micelles. *Molecular Pharmaceutics* 9(10) (2012) 2812-2818.
28. C. Wandrey, U. Hasegawa, A. J. van der Vlies, C. O'Neil, N. Angelova, J.A. Hubbell*, Analytical ultracentrifugation to support the development of biomaterials and biomedical devices, *Methods*, 54(1) (2011) 92-100.
29. U. Hasegawa, A. J. van der Vlies, E. Simeoni, C. Wandrey, J.A. Hubbell*, Carbon monoxide-releasing micelles for immunotherapy. *Journal of the American Chemical Society* 132(51) (2010) 18273–18280.
30. A. J. van der Vlies, C.P. O'Neil, U. Hasegawa, N. Hammond, J.A. Hubbell*, Synthesis of pyridyl disulfide-functionalized nanoparticles for conjugating thiol-containing small molecules, peptides, and proteins. *Bioconjugate Chemistry* 21(4) (2010) 653-662.
31. N. Inomoto, N. Osaka, T. Suzuki, U. Hasegawa, Y. Ozawa, H. Endo, K. Akiyoshi, M. Shibayama*, Interaction of nanogel with cyclodextrin or protein: Study by dynamic light scattering and small-angle neutron scattering. *Polymer* 50(2) (2009) 541-546.
32. K. Miyai, M. Yoneda, U. Hasegawa, S. Toita, Y. Izu, H. Hemmi, T. Hayata, Y. Ezura, S. Mizutani, K. Miyazono, K. Akiyoshi, T. Yamamoto, M. Noda*, ANA Deficiency Enhances Bone Morphogenetic Protein-induced Ectopic Bone Formation via Transcriptional Events. *Journal of Biological Chemistry* 284(16) (2009) 10593-10600.
33. C. Hayashi, U. Hasegawa, Y. Saita, H. Hemmi, T. Hayata, K. Nakashima, Y. Ezura, T. Amagasa, K. Akiyoshi, M. Noda*, Osteoblastic Bone Formation Is Induced by Using Nanogel-

Crosslinking Hydrogel as Novel Scaffold for Bone Growth Factor. *Journal of Cellular Physiology* 220(1) (2009) 1-7.

34. U. Hasegawa, S. Sawada, T. Shimizu, T. Kishida, E. Otsuji, O. Mazda, K. Akiyoshi*, Raspberry-like assembly of cross-linked nanogels for protein delivery. *Journal of Controlled Release* 140(3) (2009) 312-317.
35. T. Shimizu, T. Kishida, U. Hasegawa, Y. Ueda, J. Imanishi, H. Yamagishi, K. Akiyoshi, E. Otsuji, O. Mazda*, Nanogel DDS enables sustained release of IL-12 for tumor immunotherapy. *Biochemical and Biophysical Research Communications* 367 (2008) 330-335.
36. S. Toita, U. Hasegawa, H. Koga, I. Sekiya, T. Muneta, K. Akiyoshi*, Protein-conjugated quantum dots effectively delivered into living cells by a cationic nanogel. *Journal of Nanoscience and Nanotechnology* 8(5) (2008) 2279-2285.
37. N. Alles, N.S. Soysa, A. Mian, N. Tomamatsu, N. Morimoto, U. Hasegawa, S. Sawada, Y. Tada, K. Akiyoshi, K. Ohya, K. Aoki*, Nanogel Cross-linking Hydrogel as a Drug Delivery System for Tumor Necrosis Factor-alpha Antagonist. *Journal of Bone and Mineral Research* 23 (2008) S403-S403.
38. N. Kato†, U. Hasegawa†, N. Morimoto, Y. Saita, K. Nakashima, Y. Ezura, H. Kurosawa, K. Akiyosh*, M. Noda*, Nanogel-based delivery system enhances PGE(2) effects on bone formation. *Journal of Cellular Biochemistry* 101(5) (2007) 1063-1070. † Both authors contributed equally.
39. T. Fukui, H. Kobayashi, U. Hasegawa, T. Nagasawa, K. Akiyoshi, I. Ishikawa*, Intracellular delivery of nanogel-quantum dot hybrid nanoparticles into human periodontal ligament cells. *Drug Metabolism Letters* 1(2) (2007) 131-135.
40. C.N.R. Alles, N. Morimoto, U. Hasegawa, A. Mian, N.S. Soysa, H. Saito, K. Aoki, R. Baron, K. Akiyoshi, K. Ohya*, Subcutaneous injection of W9 peptide and CHP nanogel complex inhibits the decrease of BMD induced by a low Ca feeding in mice. *Journal of Bone and Mineral Research* 21 (2006) S396-S396.
41. K. Nagase, U. Hasegawa, F. Kohori, K. Sakai*, H. Nishide, The photoresponse of a molybdenum porphyrin makes an artificial gill feasible. *Journal of Membrane Science* 249(1-2) (2005) 235-243.
42. U. Hasegawa, S.I.M. Nomura, S.C. Kaul, T. Hirano, K. Akiyoshi*, Nanogel-quantum dot hybrid nanoparticles for live cell imaging. *Biochemical and Biophysical Research Communications* 331(4) (2005) 917-921.
43. S. Aoyagi, M. Hayama, U. Hasegawa, K. Sakai, M. Tozu, T. Hoshi, M. Kudo*, Estimation of protein adsorption on dialysis membrane by means of TOF-SIMS imaging. *Journal of Membrane Science* 236(1) (2004) 91-99.
44. S. Aoyagi, M. Hayama, U. Hasegawa, K. Sakai, T. Hoshi, M. Kudo*, TOF-SIMS imaging of protein adsorption on dialysis membrane. *Applied Surface Science* 231-2 (2004) 411-415.
45. S. Aoyagi, M. Hayama. U. Hasegawa, K. Sakai, M. Tozu, T. Hoshi and M. Kudo*, TOF-SIMS Imaging of Protein Adsorption on Dialysis Membrane by means of Information Entropy, *e-Journal of Surface Science and Nanotechnology*, 1 (2003) 67-71.

Reviews

1. U. Hasegawa, K. Akiyoshi, Drug delivery systems by nanogel engineering. Saibo Kogaku 26(6) (2007) 679-685.
2. U. Hasegawa, K. Akiyoshi, Nanogel carriers, Soft-Nanotechnology: The Biomaterial Revolution, CMC Publishing, Tokyo, Japan, 2005, pp. 236-244.
3. N. Morimoto, U. Hasegawa, A. Sugawara, S. Yamane, K. Akiyoshi, in: H. Yuasa (Ed.), Nanotechnology in Carbohydrate Chemistry, Transworld Research Network, Trivandrum, India, 2006, pp. 67-85.

Patent

1. K. Akiyoshi, T. Hirano, U. Hasegawa, Quantum dot-nanogel composites with improved colloidal stability, their preparation, control of quantum dot dissociation from them, and control of uptake rate of them into animal cells. Jpn. Kokai Tokkyo Koho (2006), JP 2006143808 A 20060608.

Invited presentations

1. "Polymeric Micelles for Therapeutic Gas Delivery", Departmental Seminar, Department of Chemistry, Kansas State University, USA, December 2017. (Oral presentation)
2. "Polymeric Micelles for Therapeutic Delivery of Gaseous Signaling Molecules", CHE6010 Seminar Series, Department of Chemical Engineering, Oklahoma State University, USA, November 2017. (Oral presentation)
3. "Polymeric Micelles for Therapeutic Delivery of Gaseous Signaling Molecules", BAE Seminar, Department of Biological and Agricultural Engineering, Kansas State University, USA, November 2017. (Oral presentation)
4. "Polymeric Micelles for Therapeutic Delivery of Gaseous Signaling Molecules", The Condensed Matter Seminar, Department of Physics, Kansas State University, USA, February 2017. (Oral presentation)
5. "Bioactive Gas Delivery by Polymeric Nanoparticles", 3rd Nanobio Forum, Institute of Systems, Information Technologies and Nanotechnologies (ISIT), Japan, Feburary 2016. (Oral presentation)
6. "Polymeric Nanomedicines in Gas Biology", 9th Japanese-French Frontiers of Science Symposium, Japan, January 2015. (Short talk and poster presentation)
7. "Polymeric nanoparticles for controlling bioactive gases and redox environments in the body", Research Group on Biomedical Polymers 65th Meeting, Japan, March 2015. (Oral presentation)
8. "Analytical Ultracentrifugation as a Tool to Characterize Polymeric Micelles for Drug Delivery", 21st International Conference on Analytical Ultracentrifugation, Hydrodynamics, Thermodynamics and Complementary Methods (AUC2013), Japan, September 2013. (Oral presentation)

Contributed presentations

1. "Hydrogen Sulfide Donor Micelles: Synthesis, Characterization and Therapeutic Potential.", AIChE Annual Meeting 2017, Minneapolis, USA, November, 2017 (Oral presentation)
2. "Hydrogen Sulfide-Releasing Micelles and Their Potential Applications.", Pacifichem 2015, Honolulu, USA, December, 2015 (Oral presentation)
3. "Catechol-Bearing Polymeric Nanoparticles for Antioxidant Therapy.", 2015 MRS Spring Meeting & Exhibit, San Francisco, USA, April, 2015 (Oral presentation)
4. "Polymeric Micelles for Hydrogen Sulfide-Based Therapy", 26th European Conference on Biomaterials, Liverpool, England, September 2014 (Oral presentation)
5. "Dithiolethione-Bearing Polymeric Micelles for Hydrogen Sulfide-Based Therapy", The 41th Annual Meeting & Exposition of the Controlled Release Society, Chicago, USA, July 2014 (Poster presentation)
6. "Polymeric Micelles for Controlled Delivery of Hydrogen Sulfide", Second European Conference on the Biology of Hydrogen Sulfide, Exeter, England, September 2013 (Poster presentation)
7. "Therapeutic Hydrogen Sulfide Delivery System based on Polymeric Micelles", The 40th Annual Meeting & Exposition of the Controlled Release Society, Hawaii, USA, July 2013 (Poster presentation)

8. "Polymeric Micelles for Therapeutic Delivery of Hydrogen Sulfide", 2nd international Conference on Biomaterials Science in Tsukuba (ICBS2013), Tsukuba, Japan, March 2013 (Oral presentation)
9. "Hydrogen Sulfide Delivery Systems based on Polymeric Micelles and its Therapeutic Potential in Immunotherapy", The 9th SPSJ International Polymer Conference (IPC2012), Kobe, Japan, December 2012 (Oral presentation)
10. "Well-Defined Prodrug Micelles for Non-Steroidal Anti-Inflammatory Drug Delivery", The 39th Annual Meeting & Exposition of the Controlled Release Society, Quebec, Canada, July 2012 (Poster presentation)
11. "Carbon Monoxide-Releasing Micelles", The third International NanoBio Conference 2010, Zurich, Switzerland, August 2010 (Poster presentation)
12. "Design of Biodegradable Hydrogel by Nanogel Engineering", AIChE 2006, San Francisco, USA, November 2006 (Poster presentation)
13. "Nanogel-Cross-Linked Hydrogel with Chaperon-Like Activity for Drug Delivery System", The Gordon Research Conference on Drug Carriers in Medicine & Biology, Big Sky, USA, August 2006 (Poster presentation)
14. "Nanogel-Quantum Dot Complex for Bioimaging", 33rd Annual Meeting and Exposition of the Controlled Release Society, Vienna, Austria, July 2006(Poster presentation)
15. "Hydrid Nanomaterials of Nanogel-Quantum Dot for Imaging of Live Cells", The 2005 International Chemical Congress of Pacific Basin Societies (Pacifichem 2005), Honolulu, USA, December 2005 (Oral presentation)
16. "Hybrid Nanomaterials of Nanogel-Quantum Dot Complex for Cell Imaging", The 8th SPSJ International Polymer Conference (IPC2005), Fukuoka, Japan, July 2005 (Poster presentation)
17. "Preparation of Nanogel-Quantum Dot Complex for Intracelluar Delivery", International Symposium on Functional Colloids and Surface, Tokyo, Japan, January 2005 (Poster presentation)