Yoshie Narui

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Education

2014	Ph.D. in Biomolecular Chemistry, Emory University, Atlanta, GA
2009	M.S. in Chemistry, California Institute of Technology, Pasadena, CA
2003	B.S. (Summa Cum Laude) in Chemistry, Ohio State University, Columbus, OH

Research Expertise

I am a biophysical chemist who is passionate about investigating biomolecules at the atomic scale. I have received extensive training in structure determination using x-ray crystallography. Using newly solved structures, I designed and ran molecular dynamics simulations to study how proteins sense and respond to physiological forces. In addition, my past research experience includes a wide range of imaging methods such as TEM, AFM, and fluorescence microscopy. I am currently exploring new and exciting areas of cryo-EM research, specifically single particle analysis and MicroED, so that I can help Ohio State researchers solve questions of significant human health relevance.

Research Experience

Cryo-EM Senior Researcher **2018-present**

- Mentor: Prof. David McComb, Ohio State University, Columbus, OH
- Assisting in the establishment of a cryo-EM facility at Ohio State, maintaining Thermo Glacios and Krios G3i instruments, training new users for single-particle data collection, advising users on experimental strategy
- **Areas of expertise**: single-particle analysis, structural biology, cryo-EM specimen preparation

Postdoctoral Researcher **2014-2018**

- Mentor: Prof. Marcos Sotomayor, Ohio State University, Columbus, OH
- Studying cadherin complexes involved in hearing; obtaining and solving protein crystal structures; conducting steered molecular dynamics simulations
- **Areas of expertise**: structural biology, x-ray crystallography, protein expression and purification, biophysical methods for studying protein-protein interactions

Graduate Doctoral Research Assistant **2010-2013**

- Mentor: Prof. Khalid Salaita, Emory University, Atlanta, GA
- Investigated the biophysical mechanisms of Notch receptor activation; micro- and nanopatterning of surfaces to introduce spatial mutations in ligand organization
- **Areas of expertise**: mechanobiology, lipid membranes, membrane proteins, mammalian and insect cell culture, surface chemistry, fluorescence microscopy

Graduate Masters Research Assistant **2003-2009**

- Mentor: Prof. C. Patrick Collier, California Institute of Technology, Pasadena, CA
- Fabrication and characterization of single-walled carbon nanotube scanning probe nanoelectrodes
- **Areas of expertise**: transmission electron microscopy, atomic force microscopy, plasma reactors, electrochemistry, thin film characterization methods

Undergraduate Researcher **2000-2003**

- Mentor: Prof. Matthew S. Platz, Ohio State University, Columbus, OH
- Mentor: Prof. Oleg Prezhdo, University of Washington, Seattle, WA

Peer-Reviewed Publications

1. Choudhary, D.; *Narui, Y.*; Neel, B.L.; Wimalasena, L.N.; Klanseck, C.F.; De-la-Torre, P.; Chen, C.; Araya-Secchi, R.; Tamilselvan, E.; Sotomayor, M. "Structural Determinants of Protocadherin-15 Elasticity and Function in Inner-Ear Mechanotransduction." *bioRxiv* **2019**, https://doi.org/10.1101/695502.

2. De-la-Torre, P.; Choudhary, D.; Araya-Secchi, R.; *Narui, Y.*; Sotomayor, M. "A Mechanically Weak Extracellular Membrane-Adjacent Domain Induces Dimerization of Protocadherin-15." *Biophys. J.* **2018,** 115, 2368–2385.

3. *Narui, Y.*; Sotomayor, M. "Tuning Inner-Ear Tip-Link Affinity Through Alternatively Spliced Variants of Protocadherin-15." *Biochemistry*. **2018**, 57, 1702-1710.

4. Fecker, T.; Galaz-Davison, P.; Engelberger, F.; *Narui, Y.*; Sotomayor, M.; Parra, L.P.; Ramírez-Sarmiento, C.A. "Active Site Flexibility as a Hallmark for Efficient PET Degradation by *I. sakaiensis* PETase." *Biophys. J.* **2018**, 114, 1302-1312.

5. Jaiganesh, A.; *Narui, Y.*; Araya-Secchi, R.; Sotomayor, M. "Beyond Cell-Cell Adhesion: Sensational Cadherins for Hearing and Balance." *Cold Spring Harb. Perspect. Biol.* **2017**, a029280.

6. Boopathy, A.V.; Che, P.L.; Somasuntharam, I.; Fiore, V.F.; Cabigas, E.B.; Ban, K.; Brown, M.E.; *Narui, Y.*; Barker, T.H.; Yoon, Y.; Salaita, K.; Garcia, A.; Davis, M. "The Modulation of Cardiac Progenitor Cell Function by Hydrogel-Dependent Notch1 Activation." *Biomaterials.* **2014**, 35, 8103-8112.

7. Jurchenko, C.; Chang, Y.; *Narui, Y.*; Zhang, Y.; Salaita, K. "Integrin-Generated Forces Lead to Streptavidin-Biotin Unbinding in Cellular Adhesions." *Biophys. J.* **2014**, 106, 1436-1446.

8. *Narui, Y.*; Salaita, K. "Membrane Tethered Delta Activates Notch and Reveals a Role for Spatio-Mechanical Regulation of the Signaling Pathway." *Biophys. J.* **2013**, 105, 2655-2665.

9. Liu, Y.; Yehl, K.; *Narui, Y*; Salaita, K. "Tension Sensing Nanoparticles for Mechano-imaging at the Living Non-Living Interface." *J. Am. Chem. Soc.* **2013**, 135, 5320-5323.

10. *Narui, Y.*; Salaita, K. "Dip-pen Nanolithography of Optically Transparent Cationic Polymers to Manipulate Spatial Organization of Proteolipid Membranes." *Chem. Sci.* **2012**, 3, 794-799.

11. Laroui, H.; Yan, Y.; *Narui, Y.*; Ingersoll, S.A.; Ayyadurai, S.; Charania, M.A.; Zhou, F.; Wang, B.; Salaita, K.; Sitaraman, S.V.; Merlin, D. "L-Ala-γ-D-Glu-*meso*-diaminopimelic Acid (DAP) Interacts Directly with Leucine-rich Region Domain of Nucleotide-binding Oligomerization Domain 1, Increasing Phosphorylation Activity of Receptor-interacting Serine/Threonine-protein Kinase 2 and Its Interaction with Nucleotide-binding Oligomerization Domain 1." *J. Biol. Chem.* **2011**, 286, 31003-31013.

12. Tayebi, N.; *Narui, Y.*; Franklin, N.; Collier, C.P.; Giapis, K.P.; Nishi, Y.; Zhang, Y. "Fully-Inverted Single-Digit Nanometer Domains in Ferroelectric Films." *Appl. Phys. Lett.* **2010**, 96, 023103.

13. *Narui, Y.*; Ceres, D.; Chen, J.; Giapis, K.P.; Collier, C.P. "High Aspect Ratio Silicon Dioxide-Coated Single-Walled Carbon Nanotube Scanning Probe Nanoelectrodes." *J. Phys. Chem. C* **2009**, 113, 6815-6820.

14. Tayebi, N.; *Narui, Y.*; Chen, R.; Collier, C.P.; Giapis, K.P.; Zhang, Y. “Nanopencil as a Wear-Tolerant Probe for Ultrahigh Density Data Storage.” *Appl. Phys. Lett.* **2008**, 93, 103112.

Presentations & Posters

1. De-la-Torre, P.; *Narui, Y.*; Choudhary, D.; Araya-Secchi, R.; Sotomayor, M. “Structures and Simulations of Membrane Adjacent Fragments of Protocadherin-15”, Platform Presentation, 63rd Annual Meeting of the Biophysical Society, Baltimore, MD, **2019**.

2. *Narui, Y.*; Sotomayor, M. “Structural and Biophysical Characterization of Inner Ear Tip Link Variants”, Poster, 40th Annual Midwinter Meeting of the Association for Research in Otolaryngology, Baltimore, MD, **2017**.

3. *Narui, Y.*; Velez-Cortes, F.; Johnson, Z.; Sotomayor, M. “Steered Molecular Dynamics Simulations of Inner-Ear Cadherins using the Drude Polarizable Force Field”, Platform Presentation, 60th Annual Meeting of the Biophysical Society, Los Angeles, CA, **2016**.

4. Sotomayor, M.; Araya-Secchi, R.; *Narui, Y.*; Chen, C.H.; Klanseck, C.; Wimalasena, L. “Structural Determinants of Protocadherin-15 Function in Inner-Ear Mechanotransduction”, Poster, 60th Annual Meeting of the Biophysical Society, Los Angeles, CA, **2016**.

5. Narui, Y.; Sotomayor, M. “Structural and Biophysical Characterization of Inner Ear Tip Link Variants”, Poster, HHMI Janelia Farm, Force-Gated Ion Channels, Ashburn, VA, **2015**.

6. *Narui, Y.*; Sotomayor, M. “Structural and Biophysical Characterization of Inner Ear Tip Link Variants”, Poster, 59th Annual Meeting of the Biophysical Society, Baltimore, MD, **2015**.

7. *Narui, Y.*; Salaita, K. “Quantitative Fluorescence Imaging of Intermembrane Ligand-Receptor Complexes”, Oral Presentation, 243rd American Chemical Society Meeting, San Diego, CA, **2012**.

Academic & Professional Honors

2017	Association for Research in Otolaryngology (ARO) Postdoctoral Fellow Travel Award
2015	Committee for Professional Opportunities for Women, Biophysical Society, Travel Award
2013	63rd Lindau Nobel Laureate Meeting, Young Researcher
2011	Osborne R. Quayle Fellowship, Emory University, Department of Chemistry
2003	HyperChem Scholar, Ohio State University
2003	B.S. awarded with Honors, *summa cum laude*, Ohio State University

Other Experience & Professional Memberships

2016-2017	Ohio State University Postdoctoral Association, Co-chair
2016-2017	Ohio State University, University Research Committee, Postdoc Representative
2014-2016	Ohio State University Postdoctoral Association, Website & Marketing Chair
2014-present	National Postdoctoral Association, Affiliate Member
2014-present	Biophysical Society, Member
2006-present	American Chemical Society, Member