

Curriculum Vitae

ETSUKO MUTO

Senior Researcher,
Laboratory for Neural Cell Dynamics
RIKEN Center for Brain Science

Visiting Professor,
Laboratory for Biophysics (Bannai Lab)
Department of Electrical Engineering and Bioscience
Faculty of Science and Engineering, Waseda University

Phone +81 (48) 467-6959
Fax +81 (48) 467-7145
E-mail etsuko.muto@riken.jp
Address 2-1 Hirosawa, Wako-shi,
Saitama 351-0198, Japan

EDUCATION

1985 – 1987	Ph.D., Molecular Biology, Nagoya University, Nagoya, Japan
1979 – 1982	M.S., Molecular Biology, Nagoya University, Nagoya, Japan
1975 – 1979	B.S., Biology, Ochanomizu University, Tokyo, Japan

ACADEMIC APPOINTMENTS

2020 – Present	Senior Researcher, Laboratory for Neural Cell Dynamics, RIKEN-CBS
2017 – 2019	Team Leader, Laboratory for Molecular Biophysics, RIKEN-CBS
2016 – 2017	Senior Team Leader, Laboratory for Molecular Biophysics, RIKEN-BSI
2008 – 2015	Team Leader, Laboratory for Molecular Biophysics, RIKEN-BSI
2004 – 2008	Unit Leader, Brain Development Research Group, RIKEN-BSI
2000 – 2004	Senior Scientist, Developmental Brain Science Group, RIKEN-BSI
1997 – 2000	Researcher, PRESTO (Precursory Research for Embryonic Science and Technology), JST
1992 – 1997	Researcher, Yanagida Biomotron Project, ERATO (Exploratory Research for Advanced Technology), JST

OTHER PROFESSIONAL POSITIONS

1989 – 1992	Lecturer, Aichi Prefectural University of Fine Arts
1987 – 1989	Visiting Scientist, Department of Ultrastructural Research, The Tokyo Metropolitan Institute of Medical Science
1982 – 1985	Visiting Scientist, National Cancer Institute, NIH

RESEARCH PRESENTATIONS

Selected Invited Talks and Seminars:

- 2018 The 62nd Annual Meeting of Biophysical Society (USA)
- 2017 International Workshop Dynein 2017 (Japan)
- 2016 IGER International Symposium on "Now in actin study: Motor protein research reaching a new stage" (Japan)
- 2015 The 53rd Annual Meeting of the Biophysical Society of Japan (Japan)
- 2015 The National Institute of Neurological Disorders and Stroke, NIH (USA)
- 2014 The 4th Discussion Meeting on Motor Proteins (Japan)
- 2014 The Center for Molecular Biology (ZMBH), Heidelberg University (Germany)
- 2014 The Max Planck Institute of Biochemistry (Germany)
- 2013 The 54th Meeting of the Japan Society of Histochemistry and Cytochemistry (Japan)
- 2013 Graduate School of Arts and Sciences, The University of Tokyo (Japan)
- 2012 Workshop on Structural Biology and Biotechnology for Food and Medicines (Japan)
- 2012 The 2nd Regular Meeting of the Japan Society for Bioscience, Biotechnology and Agrochemistry (Japan)
- 2011 The 1st KIAS Conference on Subcellular Dynamics (Korea)
- 2010 Alpbach Workshop on Molecular Motors (Austria)
- 2010 The European Molecular Biology Laboratory (Germany)
- 2010 The Max Planck Institute of Molecular Cell Biology and Genetics (Germany)
- 2010 International Symposium: Fifty Years of Biophysics Research at Nagoya University (Japan)
- 2009 Graduate School of Science, The University of Tokyo (Japan)
- 2008 The 46th Annual Meeting of the Biophysical Society of Japan (Japan)
- 2007 The 15th Systems Biology Meeting (Japan)
- 2005 The 43rd Annual Meeting of the Biophysical Society of Japan (Japan)
- 2005 The 4th World Congress of Cellular and Molecular Biology (France)
- 2005 The 82nd Annual Meeting of the Physiological Society of Japan (Japan)
- 2003 The 41st Annual Meeting of the Biophysical Society of Japan (Japan)
- 2003 The 9th Fujime Memorial Seminar (Japan)
- 2001 The 54th Annual Meeting of the Japan Society for Cell Biology (Japan)

Platform Presentations:

- 2021 The 65th Annual Meeting of the U.S. Biophysical Society - virtual
- 2020 EMBO Symposium "Microtubules: From Atoms to Complex Systems" - virtual
- 2015 The 59th Annual Meeting of the U.S. Biophysical Society
- 2001 The 45th Annual Meeting of the U.S. Biophysical Society

MEMBERSHIPS

The Biophysical Society of Japan

The U.S. Biophysical Society

TEACHING

Soka University Special Lecture, September 2011

Brain Science Institute Brain Science Training Program, 2010

GRANTS and AWARDS

2017 – 2019	Grants-in-Aid for Scientific Research (B) (<i>Kakenhi</i>) (PI: Etsuko Muto, ¥13,100,000)
2015 – 2017	RIKEN Single Cell project (Co-researcher:Etsuko Muto, ¥14,000,000)
2014 – 2016	Grants-in-Aid for Scientific Research (C) (<i>Kakenhi</i>) (PI: Itsushi Minoura, ¥3,900,000)
2014 – 2015	Grants-in-Aid for Young Scientists (B) (<i>Kakenhi</i>) (PI: Tsukasa Makino, ¥3,200,000)
2008 – 2010	President's Discretionary Fund (RIKEN Strategic Programs for R&D) (Co-researcher: Etsuko Muto, ¥6,000,000)
2007 – 2010	Grants-in-Aid for Young Scientists (B) (<i>Kakenhi</i>) (PI: Itsushi Minoura, ¥3,300,000)
2007 – 2009	President's Discretionary Fund (RIKEN Strategic Programs for R&D) (PI: Etsuko Muto, ¥17,500,000)
2007 – 2009	Grants-in-Aid for Young Scientists (Start-up) (<i>Kakenhi</i>) (PI: Seiichi Uchimura, ¥2,720,000)
2006	Research Grant from BSI Director's Fund (PI: Etsuko Muto, ¥4,000,000)
1990	Kazato Research Encouragement Prize (Kazato Research Foundation)

COLLABORATIONS

Current Collaborators:

Marcel Knossow (Paris-Saclay)
Benoit Gigant (Paris-Saclay)
Hiroshi Imai (Osaka University)
Shinji Kamimura (Chuo University)
Takahide Kon (Osaka University)
Ken Sekimoto (Paris-Diderot University)

Past Collaborators :

Mikako Shirouzu (RIKEN, Center for Life Science Technologies)
Hideki Shigematsu (RIKEN, Center for Life Science Technologies)
Fernando Diaz (The Spanish National Research Council)
Michel Steinmetz (Paul Scherrer Institute)
Genji Kurisu (Osaka University)
Naoko Mizuno (The Max Planck Institute of Biochemistry)
Keiichi Namba (Osaka University)
Asako Terasaki (Chiba University)
Yasushi Okada (RIKEN, QBiC)
Kazuo Sutoh (Waseda University)
Shin'ichi Ishiwata (Waseda University)
Yoko Toyoshima (The University of Tokyo)
Junichi Nikawa (Kyushu Institute of Technology)
Eisaku Katayama (The University of Tokyo)
Hiroyuki Osada (RIKEN)
Takeo Usui (University of Tsukuba)
Shiro Usui (RIKEN, BSI)
Hiroyuki Kamiguchi (RIKEN, BSI)
Tomomi Shimogori (RIKEN, BSI)

LIST OF PUBLICATIONS

- Ayukawa R, Iwata S, Imai H, Kamimura S, Hayashi M, Ngo KX, Minoura I, Uchimura S, Makino T, Shirouzu M, Shigematsu H, Sekimoto K, Gigant B, **Muto E**. GTP-dependent formation of straight tubulin oligomers leads to microtubule nucleation.
J. Cell Biol. *in press*.
- Minoura I, Takazaki H, Ayukawa R, Saruta C, Hachikubo Y, Uchimura S, Hida T, Kamiguchi H, Shimogori T, **Muto E**. Reversal of axonal growth defects in an extraocular fibrosis model by engineering the kinesin-microtubule interface.
Nat. Commun. **7**:10058 (2016).
- Hotta T, Fujita S, Uchimura S, Noguchi M, Demura T, Muto E, Hashimoto T. Affinity purification and characterization of functional tubulin from cell suspension cultures of Arabidopsis and tobacco.
Plant Physiol. **170**(3): 1189-1205 (2016).
- Uchimura S, Fujii T, Takazaki H, Ayukawa R, Nishikawa Y, Minoura I, Hachikubo Y, Kurisu G, Sutoh K, Kon T, Namba K, **Muto E**. A flipped ion pair at the dynein-microtubule interface is critical for dynein motility and ATPase activation.
J Cell Biol. **208**:211-22 (2015).
- Minoura I, Hachikubo Y, Yamakita Y, Takazaki H, Ayukawa R, Uchimura S, **Muto E**. Overexpression, purification, and functional analysis of recombinant human tubulin dimer.
FEBS Lett. **587**:3450-5 (2013).
- Katsuki M, **Muto E**, Cross RA. Preparation of dual-color polarity-marked fluorescent microtubule seeds.
Methods Mol Biol. **777**:117-26 (2011).
- Minoura I, Katayama E, Sekimoto K, **Muto E**. One-dimensional Brownian motion of charged nanoparticles along microtubules: a model system for weak binding interactions.
Biophys J. **98**:1589-97 (2010).
- Uchimura S, Oguchi Y, Hachikubo Y, Ishiwata S, **Muto E**. Key residues on microtubule responsible for activation of kinesin ATPase.
EMBO J. **29**:1167-75 (2010).
- Minoura I, **Muto E**. Dielectric measurement of individual microtubules using the electroorientation method.
Biophys J. **90**:3739-48 (2006).
- Uchimura S, Oguchi Y, Katsuki M, Usui T, Osada H, Nikawa J, Ishiwata S, **Muto E**. Identification of a strong binding site for kinesin on the microtubule using mutant analysis of tubulin.
EMBO J. **25**:5932-41 (2006).
- Muto E**, Sakai H, Kaseda K. Long-range cooperative binding of kinesin to a microtubule in the presence of ATP.
J Cell Biol. **168**:691-6 (2005).
- Nishiyama M, **Muto E**, Inoue Y, Yanagida T, Higuchi H. Substeps within the 8-nm step of the ATPase cycle of single kinesin molecules.
Nat Cell Biol. **3**:425-8 (2001).
- Inoue Y, Iwane AH, Miyai T, **Muto E**, Yanagida T. Motility of single one-headed kinesin molecules along microtubules.
Biophys J. **81**:2838-50 (2001).
- Miyamoto Y, **Muto E**, Mashimo T, Iwane AH, Yoshiya I, Yanagida T. Direct inhibition of microtubule-based kinesin motility by local anesthetics.
Biophys J. **78**:940-9 (2000).
- Higuchi H, **Muto E**, Inoue Y, Yanagida T. Kinetics of force generation by single kinesin molecules activated by laser photolysis of caged ATP.

- Proc Natl Acad Sci USA*. **94**:4395-400 (1997).
- Kojima H, **Muto E**, Higuchi H, Yanagida T. Mechanics of single kinesin molecules measured by optical nanometry.
Biophys J. **73**:2012-22 (1997).
- Muto E**, Edamatsu M, Hirono M, Kamiya R. Immunological detection of actin in the 14S ciliary dynein of *Tetrahymena*.
FEBS Lett. **343**:173-6 (1994).
- Kamiya R, Kurimoto E, **Muto E**. Two types of *Chlamydomonas* flagellar mutants missing different components of inner-arm dynein.
J Cell Biol. **112**:441-7 (1991).
- Muto E**, Kamiya R, Tsukita S. Double-rowed organization of inner dynein arms in *Chlamydomonas* flagella revealed by tilt-series thin-section electron microscopy.
J Cell Sci. **99**:57-66 (1991).
- Kamiya R, **Hasegawa E**. Intrinsic difference in beat frequency between the two flagella of *Chlamydomonas reinhardtii*.
Exp Cell Res. **173**:299-304 (1987).
- Hasegawa E**, Hayashi H, Asakura S, Kamiya R. Stimulation of in vitro motility of *Chlamydomonas* axonemes by inhibition of cAMP-dependent phosphorylation.
Cell Motil Cytoskel. **8**:302-11 (1987).
- Newman SA, Frenz DA, **Hasegawa E**, Akiyama SK. Matrix-driven translocation: Dependence on interaction of amino-terminal domain of fibronectin with heparin-like surface components of cells or particles.
Proc Natl Acad Sci USA. **84**:4791-5 (1987).
- McDonald JA, Quade BJ, Broekelmann TJ, LaChance R, Forsmant K, **Hasegawa E**, Akiyama S. Fibronectin's cell-adhesive domain and an amino-terminal matrix assembly domain participate in its assembly into fibroblast pericellular matrix.
J Biol Chem. **262**:2957-67 (1987).
- Akiyama SK, **Hasegawa E**, Hasegawa T, Yamada KM. The interaction of fibronectin fragments with fibroblastic cells.
J Biol Chem. **260**:13256-60 (1985).
- Hasegawa T, **Hasegawa E**, Chen WT, Yamada KM. Characterization of a membrane-associated glycoprotein complex implicated in cell adhesion to fibronectin.
J Cell Biochem. **28**:307-18 (1985).
- Chen WT, **Hasegawa E**, Hasegawa T, Weinstock C, Yamada KM. Development of cell surface linkage complexes in cultured fibroblasts.
J Cell Biol. **100**:1103-14 (1985).
- Hasegawa E**, Kamiya R, Asakura S. Thermal transition in helical forms of *Salmonella* flagella.
J Mol Biol. **160**:609-21 (1982).