

CV for Etsuko Muto

Etsuko Muto

Head, Laboratory for Molecular Biophysics
RIKEN Center for Brain Science



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

Education:

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

Academic appointments:

2018 – Present	Laboratory Head, Laboratory for Molecular Biophysics, RIKEN-CBS
2008 – 2017	Laboratory Head, 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

Award:

1990	Kazato Research Encouragement Prize (Kazato Research Foundation)
------	--

List of selected papers:

Muto E, Sakai H, Kaseda K. Long-range cooperative binding of kinesin to a microtubule in the presence of ATP. *J. Cell Biol.* 168: 691-696, 2005.

Minoura I, Muto E. Dielectric measurement of individual microtubules using the electroorientation method. *Biophys. J.* 90: 3739-3748, 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: 5932-5941, 2006.

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: 1589-1597, 2010.

Uchimura S, Oguchi Y, Hachikubo Y, Ishiwata S, Muto E. Key residues on microtubule responsible for activation of kinesin ATPase. *EMBO J.* 29: 1167-1175, 2010.

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: 3450-3455, 2013.

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: 211-222, 2015.

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.

All publications in English:

Hasegawa E, Kamiya R, Asakura S. Thermal transition in helical forms of *Salmonella* flagella. *J. Mol. Biol.* 160: 609-621, 1982.

Chen WT, Hasegawa E, Hasegawa T, Weinstock C, Yamada KM. Development of cell surface linkage complexes in cultured fibroblasts. *J. Cell Biol.* 100: 1103-1114, 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: 307-318, 1985.

Akiyama SK, Hasegawa E, Hasegawa T, Yamada KM. The interaction of fibronectin fragments with fibroblastic cells. J. Biol. Chem. 260: 13256-13260, 1985.

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: 2957-2967, 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. U.S.A. 84: 4791-4795, 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: 302-311, 1987.

Kamiya R, Hasegawa E. Intrinsic difference in beat frequency between the two flagella of *Chlamydomonas reinhardtii*. Exp. Cell Res. 173: 299-304, 1987.

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, Kurimoto E, Muto E. Two types of *Chlamydomonas* flagellar mutants missing different components of inner-arm dynein. J. Cell Biol. 112: 441-447, 1991.

Muto E, Edamatsu M, Hirono M, Kamiya R. Immunological detection of actin in the 14S ciliary dynein of *Tetrahymena*. FEBS Lett. 343: 173-176, 1994.

Muto E, Kojima H, Yanagida T. Piconewton force and nano-meter step measurements of single kinesins by a glass microneedle. Jpn. J. Physiol. 45, suppl.2: s89, 1995.

Muto E, Yanagida T. Cooperative binding of kinesin molecules to a microtubule in the presence of ATP. *Biophys. J.* 72(2): A62, 1996.

Kojima H, Muto E, Higuchi H, Yanagida T. Mechanics of single kinesin molecules measured by optical nanometry. *Biophys. J.* 73: 2012-2022, 1997.

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. U.S.A.* 94: 4395-4400, 1997.

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: 940-949, 2000.

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: 425-428, 2001.

Inoue Y, Iwane AH, Miyai T, Muto E, Yanagida T. Motility of single one-headed kinesin molecules along microtubules. *Biophys. J.* 81: 2838-2850, 2001.

Muto E, Sakai H, Kaseda K. Long-range cooperative binding of kinesin to a microtubule in the presence of ATP. *J. Cell Biol.* 168: 691-696, 2005.

Minoura I, Muto E. Dielectric measurement of individual microtubules using the electroorientation method. *Biophys. J.* 90: 3739-3748, 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: 5932-5941, 2006.

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: 1589-1597, 2010.

Uchimura S, Oguchi Y, Hachikubo Y, Ishiwata S, Muto E. Key residues on microtubule responsible for activation of kinesin ATPase. *EMBO J.* 29: 1167-1175, 2010.

Katsuki M, Muto E, Cross RA. Preparation of dual-color polarity-marked fluorescent microtubule seeds. *Method. Mol. Biol.* 777: 117-126, 2011.

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: 3450-3455, 2013.

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: 211-222, 2015.

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: 1189-1205, 2016

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.