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Education

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| 1990-1994 | Kyoto University, Faculty of Engineering, Japan: B.S. |
| 1994-1996 | Kyoto University, Department of Molecular Engineering, Japan: M.S. |
| 1996-1999 | Kyoto University, Department of Molecular Engineering, Japan: Ph.D. (Prof. Isao Morishima) |

Work experience

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| 1996 – 1999 | JSPS Predoctoral Fellowships (DC1) |
| 1999 – 2002 | Special Postdoctoral Fellow of Science, RIKEN Brain Science Institute, Japan (Dr. Nobuyuki Nukina) |
| 2002 – 2006 | Postdoctoral Fellow, Howard Hughes Medical Institute and University of California-San Francisco, Department of Cellular and Molecular Pharmacology, USA (Prof. Jonathan Weissman) |
| 2003 – 2005 | JSPS Postdoctoral Fellow for Research Abroad (at UCSF) |
| 2005 – 2009 | PRESTO Researcher, Japan Science and Technology (at UCSF) |
| 2006 – 2011 | Unit Leader (Laboratory Head), Tanaka Research Unit, RIKEN Brain Science Institute, Japan |
| 2011 – 2018 | Team Leader (Laboratory Head), Laboratory for Protein Conformation Diseases, RIKEN Brain Science Institute, Japan |
| 2018 – Present | Team Leader (Laboratory Head), Laboratory for Protein Conformation Diseases, RIKEN Center for Brain Science, Japan |
| 2016– Present | Visiting Professor, Tokyo Medical and Dental University, Japan |
| 2018– Present | Visiting Professor (Group Leader in RIKEN), Tokyo Medical and Dental University, Japan |

Award

- 2008 The Young Scientists' Prize, The Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology, Japan
- 2013 JSPS (Japan Society for the Promotion of Science) Prize, Japan

List of full publications

[Original Articles]

- (1) Chen, C.W. **Tanaka, M.** Genome-Wide Translation Profiling by Ribosome-Bound tRNA Capture. *Cell Reports*, in press (2018).
- (2) Ohhashi, Y., Yamaguchi, Y., Kurahashi, H., Kamatari, Y.O. Sugiyama, S., Uluca, B., Piechatek, T., Komi, Y., Shida, T., Müller, H., Hanashima, S., Heise, H., Kuwata, K., **Tanaka, M.** Molecular basis for diversification of yeast prion strain conformation. *Proc. Natl. Acad. Sci. U. S. A.*, in press (2018).
- (3) **Tanaka, M.***, Ishizuka, K., Nekooki-Machida, Y., Endo, R., Takashima, N., Sasaki, H., Komi, Y., Gathercole, A., Huston, E., Ishii, K., Hui, K.K., Kurosawa, M., Kim, S.H., Nukina, N., Takimoto, E., Houslay, M.D., Sawa, A.* Aggregation of scaffolding protein DISC1 dysregulates phosphodiesterase 4 in Huntington's disease. *J. Clin. Invest.*, 127, 1438-1450 (2017). *Corresponding authors
- (4) Toyoshima, M., Akamatsu, W., Okada, Y., Ohnishi, T., Balan, S., Hisano, Y., Iwayama, Y., Toyota, T., Matsumoto, T., Itasaka, N., Sugiyama, S., **Tanaka, M.**, Yano, M., Dean, B., Okano, H., Yoshikawa, T. Analysis of induced pluripotent stem cells carrying 22q11.2 deletion. *Transl. Psychiatry*, 6, e934 (2016).
- (5) Suzuki, G., Weissman, J.S. and **Tanaka, M.** [KIL-d] protein element confers antiviral activity via catastrophic viral mutagenesis. *Mol. Cell*, 60, 651-660 (2015).
- (6) Nilsson, P., Sekiguchi, M., Akagi, T., Izumi, S., Komori, T., Hui, K., Sörgjerd, K., **Tanaka, M.**, Saito, T., Iwata, N., Saido, T.C. Autophagy-related protein 7 deficiency in APP transgenic mice decreases A β in multivesicular bodies and induces A β accumulation in the Golgi. *Am. J. Pathol.*, 185(2), 305-13 (2015).
- (7) Nilsson, P., Loganathan, K., Sekiguchi, M., Matsuba, Y., Hui, K., Tsubuki, S., **Tanaka, M.**, Iwata, N., Saito, T., and Saido, T.C. A β secretion and plaque formation depend on autophagy. *Cell Reports*, 5, 61-69 (2013).

- (8) Suzuki G. Shimazu N., and **Tanaka, M.** A yeast prion, Mod 5, promotes acquired drug resistance and cell survival under environmental stress. **Science**, 336, 335-339 (2012).
- (9) Tonoki, A., Kuranaga, E., Ito, N., Nekooki-Machida, Y., **Tanaka, M.**, Miura, M. Aging causes distinct characteristics of polyglutamine amyloids *in vivo*. *Genes Cells* 16, 557-564 (2011).
- (10) Foo, C.K., Ohhashi, Y., Kelly, M.J., **Tanaka, M.**, Weissman, J.S. Radically Different Amyloid Conformations Dictate the Seeding Specificity of a Chimeric Sup35 Prion. *J. Mol. Biol.* 408, 1-8 (2011).
- (11) Ohhashi Y, Ito K, Toyama BH, Weissman JS, and **Tanaka M.** Differences in prion strain conformations result from non-native interactions in a nucleus. *Nat. Chem. Biol.* 6, 225-230 (2010).
- (12) Nekooki-Machida, Y., Kurosawa, M., Nukina, N., Ito, K., Oda, T., and **Tanaka, M.** Distinct conformations of *in vitro* and *in vivo* amyloids of huntingtin-exon1 show different cytotoxicity. *Proc. Natl. Acad. Sci. U. S. A.*, 106, 9678-9684 (2009).
- (13) McDobald M., Kendall A., **Tanaka M.**, Weissman JS, Stubbs G. Enclosed chambers for humidity control and sample containment in fiber diffraction. *J. Appl. Cryst.*, 41, 206-209 (2008).
- (14) Krzewska J, **Tanaka M**, Burston SG, Melki R. "Biochemical and functional analysis of the assembly of full-length Sup35p and its prion-forming domain" *J. Biol. Chem.*, 282, 1679-1686 (2007).
- (15) **Tanaka, M.**, Collins, S.R., Toyama, B.H., and Weissman, J.S. The Physical Basis of How Prion Conformations Determine Strain Phenotypes. *Nature*, 442, 585-589 (2006).
- (16) **Tanaka, M.**, Chien, P., Yonekura, K., Weissman, J.S. Mechanism of cross-species prion transmission: An infectious conformation compatible with two highly divergent yeast prion proteins. *Cell* 121, 49-62 (2005).
- (17) Venkatraman, P. Wetzel, R. **Tanaka, M.**, Nukina, M., and Goldberg, A.L. Eukaryotic Proteasomes Cannot Digest Polyglutamine Sequences and Release Them Intact during Degradation of Polyglutamine-Containing Proteins. *Mol. Cell* 14, 95-104 (2004).
- (18) **Tanaka, M.**, Chien, P., Naber, N., Cooke, R., and Weissman, J.S. Conformational Variations in an Infectious Protein Determine Prion Strain Differences. *Nature* 428, 323-328 (2004).
- (19) **Tanaka, M.**, Machida, Y., Niu, S., Ikeda, T., Jana, N.R., Doi, H., Kurosawa, M., Nekooki, M., and Nukina, N. Trehalose alleviates polyglutamine-mediated pathology in a mouse model of Huntington disease. *Nat. Med.* 10, 148-154 (2004).
- (20) **Tanaka, M.**, Machida, Y., Nishikawa, Y., Akagi, T., Hashikawa, T., Fujisawa, T. and Nukina, N.

- Expansion of polyglutamine induces the formation of quasi-aggregate in the early stage of protein fibrillization. *J. Biol. Chem.* 278, 34717–34724 (2003).
- (21) **Tanaka, M.**, Matsuura, K., Yoshioka, S., Takahashi, S., Ishimori, K., Hori, H., and Morishima, I. Activation of Hydrogen Peroxide in Horseradish Peroxidase Occurs within approximately 200 μ s Observed by a New Freeze-Quench Device. *Biophys. J.* 84, 1998-2004 (2003).
- (22) **Tanaka, M.**, Machida, Y., Nishikawa, Y., Akagi, T., Morishima, I. Hashikawa, T., Fujisawa, T. and Nukina, N. The Effects of Aggregation-Inducing Motifs on Amyloid Formation of Model Proteins Related to Neurodegenerative Diseases. *Biochemistry* 41, 10277-10286 (2002).
- (23) **Tanaka, M.**, Morishima, I., Akagi, T., Hashikawa, T. and Nukina, N. Intra-and intermolecular beta-pleated sheet formation in glutamine-repeat inserted myoglobin as a model for polyglutamine diseases. *J. Biol. Chem.* 276, 45470-45475 (2001).
- (24) Jana, N.R., **Tanaka, M.**, Wang, G-h., and Nukina, N. Polyglutamine length-dependent interaction of Hsp40 and Hsp70 family chaperones with truncated N-terminal huntingtin: their role in suppression of aggregation and cellular toxicity. *Hum. Mol. Genet.* 9, 2009-2018 (2000).
- (25) **Tanaka, M.**, Ishimori, K. and Morishima, I. Luminol Activity of Horseradish Peroxidase Mutants Mimicking a Proposed Binding Site for Luminol in *Arthromyces ramosus* Peroxidase. *Biochemistry* 38, 10463-10473 (1999).
- (26) Lindgren, A., **Tanaka, M.**, Ruzgas, T., Gorton, L., Gazaryan, I., Ishimori, K. and Morishima, I. Direct electron transfer catalysed by recombinant forms of horseradish peroxidase: insight into the mechanism. *Electrochem. Commun.* 1, 171-175 (1999).
- (27) **Tanaka, M.**, Ishimori, K. and Morishima, I. Structural Roles of the Highly Conserved Glu Residue in the Heme Distal Site of Peroxidases. *Biochemistry* 37, 2629-2638 (1998).
- (28) Morimoto, A., **Tanaka, M.**, Takahashi, S., Ishimori, K., Hori, H., and Morishima, I. Detection of a Tryptophan Radical as an Intermediate Species in the Reaction of Horseradish Peroxidase Mutant (Phe-221 \rightarrow Trp) and Hydrogen Peroxide. *J. Biol. Chem.* 273, 14753-14760 (1998).
- (29) **Tanaka, M.**, Ishimori, K., Mukai, M., Kitagawa, T., and Morishima, I. Catalytic Activities and Structural Properties of Horseradish Peroxidase Distal His42 \rightarrow Glu or Gln Mutant. *Biochemistry* 36, 9889-9898 (1997).
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- (31) **Tanaka, M.**, Nagano, S., Ishimori, K., Morishima, I. Hydrogen Bond Network in the Distal Site of Peroxidases: Spectroscopic Properties of Asn70 \rightarrow Asp Horseradish Peroxidase Mutant. *Biochemistry* 36, 9791-9798 (1997).
- (32) **Tanaka, M.**, Ishimori, K. and Morishima, I. The Distal Glutamic Acid as an Acid-Base Catalyst

in the Distal Site of Horseradish Peroxidase. *Biochem. Biophys. Res. Commun.* 227, 393-399 (1996).

- (3) Nagano, S., **Tanaka, M.**, Ishimori, K., Watanabe, Y., and Morishima, I. Catalytic Roles of the Distal Site Asparagine-Histidine Couple in Peroxidases. *Biochemistry* 35, 14251-14258 (1996).
- (34) Nagano, S., **Tanaka, M.**, Watanabe, Y., and Morishima, I. Putative Hydrogen Bond Network in the Heme Distal Site of Horseradish Peroxidase. *Biochem. Biophys. Res. Commun.* 207, 417-423 (1995).

[Reviews and Books]

- (1) **Tanaka, M.** and Komi, Y. Layers of structure and function in protein aggregation. *Nat. Chem. Biol.*, 11, 373-377 (2015).
- (2) Sugiyama, S. and **Tanaka, M.** Self-propagating amyloid as a critical regulator for diverse cellular functions. *J. Biochem*, 155, 345-351 (2014).
- (3) Suzuki G, **Tanaka, M.** Active conversion to the prion state as a molecular switch for cellular adaptation to environmental stress. *BioEssays*, 35, 12-16 (2013).
- (4) Suzuki G, **Tanaka, M.** Expanding the yeast prion world: Active prion conversion of non-glutamine/asparagine-rich Mod5 for cell survival. *Prion*, 7, 109-113 (2013).
- (5) **Tanaka, M.** Tracking a toxic polyglutamine epitope. *Nat. Chem. Biol.* 7, 861-862 (2011).
- (6) **Tanaka, M.** A protein transformation protocol for introducing yeast prion particles into yeast. *Methods in Enzymology (Guide to Yeast Genetics: Functional Genomics, Proteomics and Other Systems Analysis)*, 470, 681-693 (2010).
- (7) **Tanaka, M.**, and Weissman, J.S. An efficient protein transformation protocol for introducing prions into yeast. *Methods in Enzymology (Amyloid, Prions, and Other Protein Aggregates, Part B)*, 412, 185-200 (2006).
- (8) **Tanaka, M.**, Machida, Y., and Nukina, N. A novel therapeutic strategy for polyglutamine diseases by stabilizing aggregation-prone proteins with small molecules. *J. Mol. Med.* 83, 343-352 (2005).
- (9) **Tanaka, M.**, Morimoto, A., Ishimori, K., and Morishima, I. Structure-Activity Relation of Horseradish Peroxidase as Studied with Mutations at Heme Distal and Proximal Sites. *Pure & Appl. Chem.* 70, 911-916 (1998).
- (10) Nagano, S., **Tanaka, M.**, Ishimori, K., Morishima, I., Watanabe, Y., Mukai, M., Ogura, T., and Kitagawa, T. Catalytic roles of the distal site hydrogen bond network of peroxidases. *Oxygen Homeostasis and Its Dynamics*. Ishimura, Y., Shimada, H., and Suematsu, M. (eds.), Springer-Verlag; Tokyo, 354 (1997).