

Manabu Tanifuji



Lab. Head,
Lab. for Integrative Neural Systems
RIKEN Brain Science Institute
2-1 Hirosawa, Wako, Saitama 351-0198 Japan
Tel: +81-48-462-1111 ext. 6411
Fax: +81-48-462-4696
e-mail: tanifuji@riken.jp

Date of birth: July 8, 1959

Academic records, qualifications:

1978-1982 Osaka University, School of Engineering Science
1982 Bachelor of Engineering Science
1982-1987 Osaka University, Graduate School of Engineering Science
1987 Doctor of Engineering

Appointments:

1987-1992 Assistant Professor, National Institute of Physiological Sciences
1992-1996 Associate Professor, Fukui University, Department of Information Science
1994-1997 PRESTO Researcher, Japan Science and Technology Agency
1996-1997 Researcher, Frontier Research System, RIKEN
1997-present Lab. Head, RIKEN Brain Science Institute
1998-2003 Adjunct Professor, Japan Advanced Institute of Science and Technology
2007-present Adjunct Professor, Waseda University, Department of Life Science
and Medical Bioscience
2011-present Adjunct Professor, National Yang-Ming University, School of Life
Science, Institute of Neuroscience (Taiwan)

Memberships:

Society for Neuroscience, USA
Japan Neuroscience Society
The Biophysical Society of Japan

Honors and Awards:

2008 JSPS Award for Outstanding reviewer of Grants-in-Aid Applications

Bibliography:

Original articles:

- 1 Tanifuji, M., Sokabe, M. and Kasai, M. (1987) An Anion Channel of Sarcoplasmic Reticulum Incorporated into Planar Lipid Bilayers: Single-Channel Behavior and Conductance Properties. *J. Membr. Biol.* 99:103-111
- 2 Wada, Y., Ohsumi, Y., Tanifuji, M., Kasai, M. and Anraku, Y. (1987) Vacuolar Ion Channel of the Yeast, *Saccharomyces cerevisiae*. *J. Biol. Chem.* 262:17260-17263
- 3 Tanifuji, M., Sato, M., Wada, Y., Anraku, Y. and Kasai, M. (1988) Gating Behaviors of a Voltage-Dependent and Ca²⁺-Activated Cation Channel of Yeast Vacuolar Membrane Incorporated into Planar Lipid Bilayer. *J. Membr. Biol.* 106:47-55
- 4 Sato, M., Tanifuji, M. and Kasai, M. (1989) Further Characterization of the Cation Channel of a Yeast Vacuolar Membrane in a Planar Lipid Bilayer. *Cell Structure and Function* 14: 659-668
- 5 Sugitani, M., Sugai, T., Tanifuji, M., Murase, K. and Onoda, N. (1994) Optical imaging of the in vitro guinea pig piriform cortex activity using a voltage-sensitive dye. *Neurosci. Lett.* 165:215-218
- 6 Yamashita, S., Park, J.B., Ryu, P.D., Inukai, H., Tanifuji, M. and Murase, K. (1994) Possible presence of the ATP-sensitive K⁺ channel in isolated spinal dorsal horn neurons of the rat. *Neurosci. Lett.* 170:208-212
- 7 Sugitani, M., Sugai, T., Tanifuji, M. and Onoda, N. (1994) Signal propagation from piriform cortex to the endopiriform nucleus in vitro revealed by optical imaging. *Neurosci. Lett.* 171:175-178
- 8 Tanifuji, M., Sugiyama, T. and Murase, K. (1994) Horizontal propagation of excitation in rat visual cortical slices revealed by optical imaging. *Science* 266:1057-1059
- 9 Kita, H., Yamada, H., Tanifuji, M., and Murase, K. (1995) Optical responses recorded after local stimulation in rat neostriatal slice preparations: effects of GABA and glutamate antagonists, and dopamine agonists. *Exp. Brain Res.* 106, 187-195

- 10 Wang, G., Tanaka, K., and Tanifuji, M. (1996) Optical Imaging of functional organization in the monkey inferotemporal cortex. *Science* 272, 1665-1668
- 11 Tanifuji, M., Yamanaka, A., Sunaba, R., Terakawa, S., Toyama, K. (1996) Optical responses evoked by white matter stimulation in rat visual cortical slices and their relation to neural activities. *Brain Res.* 738, 83-95
- 12 Toyama, K., Tanifuji, M. (1996) Imaging a computational process in the visual cortex. *Neural Networks*, 9, 1351-1356
- 13 Sekino, Y., Obata, K., Tanifuji, M., Mizuno, M., Murayama, J. (1997) Delayed signal propagation via CA2 in rat hippocampal slices revealed by optical recording. *J. Neurophysiol.* 78, 1662-1668
- 14 Wang, G., Tanifuji, M., Tanaka, K. (1998) Functional architecture in monkey inferotemporal cortex revealed by in vivo optical imaging. *Neurosci. Res.* 32, 33-46
- 15 Ikeda, H., Ryu, P-D., Park, J-B., Tanifuji, M., Asai, T., and Murase, K. (1998) Optical responses evoked by single-pulse stimulation to the dorsal root in the rat spinal dorsal horn in slice. *Brain Res.* 812, 81-90
- 16 Uchida, N., Takahashi, Y. K., Tanifuji, M., and Mori, K. (2000) Odor maps in the mammalian olfactory bulb: domain organization and odorant structural features. *Nature Neurosci.* 3, 1035-1043
- 17 Tsunoda, K., Yamane, Y., Nishizaki, M., Tanifuji, M. (2001) Complex objects are represented in macaque inferotemporal cortex by the combination of feature columns. *Nature Neurosci.* 4, 832-838
- 18 R. Uma Maheswari, H. Takaoka, H., Homma, R., Kadono, H., Tanifuji, M. (2002) Implementation of optical coherence tomography (OCT) in visualization of functional structures of cat visual cortex. *Opt. Comm.* 202, 47-54
- 19 Rajagopalan, U.M., Takaoka, H., Homma, R., Kadono, H., Tanifuji, M. (2002) Functional imaging of cat primary visual cortex with optical coherence tomography. *Proc. SPIE* 4619, 128-136

- 20 Maheswari, R.U., Takaoka, H., Kadono, H., Homma, R., Tanifuji, M. (2003) Novel functional imaging technique from brain surface with optical coherence tomography enabling visualization of depth resolved functional structure in vivo. *J. Neurosci. Methods.* 124, 83-92
- 21 Li, H., Fukuda, M., Tanifuji, M., and Rockland, K. S. (2003) Intrinsic Collaterals of layer 6 Meynert cells and functional column in primate V1. *Neurosci.* 120, 1061-1069
- 22 Tsunoda, K., Oguchi, Y., Hanazono, G. and Tanifuji, M. (2004) Mapping cone- and rod-induced retinal responsiveness in macaque retina by optical imaging. *Invest. Ophthalmol. Vis. Sci.* 45 (10):3820-3826
- 23 Fukuda, M., Rajagopalan, U. Maheswari, Homma, R., Matsumoto, M., Nishizaki, M. and Tanifuji, M. (2004) Localization of activity-dependent changes in blood volume to submillimeter-scale functional domains in cat visual cortex. *Cerebral Cortex.* 15: 823-833
- 24 Fukuda, M., Wang, P., Moon, C-H., Tanifuji, M., and Kim, S-G. (2006) Spatial specificity of the enhanced dip inherently induced by prolonged oxygen consumption in cat visual cortex: Implication for columnar resolution functional MRI. *NeuroImage.* 30: 70-87
- 25 Uchida, G., Fukuda, M., and Tanifuji, M. (2006) Correlated transition between two activity states of neurons. *Physical Review E* 73: 031910-1 – 031910-6
- 26 Yamane, Y., Tsunoda, K., Matsumoto, M., Phillips, A.N., Tanifuji, M. (2006) Representation of the spatial relationship among object parts by neurons in macaque inferotemporal cortex. *J. Neurophysiol.* 96, 3147-3156
- 27 Rajagopalan, U.M., Tanifuji, M. (2007) Functional optical coherence tomography reveals localized layer-specific activations in cat primary visual cortex in vivo. *Optics Letters* 32, 2614-2616
- 28 Hanazono, G., Tsunoda, K., Shinoda, K., Tsubota, K., Miyake, Y., and Tanifuji, M. (2007) Intrinsic Signal imaging in macaque retina reveals different types of flash-induced light reflectance changes of different origins. *Invest. Ophthalmol. Vis. Sci.* 48, 2903-2912

- 29 Inomata, K., Tsunoda, K., Hanazono, G., Kazato, Y., Shinoda, K., Yuzawa, M., Tanifuji, M., and Miyake, Y. (2008) Distribution of retinal responses evoked by transscleral electrical stimulation detected by intrinsic signal imaging in macaque monkeys. *Invest. Ophthalmol. Vis. Sci.* 49, 2193-2200

- 30 Hanazono, G., Tsunoda, K., Kazato, Y., Tsubota, K., and Tanifuji, M. (2008) Evaluating Neural Activity of Retinal Ganglion Cells by Flash-evoked Intrinsic Signal Imaging in Macaque Retina. *Invest. Ophthalmol. Vis. Sci.* 49: 4655-4663

- 31 de Beeck, HPO., DiCarlo, JJ., Goense, JBM., Grill-Spector, K., Papanastassiou, A., Tanifuji, M., and Tsao, DY. (2008) Spatial specificity of the enhanced dip inherently induced by prolonged oxygen consumption in cat visual cortex: Implication for columnar resolution functional MRI. *J Neurosci.* 28: 11796-11801

- 32 Sato, T., Uchida, G., and Tanifuji, M. (2009) Cortical columnar organization is reconsidered in inferior temporal cortex. *Cerebral Cortex* 19: 1870-1888

- 33 Borra, E., Ichinohe, N., Sato, T., Tanifuji, M., Rockland, K.S. (2010) Cortical connections to area TE in monkey: hybrid modular and distributed organization. *Cerebral Cortex* 20, 257-270

Reviews and book chapters:

- 1 Kasai, M., Nunogaki, K., Nagasaki, K., Tanifuji, M. and Sokabe, M. (1985) Ion Channels of Sarcoplasmic Reticulum Vesicles and Calcium Release. In: *Structure and Function of Sarcoplasmic Reticulum*. S. Fleischer and Y. Tonomura, (eds). pp. 537-560 Academic, New York

- 2 Fukuda, M., Maheswari, R.U., Homma, R., Tanifuji, M. (2002) Contribution of blood volume changes to intrinsic optical signals. In *Brain activation and CBF control*. M. Tomita, I. Kanno, E. Hamel, (eds). pp. 165-171

- 3 Tanifuji, M. (2003) The functional organization of monkey inferotemporal cortex. In: *The primate visual system*. J. H. Kaas and C. E. Collins, (eds). pp. 345-363 CRC Press, London

- 4 Rajagopalan, U., Honma, R., Kadono, H., and Tanifuji, M. (2003) Functional optical coherence tomography to reveal functional architecture of cat visual cortex in vivo. *Proceedings of SPIE-The International Society for Optical Engineering* 5140: 77-83
- 5 Tanifuji, M., Tsunoda, K., Yamane, Y. (2004) Neural representation of object images in the macaque inferotemporal cortex. In: *Functional Neuroimaging of Visual Cognition*. N. Kanwisher and J. Duncan, (eds). pp.241—256, Oxford University Press, New York
- 6 Tanifuji, M., Tsunoda, K., and Yamane, Y. (2005) Representation of object images by combinations of visual features in the macaque inferotemporal cortex. In: *From Monkey Brain to Human Brain*. The MIT Press, Cambridge. pp. 357-370
- 7 Tanifuji, M., Tsunoda, K., Yamane, Y. (2006) Representation of object images by combinations of visual features in the macaque inferior temporal cortex. In: *Percept, Decision, Action: Bridging the gaps*. Chadwick, D.J., Diamond, M., and Goode, J., (eds). John Wiley & Sons, London. pp. 217-231
- 8 Rajagopalan, U.M., Tanifuji, M., and Tsunoda, K. (2008) Using the light scattering component of optical intrinsic signals to visualize in vivo functional structures of neural tissues. In: *Dynamic Brain Imaging: Multi-Modal Methods and In Vivo Applications*. F. Hyder (ed). Humana Press, NY. pp. 111-132
- 9 Tanifuji, M., Sato, T., Uchida, G., Yamane, Y., and Tsunoda, K. (2009) How images of objects are represented in macaque inferotemporal cortex. In: *Imaging the brain with optical methods*. A. Roe (ed.) Springer-Verlag, NY. pp 93-117
- 10 Tsunoda, K., Hanazono, G., Inomata, K., Kazato, Y., Suzuki, W., Tanifuji, M. (2009) Origins of retinal intrinsic signals: A series of experiments on retinas of macaque monkeys. *Japanese J. Ophthal.* 53, 297-314

Plenary lectures:

Tanifuji M, "Population coding of object images based on visual features and its relevance to view invariant representation" *Neural Information Processing Systems Conference (NIPS 2007)* Canada Vancouver 12 2007

Tanifuji M, "Functional structures and object images representation in inferior temporal (IT)

cortex of macaque monkeys” IEEE 8th International Conference on Development and Learning (ICDL 2009) Shanghai, China, 6 2009

Invited lectures and seminars :

1. Tanifuji M, "Feature based representation of objects in inferotemporal cortex revealed by intrinsic optical imaging" Recent Advances in Understanding the Structure and Function of the Mammalian Visual Cortex Australia Canberra 2 1999
2. Tanifuji M, "Feature-based representation of objects in Macaque Area Te revealed by intrinsic optical imaging" 5th IBRO World Congress of Neuroscience Israel Jerusalem 7 1999
3. Tanifuji M, Tsunoda K, "Feature-based representation of objects in Macaque area Te revealed by intrinsic optical imaging" Neocortical Columns Israel Rehovot 7 1999
4. Tanifuji M, "Integrative neural systems: Feature-based representation of object images in monkey inferotemporal cortex" 1999 Annual Meeting of the Korea Brain Science Society Korea Seoul 11 1999
5. Tanifuji M, "Optical imaging from the monkey inferotemporal cortex:A combination rule for object image representation" Ericsson Workshop on Bio-IT Japan Odawara 4 2000
6. Tanifuji M, "Feature-based and object-based representation of visually presented objects in monkey inferotemporal cortex revealed by intrinsic signal imaging" Neural Information Processing Systems(NIPS'2000) USA Breckenridge 12 2000
7. Tanifuji M, "Optical imaging from the monkey inferotemporal cortex: A combination rule for object image representation " International Chemical Congress of Pacific Basin Societies (PACIFICHEM 2000) USA Honolulu 12 2000
8. Tanifuji M, Tsunoda K, "Internal representation of object images in monkey association cortex" Genes and Minds Initiative Workshop on Ape Genomics (GEMINI) Japan Tokyo 3 2001
9. Tanifuji M, "Feature-based representation of visually presented objects in monkey infero-temporal cortex revealed by intrinsic signal imaging" 2001 Stockholm Workshop on

Computational Vision Sweden Stockholm 7 2001

10. Tanifuji M, Fukuda M, Rajagopalan U, "Reflection measurement from exposed cat cortex shows blood volume changes are localized to activated cortical columns" 2001 Minnesota Workshop on MR Imaging of Brain Function USA Minneapolis 10 2001
11. Tanifuji M, Yamane Y, Tunoda K, "Object representation in monkey inferotemporal cortex by the combination of feature columns" 2nd RIKEN-MIT Neuroscience Symposium on New Frontiers in Brain Science: from Molecules to Mind USA Cambridge 11 2001
12. Tanifuji M, Yamane Y, Tunoda K, "Combination study of intrinsic signal imaging and extracellular recordings for understanding neural representation of objects in visual association cortex" Symposium on Advanced Photonic Science (The Third RIES-Hokudai Symposium, 彩(SAI) Japan Sapporo 12 2001
13. Tanifuji M, "Object representation in monkey inferotemporal cortex by the combination of feature columns" International Symposium on Attention & Performance XX: Functional Brain Imaging of Visual Cognition Italy Erice 7 2002
14. Tanifuji M, "Object representation in monkey visual association cortex" The Annual Symposium for Pattern Recognition of the DAGM (DAGM 02) Switzerland Zurich 9 2002
15. Tanifuji M, "Object representation in the inferotemporal cortex of monkeys" Colloquium on From Monkey Brain to Human Brain France Saint Germain en Laye 6 2003
16. Tanifuji M, "Representation of object images in the monkey inferotemporal cortex" 2004 Workshop on Generic Object Recognition and Categorization USA Washington DC 6 2004
17. Tanifuji M, "Neural representation of object images in the monkey inferotemporal cortex" Shanghai International Conference on Physiological Biophysics (Shanghai ICPB'04) China Shanghai 11 2004
18. Tanifuji M, "Representation of object images in the brain" Brain, Mind and Culture: Modern insights into 2500-year-old riddles, A neuroscience forum on the island of Aphrodite Cyprus Limassol 11-12 2004
19. Tanifuji M, "Functional brain imaging with light scattering changes elicited by neural

activities" 5th IBRO Asia-Pacific Neuroscience School Thailand Bangkok 12 2004

20. Tanifuji M, "Representation of object images in the brain" 10th TNS Annual Conference 2004 Thailand Bangkok 12 2004
21. Tanifuji M, "Visualization of neural activities elicited by object images in visual association cortex with optical intrinsic signal imaging and dense multiple electrode array" International Symposium on Topical Problems of Biophotonics - 2007 Russia Nizhny Novgorod-Moscow-Nizhny Novgorod 8 2007
22. Tanifuji M, "Object representation in IT cortex at a columnar level" The 31st Annual Meeting of the Japan Neuroscience Society Japan Tokyo 7-9 2008