

Shigeo Okabe, M.D., Ph.D.

Position

Director, Brain Medical Science Collaboration Division, RIKEN Center for Brain Science
Institution and Department: Cellular Neurobiology, Graduate School of Medicine, The
University of Tokyo
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Educational Background:

- M.D., School of Medicine, University of Tokyo, Tokyo (1986)
- Ph.D., Division of Medical Science, The Graduate School, The University of Tokyo, Tokyo (1993)

Major Fields of Interest:

Neuron and glia biology, synapse development and remodeling, postsynaptic density, synapse plasticity, neuronal cytoskeleton, neurodevelopmental disorders

Employment History:

- 1988-1993 Assistant Professor, Department of Anatomy and Cell Biology, The University of Tokyo
- 1993-1996 Visiting Associate, National Institute of Neurological Disorders and Stroke, National Institutes of Health, Bethesda
- 1996-1999 Principal Investigator, National Institute of Bioscience and Human-Technology, Tsukuba
- 1999-2007 Professor, Department of Cell Biology, Tokyo Medical and Dental University, Tokyo
- 2007- Professor, Department of Cellular Neurobiology, Graduate School of Medicine, The University of Tokyo
- 2018- Director, Brain Medical Science Collaboration Division, RIKEN Center for Brain Science

Government related titles

Program Director of Japan Agency for Medical Research and Development (2016-present)
Program Supervisor of Brain/MIMDS in Japan Agency for Medical Research and Development (2015-present)

Membership of organizations/associations

Society for Neuroscience: 1994 – present

Japanese Association of Anatomists: 1988 – present: Councilor (1999 – 2012); Executive director (2007 – 2012, 2015 – 2017); President (2017- present)

Japanese Society for Neuroscience: 1990 – present: Councilor (2008–present); Vice President (2017- present)

Japanese Society for Cell Biology: 1988 – present

Japanese Society for Microscopy: 2007 – present: Councilor (2017-present)

Union of Brain Science Associations in Japan; President (2016- present)

List of Awards, Honors & Positions:

1996 Young Investigator Award (Japanese Association of Anatomists)

2004 Tsukahara Nakaakira Award (Japan Neuroscience Society)

2010 Seto Award (Japanese Society of Microscopy)

Selected publications

1. Higashi T, Tanaka S, Iida T, and S. Okabe Synapse Elimination Triggered by BMP4 Exocytosis and Presynaptic BMP Receptor Activation. **Cell Reports** 23;22(4):919-929, 2018.
2. Isshiki, M., Tanaka, S., Kuriu, T., Tabuchi, K., Takumi, T. and S. Okabe. Enhanced synapse remodelling as a common phenotype in mouse models of autism. **Nature Communications** 5, 4742, 2014.
3. Shin, E., Kashiwagi, Y., Kuriu, T., Iwasaki, H., Tanaka, T., Koizumi, H., Gleeson, J. G. and S. Okabe Doublecortin-like kinase enhances dendritic remodeling and negatively regulates synapse maturation. **Nature Communications** 4, 1440, 2013.
4. Ito-Ishida, A., Miyazaki, T., Miura, E., Matsuda, K., Watanabe, M., Yuzaki, M and S. Okabe Presynaptically released Cbln1 induces dynamic axonal structural changes by interacting with GluD2 during cerebellar synapse formation. **Neuron** 76, 549-564, 2012.
5. Kawabata, I., Kashiwagi, Y., Obashi, K., Ohkura, M., Nakai, J., Wynshaw-Boris, A., Yanagawa, Y., and S. Okabe LIS1-dependent retrograde translocation of excitatory synapses in developing interneuron dendrites. **Nature Communications** 3, 722, 2012.

6. Yamagata, Y., Kobayashi, S., Umeda, T., Inoue, A., Sakagami, H., Fukaya, M., Watanabe, M., Hatanaka, N., Totsuka, M., Yagi, T., Obata, K., Imoto, K., Yanagawa, Y., Manabe, T. and S. Okabe Kinase-dead knock-in mouse reveals an essential role of CaMKII α kinase activity in dendritic spine enlargement, LTP and learning **Journal of Neuroscience**, 29, 7607-7618, 2009.
7. Nishida, H. and S. Okabe Direct astrocytic contacts regulate local maturation of dendritic spines. **Journal of Neuroscience** 27, 331-340, 2007.
8. Kuriu, T., Inoue, A., Bito, H., Sobue, K., and S. Okabe Differential control of postsynaptic density scaffolds via actin-dependent and independent mechanisms. **Journal of Neuroscience** 26, 7693-7706, 2006.
9. Sugiyama, Y., Kawabata, I., Sobue, K., and S. Okabe Determination of absolute protein numbers in single synapses by a GFP-based calibration technique. **Nature Methods** 2, 677-684, 2005.
10. Ebihara, T., Kawabata, I., Usui, S., Sobue, K., and S. Okabe. Synchronized formation and remodeling of postsynaptic densities: long-term visualization of hippocampal neurons expressing postsynaptic density proteins tagged with GFP. **Journal of Neuroscience**, 23, 2170-2181, 2003.
11. Nakatomi, H., Kuriu, T., Okabe, S., Yamamoto, S., Hatano, O., Kawahara, N., Tamura, A., Kirino, T. and M. Nakafuku. Regeneration of hippocampal pyramidal neurons by recruitment of endogenous neural progenitors: An animal model for a neuronal replacement therapy for ischemic brain injury. **Cell**, 110, 429-441, 2002.
12. Okabe, S., Miwa, A., and H. Okado. Spine formation and correlated assembly of presynaptic and postsynaptic molecules. **Journal of Neuroscience**, 21, 6105-6114, 2001.
13. Okabe, S., Kim, H., Miwa, A., Kuriu, T., and H. Okado. Continual remodeling of postsynaptic density and its regulation by synaptic activity. **Nature Neuroscience**, 2, 804-811, 1999.

14. Okabe, S., Collin, C., Auerbach, J. M., Meiri, N., Bengzon, J., Kennedy, M. B., Segal, M., and R. D. G. McKay. Hippocampal synaptic plasticity in mice overexpressing an embryonic subunit of the NMDA receptor. **Journal of Neuroscience**, 18, 4177-4188, 1998.
15. Brüstle, O., Spiro, A.C., Karam, K., Choudhary, K., Okabe, S., and R. D. G. McKay. In vitro-generated neural precursors participate in mammalian brain development. **Proc. Natl. Acad. Sci. USA**, 94, 14809-14814, 1997.
16. Okabe, S., Forsberg-Nilsson, K., Spiro, A. C., Segal, M. and R. D. G. McKay. Development of neuronal precursor cells and functional postmitotic neurons from embryonic stem cells in vitro. **Mechanisms of Development**, 59, 89-102, 1996.
17. Harada, A., Oguchi, K., Okabe, S., Kuno, J., Terada, T., Oshima, T., Sato-Yoshitake, R., Takei, Y., Noda, T. and N. Hirokawa. Altered microtubule organization in small-calibre axons of mice lacking tau protein. **Nature**, 369, 488-491, 1994.
18. Okabe, S. and N. Hirokawa. Differential behavior of photoactivated microtubules in growing axon of mouse and frog neurons. **Journal of Cell Biology**, 117, 105-120, 1992.
19. Okabe, S. and N. Hirokawa. Turnover of fluorescently labelled tubulin and actin in the axon. **Nature**, 343, 479-482, 1990.
20. Okabe, S. and N. Hirokawa. Rapid turnover of microtubule-associated protein MAP2 in the axon revealed by microinjection of biotinylated MAP2 into cultured neurons. **Proc. Natl. Acad. Sci. USA**, 86, 4127-4131, 1989.