

Akimitsu Okamoto, Ph.D.

Professor

Research Center for Advanced Science and Technology (RCAST)

The University of Tokyo

4-6-1 Komaba, Meguro-ku, Tokyo 153-8904, Japan

Tel: +81-3-5452-5200; Fax: +81-3-5452-5209; E-Mail: okamoto@chembio.t.u-tokyo.ac.jp



1993	BS	Synthetic Chemistry, Kyoto University
1995	MS	Synthetic Chem. & Biological Chem., Kyoto University
1998	PhD	Synthetic Chem. & Biological Chem., Kyoto University
1998-1999		Postdoctoral Associate, Massachusetts Institute of Technology
1999-2006		Assistant Professor, Kyoto University
2006-2011		Unit Leader, RIKEN
2011-2012		Associate Chief Scientist, RIKEN
2012-present		Professor, RCAST, The University of Tokyo

Awards and Honors:

- 1) The JSPS Fellowship for Japanese Junior Scientist, 1996-1998
- 2) Chisso Award in Synthetic Organic Chemistry, Japan, 2001
- 3) The Lectureship Award of Young Generation Special Forum from the Chemical Society of Japan, 2002
- 4) Lecture Award in Division of Biofunctional Chemistry, The Chemical Society of Japan, 2003
- 5) Young Investigator's Award of Japanese Society for Photomedicine and Photobiology, 2004
- 6) Investigator's Award of Research Foundation for Opto-Science and Technology, 2005
- 7) The Chemical Society of Japan Award for Young Chemists, 2005
- 8) The Young Scientists' Prize, The Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology, 2007
- 9) Royal Society of Chemistry, Organic & Biomolecular Chemistry (OBC) Lecture Award, 2008
- 10) JSPS Prize, 2012

Research Interests:

Design, synthesis and physical properties of new, man-made biopolymers with various functions

1. Visualizing the variable behavior of nucleic acid molecules in living cells
2. Catching the key of gene expression by developing target-specific chemical reactions
3. Creating new cellular function control system by synthesizing superbiopolymers containing unnatural nucleotides and amino acids
4. Designing stimuli-responsive chemical tools simply and precisely controlling biopolymers and living cells without denaturation and cytotoxicity

Selected Recent Publications:

- 1) DNA-friendly Cu(II)/TEMPO-catalyzed 5-hydroxymethylcytosine-specific oxidation. Matsushita, T.; Moriyama, Y.; Nagae, G.; Aburatani, H.; Okamoto, A. *Chem. Commun.* in press (2017).
- 2) Chemical synthesis of dual labeled protein via differently protected alkynes enables intramolecular FRET analysis. Hayashi, G.; Kamo, N.; Okamoto, A. *Chem. Commun.* in press (2017).
- 3) Chemically-activatable alkyne-tagged probe for imaging microdomains in lipid bilayer membranes. Yamaguchi, S.; Matsushita, T.; Izuta, S.; Katada, S.; Ura, M.; Ikeda, T.; Hayashi, G.; Suzuki, Y.; Kobayashi, Y.; Tokunaga, K.; Ozeki, Y.;

- Okamoto, A. Sci. Rep. 7, 41007 (2017).
- 4) Base-Resolution Analysis of 5-Hydroxymethylcytosine by One-Pot Bisulfite-Free Chemical Conversion with Peroxotungstate. Hayashi, G.; Koyama, K.; Shiota, H.; Kamio, A.; Umeda, T.; Nagae, G.; Aburatani, H.; Okamoto, A. J. Am. Chem. Soc. 138, 14178-14181 (2016).
 - 5) In vitro and in cell analysis of chemically synthesized histone H2A with multiple modifications. Hayashi, G.; Sueoka, T.; Okamoto, A. Chem. Commun. 52, 4999-5002 (2016).
 - 6) ECHO-liveFISH: in vivo RNA Labeling Reveals Dynamic Regulation of Nuclear RNA Foci in Living Tissues. Oomoto, I.; Suzuki-Hirano, A.; Umeshima, H.; Han, Y.-W.; Yanagisawa, H.; Carlton, P.; Harada, Y.; Kengaku, M.; Okamoto, A.; Shimogori, T.; Wang, D. O. Nucleic Acid Res. 43, e126 (2015)
 - 7) Diazirine Photocrosslinking Recruits Activated FTO Demethylase Complexes for Specific *N*⁶-methyladenosine Recognition. Jeong, H. S.; Hayashi, G.; Okamoto, A. ACS Chem. Biol. 10, 1450–1455 (2015)
 - 8) DNA-Osmium Complexes: Recent Developments for Operative Chemical Analysis of DNA Epigenetic Modification. Okamoto, A. ChemMedChem, 9, 1958-1965 (2014).
 - 9) Whole-mount MeFISH: A novel technique for simultaneous visualization of specific DNA methylation and protein/RNA expression. Shiura, H.; Okamoto, A.; Sasaki, H.; Abe, K. PLoS ONE 9, e95750 (2014).
 - 10) Sequence-specific microscopic visualization of DNA methylation status at satellite repeats in individual cell nuclei and chromosomes. Li, Y.; Miyanari, Y.; Shirane, K.; Nitta, H.; Kubota, T.; Ohashi, H.; Okamoto, A.; Sasaki, H. Nucleic Acids Res. 41, e186 (2013).
 - 11) A Quick and Simple FISH Protocol with Hybridization-sensitive Fluorescent Linear Oligodeoxynucleotide Probes. Wang, D. O.; Matsuno, H.; Ikeda, S.; Nakamura, A.; Yanagisawa, H.; Hayashi, Y.; Okamoto, A. RNA 18, 166–175 (2012).
 - 12) 5-Hydroxymethylcytosine-selective oxidation with peroxotungstate. Okamoto, A.; Sugizaki, K.; Nakamura, A.; Yanagisawa, H.; Ikeda, S. Chem. Commun. 47, 11231–11233 (2011).
 - 13) Phosphopeptides Designed for 5-Methylcytosine Recognition. Nomura, A.; Okamoto, A. Biochemistry 50, 3376–3385 (2011).
 - 14) Exciton-controlled hybridization-sensitive fluorescent probes: Multicolor detection of nucleic acids, Ikeda, S.; Kubota, T.; Yuki, M.; Okamoto, A. Angew. Chem., Int. Ed. 48, 6480–6484 (2009).
 - 15) An Osmium–DNA interstrand complex: Application to facile DNA methylation analysis, Tanaka, K.; Tainaka, K.; Umemoto, T.; Nomura, A.; Okamoto, A. J. Am. Chem. Soc. 129, 14511–14517 (2007).
 - 16) Direct labeling of 5-methylcytosine and its applications, Tanaka, K.; Tainaka, K.; Kamei, T.; Okamoto, A. J. Am. Chem. Soc. 129, 5612–5620 (2007).



Akimitsu Okamoto, PhD
Professor
RCAST, The University of Tokyo