

Masahiro Okada, Ph.D., Professor

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Department of Material and Life Chemistry, Kanagawa University

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Career

1974.4 Born in Aichi Prefecture, Japan
1993.4-2000.3 Bachelor's degree and Master's degree
Laboratory of Natural Products Chemistry (P.I. Prof. Shosuke Yamamura),
Department of Chemistry/Graduate School of Sciences, Keio University
2000.4-2006.3 Doctor's degree and Research Assistant
Laboratory of Bioactive Natural Product Chemistry (P.I. Prof. Youji Sakagami),
Graduate School of Bioagricultural Sciences, Nagoya University
2006.4-2011.3 Assistant Professor
Laboratory of Organic Chemistry (P.I. Prof. Minoru Ueda),
Graduate School of Sciences, Tohoku University
2011.4-2015.3 Lecturer and Associate Professor (P.I.)
College of Bioscience and Biotechnology, Chubu University
2015.4-2017.5 Associate Professor
Laboratory of Natural Products Chemistry (P.I. Prof. Ikuro Abe),
Graduate School of Pharmaceutical Sciences, The University of Tokyo
2017.5-2018.3 Environmental Science Center, The University of Tokyo
2018.4-present Professor (P.I.)
Laboratory of Bioactive Natural Products Chemistry,
Department of Material and Life Chemistry, Kanagawa University

Awards

2005.10 Young Scientist's Award in Symposium on the Chemistry of Natural Products
(Oral presentation at the 47th Symposium)
2007.9 Young Scientist's Research Award in Natural Product Chemistry
2009.10 Young Scientist's Award in Symposium on the Chemistry of Natural Products
(Poster presentation at the 51st Symposium)
2009.10 Tohoku branch, Japan Society for Bioscience, Biotechnology, and Agrochemistry Award
for Young Scientists
2010.3 Japan Society for Bioscience, Biotechnology, and Agrochemistry Award
for Young Scientists

Research

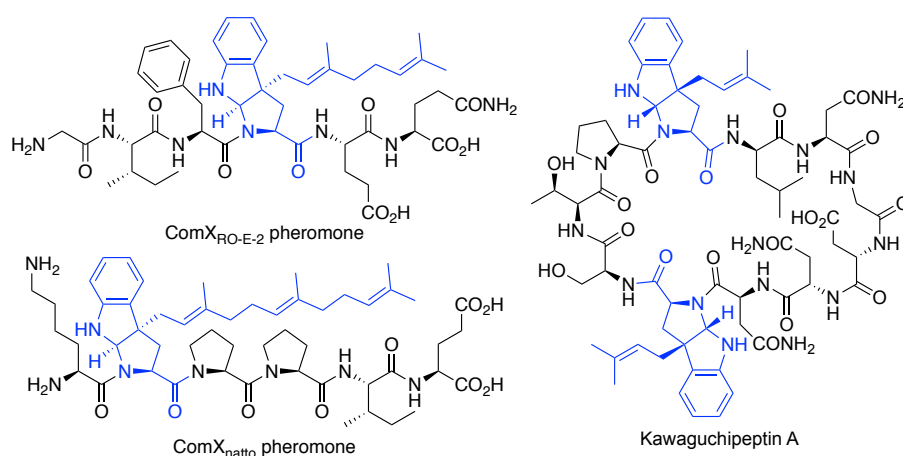
Studies on "bioactive" natural products

- 1) Search, purification and structure determination
- 2) Chemical synthesis and structure-activity-relationship
- 3) Biosynthesis machinery
- 4) Mode of action (Chemical biology)

Research Highlights:

Studies of peptides post-translationally isoprenylated at the tryptophan residue.

Proteins and peptides are biosynthesized through RNA translation, and RNA is produced through DNA transcription. The plain proteins and peptides are generally inactive and frequently chemically modified via post-translational modification. I have identified a new post-translation modification in a peptide pheromone, namely post-translational isoprenylation of the tryptophan residue. We are investigating the activation mechanism, biological events, and universality of the modification.



Publications list (selected)

- 1) K. Hirooka, S. Shioda, and M. Okada. Identification of critical residues for the catalytic activity of ComQ, a *Bacillus* prenylation enzyme for quorum sensing, by using a simple bioassay system. *Biosci. Biotechnol. Biochem.*, **2020**, *84*, 347–357.
- 2) M. Okada, Y. Matsuda, T. Mitsuhashi, S. Hoshino, T. Mori, K. Nakagawa, Z. Quan, B. Qin, H. Zhang, F. Hayashi, H. Kawaide, and I. Abe. Genome-Based Discovery of an Unprecedented Cyclization Mode in Fungal Sesterterpenoids Biosynthesis. *J. Am. Chem. Soc.* **2016**, *138*, 10011–10018.
- 3) S. Hayashi, S. Usami, Y. Nakamura, K. Ozaki, and M. Okada. Identification of a quorum sensing pheromone posttranslationally farnesylated at the internal tryptophan residue from *Bacillus subtilis* subsp. *natto*. *Biosci Biotechnol. Biochem.* **2015**, *79*, 1413–1417.
- 4) M. Okada. Post-translational isoprenylation of tryptophan. *Biosci Biotechnol. Biochem.* **2011**, *75*, 1413–1417. [Award review]
- 5) M. Okada, S. Ito, A. Matsubara, I. Iwakura, S. Egoshi, and M. Ueda. Total syntheses of coronatines by *exo*-selective Diels-Alder reaction and their biological activities on stomatal opening. *Org. Biomol. Chem.* **2009**, *7*, 3065–3073. [selected as inside front cover]
- 6) M. Okada, I. Sato, S.J. Cho, H. Iwata, T. Nishio, D. Dubnau, and Y. Sakagami. Structure of the *Bacillus subtilis* quorum-sensing peptide pheromone ComX. *Nat. Chem. Biol.* **2005**, *1*, 23–24. [published as the 1st paper of the 1st issue]