

Kanagawa University

Department of Biochemistry and Biotechnology/Faculty of Chemistry and Biochemistry
Field of Bio and Life Engineering/Graduate School of Engineering

Bioactive Natural Products Chemistry Laboratory

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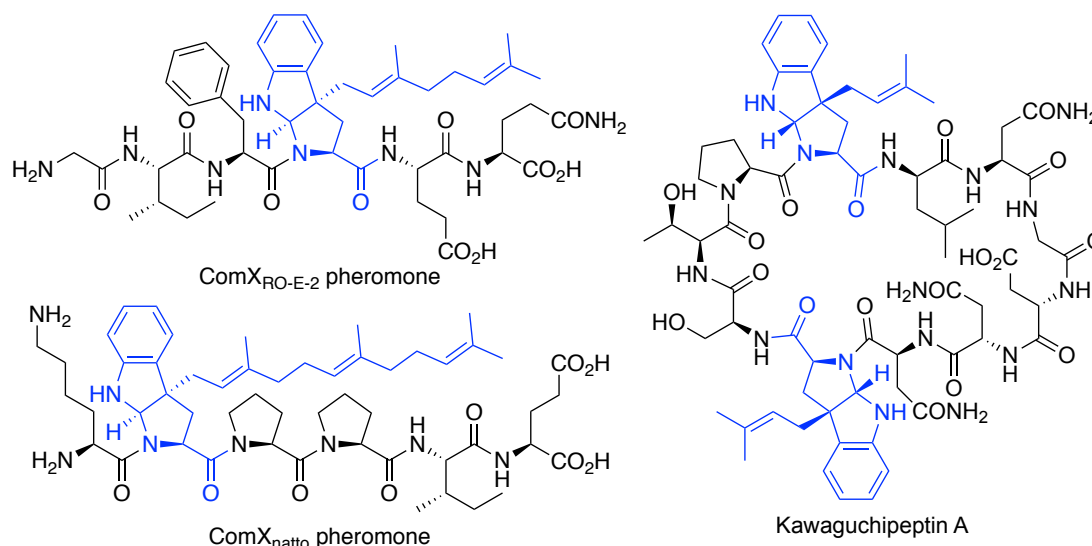
Research Field: Natural Products chemistry, Bioorganic Chemistry.

Research Overview: Bioactive natural products chemistry

1. Discovery and identification, 2. Chemical synthesis, 3. Biosynthesis and functions

Research Subjects: 1. Studies of post-translationally modified peptides, 2. Creation of bioactive metabolites by biosynthetic engineering, 3. Discovery of novel natural products.

Research Highlights: Studies of peptides post-translationally prenylated 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 prenylation of the tryptophan residue. We are investigating the activation mechanism, biological events, and universality of the modification.



Publications list (Recent 5)

- 1) A. Kasahara, R. Yamada, T. Hyodo, K. Yamaguchi, Y. Otani, S. Sumimoto, M. Okada, and T. Ohwada. Generation and Application of All Possible Conformations of Cyclic Tryptophan within and beyond Post-translational Modification. *J. Org. Chem.* **2025**, *90*(1), 623-635.
- 2) S. Inoue, D. T. Nguyen, K. Hamada, R. Okuma, C. Okada, M. Okada, I. Abe, T. Sengoku, Y. Goto, and H. Suga. De Novo Discovery of Pseudo-Natural Prenylated Macrocyclic Peptide Ligands, *Angew. Chem. Int. Ed.*, **2024**, *63*(36), e202409973.
- 3) Y. Zhang, K. Hamada, D.T. Nguyen, S. Inoue, M. Satake, S. Kobayashi, C. Okada, K. Ogata, M. Okada, T. Sengoku, Y. Goto, and H. Suga. LimF is a Versatile Prenyltransferase for Histidine-C-Geranylation on Diverse Non-Natural Substrates. *Nat. Catal.* **2022**, *5*, 682-693.
- 4) 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*(2), 347-357.
- 5) M. Okada and S. Sumimoto. *Bacillus* Quorum Sensing Pheromones: ComX and Phr. *Quorum Sensing: Microbial Rules of Life*, **2020**, *1374*(11), 201-217.

Current Members: Research assistants 2, Postgraduate students 7, Undergraduate students 13.