

Curriculum Vitae

Kohei TORIKAI

Present Position

(Tenured) Assistant Professor of Chemistry

Present Address

Department of Chemistry, Faculty of Science,
Kyushu University
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Contact Information

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Research Interests

Synthetic Organic Chemistry, Bioorganic Chemistry, Medicinal Chemistry, Natural Product Chemistry

Date of Birth

January 15, 1979

Education

B.S. in Chemistry, Osaka University, 2001.

Supervisor: Prof. Ikuo UEDA (Medicinal Chemistry)

M.S. in Chemistry, Osaka University, 2003.

Supervisors: Prof. I. UEDA, Prof. Kiyotoshi SEKIGUCHI (Cell Biology), and Prof. Tomoji KAWAI (Physical Chemistry)

Ph.D. in Chemistry, Osaka University, 2007.

Supervisor: Prof. Michio MURATA (Bioorganic Chemistry)

List of Academic Positions

2007-2007

Postdoctoral Fellow; Department of Chemistry, Graduate School of Science, Osaka University

2007-2009

Postdoctoral Fellow; Research Center for Advanced Science and Technology, the University of Tokyo

2009-2010

Postdoctoral Research Fellow; Japan Society for the Promotion of Science

2010-2010

Research Assistant Professor; Department of Pharmacognosy, Graduate School of Pharmaceutical Sciences, University of Shizuoka

2010-

(Tenured) Assistant Professor; Department of Chemistry, Faculty of Science, Kyushu University

Honors, Recognitions, and Outstanding Achievements

1. 9th Young Scientist's Award in Natural Product Chemistry, 2009.
2. 25th Naito Conference Poster Award (with Research Grant), 2009.
3. Listed in Annual Report of Osaka University Academic Achievement 2008-2009, 24 Selected Graphics.
4. 26th Inoue Research Award for Young Scientists, 2010.
5. Travel Award from the Research Foundation for Pharmaceutical Sciences, 2010.
6. Listed in Who's Who in the World, 2011, 2014, 2015.
7. Best Award in Cancer Research, Fukuoka-ken Sukoyaka Kenko Jigyodan, 2013.
8. Wako Pure Chemical Industries' Award in Synthetic Organic Chemistry, Japan, 2014.

Grants Received

1. **Kohei TORIKAI (PI)**: Grant-in-Aid for Japan Society for the Promotion of Science (JSPS) Fellows (No. 09J09272), 2009, ¥ 1,400,000.
2. **Kohei TORIKAI (PI)**: Grant from the Naito Foundation, 2010, ¥ 500,000.
3. **Kohei TORIKAI (PI)**: Grant from the President of University of Shizuoka, 2010.
4. **Kohei TORIKAI (PI)**, Kaoru UMEHARA, Kazuya HIDARI: Special Grant for the Faculty Member of University of Shizuoka, 2010.
5. **Kohei TORIKAI (PI)**: SUNBOR Grant from Suntory Foundation for Life Sciences, 2010-2012, ¥ 1,500,000.
6. **Kohei TORIKAI (PI)**: Grant-in-Aid for Young Scientists (B) (No. 23710274) from JSPS, 2011-2013, ¥ 4,550,000.
7. **Kohei TORIKAI (PI)**: Grant from Kyushu University Interdisciplinary Programs in Education and Projects in Research Development, 2011.
8. **Kohei TORIKAI (PI)**: Grant-in-Aid from the Tokyo Biochemical Research Foundation, 2011-2012, ¥ 1,500,000.
9. Tohru OISHI (PI), **Kohei TORIKAI (Senior Collaborator)**, Keiichi KONOKI (Senior Collaborator), Makoto EBINE (Senior Collaborator): Grant-in-Aid for Scientific Research (A) (No. 24245009) from JSPS, 2012-2016, ¥ 45,500,000.
10. **Kohei TORIKAI (PI)**: Grant from the Fukuoka-ken Sukoyaka Kenko Jigyodan, 2013-2015, ¥ 500,000.
11. **Kohei TORIKAI (PI)**: Grant from Wako Pure Chemical Industries, 2014-2016, ¥ 500,000.
12. **Kohei TORIKAI (PI)**: Grant-in-Aid for Young Scientists (B) (No. 15K212210) from JSPS, 2015-2018, ¥ 4,030,000.
13. **Kohei TORIKAI (PI)**: English Proofreading Expenses Support from the Research Activity Basic Support System of Kyushu University, 2016, ¥ 60,000.
14. **Kohei TORIKAI (PI)**: Grant for Inviting a Foreign Researcher from Heiwa-Nakajima Foundation, 2017-2017, ¥ 1,000,000.
15. **Kohei TORIKAI (PI)**: Grant for Inviting a Foreign Researcher from Takeda Science Foundation, 2017-2018, ¥ 3,200,000.
16. **Kohei TORIKAI (PI)**: Nakamura Grant from the Nakamura Jishiro Ikueikai Foundation, 2017-2018, ¥ 100,000.
17. **Kohei TORIKAI (PI)**: Grant-in-Aid for Scientific Research (C) (No. 18K05462) from JSPS, 2018-2022, ¥ 4,420,000.
18. **Kohei TORIKAI (PI)**: Grant for Inviting a Foreign Researcher from JICEF Foundation, 2018, ¥ 150,000.
19. **Kohei TORIKAI**: Travel Grant from the Tokyo Biochemical Research Foundation, 2018, ¥ 500,000.

List of Publication (“*” denotes a corresponding author.)

Original Papers

1. Karak, M.*; Oishi, T.; **Torikai, K.*** “Synthesis of Anti-Tubercular Marine Alkaloids Denigrins A and B.” *Tetrahedron Lett.* **2018**, *59*, 2800-2803.
2. Yamamoto, H.; **Torikai, K.**; Ebine, M.; Oishi, T.* “Synthesis of 6/6/6-Tricyclic Ether System via Achmatowicz and Intramolecular Oxa-Michael Reactions.” *Heterocycles*, in press.
3. Osato, N.; Onoue, H.; Tohma, Y.; **Torikai, K.**; Ebine, M.; Satake, M.; Oishi, T.* “Convergent Syntheses of the WXYZ Ring of Maitotoxin and the HIJK Ring of Brevisulcinal-F.” *Chem. Lett.* **2018**, *47*, 265-268.
4. Onoue, H.; Marubayashi, R.; Ishikawa, E.; Konoki, K.; **Torikai, K.**; Ebine, M.; Murata, M.; Oishi, T.* “Syntheses and Biological Activities of the LMNO, *ent*-LMNO, and NOPQR(S) Ring Systems of Maitotoxin.” *J. Org. Chem.* **2017**, *82*, 9595-9618.
5. **Torikai, K.***; Koga, R.; Liu, X.; Umehara, K.; Kitano, T.; Watanabe, K.; Oishi, T.; Noguchi, H.; Shimohigashi, Y. “Design and Synthesis of Benzoacridines as Estrogenic and Anti-Estrogenic Agents.” *Bioorg. Med. Chem.* **2017**, *25*, 5216-5237.
6. Sato, T.; Joh, Y.; Oishi, T.; **Torikai, K.*** “1-Naphthylmethyl and 1-Naphthylmethoxymethyl Protecting Groups: New Members of the Benzyl- and Benzyloxymethyl-Type Family.” *Tetrahedron Lett.* **2017**, *58*, 2178-2181.
7. Koga, R.; Oishi, T.; **Torikai, K.*** “Tuned Classical Thermal Aromatization Furnishing Estrogenic

- Benzoacridines.” *Synlett* **2015**, 26, 2801-2805.
8. Sato, T.; Oishi, T.; **Torikai, K.*** “Naphthylmethoxymethyl as a Mildly Introdudible and Oxidatively Removable Benzyloxymethyl-Type Protecting Group.” *Org. Lett.* **2015**, 17, 3110-3113.
 9. **Torikai, K.;** Suga, H.* “Ribosomal Synthesis of an Amphotericin-B Inspired Macrocyclic.” *J. Am. Chem. Soc.* **2014**, 136, 17359-17361.
 10. Onoue, H.; Baba, T.; Konoki, K.; **Torikai, K.;** Ebine, M.; Oishi, T.* “Synthesis and Biological Activity of the QRS Ring System of Maitotoxin.” *Chem. Lett.* **2014**, 43, 1904-1906.
 11. Kunitake, M.; Oshima, T.; Konoki, K.; Ebine, M.; **Torikai, K.;** Murata, M.; Oishi, T.* “Synthesis and Biological Activity of the C’D’E’F’ Ring System of Maitotoxin.” *J. Org. Chem.* **2014**, 79, 4948-4962.
 12. Kajitani, K.; Koshiyama, T.; Hori, A.; Ohtani, R.; Mishima, A.; **Torikai, K.;** Ebine, M.; Oishi, T.; Takata, M.; Kitagawa, S.; Ohba, M.* “Guest Responsivity of a Two-Dimensional Coordination Polymer Incorporating a Cholesterol-Based Co-Ligand.” *Dalton Trans.* **2013**, 42, 15893-15897.
 13. Nakashima, T.; Baba, T.; Onoue, H.; Yamashita, W.; **Torikai, K.*** “A Facile and Practical Synthesis of Nicolaou’s Key Intermediates, 2-Methyl- and 2,6-Dimethyl- Tetrahydropyrans, toward the Total Synthesis of Ladder-Shaped Polyethers.” *Synthesis* **2013**, 45, 2417-2425.
 14. Oishi, T.*; Konoki, K.; Tamate, R.; **Torikai, K.;** Hasegawa, F.; Matsumori, N.; Murata, M. “Artificial Ladder-Shaped Polyethers that Inhibit Maitotoxin-Induced Ca²⁺ Influx in Rat Glioma C6 Cells.” *Bioorg. Med. Chem. Lett.* **2012**, 22, 3619-3622.
 15. **Torikai, K.***, Saruwatari, T.; Kitano, T.; Sano, T.; Nakane, A.; Noguchi, H.; Watanabe, K. “Practical Synthesis of DOPA Derivative for Biosynthetic Production of Potent Antitumor Natural Products, Saframycins and Ecteinascidin 743.” *Lett. Org. Chem.* **2011**, 8, 686-689.
 16. Goto, Y.; Iwasaki, K.; **Torikai, K.;** Murakami, H.; Suga, H.* “Ribosomal Synthesis of Dehydrobutyrine- and Methylanthionine-Containing Peptides.” *Chem. Commun.* **2009**, 3419-3421.
 17. Mouri, R.; Oishi, T.*; **Torikai, K.;** Ujihara, S.; Matsumori, N.; Murata, M.*; Oshima, Y. “Surface Plasmon Resonance-Based Detection of Ladder-Shaped Polyethers by Inhibition Detection Method.” *Bioorg. Med. Chem. Lett.* **2009**, 19, 2824-2828.
 18. Kimura, H.*; **Torikai, K.;** Ueda, I. “Thermal Cyclization of Nonconjugated Aryl-Yne-Carbodiimide Furnishing a Dibenzonaphthyridine Derivative.” *Chem. Pharm. Bull.* **2009**, 57, 393-396.
 19. Ujihara, S.; Oishi, T.*; **Torikai, K.;** Konoki, K.; Matsumori, N.; Murata, M.*; Oshima, Y.; Aimoto, S. “Interaction of Ladder-Shaped Polyethers with Transmembrane α -Helix of Glycophorin A as Evidenced by Saturation Transfer Difference NMR and Surface Plasmon Resonance.” *Bioorg. Med. Chem. Lett.* **2008**, 18, 6115-6118.
 20. Oishi, T.*; Hasegawa, F.; **Torikai, K.;** Konoki, K.; Matsumori, N.; Murata, M. “Convergent Synthesis and Biological Activity of the WXYZA’B’C’ Ring System of Maitotoxin.” *Org. Lett.* **2008**, 10, 3599-3602.
 21. **Torikai, K.;** Watanabe, K.; Minato, H.; Imaizumi, T.; Murata, M.; Oishi, T.* “Convergent Synthesis of the A-J ring System of Yessotoxin.” *Synlett* **2008**, 2368-2372.
 22. **Torikai, K.;** Oishi, T.*; Ujihara, S.; Matsumori, N.; Konoki, K.; Murata, M.; Aimoto, S. “Design and Synthesis of Ladder-Shaped Tetracyclic, Heptacyclic, and Decacyclic Ethers and Evaluation of the Interaction with Transmembrane Proteins.” *J. Am. Chem. Soc.* **2008**, 130, 10217-10226.
 23. Kimura, H.*; **Torikai, K.;** Miyawaki, K.; Ueda, I. “Scope of the Thermal Cyclization of Non-Conjugated Ene-Yne-Nitrile System: A Facile Synthesis of Cyanofluorene Derivatives.” *Chem. Lett.* **2008**, 37, 662-663.
 24. **Torikai, K.*;** Otsuka, Y.; Nishimura, M.; Sumida, M.; Kawai, T.; Sekiguchi, K.; Ueda, I. “Synthesis and DNA Cleaving Activity of Water-Soluble Non-Conjugated Thienyl Tetraynes.” *Bioorg. Med. Chem.* **2008**, 16, 5441-5451.
 25. **Torikai, K.;** Yari, H.; Murata, M.; Oishi, T.* “Synthesis of Artificial Ladder-Shaped Polyethers Containing a 6/7 Cis-Fused Ring System.” *Heterocycles* **2006**, 70, 161-167.
 26. **Torikai, K.;** Yari, H.; Mori, M.; Ujihara, S.; Matsumori, N.; Murata, M.; Oishi, T.* “Design and Synthesis of an Artificial Ladder-Shaped Polyether that Interacts with Glycophorin A.” *Bioorg. Med. Chem. Lett.* **2006**, 16, 6355-6359.

Review Article

27. Saruwatari, T.; Praseuth, A. P.; Sato, M.; **Torikai, K.;** Noguchi, H.; Watanabe, K.* “A Comprehensive Overview of Genomically Directed Assembly of Aromatic Polyketides and Macrolide Lactones Using Fungal Megasynthases.” *J. Antibiot.* **2010**, 64, 9-17.

Japanese Review Articles

28. **鳥飼浩平*** “ナフチルメトキシメチル：扱いやすくして酸化的に外せるベンジルオキシメチル系保護基” *Wako Organic Square* **2016**, 55, 2-4.
29. **鳥飼浩平*** “気になった論文” *生命科学研究レター*, **2015**.
30. **鳥飼浩平*** “体細胞を *iPS* 細胞に変える四つの魔法薬—絵空事を現実にする化学の醍醐味—” *化学* **2013**.
31. 大石 徹*, **鳥飼浩平**, 長谷川太志 “膜蛋白質との相互作用解明を志向した梯子状ポリエーテルの設計・合成・活性評価.” *有機合成化学協会誌* **2009**, 67, 1250-1260.
32. **鳥飼浩平**, 菅 裕明.* “特殊ペプチドの翻訳合成から天然物化学, 創薬へ.” *ファルマシア* **2009**, 45, 115-119.

Book Chapter

33. Oishi, T.; Konoki, K.; Tamate, R.; **Torikai, K.**; Hasegawa, F.; Nakashima, T.; Matsumori, N.; Murata, M. “*Chemiomolecular Science: At the Frontier of Chemistry and Biology.*” **2012**, 23-35, Springer Japan.

Patent

34. Pending, Kyushu University. Japanese Patent Application No. 2018-143585, July 31, 2018.
35. Pending, Kyushu University. Japanese Patent Application No. 2016-256943, December 28, 2016; PCT/JP2017/046800.
36. Pending, Kyushu University. Japanese Patent Application No. 2014-206408, October 7, 2014; PCT/JP2015/77835.

(Selected) Invited Lectures and Invited Conference Presentations

1. Kohei TORIKAI, “Seminar in Organic Chemistry”, August **2018**, Busan, Korea.
2. Kohei TORIKAI, “2-Naphthylmethoxymethyl: A mildly introducible and oxidatively removable benzyloxymethoxymethyl-type protecting group”, International Conference on Organic Chemistry, August **2016**, Las Vegas, U.S.A.
3. Kohei TORIKAI, “Basic Organic Chemistry for Predicting Reactivity of Compounds”, January **2015**, Walailak University, Thailand.
4. Kohei TORIKAI, “Toward the Drug Discovery from an Organic Synthesis Laboratory in Science Faculty”, December **2013**, Fukuoka-ken Sukoyaka Kenko Jigyodan, Fukuoka, Japan.
5. Kohei TORIKAI, “Role of Synthetic Organic Chemistry in the Research of Natural Products and Drug Discovery”, October **2013**, OP Biofactory, Okinawa, Japan.
6. Kohei TORIKAI, “Design and Synthesis of Artificial Compounds; A Natural Product-Driven Research.” Special Seminar in Pharmaceutical Sciences, “Marine Natural Product Research in a Stream from Organic Chemistry to Chemical Biology”, February **2013**, Walailak University, Thailand.
7. Kohei TORIKAI, “Toward the Chemical Biological Research upon Ladder-Shaped Polyethers”, July **2011**, Kanagawa, Japan.

Activities

1. Editorial Board Member of *JSM Chemistry*, 2013 - present.
2. Chairman of the Assistant Professors in Department of Chemistry, Faculty of Science, Kyushu University, 2013.
3. Research Fellow of the MEXT Project of Integrated Research on Chemical Synthesis, 2012 - 2016.
4. Committee Member of the Annual Meetings of Young Natural Product Chemists, 2011- present.
5. Invited Session Organizer (Domestic Conferences): 6 times
6. Referee of the Presentation Award in Annual Meetings of Chemical Society of Japan.
7. Organizing Committee Member of Domestic Conferences.
8. Reviewer (Referee) of Journals and Proceedings.