Tsutomu SATO, Ph.D.

Associate Professor
Program: Life and Food Sciences
Area: Applied Life and Food Sciences
Undergraduate: Dept. of Applied Biological Chemistry
http://www.agr.niigata-u.ac.jp/~satot/index.html

Professional Expertise

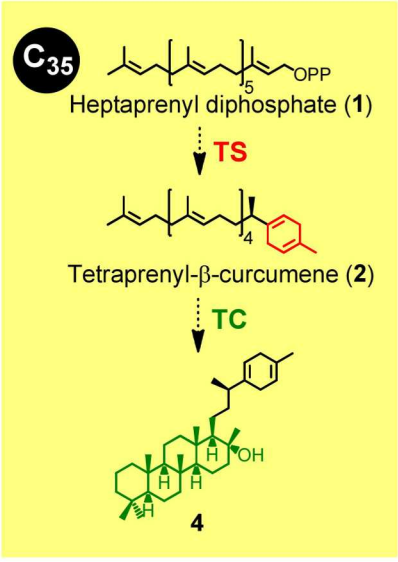
Bioorganic Chemistry, Chemical Biology, Natural products Chemistry

Research Fields of Interest

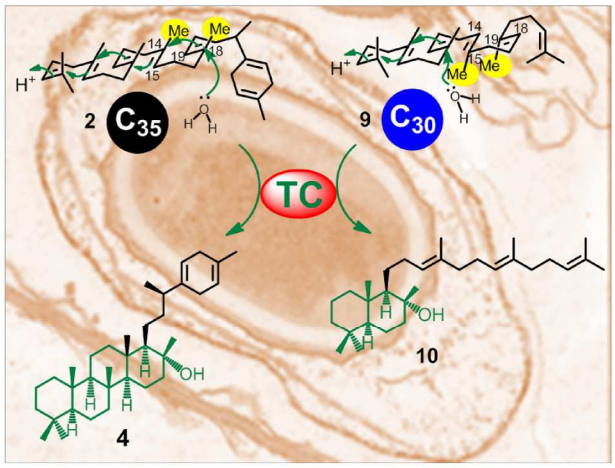
- Searches for novel natural products
- Biosynthetic studies on terpenoids and peptides
- Bioengineering of unnatural natural products

Education

2000: Ph.D. in Agriculture, Graduate School of Science and Technology, Niigata University, Japan
1997: M.S. in Agriculture, Graduate School of Science and Technology, Niigata University, Japan
1995: B.S. in Agriculture, Department of Applied Biological Sciences, Nihon University, Japan



Identification of novel type of terpene cyclases from *Bacillus subtilis* [2]



Identification of bifunctional terpene cyclase from *Bacillus megaterium* [1]

Professional Societies and Activities

1. Japan Society for Bioscience, Biotechnology, and Agrochemistry

Awards

Award for Excellence to Authors Publishing in *Bioscience, Biotechnology, and Biochemistry*, 2001

Major Publications

Papers

[1] Bifunctional triterpene/sesquarterpene cyclase: tetraprenyl-β-curcumene cyclase is also squalene cyclase in *Bacillus megaterium*, *J. Am. Chem. Soc.*, 133, 17540-17543, 2011.

[2] Sesquarterpenes (C_{35} terpenes) biosynthesized via the cylization of a linear C_{35} isoprenoid by a tetraprenyl-β-curcumene synthase and a tetraprenyl-β-curcumene cyclase: identification of a new terpene cyclase, *J. Am. Chem. Soc.*, 133, 9734-9737, 2011.

[3] Insight into C_{35}-terpene biosyntheses by non-pathogenic *Mycobacterium* species: functional analyses of three *Z*-prenyltransferases and identification of dehydroheptaprenylcyclines, *ChemBioChem*, 11, 1874–1881, 2010.

[4] Novel compounds of octahydroheptaprenyl mycolic acyl ester and monocyclic C_{35}-terpene, heptaprenylcycline B, from nonpathogenic *Mycobacterium* species, *Biosci. Biotechnol. Biochem.*, 74, 147–151, 2010.

[5] Biosynthesis of a novel cyclic C_{35}-terpene via the cyclisation of a *Z*-type C_{35}-polyprenyl diphosphate obtained from a nonpathogenic *Mycobacterium* species, *Org. Biomol. Chem.*, 6, 3788–3794, 2008.

[6] *Mycobacterium tuberculosis* H37Rv3377c encodes the diterpene cyclase for producing the halimane skeleton. *Chem. Commun.*, 1016-1018, 2005.

[7] Deletion of the Gly600 residue of *Alicyclobacillus acidocaldarius* squalene cyclase alters the substrate specificity into that of eukaryotic type cyclase specific to (3*S*)-2,3-oxidosqualene., *Angew. Chem. Int. Ed.*, 43, 6700-6703, 2004.

[8] Site-directed mutagenesis experiments on the putative deprotonation site of squalene-hopene cyclase from *Alicyclobacillus acidocaldarius. Biosci. Biotechnol. Biochem* ,68 (3) 728-738, 2004.

[9] Squalene-hopene cyclase: catalytic mechanism and substrate recognition., *Chem. Commun.*, 291-301, 2002.

[10] Functional analyses of Tyr420 and Leu607 of *Alicyclobacillus acidocaldarius* squalene-hopene cyclase. Neoachillapentaene, a novel triterpene with the 1, 5, 6-trimethylcyclohexene moiety produced through a folding of the constrained boat structure. *Biosci. Biotechnol. Biochem* ,66 (8) 1660-1670, 2002.

[11] Catalytic function of the residues of phenylalanine and tyrosine conserved in squalene-hopene cyclases. *Biosci. Biotechnol. Biochem.,* 65 (10) 2233-2242, 2001.

[12] Functional analysis of Phe605, a conserved aromatic amino acid in squalene-hopene cyclases., *Chem. Commun.*, 1485-1486, 2000.

[13] Functional analysis of phenylalanine 365 in hopene synthase, a conserved amino acid in the families of squalene and oxidosqualene cyclases. *Chem. Commun.*, 2005-2006, 1999.

[14] Functional analysis of the DXDDTA motif in squalene-hopene cyclase by site-directed mutagenesis experiments: initiation site of the polycyclization reaction and stabilization site of the carbocation intermediate of the initially cyclized A-ring. *Biosci. Biotechnol. Biochem.* 63 (12) 2189-2198, 1999.

[15] Kinetic studies on the function of all the conserved tryptophans involved inside and outside the QW motifs of squalene-hopene cyclase: stabilizing effect of the protein structure against thermal denaturation. . *Biosci. Biotechnol. Biochem.* 63 (7) 1171-1180, 1999.

[16] On the cyclization mechanism of squalene: a ring expansion process of the five-membered D-ring intermediate., *Chem. Commun.*, 2617-2618, 1998.

[17] Overexpression of squalene-hopene cyclase by the pET vector in *Escherichia coli* and first identification of tryptophan and aspartic acid residues inside the QW motif as active sites. *Biosci. Biotechnol. Biochem.* 62 (2) 407-41, 1998.