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Conferencia:

Asymmetric Total Synthesis of Alkaloid Natural Products without External Chiral Sources

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Aula de Seminarios do CIQUS

12:15 h

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Asymmetric Total Synthesis of Alkaloid Natural Products without External Chiral Sources

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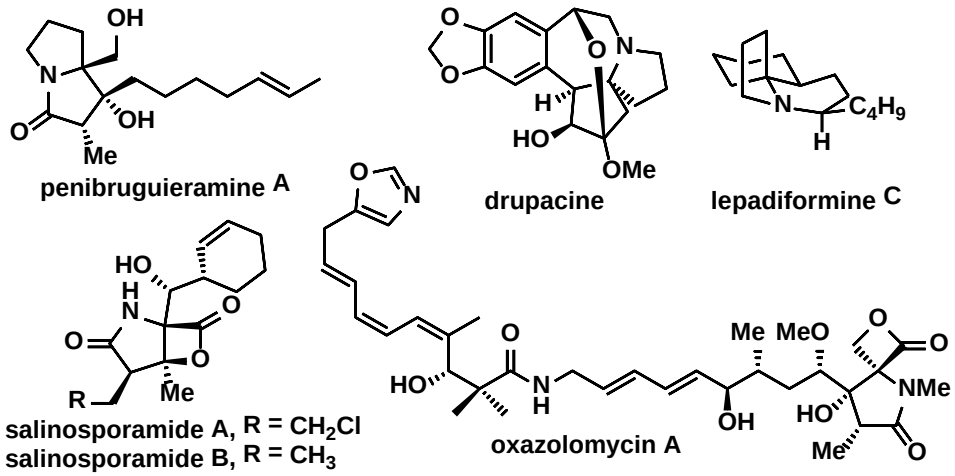
The chirality of a starting material having a chiral sp3-carbon can be preserved under some circumstances in the reaction product even though the reaction proceeds at the chiral carbon as a reaction center through reactive intermediates. This process is defined as Memory of chirality (MOC). MOC is an attractive strategy for asymmetric synthesis, but it has found limited applications. There are only few reports of MOC being applied in the total synthesis of natural products.

In recent years, we have been involved in the total synthesis of biological interesting alkaloid natural products and their analogues without the aid of external chiral influences. Representative alkaloids of such interest include penibruguieramine, drupacine, lepadiformines, salinosporamides, and oxazolomycins. The principle of MOC is applied for the asymmetric synthesis of these alkaloids using an appropriate amino acid as the only chiral source. In this presentation, I would like to share our old and new progress on this subject. A mechanistic rationale would be discussed for the excellent stereochemical outcome of MOC reactions.



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Education

1997 - 1998	The Scripps Research Institute	Post-doctoral fellow (Advisor: Prof. K.C. Nicolaou)
1992 - 1997	University of Pennsylvania	Ph.D., Organic Chemistry (Advisor: Prof. Jeffrey D. Winkler)
1988 - 1990	Seoul National University	M.S., Medicinal Chemistry (Advisor: Prof. Deukjoon Kim)
1984 - 1988	Seoul National University	B.S., Pharmacy

Positions and Employment

2008 - Present	Professor; Seoul National University, College of Pharmacy
1999 - 2008	Assistant & Associate Professor; Seoul National University, College of Pharmacy
1998 - 1999	Senior Research Scientist; Abbott Laboratories, Infectious Diseases, USA
1991 - 1992	Chemistry Research Scientist; Korea Institute of Science and Technology, Korea

Other Experience and Professional Memberships

1999 -	The Pharmaceutical Society of Korea, Member
1999 -	The Korean Chemical Society, Member
2005 - 2010	His laboratory (Signal Regulator Synthesis Lab.) was nominated as 'National Research Laboratory' by 'Ministry of Science and Technology of the Korean Government'.

Honors

2015. 04	Shinpoong-Howall Research Award by 'Shinpoong Pharm. Co. Ltd.'
2011. 04	Sim-Sangcheol Research Award by 'The Korean Chemical Society'
2010. 11	2010 Seoul National University Research Award by 'Seoul National University'
2010. 10	Young Pharmaceutical Scientist Award by 'The Pharmaceutical Society of Korea'
2007. 03	2007 CSJ-The Distinguished Lectureship Award by 'The Chemical Society of Japan'

Selected Recent publications

1. Seokwoo Lee, Minsik Bae, Jinkyung In, Jae Hyun Kim, and Sanghee Kim "Asymmetric Total Synthesis of Lepadiformine C Using Memory of Chirality in an Intramolecular Ester Enolate Michael Addition" *Org. Lett.* 2017, 19(1), 254-257
2. Shuai Yu, Feng Li, Hongjun Jeon, Seokwoo Lee, Jongheon Shin, and Sanghee Kim "Total Syntheses of Isowondonins Based on a Biosynthetic Pathway" *Org. Lett.* 2016, 18(12), 2986-2989.
3. Jae Hyun Kim, Seokwoo Lee, and Sanghee Kim "Biomimetic Total Synthesis of (−)-Penibruguieramine A Using Memory of Chirality and Dynamic Kinetic Resolution" *Angew. Chem. Int. Ed. Engl.* 2015, 54(37), 10875-10878.
4. Hongjun Jeon, Chaemin Lim, Ji Min Lee, and Sanghee Kim "Chemical assay-guided natural product isolation via solid-supported chemodosimetric fluorescent probe" *Chem. Sci.* 2015, (6), 2806-2811.
5. Yongseok Kwon, Jayoung Song, Honggu Lee, Eun-Yeong Kim, Kiho Lee, Sang Kook Lee, and Sanghee Kim "Design, Synthesis, and Biological Activity of Sulfonamide Analogues of Antofine and Cryptopleurine as Potent and Orally Active Antitumor Agents" *J. Med. Chem.* 2015, 58(19), 7749-7762.
6. Jinkyung In, Seokwoo Lee, Yongseok Kwon, and Sanghee Kim "Divergent Total Synthesis of the Tricyclic Marine Alkaloids Lepadiformine, Fasicularin, and Isomers of Polycitorols by Reagent-Controlled Diastereoselective Reductive Amination" *Chem. Eur. J.* 2014, 20(52), 17433-17442.
7. Yun Mi Lee, Chaemin Lim, Hun Seok Lee, Young Kee Shin, Kyong-Oh Shin, Yong-Moon Lee, and Sanghee Kim "Synthesis and Biological Evaluation of a Polyyne-Containing Sphingoid Base Probe as a Chemical Tool" *Bioconjugate Chem.* 2013, 24(8), 1324-1331.
8. Yongseok Kwon, Hyunkyung Cho, Sanghee Kim "Expedient Synthesis of Phenanthrenes via In(III)-Catalyzed 6-Exo-Dig Cycloisomerization" *Org. Lett.* 2013, 15(4), 920-923.
9. Sumin Kim, Chaemin Lim, Sukjin Lee, Seokwoo Lee, Hyunkyung Cho, Joo-Youn Lee, Dong Sup Shim, Hee Dong Park, Sanghee Kim "Column Chromatography-Free Solution-Phase Synthesis of a Natural Piper Amide-Like Compound Library" *ACS Comb. Sci.* 2013, 15(4), 208-215.
10. Soonho Hwang, Deukjoon Kim, and Sanghee Kim "Stereocontrolled Total Synthesis of (+)-trans-Dihydronarciclasine" *Chem. Eur. J.* 2012, 18(32), 9977-9982.
11. Dong Jae Baek, Jeong-Hwan Seo, Chaemin Lim, Jae Hyun Kim, Doo Hyun Chung, Won-Jea Cho, Chang-Yuil Kang, and Sanghee Kim "The 3-Deoxy Analogue of a-GalCer: Disclosing the Role of the 4-Hydroxyl Group for CD1d-Mediated NKT Cell Activation" *ACS Med. Chem. Lett.* 2011, 2(7), 544-548
12. Yongseok Kwon, Seonwoo Lee, Dong-Chan Oh, and Sanghee Kim "Simple Determination of Double Bond Positions in Long-Chain Olefins by Cross-Metathesis" *Angew. Chem. Int. Ed. Engl.* 2011, 50(36), 8275-8278.
13. Wonjang Jeong, Mi Jung Kim, Hyoungsu Kim, Sanghee Kim, Deukjoon Kim, Kye Jung Shin "Substrate-Controlled Asymmetric Total Synthesis and Structure Revision of (+)-Itomanallene A" *Angew. Chem. Int. Ed. Engl*. 2010, 49(4), 752-756.
14. Sanghee Kim "Synthesis and Structural Analysis of One-Dimensional sp-Hybridized Carbon Chain Molecules" *Angew. Chem. Int. Ed. Engl.* 2009, 48(42), 7740-7743.
15. Seonwoo Lee, Taeho Lee, Yun Mi Lee, Deukjoon Kim, and Sanghee Kim "Solid-Phase Library Synthesis of Polyynes Similar to Natural Products" *Angew. Chem. Int. Ed. Engl.* 2007, 46(44), 8422-8425.