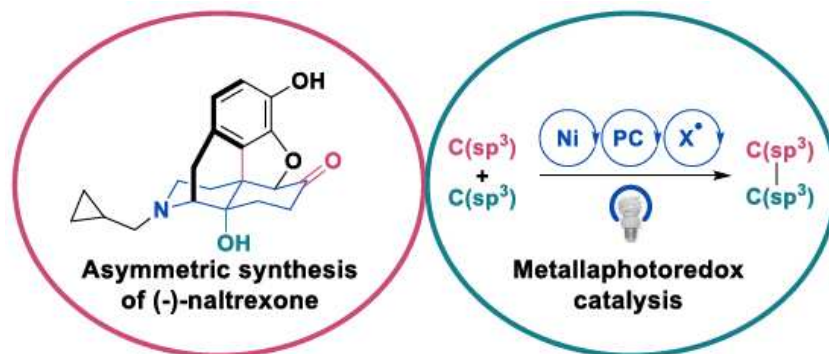


화학과 대학원 세미나

일시 : 2023년 4월 21일 (금) 오후 5 : 00 장 소 : 이학관 331

Generating Structural Complexity via Transition Metal Catalysis

The efficient generation of structural complexity from simple starting inputs is one of the main goals that we stride toward in synthetic chemistry. In this regard, using transition metal-catalyzed strategies as a key bond-forming step can provide straightforward routes to synthesizing bioactive and functionalized structural motifs.¹ In the first part of my talk, I will discuss the journey toward the asymmetric synthesis of (-)-naltrexone, an opioid antagonist used extensively for managing opioid drug abuse and addiction.² Critical bond disconnections of the synthesis will be highlighted, including a Rh-catalyzed C–H alkenylation and electrocyclization, an acid-catalyzed Friedel-Craft cyclization to generate the morphinan core, and a novel late-stage Cu-catalyzed hydroxylation strategy. In the second part of my talk, I will be discussing a different story of developing a dual Ni/photoredox catalyzed methodology to enable C(sp³)–C(sp³) bond formation to generate β-functionalized amines via cross-coupling between aziridines and aliphatic alcohols activated as benzaldehyde dialkyl acetals.³ Orthogonal activation modes of each alkyl coupling partner facilitate the cross-selectivity in the C(sp³)–C(sp³) bond-forming reaction. Furthermore, a detailed mechanistic study result will be discussed, elucidating that Ni(II) azametallacycle, conventionally proposed in aziridine cross-coupling, is not an intermediate in the productive cross-coupling. Rather, aziridine activation proceeds via Ni(I) oxidative addition, a previously unexplored elementary step.



References

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- (2) Dongbang, S.; Pedersen, B.; Ellman, J. A*. 'Asymmetric Synthesis of (–)-Naltrexone', *Chem. Sci.* **2019**, *10*, 535–541.
- (3) Dongbang, S.; Doyle, A. G*. 'Ni/Photoredox-Catalyzed C(sp³)–C(sp³) Coupling between Aziridines and Acetals as Alcohol-Derived Alkyl Radical Precursors', *J. Am. Chem. Soc.* **2022**, *144*, 20067–20077.

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