Controlling Chiral Environments Constructed by Molecular Catalysts and Enzymes

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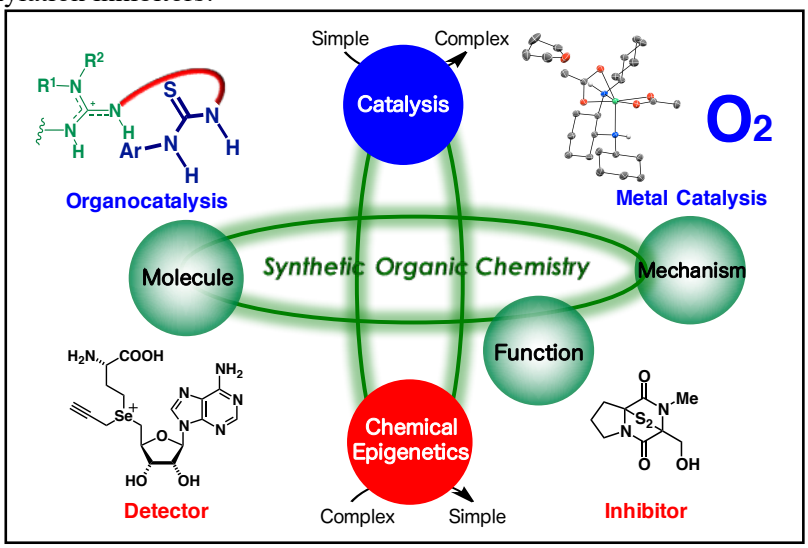
A common goal between chemists and biologists is to understand and manipulate the relationship between structure and function. We would like to talk about mainly two research topics including asymmetric catalysis and chemical methylome analyses with our emphasis to regulate the chemical reactions by integrating multidisciplinary approaches.

I. Asymmetric catalysis[1,2]

In general, optimization of the selectivity (enantio-, diastereo-, regio- and chemoselectivity) of asymmetric catalysis relies on trial and error screening using the inherent stereochemistry embedded in "privileged" chiral templates. We will present our nascent efforts to broaden the conceptual basis of catalyst design, focusing on the development of two different classes of asymmetric catalysts including conformationally flexible guanidine/bisthiourea organocatalysts and centrochiral transition-metal catalysts. We will also discuss physical-organic chemical methodologies available to explore the interplay of structure and selectivity in asymmetric acid-base catalysis.

II. Chemical methylome analyses[3]

Protein methyl transferases (PMTs) have developed into one of the largest classes of epigenetic enzymes that can transfer methyl group from *S*-adenosylmethionine (SAM) into the protein substrates. However, drawing the methylome map indicating PMTs responsible for non-histone substrates and methylation sites has been seldom investigated and exploited. In this talk, we would like to deliver how we have developed a chemical strategy to identify non-histone methylation substrates and non-histone methylation inhibitors.



References:

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