

Asymmetric Catalysis with Peptides

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In nature, proteins fulfill manifold different functions and are crucial as, for example, enzymes or templates for the controlled formation of structural components such as bones. The Wennemers group is intrigued by the question of whether also peptides with significantly lower molecular weights than proteins can fulfill functions for which nature evolved large macromolecules. Specifically, we ask whether peptides can serve as effective asymmetric catalysts, synthetic collagen-based materials, or imaging and targeting vectors.

The lecture will give an overview of our project on stereoselective catalysis with peptides of the type Pro-Pro-Xaa. The focus will be on the practical use of peptides for efficient catalysis and their potential role in the emergence of life. We will discuss the scope of the peptide-catalyzed reactions and insights into the mechanism. The lecture will also show the importance of the conformational properties of (organo)catalysts and highlight how changes in the conformational properties enable tuning of the catalytic activity, stereoselectivity, and chemoselectivity.