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Chemoenzymatic Total Synthesis of Natural Products: Recent Progress in Approaches to Morphine and Amaryllidaceae Alkaloids and Other Complex Targets

The lecture will provide a brief introduction to biocatalytic methods in synthesis. Specifically, the use of various aromatic dioxygenase enzymes will be highlighted and their applications in total synthesis will be presented. These include several total syntheses of morphine alkaloids, total synthesis of Amaryllidaceae alkaloids and their medicinally useful derivatives, and approaches to other, highly oxygenated compounds such as xylosmin, tetrodotoxin, and idesolide. Biological activities will be included where relevant. Highlights of our process development for the industrial production of opiate-derived medicinal agents will also be presented with a discussion of academic versus industrial requirements for solutions to problems. A short discussion of efficiency metrics will be provided at the conclusion of the lecture.