BIOCATALYSIS AND CHEMOENZYMATIC CASCADES: EXPANDING THE TOOLBOX OF ORGANIC SYNTHESIS

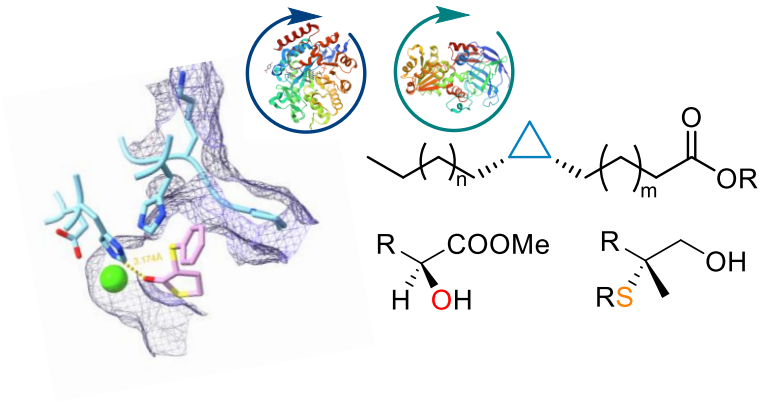
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Biocatalysis is rapidly transforming the way fine chemicals and pharmaceuticals are produced, offering highly selective and sustainable alternatives to traditional synthetic methods. Thanks to their remarkable chemo-, regio- and stereoselectivity, enzymes enable complex molecular transformations under mild and environmentally friendly conditions, making biocatalysis one of the most powerful technologies in modern green chemistry.

At the Manufacturing Futures Lab (MFL), our research focuses on the development of sustainable and stereoselective synthetic methodologies that replace hazardous reagents with tailor-made biocatalysts for the preparation of high-value chemicals and advanced molecular building blocks.

This lecture will showcase recent advances from our laboratory in the biocatalytic and chemoenzymatic synthesis of chiral molecules featuring stereogenic C–O and C–S bonds, together with new enzymatic strategies for C–C bond formation in cyclopropane systems. Highlights will include cascade processes for the synthesis of hydroxysulfide derivatives with excellent yields and stereocontrol, engineered lactonase biocatalysts for the dynamic kinetic resolution of γ-thiolactones to access enantiopure α-thio carboxylic acids, and cyclopropane fatty acid synthase (CFAS) enzymes capable of stereoselective cyclopropanation of lipid substrates.



References

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