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SYNFACTS Highlights in Chemical Synthesis

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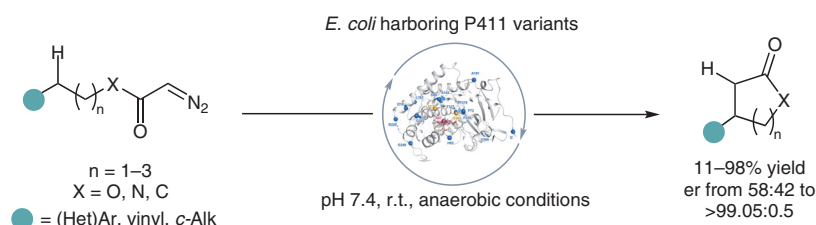
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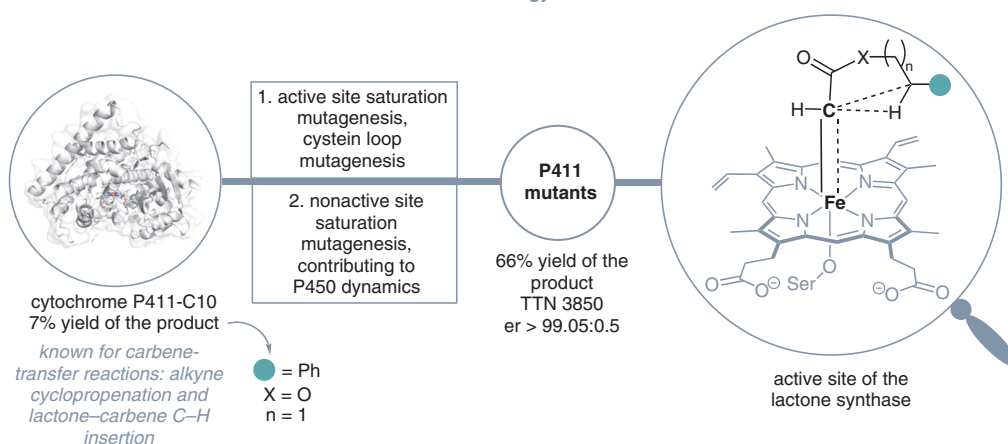
Enzymatic Assembly of Diverse Lactone Structures: An Intramolecular C–H Functionalization Strategy

J. Am. Chem. Soc. **2024**, *146*, 1580–1587, DOI: 10.1021/jacs.3c11722.

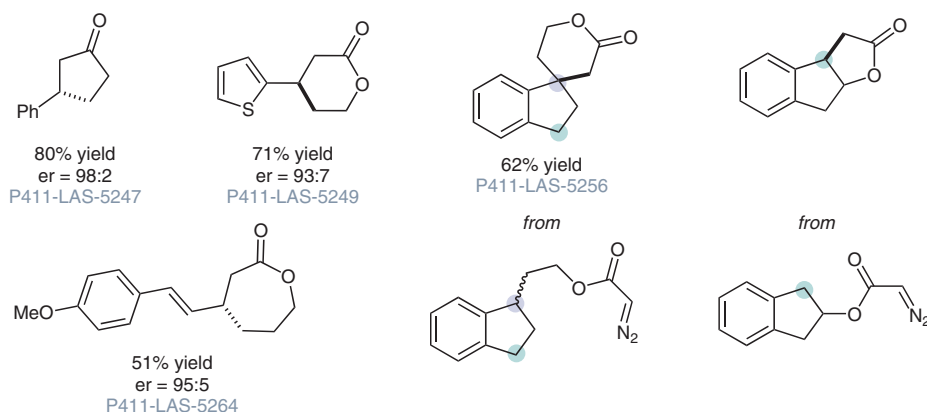
Biocatalytic Approach for the Synthesis of Lactones via Carbene C–H Insertion



Directed evolution strategy and active site scheme



Selected examples



Significance: Arnold and co-workers report an engineered-enzyme-catalyzed intramolecular carbene-insertion reaction of terminal diazo compounds yielding a variety of lactones (including complex-fused and spiro-compounds) in moderate yields and generally high enantioselectivities.

Comment: Neither diazo compounds nor C–C bond disconnection for lactone synthesis are found in biological systems. Yet, the exceptional evolvability of P411 allows scientists to successfully implement these biocatalysts in chemical synthesis and its, in many cases, inherently abiotic reactions.

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Category

Organo- and Biocatalysis

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lactones

C–H functionalization