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Cascade Processes Merging Chemical and Enzyme Catalysis

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PURPOSE OF THE ABSTRACT
Organocatalysis, i.e., the use of small molecules to catalyse chemical transformations, has proven to be an excellent tool in asymmetric synthesis, allowing a wide variety of reactions under mild conditions. [1] Despite the relatively late development when compared with other modalities of catalysis, the field has greatly expanded in the last 15 years and has proved to be especially useful to make asymmetric C-C bonds. Even though both technologies present moderate similarities concerning reaction conditions as well as the mode of action, and display a broad synthetic complementarity, examples in the literature on cascade processes are still scarce compared to those of metal and enzyme catalysis. [2]

These processes are an attractive strategy to rapidly build molecular complexity and circumvent the need to isolate reaction intermediates, allowing higher efficiencies into synthetic routes and simpler experimental setups.[3]

We are particularly interested in using these synthetic strategies to make chiral compounds starting from simple starting materials and in this oral communication, we will provide the audience with an overview of our latest findings on the preparation of chiral 1,4 [4] and 1,2-nitro alcohols as well as chiral 1,2-hydroxy phosphonates via the one-pot sequential combination of oxidoreductases and different organocatalysts.

FIGURES

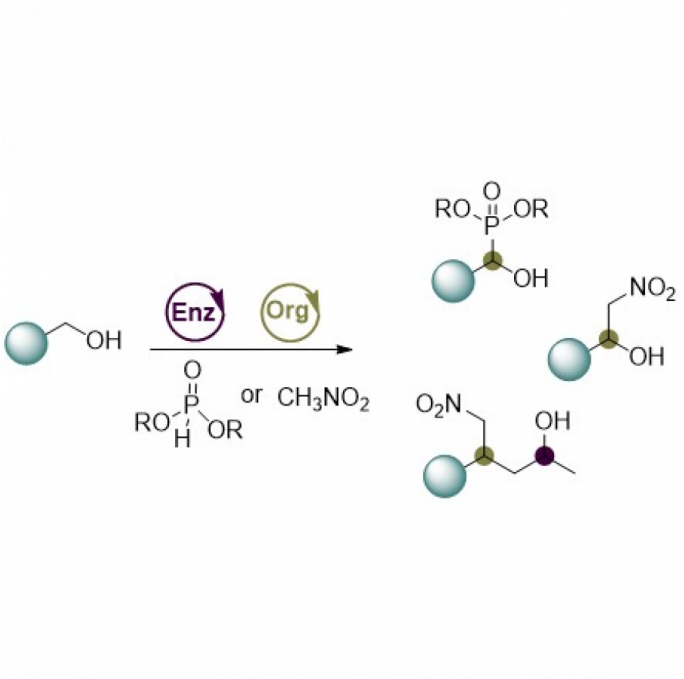

FIGURE 1

Scheme 1

Cascade processes involving enzyme and organocatalysis to access chiral compounds

FIGURE 2

KEYWORDS

cascade | organocatalysis | oxidoreductases | one-pot

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