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Engineering Amine Dehydrogenases (AmDHs) for the Synthesis of Vicinal Amino Alchols

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PURPOSE OF THE ABSTRACT
ENGINEERING AMINE DEHYDROGENASES (AMDHS) FOR THE SYNTHESIS OF VICINAL AMINO ALCOHOLS

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Enantiopure vicinal amino alcohols are prevalent in a plethora of bioactive molecules and are thus a major target in biocatalytic synthesis. Amine dehydrogenases (AmDHs) are a growing class of biocatalysts capable of synthesising chiral amines via the reductive amination of prochiral ketones using ammonia as an inexpensive amino donor. AmDHs have previously been shown to exhibit excellent reductive amination activity towards a diverse collection of linear ketones and a-hydroxyketones. Herein, an amine dehydrogenase developed from a leucine amino acid dehydrogenase (L-AADH) is shown to catalyse the synthesis of cyclic vicinal amino alcohols from the corresponding a-hydroxy ketones with good stereoselectivity. Additionally, as biocatalytic cascades offer a sustainable synthetic route to vicinal amino alcohols from readily available starting materials, a multienzyme cascade featuring this AmDH has also been designed for the synthesis of 2-aminocyclohexanol with high atom efficiency.

FIGURES

FIGURE 1

FIGURE 2

KEYWORDS

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