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A new artificial imine reductase based on dalbapeptides metal interaction

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Homogeneous catalysis by transition metals containing chiral bidentate ligands has been often considered a valid strategy to obtain high productivity, stereoselectivity and atom economy by many academic and industrial researchers interested in the synthesis of optically pure compounds. The same attraction has been reserved to enzymatic catalysis based on the fact that biocatalysis has many benefits to offer in the context of green chemistry. Considering the ability of macromolecules to selectively discriminate substrates and the number of chemical transformations catalyzed by transition metals, which have not been observed to occur enzymatically, in the last decade several research groups reasoned that a hybrid catalyst may combine some of the most attractive features of metal and enzymatic catalysts. In this contest, the use of a dalbapeptides,

such as vancomycin, teicoplanin, ristocetin etc, could be an interesting alternative to the well-known biotin/(strept)avidin system. Dalbapeptides are known for their strong antibacterial activity due to their interaction with the dimer D-Ala-D-Ala in the terminal chain of bacterial cell wall peptidoglycan with a dissociation constant $K_D = \sim 10^{-17}$ M and they have recently been investigated for their capability to interact with different transition metals such as copper. By exploiting these features of the class of glycopeptides, new hybrid iridium systems were prepared and evaluated as catalysts in asymmetric transfer hydrogenation of different cyclic imine substrates chosen for their important applications in medicinal chemistry.

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