Artificial metalloenzymes: proteins as hosts for enantioselective catalysis

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Enantioselective catalysis is one of the most efficient ways to synthesize high-added-value enantiomerically pure organic compounds. As the subtle details which govern enantioselection cannot be reliably predicted or computed, catalysis relies more and more on a combinatorial approach. Biocatalysis offers an attractive, and often complementary, alternative for the synthesis of enantiopure products. From a combinatorial perspective, the potential of directed evolution techniques in optimizing an enzyme's selectivity is unrivaled. In this review, attention is focused on the construction of artificial metalloenzymes for enantioselective catalytic applications. Such systems are shown to combine properties of both homogeneous and enzymatic kingdoms. This review also includes our recent research results and implications in the development of new semisynthetic metalloproteins for the enantioselective hydrogenation of N-protected dehydro-amino acids.
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