SL02 A Challenge for Total Synthesis of Bioactive Targets: Atom Economy

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Synthetic efficiency demands that asymmetric synthesis, must be the long term objective for the synthesis of chiral molecules. While most attention has focused on transition metal catalysis, less effort has involved main group asymmetric catalysis. Furthermore, most metal catalysts are mononuclear. Given the nature of most chemical reactions wherein two groups are added, dinuclear catalysts have much more potential due to the ability to tailor the choice of metal to each reactant. A ligand derived from α,α-diarylprolinols and phenols provides spontaneous self-assembly of dinuclear metal complexes with zinc and/or magnesium as the metal. The effect of ligand structure on performance is evaluated. Extension to other metals is also being evaluated. Furthermore, the design potentially allows the introduction of two different metals. The utility of this design for a range of additions using numerous types of donors with both carbonyl and imine, notably N-boc-imine, groups as acceptors. A strategy for the design of libraries for lead discovery in pharmaceutical research is suggested. Asymmetric additions of acetylides are particularly emphasized because of their utility for subsequent structural elaboration in complex molecule synthesis. This methodology also provides simplification for the total synthesis of some novel bioactive natural products.