Synthesis of Enantiomerically Pure Alcohols Useful for the Synthesis of Natural Products and Other Biologically Active Compounds

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Asymmetric synthesis of chiral compounds remains a significant challenge to synthetic organic chemists as the demand for enantiomerically pure compounds continues to increase. Chirality greatly influences a drug's biological and pharmacological properties. Advances in the synthesis of chiral tertiary alkyl-containing compounds have been made through the development of catalytic asymmetric alkene hydrogenation, epoxidation, and carboalumination. However, in cases where the initial enantiomeric excess of the crude product is low or where two groups around the chiral center are chemically similar, enantiomeric purification of the crudely obtained products is difficult and synthetically impractical.

Purdue University researchers have developed a synthesis for tertiary 1-alkanols yielding greater than 99 percent enantiomeric purity. First, an alcohol is coupled to a branching group using the ZACA reagent. A subsequent purification method is then used to yield a product of greater than 99 percent enantiomeric excess. A wide range of enantiomerically pure compounds, including valuable biologically relevant isoprenoid and deoxypolypropionate natural products, can be synthesized using this strategy.

Advantages:
-Yields greater than 99 percent enantiomeric purity
-Applicable to a wide range of compounds

Potential Applications:
-Synthesis of chiral 1-alkanols
-Synthesis of natural products-derived pharmaceuticals

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People:

- Negishi (DECEASED), Ei-ichi (Project leader)

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Contact OTC:

Purdue Office of Technology Commercialization
The Convergence Center
101 Foundry Drive, Suite 2500
West Lafayette, IN 47906

Phone: (765) 588-3475
Fax: (765) 463-3486
Email: otcip@prf.org