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A Route to Enantiopure RNA Precursors from Nearly Racemic Starting Materials
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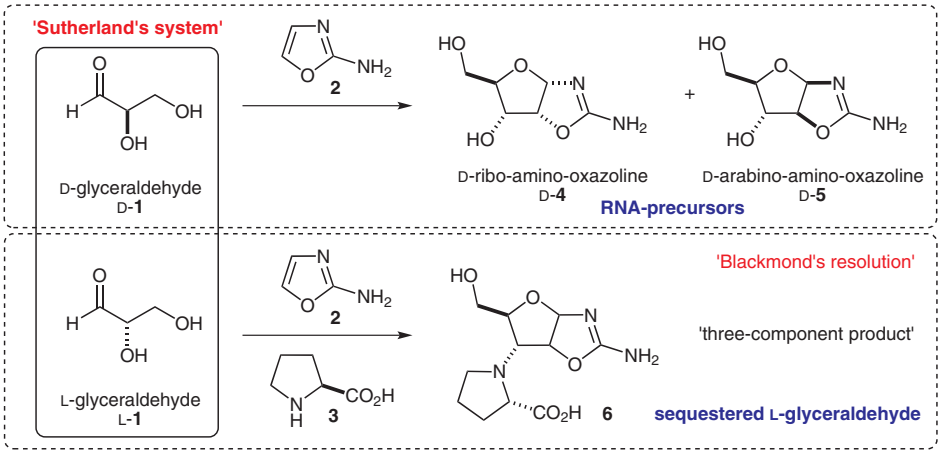
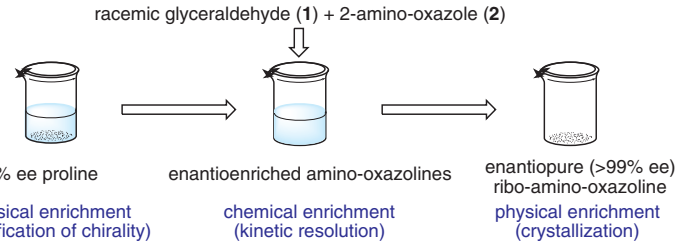
Enantiopure RNA Precursors from Nearly Racemic Starting Materials



Route to enantiopure RNA precursors from slightly enantioenriched amino acid



Significance: Blackmond and colleagues report the synthesis of enantiopure RNA precursors from nearly racemic starting materials. The study draws on the recent reports of Sutherland and co-workers (*Nature* **2009**, *459*, 239; *J. Am. Chem. Soc.* **2010**, *132*, 16677), who demonstrated that pyrimidine and purine nucleotides could be synthesized from simple building blocks under prebiotically plausible conditions. Through a series of experiments with nearly racemic amino acids, which undergo amplification of chirality via physical processes and then act as 'kinetic resolvers' of glyceraldehyde in Sutherland's system, Blackmond and co-workers successfully demonstrated how these RNA precursors can be obtained in enantiopure form. Proline with an enantiomeric excess as low as 1% was shown to effect this process.

Comment: In a quest to elucidate the biochemical origin of life, the group of Sutherland has made significant progress in synthesizing RNA nucleotides under prebiotically plausible conditions. However, an important question of the origin of enantiopurity in these putative processes remained unsolved. Enantiopurity of RNA precursors is a necessary feature for polymerization and the role of RNA as an 'informational polymer'. Blackmond and colleagues now close this gap with their convincing and simple experiments on amino acid additives. Without being incorporated into the RNA precursors, amino acids were shown to effect a powerful kinetic resolution of glyceraldehyde, preferentially sequestering the L-enantiomer. Coupled with crystallization-induced amplification of chirality, enantiopurity of the products could be achieved.

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kinetic resolution