A scalable approach to obtaining orthogonally protected β-D-idopyranosides

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Author(s) Hevey, Rachel; Morland, Alizée; Ling, Chang-Chun
Author(s) at UniBasel Hevey, Rachel ;
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A practical method to obtain orthogonally protected D-idopyranose from D-galactose has been developed, which is the first method to enable synthesis of the challenging β-D-idopyranoside linkage. The method relies on a key double inversion at O-2 and O-3 in an easily prepared D-galactose derivative, which proceeds regio- and stereoselectively through a 2,3-anhydrotalopyranoside; reaction using a selection of alkoxides affords exclusively the 3-O-alkylidopyranoside, which can be used to generate an orthogonally protected monosaccharide. The process is scalable and requires minimal purification, so it could be used to produce building blocks to aid in the synthesis of various β-idopyranose-containing oligosaccharide targets to further probe their biological functions.
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