EXPLOITING CHALCOGENONIUM CATALYSIS TO ACHIEVE STEREOSELECTIVE SYNTHESIS OF DEOXYGLYCOSIDES FROM GLYCALS

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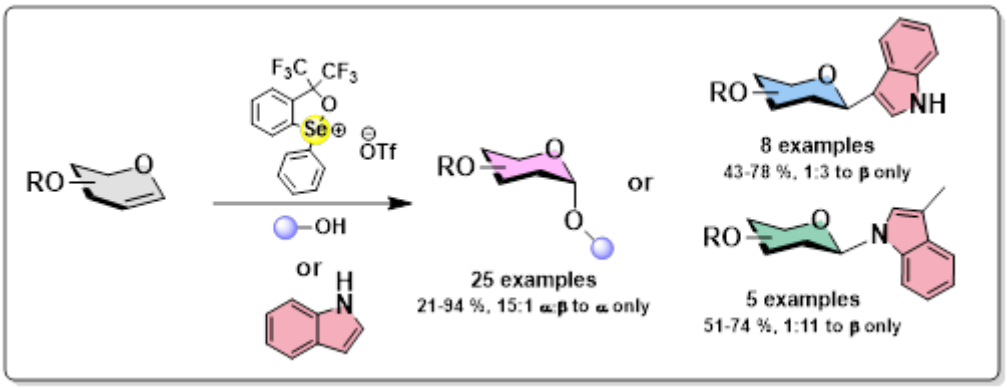
The development of stereoselective glycosylation methods is vital for enabling the synthesis of biologically relevant carbohydrate-based molecules [1]. Often, glycosylation reactions result in a mixture of anomers, leading to purification problems and lower enantiomeric yields. Additionally, achieving stereoselectivity is more challenging when using 2-deoxy sugars which lack substituents at C-2 that can direct the nucleophilic attack. Our group is interested in the development of novel catalytic methods for the synthesis of deoxyglycosides to address this challenge through the activation of both glycals and hemiacetals as glycosyl donors [2,3].
In this work, we demonstrate our latest effort to apply group 16 elements in transition metal-free catalysis for carbohydrate synthesis. We demonstrate the direct activation of glycal donors via hypervalent chalcogenonium catalysis to synthesise 2-deoxy glycosides in good to high yields and stereoselectivity. The glycosylation strategy is mild, practical and compatible with a range of orthogonally protected glycal substrates and both primary and secondary OH nucleophiles, as well as indolyl C- and N- nucleophiles. High α-stereocontrol is observed with alcohol nucleophiles, whilst β-stereocontrol is obtained in the case of indolyl nucleophiles. ^{1}H-NMR and kinetic isotope studies provided insights towards the reaction mechanism pathways to unravel the key steps in the activation process [4].



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