ANOMERIC CONTROL FOR TREHALOSE TRANSFERASES

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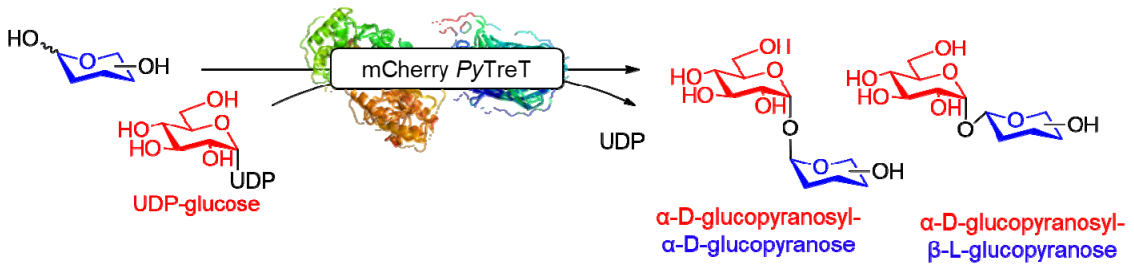
The stereo- and regioselective α,α-(1→1)-coupling of unprotected sugars is a formidable challenge in organic synthesis. Traditional chemical methods typically lack the desired anomeric control in the formation of a glycosidic bond. Trehalose transferases (TreT) are of particular interest since they catalyse α,α-(1→1)-coupling of a nucleotide sugar donors and a wide range of sugar acceptors with excellent regio- and enantioselectivity (scheme 1)[1]. Interestingly, an inversion of anomeric selectivity was observed when switching from D- to L-monosaccharide acceptors. Also, the semi-preparative chemoenzymatic coupling demonstrated quantitative yields within less than 1 hour of reaction time.



Scheme 1: Enzymatic glycosylation with mCherry *Py*TreT with a nucleotide sugar donor (red) and a sugar acceptor (blue) to an α,α- or α,β-linked non-reducing disaccharide.

[1] L.Mestrom, P.L. Marsden, S.R.; Dieters, M.; Achterberg, P.; Stolk, L.; Bento, I.; Hanefeld, U.; Hagedoorn, P.-L., Artificial Fusion of mCherry Enhanced Solubility and Stability of Trehalose Transferase. *Applied and Environmental Microbiology* **2019**, AEM.03084-18.