Conference abstract PPAT18

Enzyme-Catalyzed Synthesis of 2-Azido-2-deoxy-D-glucose under Catalysis by Recombinant Cellobiose Phosphorylase (CeP)

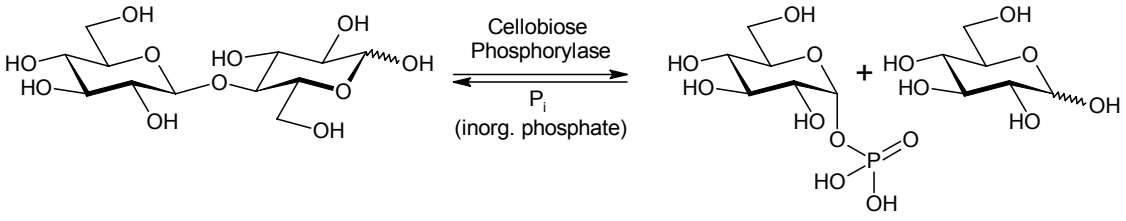
B. LUBURA [1], N. GABRA [1], P. STARKL [2], H. VIERNSTEIN [1], F. M. UNGER [1]

[1] Department of Pharmaceutical Technology and Biopharmaceutics, University of Vienna, Althanstrasse 14, 1090 Vienna, Austria
[2] Department of Pathophysiology, Medical University of Vienna, Waehringer Guertel 18-20, 1090 Vienna, Austria

E-mail: borjana.lubura@univie.ac.at (B. Lubura)

Sci Pharm. 2010; 78: 707 doi:10.3797/scipharm.cespt.8.PPAT18

The use of enzyme-catalyzed reactions for the synthesis of sugar substrates represents a more desirable approach in terms of "green chemistry". As the azidonitratization reaction of cellobial furnishes the 2-azido-2-deoxycellobiose stereospecifically, we have prepared 2-azido-2-deoxyglucose from 2-azido-2-deoxycellobiose using recombinant cellobiose phosphorylase (CeP) from *Clostridium thermocellum* NCIMB 10682 [1]. This enzyme catalyzes the reversible phosphorolysis of cellobiose to form α-D-glucose and α-D-Glucose-1-phosphate with inversion of the anomeric configuration (Scheme 1) [2].



Cellobiose D-Glucose-1-phosphate D-Glucose

2-Azido-2-deoxycellobiose is cleaved quantitatively by the action of cellobiose phosphorylase and is separated from glucose 1-phosphate by filtration through DEAE-cellulose. In this manner, we have demonstrated that the substitution of the hydroxyl group by an azido group in position 2 of the reducing cellobiose moiety is tolerated by the recombinant CeP.

[1] Wong CH, Koeller KM. Enzymes for chemical synthesis. Nature. 2001; 409: 232–240. doi:10.1038/35051706
[2] David BG, Fairbanks AJ. Carbohydrate Chemistry. Oxford University Press, 2002