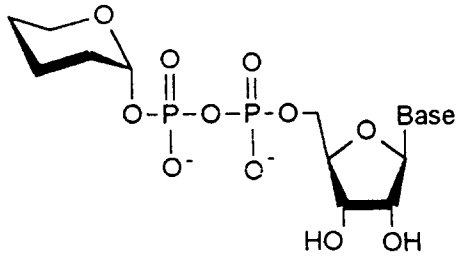
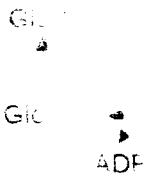
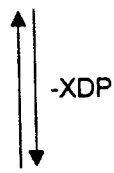
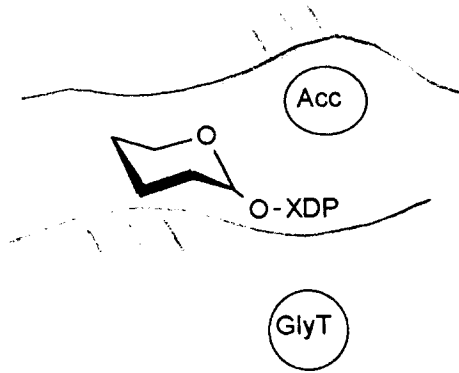
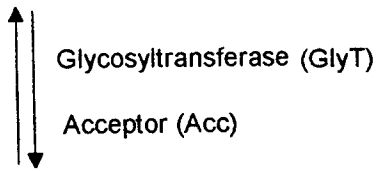


Legends

- Figure 1** Glycosylation by glycosyltransferases [21].
- Figure 2** Galactosylation with galactosyltransferase and integrated cofactor regeneration (Enzymes: **i** phosphoglucomutase, **ii** UDP-glucose-pyrophosphorylase, **iii** inorganic pyrophosphorylase, **iv** UDP-galactose-4-epimerase, **v** galactosyltransferase, **vi** pyruvate kinase) [31].
- Figure 3** Galactosylation with UDP-2d-Gal as donor (Enzymes: **i-vi** cf. Fig. 2, **vii** hexokinase) [38].
- Figure 4** Galactosylation leading to β 1- β 1- and β 1-4-transfer products (Enzymes: **iv**, **v** cf. Fig. 2; R^1 , R^2 cf. Tab. 1) [43].
- Figure 5** Postulated structural map of the substrate binding site of galactosyltransferase (R^1 , R^2 cf. Tab. 1) [43].
- Figure 6** Sialylation of lactosamine derivatives with α 2-6-sialyltransferase [48, 55-59].
- Figure 7** Enzymatic synthesis with integrated cofactor regeneration (Enzymes: **iii**, **vi** cf. Fig. 2, **viii** sialate-cytidyl-transferase, **ix** α 2-3- or α 2-6-sialyltransferase, **x** adenylate kinase) [48, 65].
- Figure 8** Enzymatic fucosylation with integrated cofactor regeneration (Enzymes: **vi** cf. Fig. 2, **xi** GDP-fucose-pyrophosphorylase, **xii** α 1-3/4-fucosyltransferase) [72].
- Figure 9** Fucosylation employing modified donors and acceptors [74].
- Figure 10** Phosphorylase catalyzed synthesis of modified maltooligosaccharides [85].
- Figure 11** Phosphorolytic formation and degradation of modified maltooligosaccharides [86].
- Table 1** Tabulation of substituent effects on acceptor ability [43].

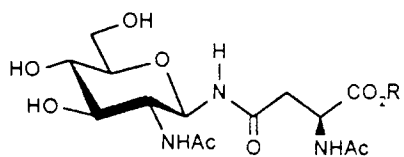
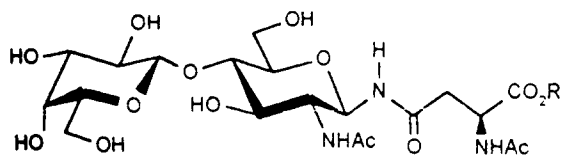


Activated Donor
(Gly-O-XDP)

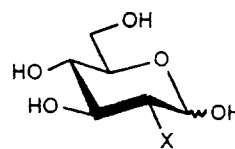
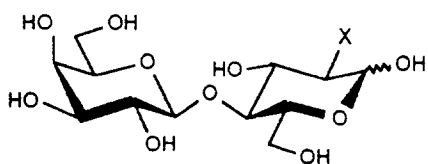
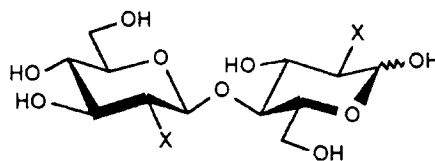
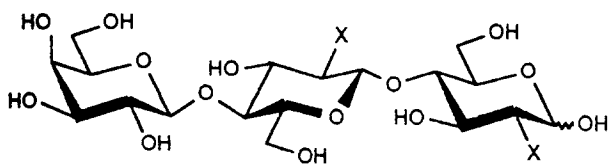
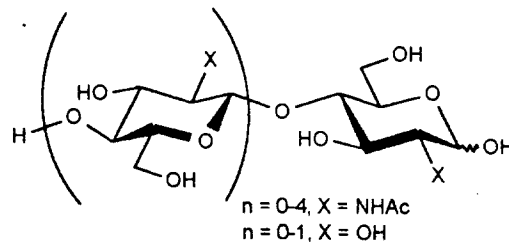
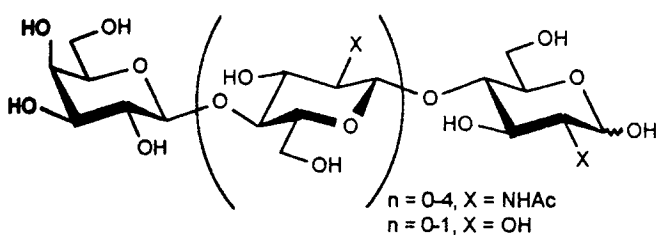
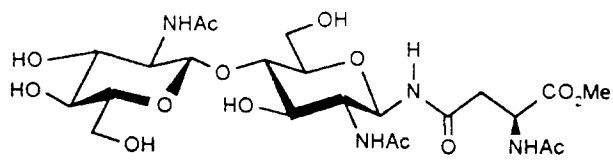
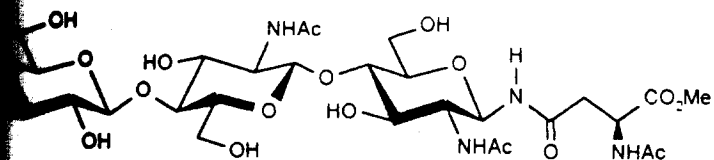


ATP

Fig. 1.



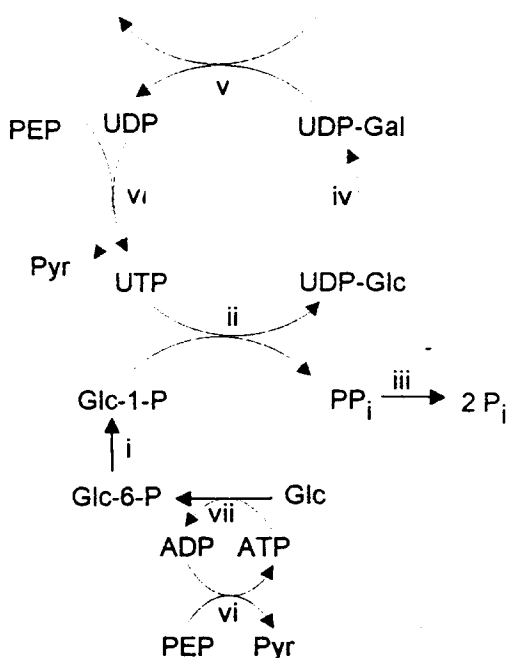
R = H, Me



X = OH, NHAc

Products

Acceptor Substrates



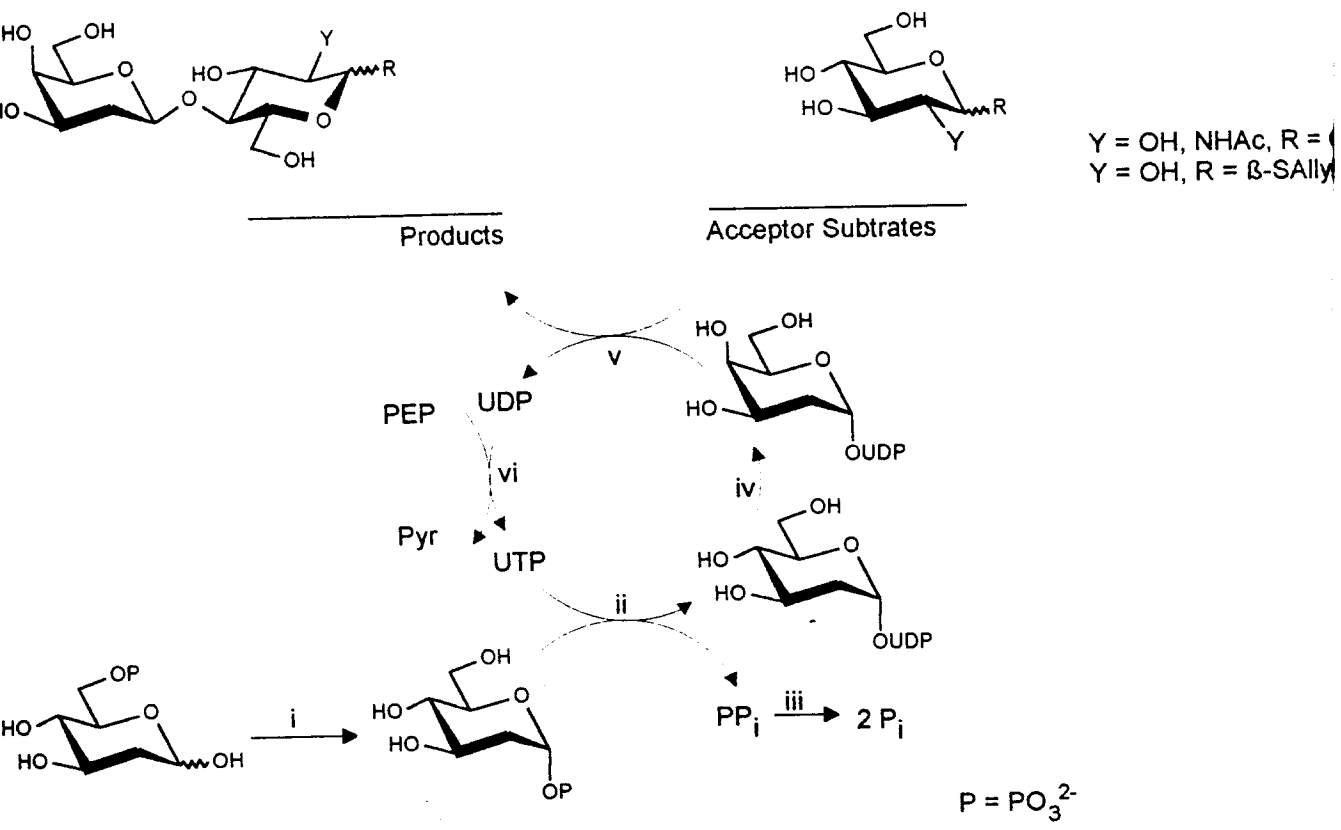
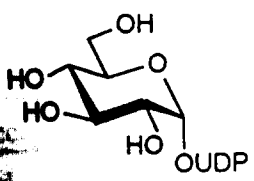
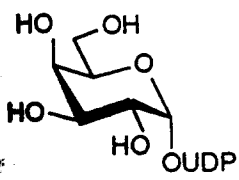


Fig. 3.

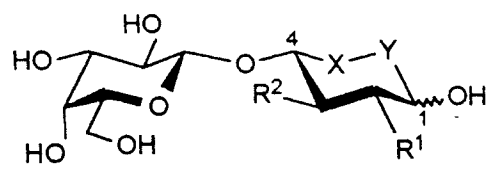
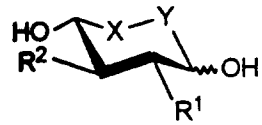


iv



UDP

v



+

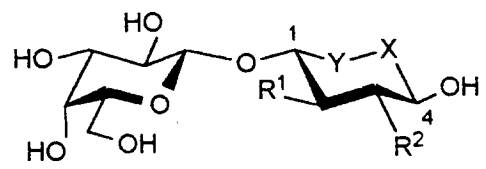
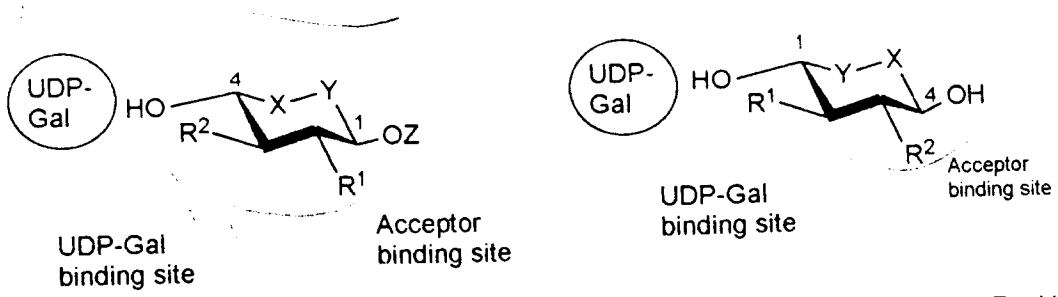


Fig. 4.



Z = Heteroolig

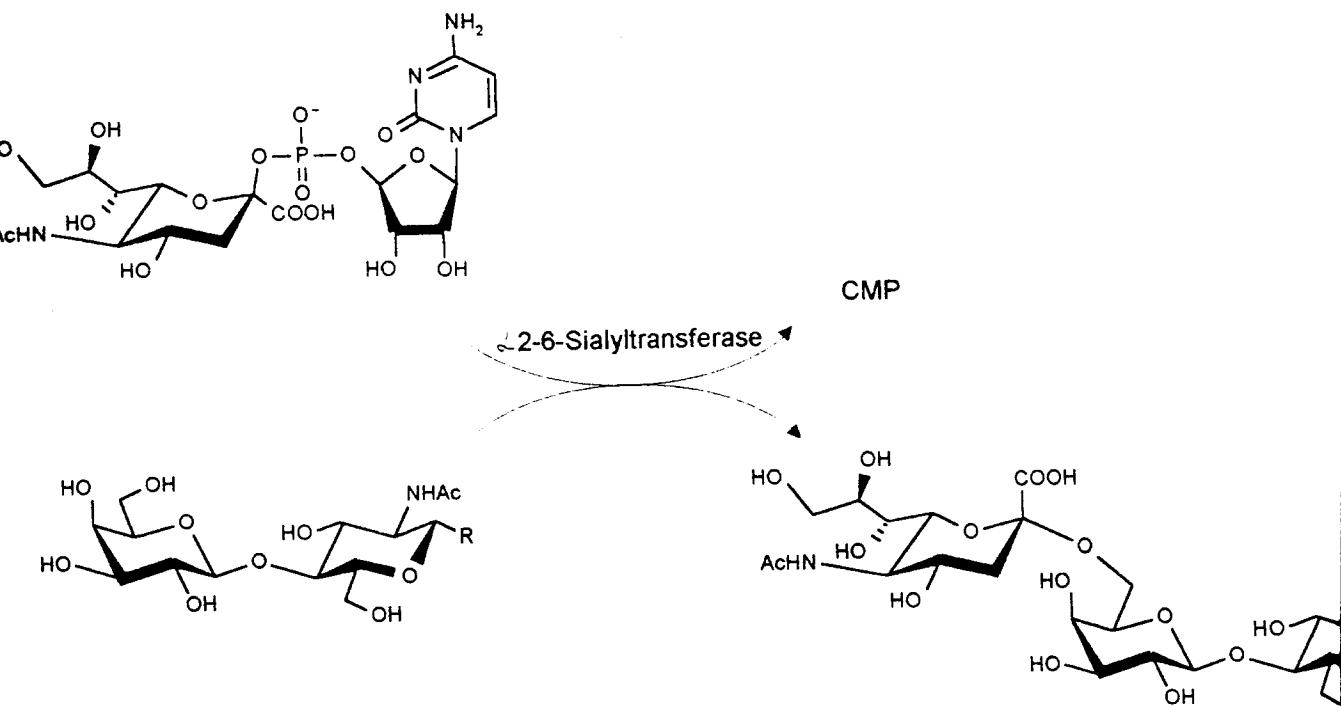
Orientation

normal

reverse

Fig. 5.

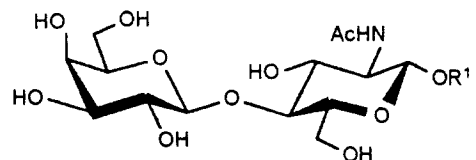
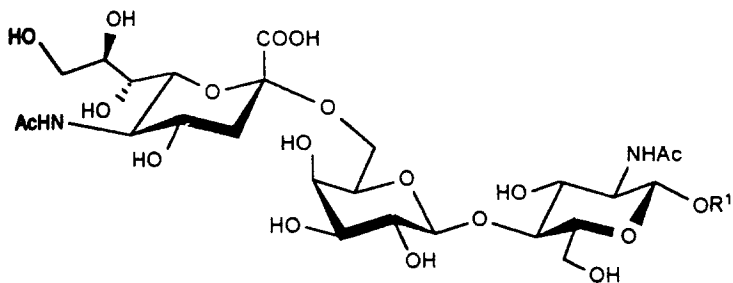
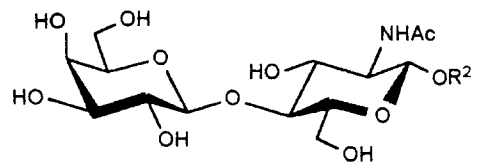
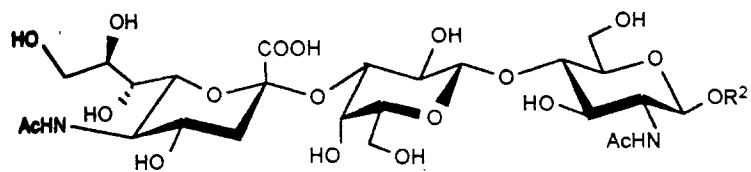
Acceptors	R ¹	R ²	X	Y	Substrate	Orientation	Product
Xyl	OH	OH	CH ₂	O	+	n	β1-4
	OH	OH	O	CH ₂	+	r	β1-β1
Glc	OH	OH	e-CH(CH ₂ OH)	O	+	n	β1-4
	OH	OH	O	CHe-(CH ₂ OH)	-	r	
Glc3NAc	OH	NHAc	e-CH(CH ₂ OH)	O	-	n	
	NHAc	OH	O	CHe-(CH ₂ OH)	+	r	β1-β1
Xyl3NAc	OH	NHAc	CH ₂	O	-	n	
	NHAc	OH	O	CH ₂	+	r	β1-β1
GlcNAc	NHAc	OH	e-CH(CH ₂ OH)	O	+	n	β1-4
	OH	NHAc	O	CHe-CH ₂ OH)	-	r	
SSXyl3NAc	OH	NHAc	CH ₂	S	-	n	
	OH	NHAc	CH ₂	S	+	r	β1-β1



a: R = OH, b: R = OCH₃, c: R = NH-CO-CH₂-CH(NH₂)COOH, d: R = Aloc-Phe-Asn-Thr-Ile-OH,

e: R = CCCC=C, f: R = CCCCCCC=C

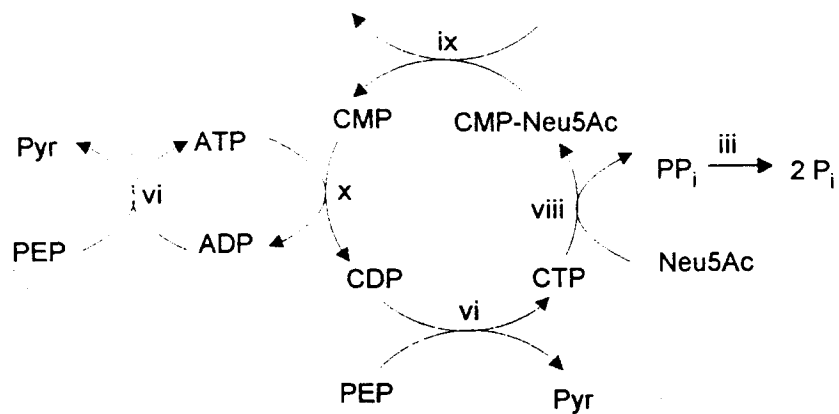
Fig. 6.

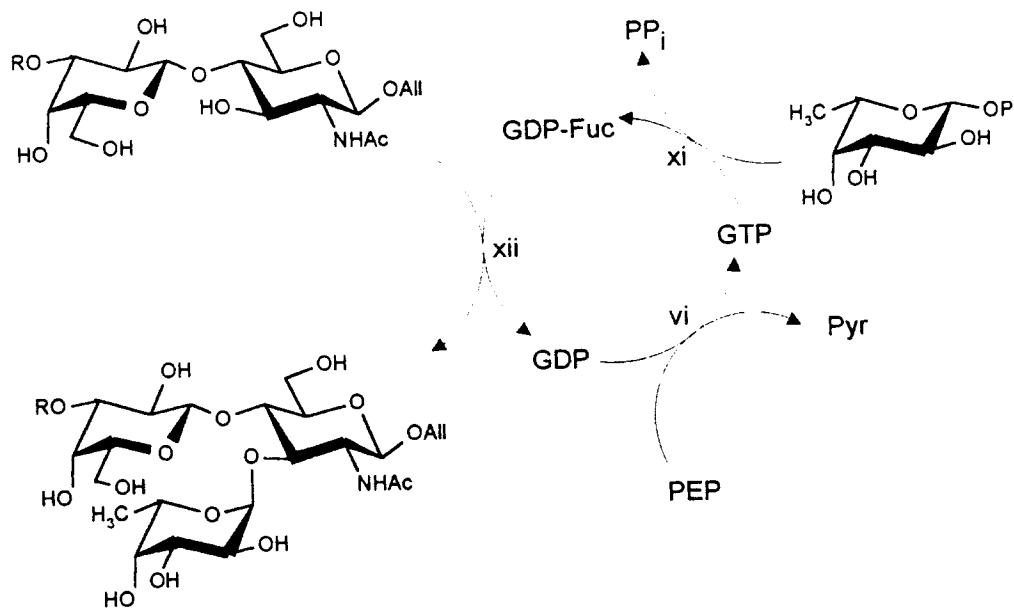


$R^1 = \text{CH}_2\text{CH}=\text{CH}_2$
 $R^2 = (\text{CH}_2)_3\text{CH}=\text{CH}_2$

Products

Acceptor Substrates



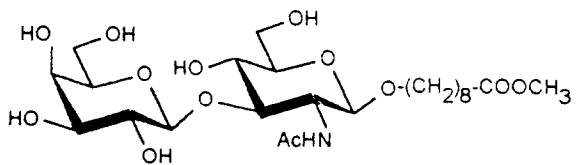


R = H, Neu5Ac12-

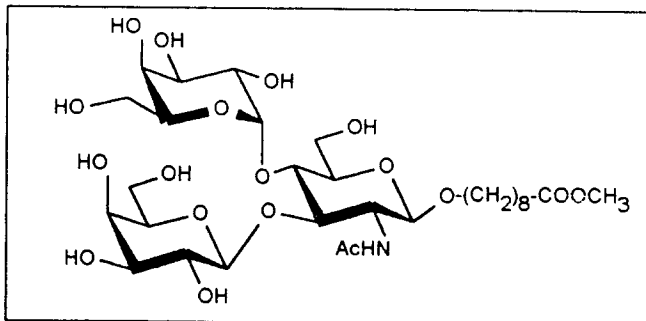
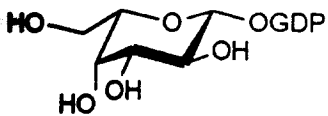


Fig. 8.

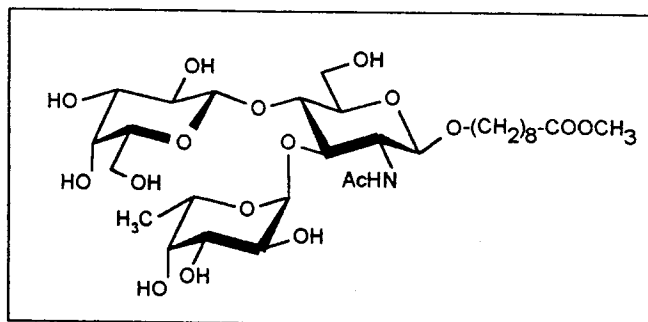
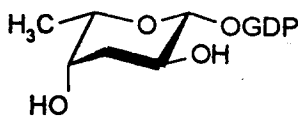
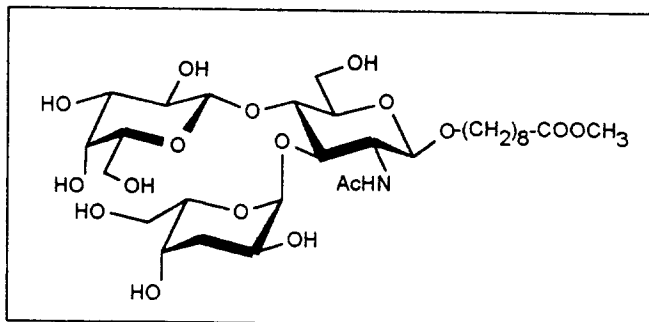
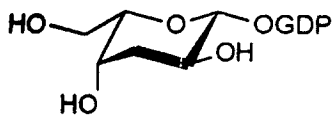
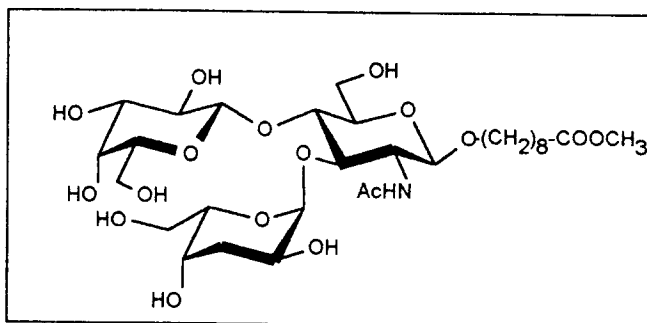
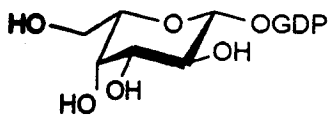
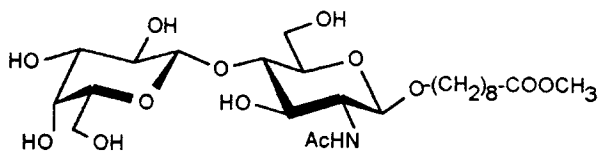
Acceptor Substrate

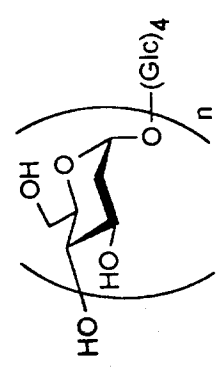
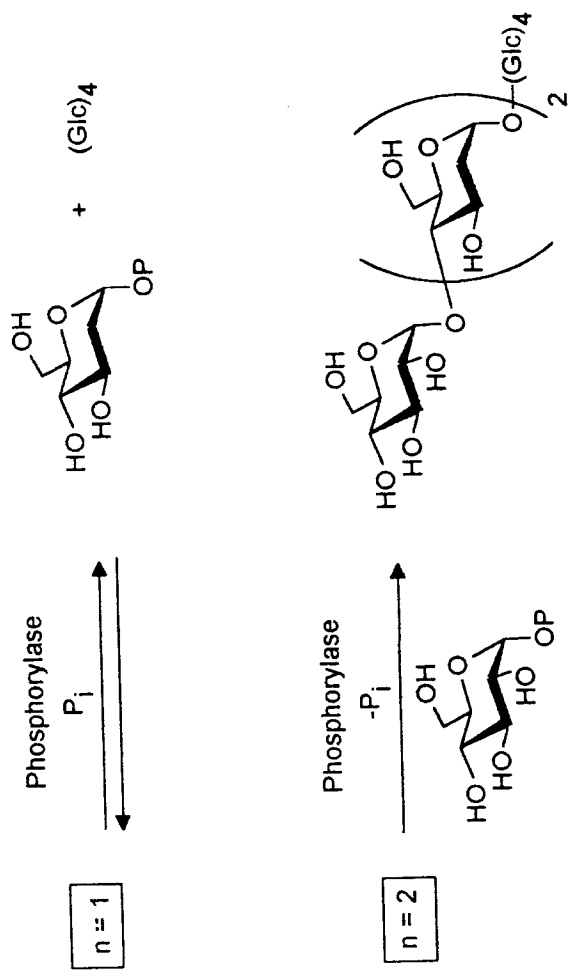


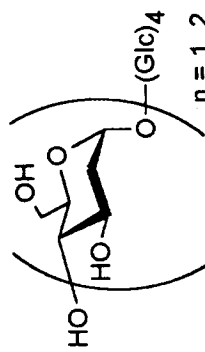
Donor Substrates



Acceptor Substrate







$n = 1, 2, 3$
 $n = 8, DP = 12$
 $n = 11-20, DP = 20$

