

Supplemental Table 1 The chemical shifts (δ) in ppm of synthetic disaccharide substrates assigned by ^1H -NMR spectroscopy.

Sugars	H-1	H-2	H-3	H-4	H-5	H-6a (b)	H-1'	H-2'	H-3'	H-4'	H-5'	H-6'a (b)
GlcNAc α 1,4Gal β 1pMP	4.82 (7.6 Hz)	3.84-3.70	3.67-3.62	4.03	3.84-3.70	3.84-3.70 (3.67-3.62)	4.93 (4.1 Hz)	3.95	3.84-3.70	3.45	4.28	3.82 (3.84-3.70)
GlcNAc α 1,6Gal β 1pMP	4.94 (6.9 Hz)	3.76	3.71-3.75	3.95-3.99	3.95-3.99	3.86 (3.69)	4.87 (3.4 Hz)	3.89	3.68	3.45	3.60-3.66	3.71-3.75 (3.60-3.66)
Hexa- <i>O</i> -Acetylated GlcNAc α 1,2Gal β 1pMP	4.93 (7.6 Hz)	4.03-4.16	5.07	5.42	4.00	4.23 (4.03-4.16)	5.29 (3.4 Hz)	4.38	5.13-5.20	5.13-5.20	4.03-4.16	4.19 (4.03-4.16)
Hexa- <i>O</i> -Acetylated GlcNAc α 1,3Gal β 1pMP	4.84 (7.6 Hz)	5.41	3.88	5.43	3.92-3.96	4.11-4.26	5.01 (3.4 Hz)	5.41	5.03	5.15	3.92-3.96	4.11-4.26
GlcNAc α 1,4GlcA β 1pMP	4.86 (8.2 Hz)	3.43	3.60-3.80	3.72	3.91	-	5.26 (4.1 Hz)	3.75	3.56	3.37	3.50	3.60-3.80 (3.60-3.80)

Supplemental Table 2 The chemical shifts (δ) in ppm of synthetic disaccharide substrates assigned by ^{13}C -NMR spectroscopy.

Sugars	C-1	C-2	C-3	C-4	C-5	C-6	C-1'	C-2'	C-3'	C-4'	C-5'	C-6'
GlcNAc α 1,4Gal β 1pMP	104.03	72.45	74.35	77.71	76.86	60.76	100.32	55.56	72.65	72.04	73.69	62.33
GlcNAc α 1,6Gal β 1pMP	102.31	71.28	73.32	69.55	73.84	67.31	97.45	54.31	71.92	70.58	72.70	61.15
Hexa- <i>O</i> -Acetylated GlcNAc α 1,2Gal β 1pMP	102.03	75.36	71.89	67.06	70.96	61.18	99.10	51.97	70.83	67.71	68.86	61.60
Hexa- <i>O</i> -Acetylated GlcNAc α 1,3Gal β 1pMP	100.96	70.40	77.83	66.60	68.91	61.11	98.85	51.64	70.03	67.78	70.73	61.25
GlcNAc α 1,4GlcA β 1pMP	101.28	73.12	76.00	76.12	75.34	174.43	97.40	53.61	70.59	69.46	72.16	59.95