Supporting Information for

One-step conversion of unprotected sugars to β-glycosyl azides using 2-chloroimidazolinium salt in aqueous solution

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List of Contents for Experimental Section

General: S2
Direct synthesis of glycosyl azides: S2 - S14
NMR spectra of products: S15 - S35
**General:** NMR spectra were recorded on Bruker DPX-400 or DRX-500 at room temperature. Assignments of $^1$H and $^{13}$C NMR spectra were performed by H-H COSY and HMQC experiments. ESI Mass spectra were recorded on Bruker Daltonics APEXIII.

**β-D-Glucopyranosyl azide (entry 1):** DMC (317.0 mg, 1.87 mmol) was added to a mixture of D-glucose (Glc, 112.5 mg, 0.625 mmol), triethylamine (0.87 ml, 6.25 mmol), and NaN$_3$ (406.5 mg, 6.25 mmol) in deuterium oxide (2.5 ml), and the reaction mixture was stirred for 1 h at 0 °C. After concentration of the reaction mixture and addition of ethanol, the solid was removed by filtration. The filtrate was concentrated *in vacuo* and the product was purified by silicagel column chromatography (CHCl$_3$/MeOH = 5/1), and HPLC (column; Shodex Asahipak NH2P-90 20F ($\phi 20.0 \times 300$ mm), eluent; acetonitrile/water = 3/1, flow rate; 10 ml/min, column oven; 40 °C, detection; RI) and concentrated *in vacuo* to give β-D-glucopyranosyl azide (106.4 mg, 0.52 mmol, 83 %).

$^1$H NMR (500 MHz, D$_2$O); δ (ppm) 4.63 (1H, d, H1, $J_{1,2} = 8.5$ Hz), 3.80 (1H, dd, H6$^a$, $J_{5,6a} = 2.2$ Hz, $J_{6a,6b} = 12.3$ Hz), 3.63 (1H, dd, H6$^b$, $J_{5,6b} = 5.7$ Hz, $J_{6a,6b} = 12.3$ Hz), 3.42 (1H, ddd, H5, $J_{4,5} = 9.7$ Hz, $J_{5,6a} = 2.2$ Hz, $J_{5,6b} = 5.7$ Hz), 3.40 (1H, t, H3, $J_{2,3} = 9.1$ Hz, $J_{3,4} = 9.1$ Hz), 3.30 (1H, t, H4, $J_{3,4} = 9.3$ Hz, $J_{4,5} = 9.3$ Hz), 3.15 (1H, t, H2, $J_{1,2} = 9.1$ Hz, $J_{2,3} = 9.1$ Hz). $^{13}$C NMR (126 MHz, D$_2$O); δ (ppm) 90.1 (C1), 77.8 (C5), 75.7 (C3), 72.8 (C2), 69.1 (C4), 60.5 (C6). ESI-MS; calcd for C$_6$H$_{11}$N$_3$O$_5$ [M+Na]$^+$: 228.0591, found: 228.0590.

**β-D-Maltosyl azide (entry 2):** DMC (63.4 mg, 0.375 mmol) was added to a mixture of D-maltose monohydrate (Glc$\alpha$1-4Glc, 45.0 mg, 0.125 mmol), diisopropylethylamine (0.19 ml, 1.125 mmol), and NaN$_3$ (81.3 mg, 1.25 mmol) in deuterium oxide (0.5 ml), and the reaction mixture was stirred for 0.5 h at 0 °C. After concentration of the reaction mixture and addition of ethanol, the solid was removed by filtration. The filtrate was concentrated *in vacuo* and the product was purified by HPLC (column; TOSOH TSK-GEL Amide-80 ($\phi 21.5 \times 300$ mm), eluent; acetonitrile/water = 7/3, flow rate; 8 ml/min, column oven; 50 °C, detection; RI) and concentrated *in vacuo* to give β-D-maltosyl azide (28.5 mg, 0.78 mmol, 62 %).
$^1$H NMR (500 MHz, D$_2$O); δ (ppm) 5.29 (1H, d, H1', $J_{1',2'}$ = 3.9 Hz), 4.63 (1H, d, H1, $J_{1,2}$ = 8.8 Hz), 3.81 (1H, dd, H6$^a$, $J_{5,6a}$ = 1.1 Hz, $J_{6a,6b}$ = 12.4 Hz), 3.73 (1H, dd, H6$^a$, $J_{5',6'a}$ = 2.0 Hz, $J_{6'a,6'b}$ = 12.2 Hz), 3.69-3.62 (2H, m, H3, H6$^b$), 3.60-3.57 (2H, m, H5', H6$^{''b}$), 3.55-3.53 (3H, m, H4, H5, H3$'$), 3.45 (1H, dd, H2', $J_{1',2'}$ = 3.9 Hz, $J_{2',3'}$ = 10.1 Hz), 3.23 (1H, t, H4', $J_{3',4'}$ = 9.5 Hz, $J_{4',5'}$ = 9.5 Hz), 3.17 (1H, t, H2, $J_{1,2}$ = 9.1 Hz, $J_{2,3}$ = 9.1 Hz). $^{13}$C NMR (126 MHz, D$_2$O); δ (ppm) 99.5 (C1'), 89.9 (C1), 76.4, 76.1, 76.0, 72.8, 72.7, 72.6, 71.6, and 69.2 (sugar-C), 60.4 (C6 and C6$'$).

ESI-MS; calcd for C$_{12}$H$_{21}$N$_3$O$_{10}$ [M+Na]$^+$: 390.1119, found: 390.1117.

**β-D-Maltotriosyl azide (entry 3);** DMC (21.1 mg, 0.125 mmol) was added to a mixture of D-maltotriose ((Glc$_1$α1-4)$_2$Glc, 12.6 mg, 0.025 mmol), diisopropylethylamine (0.065 ml, 0.375 mmol), and NaN$_3$ (81.3 mg, 1.25 mmol) in deuterium oxide (0.5 ml), and the reaction mixture was stirred for 0.5 h at room temperature. The product was purified by HPLC (column; TOSOH TSK-GEL Amide-80 (φ21.5 × 300 mm), eluent; acetonitrile/water = 2/1, flow rate; 8 ml/min, column oven; 40 ºC, detection; RI) and concentrated in vacuo to give β-D-maltotriosyl azide (10.3 mg, 0.020 mmol, 78 %).

$^1$H NMR (500 MHz, D$_2$O); δ (ppm) 5.29 (2H, t, H1' and H1$''$), 4.64 (1H, d, H1, $J_{1,2}$ = 8.9 Hz), 3.86-3.81 (2H, m), 3.77-3.53 (12H, m), 3.52-3.46 (2H, m, H2' and H2$''$), 3.30 (1H, t), 3.18 (1H, t, H2, $J_{1,2}$ = 9.0 Hz, $J_{2,3}$ = 9.0 Hz). $^{13}$C NMR (126 MHz, D$_2$O); δ (ppm) 99.7 and 99.4 (C1' and C1$''$), 89.9(C1), 76.6, 76.4, 76.2, 76.1, 73.3, 72.8, 72.7, 72.6, 71.7, 71.4, 71.2, and 69.2 (sugar-C), 60.4 (C6, C6$'$, and C6$''$). ESI-MS; calcd for C$_{18}$H$_{31}$N$_3$O$_{15}$ [M+Na]$^+$: 552.1647, found: 552.1647.

**β-D-Maltotetraosyl azide (entry 4);** DMC (21.1 mg, 0.125 mmol) was added to a mixture of D-maltotetraose ((Glc$_1$α1-4)$_3$Glc, 16.6 mg, 0.025 mmol), diisopropylethylamine (0.065 ml, 0.375 mmol), and NaN$_3$ (81.3 mg, 1.25 mmol) in deuterium oxide (0.5 ml), and the reaction mixture was stirred for 0.5 h at room temperature. The product was purified by HPLC (column; TOSOH TSK-GEL Amide-80 (φ21.5 × 300 mm), eluent; acetonitrile/water = 2/1, flow rate; 8 ml/min, column oven; 40 ºC, detection; RI) and concentrated in vacuo to give β-D-maltotetraosyl azide (9.4 mg, 0.014 mmol, 54 %).
$^1$H NMR (500 MHz, D$_2$O); $\delta$ (ppm) 5.30-5.27 (3H, m, H1’, H1’’, and H1’’’), 4.63 (1H, d, H1, $J_{1,2} = 8.9$ Hz), 3.85-3.80 (3H, m), 3.77-3.44 (19H, m), 3.30 (1H, t), 3.18 (1H, t, H2, $J_{1,2} = 9.1$ Hz, $J_{2,3} = 9.1$ Hz). $^{13}$C NMR (126 MHz, D$_2$O); $\delta$ (ppm) 99.7, 99.6, and 99.4 (C1’, C1’’, and C1’’’), 89.9 (C1), 76.8, 76.5, 76.4, 76.13, 76.09, 73.3, 73.2, 72.8, 72.6, 71.7, 71.5, 71.4, 71.1, and 69.3 (sugar-C), 60.4 and 60.3 (C6, C6’, C6’’, and C6’’’). ESI-MS; calcd for C$_{24}$H$_{41}$N$_3$O$_{20}$ [M+Na$^+$]: 714.2176, found: 714.2174.

**β-D-Maltopentaosyl azide (entry 5);** DMC (21.1 mg, 0.125 mmol) was added to a mixture of D-maltopentaose ((Glc1α1-4)$_4$Glc, 20.7 mg, 0.025 mmol), diisopropylethylamine (0.065 ml, 0.375 mmol), and NaN$_3$ (81.3 mg, 1.25 mmol) in deuterium oxide (0.5 ml), and the reaction mixture was stirred for 0.5 h at room temperature. The product was purified by HPLC (column; TOSOH TSK-GEL Amide-80 ($\phi$21.5 × 300 mm), eluent; acetonitrile/water = 2/1, flow rate; 8 ml/min, column oven; 40 °C, detection; RI) and concentrated in vacuo to give β-D-maltopentaosyl azide (15.4 mg, 0.018 mmol, 72 %).

$^1$H NMR (500 MHz, D$_2$O); $\delta$ (ppm) 5.30-5.27 (4H, m, H1’, H1’’, H1’’’, and H1’’’’), 4.63 (1H, d, H1, $J_{1,2} = 8.8$ Hz), 3.86-3.45 (28H, m), 3.30 (1H, t), 3.18 (1H, t, H2, $J_{1,2} = 9.1$ Hz, $J_{2,3} = 9.1$ Hz). $^{13}$C NMR (126 MHz, D$_2$O); $\delta$ (ppm) 99.7, 99.5, and 99.4 (C1’, C1’’, C1’’’, and C1’’’’), 89.9 (C1), 76.7, 76.6, 76.5, 76.4, 76.13, 76.07, 73.3, 73.2, 72.8, 72.6, 71.7, 71.5, 71.4, 71.1, and 69.2 (sugar-C), 60.4 and 60.3 (C6, C6’, C6’’, C6’’’, and C6’’’’). ESI-MS; calcd for C$_{30}$H$_{51}$N$_3$O$_{25}$ [M+Na$^+$]: 876.2704, found: 876.2707.

**β-D-Maltohexaosyl azide (entry 6);** DMC (10.6 mg, 0.0625 mmol) was added to a mixture of D-maltohexaose ((Glc1α1-4)$_5$Glc, 12.4 mg, 0.0125 mmol), diisopropylethylamine (0.033 ml, 0.188 mmol), and NaN$_3$ (81.3 mg, 1.25 mmol) in deuterium oxide (0.5 ml), and the reaction mixture was stirred for 0.5 h at room temperature. The product was purified by HPLC (column; TOSOH TSK-GEL Amide-80 ($\phi$21.5 × 300 mm), eluent; acetonitrile/water = 3/2, flow rate; 8 ml/min, column oven; 40 °C, detection; RI) and concentrated in vacuo to give β-D-maltohexaosyl azide (8.2 mg, 0.0081 mmol, 65 %).
**β-D-Maltoheptaosyl azide (entry 7);** DMC (21.1 mg, 0.125 mmol) was added to a mixture of D-maltoheptaose (Glc1α1-4)6Glc, 5.8 mg, 0.005 mmol), diisopropylethylamine (0.065 ml, 0.375 mmol), and NaN3 (81.3 mg, 1.25 mmol) in deuterium oxide (0.5 ml), and the reaction mixture was stirred for 1.5 h at room temperature. The product was purified by HPLC (column; TOSOH TSK-GEL Amide-80 (φ21.5 × 300 mm), eluent; acetonitrile/water = 3/2, flow rate; 8 ml/min, column oven; 40 °C, detection; RI) and concentrated in vacuo to give β-D-maltoheptaosyl azide (4.4 mg, 0.0037 mmol, 75 %).

1H NMR (500 MHz, D2O); δ (ppm) 5.30-5.28 (6H, m, H1’, H1”, H1”’, H1”’’, H1”’’’, and H1”’’’’), 4.64 (1H, d, H1, J1,2 = 8.8 Hz), 3.86-3.45 (40H, m), 3.30 (1H, t, H2, J2,3 = 9.1 Hz). 13C NMR (126 MHz, D2O); δ (ppm) 99.6 and 99.5 (C1’, C1”, C1”’, C1”’’, C1”’’’, and C1”’’’’), 89.9 (C1), 76.5, 76.3, 76.1, 76.0, 73.3, 72.8, 72.6, 71.6, 71.4, 71.3, 71.2, and 69.2 (sugar-C), 60.34 and 60.28 (C6, C6’, C6”’, C6”’’, C6”’’’, and C6”’’’’). ESI-MS; calcd for C26H61N3O30 [M+Na]+: 1038.3232, found: 1038.3228.

**β-D-Cellobiosyl azide (entry 8);** DMC (63.4 mg, 0.375 mmol) was added to a mixture of D-cellobiose (Glcβ1-4Glc, 42.8 mg, 0.125 mmol), diisopropylethylamine (0.19 ml, 1.125 mmol), and NaN3 (81.3 mg, 1.25 mmol) in deuterium oxide (0.5 ml), and the reaction mixture was stirred for 0.5 h at room temperature. After concentration of the reaction mixture and addition of ethanol, the solid was removed by filtration. The filtrate was concentrated in vacuo and the product was purified by HPLC (column; TOSOH TSK-GEL Amide-80 (φ21.5 × 300 mm), eluent; acetonitrile/water = 7/3, flow rate; 8 ml/min, column oven; 60 °C, detection; RI) and concentrated in vacuo to give β-D-cellobiosyl azide (33.6 mg, 0.091 mmol, 73 %).
$^1$H NMR (500 MHz, D$_2$O); $\delta$ (ppm) 4.66 (1H, d, H1, $J_{1,2} = 8.8$ Hz), 4.40 (1H, d, H1', $J_{1',2'} = 7.9$ Hz), 3.88 (1H, dd, H6$^a$, $J_{5,6a} = 1.4$ Hz, $J_{6a,6b} = 12.6$ Hz), 3.80 (1H, dd, H6$^a$, $J_{5',6'a} = 2.2$ Hz, $J_{6'a,6'b} = 12.5$ Hz), 3.73 (1H, dd, H6$^b$, $J_{5,6b} = 3.8$ Hz, $J_{6a,6b} = 12.5$ Hz), 3.61 (1H, dd, H6$^b$, $J_{5',6'b} = 5.9$ Hz, $J_{6'a,6'b} = 12.6$ Hz), 3.56-3.54 (3H, m, H3, H4, and H5), 3.41-3.35 (2H, m, H3' and H5'), 3.30 (1H, t, H4', $J_{3',4'} = 9.4$ Hz, $J_{4',5'} = 9.4$ Hz), 3.19 (2H, m, H2 and H2'). $^{13}$C NMR (126 MHz, D$_2$O); $\delta$ (ppm) 102.5 (C1'), 89.9 (C1), 78.0 (C4), 76.6 (C5), 76.0 (C5'), 75.4 (C3'), 74.2 (C3), 73.1 (C2), 72.6 (C2'), 69.4 (C4'), 60.5 (C6'), 59.7 (C6). ESI-MS; calcd for C$_{12}$H$_{21}$N$_3$O$_{10}$ [M+Na]$^+$: 390.1119, found: 390.1119.

**β-D-Lactosyl azide (entry 9);** DMC (42.3 mg, 0.25 mmol) was added to a mixture of D-lactose (Galβ1-4Glc, 17.1 mg, 0.050 mmol), diisopropylethylamine (0.13 ml, 0.75 mmol), and NaN$_3$ (81.3 mg, 1.25 mmol) in deuterium oxide (0.5 ml), and the reaction mixture was stirred for 0.5 h at room temperature. The product was purified by HPLC (column: TOSOH TSK-GEL Amide-80 (φ21.5 × 300 mm), eluent: acetonitrile/water = 3/1, flow rate: 8 ml/min, column oven: 40 °C, detection; RI) and concentrated in vacuo to give β-D-lactosyl azide (15.8 mg, 0.043 mmol, 86%). $^1$H NMR (400 MHz, D$_2$O); $\delta$ (ppm) 4.65 (1H, d, H1, $J_{1,2} = 8.9$ Hz), 4.33 (1H, d, H1', $J_{1',2'} = 7.8$ Hz), 3.86 (1H, dd, H6$^a$, $J_{5,6a} = 1.0$ Hz, $J_{6a,6b} = 12.6$ Hz), 3.81 (1H, dd, H4$'$), 3.72 (1H, dd, H6$^a$, $J_{5',6'a} = 3.7$ Hz, $J_{6'a,6'b} = 12.5$ Hz), 3.67-3.64 (2H, m, H6$^b$ and H6$^{b'}$), 3.63-3.53 (5H, m, H3, H4, H5, H3', and H5'), 3.42 (1H, t, H2$, J_{1,2} = 8.8$ Hz, $J_{2',3} = 8.8$ Hz), 3.18 (1H, t, H2, $J_{1,2} = 9.0$ Hz, $J_{2,3} = 9.0$ Hz). $^{13}$C NMR (100 MHz, D$_2$O); $\delta$ (ppm) 102.8 (C1'), 89.9 (C1), 77.6 (C4), 76.6(C5), 75.3 (C5'), 74.3 (C3), 72.5 (C2), 72.4 (C3'), 70.9 (C2'), 68.5 (C4'), 61.0 (C6'), 59.8 (C6). ESI-MS; calcd for C$_{12}$H$_{21}$N$_3$O$_{10}$ [M+Na]$^+$: 390.1119, found: 390.1117.

**β-D-Cellotriosyl azide (entry 10);** DMC (21.1 mg, 0.125 mmol) was added to a mixture of D-cellotriose ((Glcβ1-4Glc, 12.6 mg, 0.025 mmol), diisopropylethylamine (0.065 ml, 0.375 mmol), and NaN$_3$ (81.3 mg, 1.25 mmol) in deuterium oxide (0.5 ml), and the reaction mixture was stirred for 1 h at room temperature. The product was purified by HPLC (column: TOSOH TSK-GEL Amide-80 (φ21.5 × 300 mm), eluent: acetonitrile/water = 8/3, flow rate: 8 ml/min,
column oven; 40 °C, detection; RI) and concentrated in vacuo to give β-D-cellotriosyl azide (10.5 mg, 0.020 mmol, 79 %).

1H NMR (500 MHz, D2O); δ (ppm) 4.62 (1H, d, H1, J1,2 = 8.8 Hz), 4.38 (1H, d, H1’, J1’,2’ = 8.0 Hz), 4.36 (1H, d, H1’’), J1’,2’’ = 8.0 Hz), 3.85-3.82 (2H, m, H6a and H6’a), 3.79 (1H, dd, H6”a, J5’’,6’’-a = 2.0 Hz, J6’-a,6’-b = 12.5 Hz), 3.71-3.66 (2H, m, H6b and H6’’b), 3.58 (1H, dd, H6”b, J5’’,6’’-b = 5.8 Hz, J6’-a,6’-b = 12.5 Hz), 3.55-3.45 (6H, m, H3, H3’, H4, H4’, H5, and H5’’), 3.36 (1H, t, H3’’, J2’’,3’’ = 9.3 Hz, J3’’,4’’ = 9.3 Hz), 3.33 (1H, m, H5’’’), 3.26 (1H, t, H4’’, J3’’,4’’ = 9.3 Hz, J4’’,5’’ = 9.3 Hz), 3.21 (1H, dd, H2’, J1’,2’ = 8.0 Hz, J2’,3’ = 8.2 Hz), 3.13 (2H, m, H2 and H2’’). 13C NMR (126 MHz, D2O); δ (ppm) 102.5 and 102.2 (C1’, C1’’), 89.9 (C1), 78.2, 77.7, 76.6, 75.9, 75.4, 74.8, 74.1, 73.9, 73.1, 72.8, 72.5, and 69.4 (sugar-C), 60.5, 59.8, and 59.6 (C6, C6’, C6’’). ESI-MS; calcd for C18H31N3O15 [M+Na]+: 552.1647, found: 552.1647.

β-D-Cellotetraosyl azide (entry 11); DMC (21.1 mg, 0.125 mmol) was added to a mixture of D-cellotetraose ((Glc1β1-4)3Glc, 16.6 mg, 0.025 mmol), diisopropylethylamine (0.065 ml, 0.375 mmol), and NaN3 (81.3 mg, 1.25 mmol) in deuterium oxide (0.5 ml), and the reaction mixture was stirred for 0.5 h at room temperature. The product was purified by HPLC (column; TOSOH TSK-GEL Amide-80 (φ21.5 × 300 mm), eluent; acetonitrile/water = 3/2, flow rate; 8 ml/min, column oven; 40 °C, detection; RI) and concentrated in vacuo to give β-D-cellotetraosyl azide (14.1 mg, 0.020 mmol, 82 %).

1H NMR (500 MHz, D2O); δ (ppm) 4.64 (1H, d, H1, J1,2 = 8.8 Hz), 4.42-4.37 (3H, m, H1’, H1’’, and H1’’’), 3.87-3.85 (3H, m, H6a, H6’a, and H6”a), 3.79 (1H, dd, H6”a, J5’’,6’’-a = 2.2 Hz, J6’-a,6’-b = 12.5 Hz), 3.73-3.68 (3H, m, H6b, H6’’b, and H6”b), 3.61 (1H, dd, H6”b, J5’’,6’’-b = 5.9 Hz, J6’-a,6’-b = 12.5 Hz), 3.59-3.47 (9H, m, H3, H3’, H3’’, H4, H4’, H4’’, H5, H5’, and H5’’’), 3.40 (1H, t, H3’’’), J2’’,3’’’ = 9.2 Hz, J3’’,4’’’ = 9.2 Hz), 3.36 (1H, m, H5’’’), 3.23 (1H, t, H4’’’), J3’’,4’’’ = 9.3 Hz), 3.25-3.19 (4H, m, H2, H2’, H2’’, and H2’’’). 13C NMR (126 MHz, D2O); δ (ppm) 102.5, 102.31, and 102.28 (C1’, C1’’, and C1’’’), 89.9 (C1), 78.3, 78.2, 77.8, 76.7, 75.9, 75.4, 74.8, 74.2, 74.0, 73.9, 73.1, 72.9, 72.6, and 69.4 (sugar-C), 60.5, 59.8, and 59.7 (C6, C6’, C6’’, and C6’’’). ESI-MS; calcd for C24H41N3O15 [M+Na]+: 714.2176, found: 714.2171.
**β-D-Cellopentaosyl azide (entry 12);** DMC (10.6 mg, 0.0625 mmol) was added to a mixture of D-cellopentaose ((Glc1β1-4)4Glc, 10.3 mg, 0.0125 mmol), diisopropylethylamine (0.033 ml, 0.188 mmol), and NaN₃ (81.3 mg, 1.25 mmol) in deuterium oxide (0.5 ml), and the reaction mixture was stirred for 0.5 h at room temperature. The product was purified by HPLC (column; TOSOH TSK-GEL Amide-80 (ϕ21.5 × 300 mm), eluent; acetonitrile/water = 3/2, flow rate; 8 ml/min, column oven; 40 °C, detection; RI) and concentrated *in vacuo* to give β-D-cellopentaosyl azide (6.1 mg, 0.072 mmol, 58 %).

**1H NMR (500 MHz, D₂O); δ (ppm) 4.65 (1H, d, H1, J₁,₂ = 8.9 Hz), 4.42-4.38 (4H, m, H1’, H1’’, H1’’’, and H1’’’’), 3.87-3.85 (4H, m, H6a, H6’’, H6’’’, and H6’’’’), 3.80 (1H, dd, H6’’’’), J₅’’’’-6’’’’₁’’’’ = 2.2 Hz, J₆’’’’-a,6’’’’-b = 12.6 Hz), 3.74-3.69 (4H, m, H6b, H6’’b, H6’’’b, and H6’’’’b), 3.61 (1H, dd, H6’’’’), J₅’’’’-6’’’’₁’’’’ = 5.7 Hz, J₆’’’’-a,6’’’’-b = 12.6 Hz), 3.59-3.48 (12H, m, H3, H3’, H3’’, H3’’’, H4, H4’, H4’’, H4’’’, H5, H5’, H5’’, and H5’’’’), 3.39 (1H, t, H3’’’’), J₂’’’’-3’’’’ = 9.3 Hz, J₃’’’’-₄’’’’ = 9.3 Hz), 3.36 (1H, m, H5’’’’), 3.29 (1H, t, H4’’’’), J₄’’’’-4’’’’ = 9.3 Hz, J₄’’’’-₅’’’’ = 9.3 Hz), 3.21-3.18 (5H, m, H2, H2’, H2’’, H2’’’, and H2’’’’). **13C NMR (126 MHz, D₂O); δ (ppm) 102.5 and 102.3 (C1’, C1’’, C1’’’, and C1’’’’), 89.9 (C1), 78.3, 78.2, 77.8, 76.7, 75.9, 75.4, 74.8, 74.2, 73.9, 73.1, 72.9, 72.6, and 69.4 (sugar-C), 60.5 and 59.8 (C6, C6’, C6’’, C6’’’, and C6’’’’).** ESI-MS; calcd for C₃₀H₅₁N₃O₂₅ [M+Na⁺]: 876.2704, found: 876.2705.

**α-D-Xylopyranosyl-(1→6)-β-D-glucopyranosyl-(1→4)-[α-D-xylopyranosyl-(1→6)]-β-D-glucopyranosyl-(1→4)-[α-D-xylopyranosyl-(1→6)]-β-D-glucopyranosyl azide (entry 13);** DMC (21.1 mg, 0.125 mmol) was added to a mixture of α-D-xylopyranosyl-(1→6)-β-D-glucopyranosyl-(1→4)-[α-D-xylopyranosyl-(1→6)]-β-D-glucopyranosyl-(1→4)-[α-D-xylopyranosyl-(1→6)]-β-D-glucopyranosyl-(1→4)-[α-D-xylopyranosyl-(1→6)]-β-D-glucopyranosyl-(1→4)-[α-D-xylopyranosyl-(1→6)]-β-D-glucopyranosyl-(1→4)-[α-D-xylopyranosyl-(1→6)]-β-D-glucopyranose (xyloglucan-heptasaccharide, 5.3 mg, 5 μmol), diisopropylethylamine (0.065 ml, 0.375 mmol), and NaN₃ (81.3 mg, 1.25 mmol) in deuterium oxide (0.5 ml), and the reaction mixture was stirred for 1.5 h at room temperature. The product was purified by HPLC (column; TOSOH TSK-GEL Amide-80 (ϕ21.5 × 300 mm), eluent; acetonitrile/water = 3/2, flow rate; 8 ml/min, column oven; 40 °C, detection; RI) and concentrated *in vacuo* to give α-D-
xylopyranosyl-(1→6)-β-D-glucopyranosyl-(1→4)-[α-D-xylopyranosyl-(1→6)]-β-D-glucopyranosyl-(1→4)-[α-D-xylopyranosyl-(1→6)]-β-D-glucopyranosyl azide (3.4 mg, 3.1 μmol, 63 %).

$^1$H NMR (500 MHz, D$_2$O); δ (ppm) 4.85-4.82 (3H, m, H1 of Xyl × 3), 4.65 (1H, d, H1 of Glc, $J_{1,2} = 8.9$ Hz), 4.47-4.43 (3H, m, H1 of Glc × 3), 3.91-3.39 (35H, m), 3.30-3.26 (2H, m), 3.24-3.18 (2H, m). $^{13}$C NMR (126 MHz, D$_2$O); δ (ppm) 102.8 and 102.4 (C1 of Glc × 3), 98.8 and 98.2 (C1 of Xyl × 3), 89.8 (C1 of Glc), 79.3, 79.1, 78.4, 76.5, 75.4, 74.2, 73.9, 73.2, 72.93, 72.88, 72.7, 72.6, 72.5, 71.4, and 69.4 (sugar-C), 65.9 and 65.8 (C6 of Glc × 3), 61.5 and 61.1 (C5 of Xyl × 3), 59.7 (C6 of Glc). ESI-MS; calcd for C$_{39}$H$_{65}$N$_3$O$_{32}$ [M+Na]$^+$: 1110.3443, found: 1110.3435.

α-D-Xylopyranosyl-(1→6)-β-D-glucopyranosyl-(1→4)-[β-D-galactopyranosyl-(1→2)-α-D-xylopyranosyl-(1→6)]-β-D-glucopyranosyl-(1→4)-[β-D-galactopyranosyl-(1→2)-α-D-xylopyranosyl-(1→6)]-β-D-glucopyranosyl-(1→4)-β-D-glucopyranosyl azide (entry 14); DMC (21.1 mg, 0.125 mmol) was added to a mixture of α-D-xylopyranosyl-(1→6)-β-D-glucopyranosyl-(1→4)-[β-D-galactopyranosyl-(1→2)-α-D-xylopyranosyl-(1→6)]-β-D-glucopyranosyl-(1→4)-[β-D-galactopyranosyl-(1→2)-α-D-xylopyranosyl-(1→6)]-β-D-glucopyranosyl-(1→4)-β-D-glucopyranose (xyloglucan-nonasaccharide, 7.0 mg, 5 μmol), diisopropylethylamine (0.065 ml, 0.375 mmol), and NaN$_3$ (81.3 mg, 1.25 mmol) in deuterium oxide (0.5 ml), and the reaction mixture was stirred for 1.5 h at room temperature. The product was purified by HPLC (column; TOSOH TSK-GEL Amide-80 (ϕ21.5 × 300 mm), eluent; acetonitrile/water = 6/5, flow rate; 8 ml/min, column oven; 40 °C, detection; RI) and concentrated in vacuo to give α-D-xylopyranosyl-(1→6)-β-D-glucopyranosyl-(1→4)-[β-D-galactopyranosyl-(1→2)-α-D-xylopyranosyl-(1→6)]-β-D-glucopyranosyl-(1→4)-[β-D-galactopyranosyl-(1→2)-α-D-xylopyranosyl-(1→6)]-β-D-glucopyranosyl azide (3.5 mg, 2.5 μmol, 49 %).

$^1$H NMR (500 MHz, D$_2$O); δ (ppm) 5.04 (2H, m, H1 of Xyl × 2), 4.81 (1H, d, H1 of Xyl, $J_{1,2} = 3.6$ Hz), 4.64 (1H, d, H1 of Glc, $J_{1,2} = 8.8$ Hz), 4.44-4.39 (5H, m, H1 of Glc × 3 and Gal × 2),
3.86-3.37 (47H, m), 3.30-3.26 (2H, m), 3.22-3.17 (2H, m). $^{13}$C NMR (126 MHz, D$_2$O); δ (ppm) 104.5 and 104.4 (C1 of Gal × 2), 103.0, 102.5, and 102.3 (C1 of Glc × 3), 98.7 and 98.2 (C1 of Xyl × 3), 89.8 (C1 of Glc), 80.2, 80.1, 79.7, 78.3, 76.5, 75.4, 75.04, 75.02, 74.3, 74.25, 74.22, 74.1, 74.0, 73.5, 73.4, 72.9, 72.6, 72.5, 71.83, 71.79, 71.4, 70.99, 70.96, 69.38, 69.35, 69.28, and 68.5 (sugar-C), 66.7, 66.6, and 65.8 (C6 of Glc × 3), 61.10 and 60.95 (C5 of Xyl × 3 and C6 of Gal × 2), 60.0 (C6 of Glc). ESI-MS; calcd for C$_{51}$H$_{85}$N$_3$O$_{42}$ [M+Na]$^+$: 1434.4500, found: 1434.4483.

2-Acetamido-2-deoxy-β-D-glucopyranosyl azide (entry 15); DMC (101.4 mg, 0.60 mmol) was added to a mixture of N-acetyl-d-glucosamine (GlcNAc, 44.2 mg, 0.20 mmol), 2,6-lutidine (0.14 ml, 1.20 mmol), and NaN$_3$ (162.6 mg, 2.5 mmol) in deuterium oxide (1.0 ml), and the reaction mixture was stirred for 48 h at 0 °C. After concentration of the reaction mixture and addition of CHCl$_3$/MeOH (3/1 (v/v)), the solid was removed by filtration. The filtrate was concentrated in vacuo and the product was purified by silicagel column chromatography (CHCl$_3$/MeOH = 4/1), and HPLC (column; TOSOH TSK-GEL Amide-80 (φ21.5 × 300 mm), eluent; acetonitrile/water = 4/1, flow rate; 8 ml/min, column oven; 40 °C, detection; UV (214 nm)) and concentrated in vacuo to give 2-acetamido-2-deoxy-β-D-glucopyranosyl azide (40.4 mg, 0.16 mmol, 82 %).

$^1$H NMR (500 MHz, D$_2$O); δ (ppm) 4.64 (1H, d, H1, $J_{1,2}$ = 9.3 Hz), 3.82 (1H, dd, H6a, $J_{5,6a}$ = 2.0 Hz, $J_{6a,6b}$ = 12.5 Hz), 3.66 (1H, dd, H6b, $J_{5,6b}$ = 5.4 Hz, $J_{6a,6b}$ = 12.5 Hz), 3.59 (1H, t, H2, $J_{1,2}$ = 9.8 Hz, $J_{2,3}$ = 9.8 Hz), 3.46 (1H, t, H3, $J_{2,3}$ = 9.5 Hz, $J_{3,4}$ = 9.5 Hz), 3.41 (1H, m, H5), 3.37 (1H, t, H4, $J_{3,4}$ = 9.3 Hz, $J_{4,5}$ = 9.3 Hz), 1.94 (3H, s, CH$_3$). $^{13}$C NMR (126 MHz, D$_2$O); δ (ppm) 174.8 (C=O), 88.6 (C1), 77.8 (C5), 73.6 (C3), 69.4 (C4), 60.5 (C6), 55.0 (C2), 22.1 (CH$_3$). ESI-MS; calcd for C$_{8}$H$_{14}$N$_{4}$O$_{5}$ [M+Na]$^+$: 269.0856, found: 269.0855.

β-D-N,N'-Diacetylchitobiosyl azide (entry 16); DMC (50.7 mg, 0.30 mmol) was added to a mixture of D-N,N'-diacetylchitobiose (GlcNAcβ1-4GlcNAc, 42.4 mg, 0.10 mmol), 2,6-lutidine (0.070 ml, 0.60 mmol), and NaN$_3$ (162.6 mg, 2.5 mmol) in deuterium oxide (1.0 ml), and the reaction mixture was stirred for 48 h at 0 °C. After concentration of the reaction mixture and addition of CHCl$_3$/MeOH (3/1 (v/v)), the solid was removed by filtration. The filtrate was
concentrated in vacuo and the product was purified by silicagel column chromatography (CHCl₃/MeOH = 2/1) and HPLC (column; TOSOH TSK-GEL Amide-80 (ϕ21.5 × 300 mm), eluent; acetonitrile/water = 4/1, flow rate; 8 ml/min, column oven; 40 °C, detection; UV (214 nm)) and concentrated in vacuo to give β-D-N,N’-diacetyllactosyl azide (34.7 mg, 0.077 mmol, 77 %).

1H NMR (500 MHz, D₂O); δ (ppm) 4.63 (1H, d, H1, J₁,₂ = 8.8 Hz), 4.47 (1H, d, H1’, J₁’,₂’ = 8.4 Hz), 3.80 (1H, dd, H6ª, J₅’,₆’a = 1.9 Hz, J₆’a,₆’b = 12.5 Hz), 3.75 (1H, dd, H6ª, J₅,₆a = 1.6 Hz, J₆a,₆b = 12.4 Hz), 3.65-3.60 (4H, m, H2, H3, H2’, and H6ª’), 3.58-3.53 (2H, m, H4 and H6ª), 3.49-3.43 (2H, m, H5 and H3’), 3.39-3.33 (2H, m, H4’ and H5’), 1.95 (3H, s, CH₃), 1.93(3H, s, CH₃). 13C NMR (126 MHz, D₂O); δ (ppm) 174.8 and 174.6 (C=O), 101.4 (C1’), 88.5 (C1), 78.8 (C4), 76.4 (C5), 75.9 (C5’), 73.4 (C3’), 72.3 (C3), 69.6 (C4’), 60.5 (C6’), 59.9 (C6), 55.5 (C2’), 54.4 (C2), 22.0 (CH₃). ESI-MS; calcd for C₁₆H₂₇N₅O₁₀ [M+Na⁺]: 472.1650, found: 472.1649.

β-D-N-Acetyllactosaminyl azide (entry 17); DMC (42.3 mg, 0.25 mmol) was added to a mixture of D-N-acetyllactosamine (Galβ1-4GlcNAc, 19.2 mg, 0.05 mmol), 2,6-lutidine (0.058 ml, 0.50 mmol), and NaN₃ (81.3 mg, 1.25 mmol) in deuterium oxide (0.5 ml), and the reaction mixture was stirred for 36 h at room temperature. After concentration of the reaction mixture, the product was purified by HPLC (column; TOSOH TSK-GEL Amide-80 (ϕ21.5 × 300 mm), eluent; acetonitrile/water = 8/3, flow rate; 8 ml/min, column oven; 40 °C, detection; UV (214 nm)) and concentrated in vacuo to give β-D-N-acetyllactosaminyl azide (16.9 mg, 0.041 mmol, 83 %).

1H NMR (500 MHz, D₂O); δ (ppm) 4.63 (1H, d, H1, J₁,₂ = 8.9 Hz), 4.47(1H, d, H1’, J₁’,₂’ = 7.8 Hz), 3.87 (1H, dd, H6ª, J₅’,₆’a = 2.2 Hz, J₆’a,₆’b = 12.5 Hz), 3.81 (1H, d, H4’, J₃’,₄’, J₄’,₅’ =3.4 Hz), 3.75 (1H, dd, H6ª, J₅,₆a = 4.8 Hz, J₆a,₆b = 12.5 Hz), 3.69-3.60 (7H, m, H2, H3, H4, H5, H5’, H6ª, and H6ª’), 3.55 (1H, dd, H3’, J₂’,₃’ = 9.8 Hz, J₃’,₄’ = 3.5 Hz), 3.43 (1H, dd, H2’, J₁’,₂’ = 7.8 Hz, J₂’,₃’ = 9.8 Hz), 1.94 (3H, s, CH₃). 13C NMR (126 MHz, D₂O); δ (ppm) 174.8 (C=O), 102.8 (C1’), 88.6 (C1), 77.8 (C4), 76.7 (C5), 75.3 (C5’), 72.5 (C3’), 72.3 (C3), 70.9 (C2’), 68.5 (C4’), 61.0 (C6’), 59.8 (C6), 54.6 (C2), 22.1 (CH₃). ESI-MS; calcd for C₁₄H₂₄N₄O₁₀ [M+Na⁺]: 431.1385, found: 431.1385.
**β-D-N,N',N''-Triacetylchitotriosyl azide (entry 18);** DMC (42.3 mg, 0.25 mmol) was added to a mixture of D-Ν,N',Ν''-triacetylchitotriose ((GlcNAcβ1-4)2GlcNAc, 15.7 mg, 0.025 mmol), 2,6-lutidine (0.058 ml, 0.50 mmol), and NaN₃ (81.3 mg, 1.25 mmol) in deuterium oxide (0.5 ml), and the reaction mixture was stirred for 36 h at room temperature. The product was purified by HPLC (column; TOSOH TSK-GEL Amide-80 (ϕ21.5 × 300 mm), eluent; acetonitrile/water = 3/1, flow rate; 8 ml/min, column oven; 40 °C, detection; UV (214 nm)) and concentrated in vacuo to give **β-D-N,N',N''-triacetylchitotriosyl azide** (10.3 mg, 0.016 mmol, 63 %).

1H NMR (500 MHz, D₂O); δ (ppm) 4.63 (1H, d, H1, J₁₁₂ = 9.0 Hz), 4.47 (2H, d, H1' and H1''), J₁₁',₂₁' = 8.3 Hz), 3.80 (1H, dd, H6''a, J₅'',₆''a = 2.0 Hz, J₆'',₆''b = 12.4 Hz), 3.73 (2H, dd, H6'' and H6''b), 3.68-3.59 (6H, m, H2, H3, H2', H3', H2'', and H6''b), 3.57-3.50 (4H, m, H4, H6b, H4', and H6'b), 3.49-3.42 (3H, m, H5, H5', and H3''), 3.39-3.33 (2H, m, H4'' and H5''), 1.94 (6H, s, CH₃), 1.93 (3H, s, CH₃). 13C NMR (126 MHz, D₂O); δ (ppm) 174.8 and 174.6 (C=O), 101.4 (C1'), 101.2 (C1''), 88.5 (C1), 79.0 (C4'), 78.6 (C4), 76.4 (C5), 75.9 (C5'), 74.5 (C5''), 73.4 (C3'), 72.2 (C3), 72.0 (C3''), 69.6 (C4''), 60.5 (C6), 59.9 (C6' and C6''), 55.5 (C2'), 55.0 (C2''), 54.4 (C2), 22.1 (CH₃). ESI-MS; calcd for C₂₄H₄₀N₆O₁₅ [M+Na]⁺: 675.2444, found: 675.2443.

**β-D-N,N',N''-Tetraacetylchitotetraosyl azide (entry 19);** DMC (16.9 mg, 0.10 mmol) was added to a mixture of D-Ν,N',Ν'',Ν'''-tetraacetylchitotetraose ((GlcNAcβ1-4)₃GlcNAc, 8.3 mg, 0.010 mmol), 2,6-lutidine (0.023 ml, 0.20 mmol), and NaN₃ (81.3 mg, 1.25 mmol) in deuterium oxide (0.5 ml), and the reaction mixture was stirred for 36 h at room temperature. The product was purified by HPLC (column; TOSOH TSK-GEL Amide-80 (ϕ21.5 × 300 mm), eluent; acetonitrile/water = 8/3, flow rate; 8 ml/min, column oven; 40 °C, detection; UV (214 nm)) and concentrated in vacuo to give **β-D-N,N',N''-tetraacetylchitotetraosyl azide** (7.3 mg, 0.0085 mmol, 85 %).

1H NMR (500 MHz, D₂O); δ (ppm) 4.60 (1H, d, H1, J₁₁₂ = 8.6 Hz), 4.43 (3H, m, H1', H1''), and H1''), 3.78-3.69 (4H, m, H6a, H6''a, H6''', and H6''''a), 3.64-3.48 (14H, m), 3.45-3.30 (6H, m, H5, H5', H5'', H3''', H4'''', and H5'''''), 1.91 (12H, s, CH₃). 13C NMR (126 MHz, D₂O); δ (ppm)
174.8 and 174.6 (C=O), 101.4 (C1’’’), 101.2 (C1’ and C1’’), 88.5 (C1), 79.1 (C4’’’), 78.8 (C4’), 78.6 (C4), 76.4 (C5), 75.9 (C5’’’), 74.5 (C5’ and C5’’), 73.4 (C3’’’), 72.2 (C3), 72.1 (C3’), 72.0 (C3’’), and 69.6 (C4’’’), 60.5 (C6’’’), 59.9 (C6, C6’, and C6’’), 55.5 (C2’’’), 55.0 (C2’ and C2’’), 54.4 (C2), 22.1 (CH3). ESI-MS; calcd for C32H53N7O20 [M+Na]+: 878.3238, found: 878.3236.

β-D-N,N’,N’’,N’’’-Pentaacetylchitopentaosyl azide (entry 20); DMC (33.8 mg, 0.20 mmol) was added to a mixture of D-N,N’,N’’,N’’’-pentaacetylchitopentaose ((GlcNAcβ1-4)4GlcNAc, 10.3 mg, 0.010 mmol), 2,6-lutidine (0.046 ml, 0.40 mmol), and NaN3 (81.3 mg, 1.25 mmol) in deuterium oxide (0.5 ml), and the reaction mixture was stirred for 36 h at room temperature. The product was purified by HPLC (column: TOSOH TSK-GEL Amide-80 (φ21.5 × 300 mm), eluent: acetonitrile/water = 2/1, flow rate; 8 ml/min, column oven; 40 °C, detection; UV (214 nm)) and concentrated in vacuo to give β-D-N,N’,N’’,N’’’-pentaacetylchitopentaosyl azide (8.6 mg, 0.0081 mmol, 81 %).

1H NMR (500 MHz, D2O); δ (ppm) 4.60 (1H, d, H1, J1,2 = 8.5 Hz), 4.45 (4H, m, H1’, H1’’, H1’’’, and H1’’’’), 3.78-3.69 (5H, m, H6a, H6’a, H6’’a, H6’’’a, and H6’’’’a), 3.65-3.29 (25H, m), 1.91 (15H, s, CH3). 13C NMR (126 MHz, D2O); δ (ppm) 174.8 and 174.6 (C=O), 101.4 (C1’’’’), 101.2 (C1’, C1’’, and C1’’’), 88.5 (C1), 79.0 (C4’’’), 78.8 (C4’ and C4’’), 78.5 (C4), 76.4 (C5), 75.8 (C5’’’’), 74.5 (C5’, C5’’, and C5’’’), 73.3 (C3’’’’), 72.2 (C3), 72.0 (C3’, C3’’, and C3’’’), 69.6 (C4’’’’), 60.4 (C6’’’’), 59.8 (C6, C6’, C6’’, and C6’’’), 55.5 (C2’’’’), 55.0 (C2’, C2’’, and C2’’’), 54.4 (C2), 22.0 (CH3). ESI-MS; calcd for C40H66N8O25 [M+Na]+: 1081.4031, found: 1081.4024.

N-Acetyl-α-D-neuraminosyl-(2→6)-β-D-galactopyranosyl-(1→4)-2-acetamido-2-deoxy-β-D-glucopyranosyl-(1→2)-α-D-mannopyranosyl-(1→3)-[N-acetyl-α-D-neuraminosyl-(2→6)-β-D-galactopyranosyl-(1→4)-2-acetamido-2-deoxy-β-D-glucopyranosyl-(1→2)-α-D-mannopyranosyl(1→6)]-β-D-mannopyranosyl-(1→4)-2-acetamido-2-deoxy-β-D-glucopyranosyl azide (entry 21); DMC (12.2 mg, 72.2 μmol) was added to a mixture of N-acetyl-α-D-neuraminosyl-(2→6)-β-D-galactopyranosyl-(1→4)-2-acetamido-2-deoxy-β-D-
glucopyranosyl-(1→2)-α-D-mannopyranosyl-(1→3)-[N-acetyl-α-D-neuraminosyl-(2→6)-β-D-galactopyranosyl-(1→4)-2-acetamido-2-deoxy-β-D-glucopyranosyl-(1→2)-α-D-mannopyranosyl-(1→6)]-β-D-mannopyranosyl-(1→4)-2-acetamido-2-deoxy-β-D-glucopyranose (7.3 mg, 3.61 μmol), 2,6-lutidine (16.8 μl, 0.14 mmol), and NaN₃ (16.3 mg, 2.5 mmol) in deuterium oxide (0.1 ml), and the reaction mixture was stirred for 48 h at 0 °C. The product was purified by HPLC (column; TOSOH TSK-GEL Amide-80 (φ21.5 × 300 mm), eluent; acetonitrile/water = 1/1 (containing 0.1 v.% TFA), flow rate; 8 ml/min, column oven; 45 °C, detection; UV (214 nm)) and concentrated in vacuo to give N-Acetyl-α-D-neuraminosyl-(2→6)-β-D-galactopyranosyl-(1→4)-2-acetamido-2-deoxy-β-D-glucopyranosyl-(1→2)-α-D-mannopyranosyl-(1→3)-[N-acetyl-α-D-neuraminosyl-(2→6)-β-D-galactopyranosyl-(1→4)-2-acetamido-2-deoxy-β-D-glucopyranosyl-(1→2)-α-D-mannopyranosyl(1→6)]-β-D-mannopyranosyl-(1→4)-2-acetamido-2-deoxy-β-D-glucopyranosyl azide (6.4 mg, 3.13 μmol, 87 %).

Water-suppressed ¹H NMR (500 MHz, D₂O); δ (ppm) 4.99 (1H, H1 of Man-3’), 4.80 (1H, H1 of Man-3), 4.63 (2H, H1 of GlcNAc-1 and Man-2), 4.47 (2H, H1 of GlcNAc-4 and GlcNAc-4’), 4.30 (2H, H1 of Gal-5 and Gal-5’), 4.10 (1H, H2 of Man-2), 4.04 (1H, H2 of Man-3’), 3.96 (1H, H2 of Man-3), 3.88-3.38 (59H, m), 2.51 (2H, H3eq. of NeuAc-6 and NeuAc-6’), 1.91 (15H, CH₃), 1.61 (2H, H3ax. of NeuAc-6 and NeuAc-6’). ¹³C DEPT135 NMR (126 MHz, D₂O); δ (ppm) 103.5, 100.4, 99.5, 99.2, 99.1, and 96.8 (C1 of Man-2, Man-3, Man-3’, GlcNAc-4, GlcNAc-4’, Gal-5, and Gal-5’), 88.5 (C1 of GlcNAc-1), 80.6, 80.4, 79.3, 76.3, 76.1, 74.3, 73.5, 72.7, 72.3, 72.1, 72.0, 71.0, 70.6, 70.1, 69.3, 68.3, 68.2, 67.5, 67.2, 65.7, 65.6, 63.2, 61.5, 60.1, and 59.8 (sugar-C), 54.5 and 54.3 (C2 of GlcNAc-1, GlcNAc-4, and GlcNAc-4’), 51.7 (C5 of NeuAc-6 and NeuAc-6’), 39.2 (C3 of NeuAc-6 and NeuAc-6’), 22.3, 22.1, and 22.0 (CH₃). ESI-MS; calcd for C₇₆H₁₂₂N₈O₅₆Na₂ [(M-2Na)/2]⁺: 1021.3478, found: 1021.3474.
β-D-Glucopyranosyl azide (entry 1)
β-D-Maltosyl azide (entry 2)
β-D-Maltotriosyl azide (entry 3)
β-D-Maltotetraosyl azide (entry 4)
β-D-Maltopentaosyl azide (entry 5)
β-D-Maltohexaosyl azide (entry 6)
β-D-Maltoheptaosyl azide (entry 7)
β-D-Cellobiosyl azide (entry 8)
β-D-Lactosyl azide (entry 9)
β-D-Cellotriosyl azide (entry 10)
β-D-Cellotetraosyl azide (entry 11)
β-D-Celopentaosyl azide (entry 12)
\[\alpha\text{-D-Xylopyranosyl-(1→6)}\beta\text{-D-glucopyranosyl-(1→4)}[\alpha\text{-D-xylopyranosyl-(1→6)}]\beta\text{-D-glucopyranosyl-(1→4)}[\alpha\text{-D-xylopyranosyl-(1→6)}]\beta\text{-D-glucopyranosyl-(1→4)}\beta\text{-D-glucopyranosyl azide (entry 13)}\]
α-D-Xylopyranosyl-(1→6)-β-D-glucopyranosyl-(1→4)-[β-D-galactopyranosyl-(1→2)-α-D-xylopyranosyl-(1→6)]-β-D-glucopyranosyl-(1→4)-[β-D-galactopyranosyl-(1→2)-α-D-xylopyranosyl-(1→6)]-β-D-glucopyranosyl-(1→4)-β-D-glucopyranosyl azide (entry 14)
2-Acetamido-2-deoxy-β-D-glucopyranosyl azide (entry 15)
β-D- \textit{N,N'}-Diacetylchitobiosyl azide (entry 16)
β-D-N-Acetyllactosaminyl azide (entry 17)
β-D-\(N,N',N''\)-Triacetylchitotriosyl azide (entry 18)
β-D-N,N',N'',N'''-Tetraacetylchitotetraosyl azide (entry 19)
β-D-N,N',N''',N''''-Pentaacetylchitopentaosyl azide (entry 20)