

The glycointeractome of *Neisseria gonorrhoeae* – identification of host glycans targeted by the gonococcus to facilitate adherence to cervical and urethral epithelial cells

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Table S1. Heat map of glycan array results for *Neisseria gonorrhoeae* 1291.

Black indicates binding (in three independent experiments) and white indicates no binding. Binding was defined as a value greater than 1-fold increase above mean background relative fluorescence units (RFU). Fold-increase above background is indicated. HA - hyaluronic acid; ΔUA - unsaturated uronic acid. Spacers used: sp2, (CH₂)₃-NH- ; sp3, (CH₂)₅-NH- ; sp4, NH-(CO)CH₂-NH-.

Class	Index	Structure	<i>N. gonorrhoeae</i> 1291
Terminal galactose	2	Gal α -sp3	
	3	Gal β -sp3	
	37	3-O-Su-Gal β -sp3	
	75	Gal α 1-2Gal β -sp3	1.16
	76	Gal α 1-3Gal β -sp3	
	77	Gal α 1-3GalNAc β -sp3	
	78	Gal α 1-3GalNAc α -sp3	
	80	Gal α 1-3GlcNAc β -sp3	
	81	Gal α 1-4GlcNAc β -sp3	
	83	Gal α 1-6Glc β -sp4	1.00
	84	Gal β 1-2Gal β -sp3	
	85	Gal β 1-3GlcNAc β -sp3	1.79
	87	Gal β 1-3Gal β -sp3	
	88	Gal β 1-3GalNAc β -sp3	
	89	Gal β 1-3GalNAc α -sp3	
	93	Gal β 1-4Glc β -sp4	
	94	Gal β 1-4Gal β -sp4	
	97	Gal β 1-4GlcNAc β -sp3	1.46
	100	Gal β 1-6Gal β -sp4	
	145	Gal β 1-3(6-O-Su)GlcNAc β -sp3	
	146	Gal β 1-4(6-O-Su)Glc β -sp2	1.68
	147	Gal β 1-4(6-O-Su)GlcNAc β -sp3	1.36
	150	3-O-Su-Gal β 1-3GalNAc α -sp3	5.23
151	6-O-Su-Gal β 1-3GalNAc α -sp3	2.26	
152	3-O-Su-Gal β 1-4Glc β -sp2	4.05	
153	6-O-Su-Gal β 1-4Glc β -sp2	1.70	
155	3-O-Su-Gal β 1-3GlcNAc β -sp3	2.46	

157	3-O-Su-Galβ1-4GlcNAcβ-sp3	
159	4-O-Su-Galβ1-4GlcNAcβ-sp3	1.41
161	6-O-Su-Galβ1-3GlcNAcβ-sp3	1.91
163	6-O-Su-Galβ1-4GlcNAcβ-sp3	
176	3-O-Su-Galβ1-4(6-O-Su)Glcβ-sp2	5.69
177	3-O-Su-Galβ1-4(6-O-Su)GlcNAcβ-sp2	2.71
178	6-O-Su-Galβ1-4(6-O-Su)Glcβ-sp2	2.44
179	6-O-Su-Galβ1-3(6-O-Su)GlcNAcβ-sp2	2.92
180	6-O-Su-Galβ1-4(6-O-Su)GlcNAcβ-sp2	2.30
181	3,4-O-Su ₂ -Galβ1-4GlcNAcβ-sp3	1.46
182	3,6-O-Su ₂ -Galβ1-4GlcNAcβ-sp2	4.42
183	4,6-O-Su ₂ -Galβ1-4GlcNAcβ-sp2	3.42
184	4,6-O-Su ₂ -Galβ1-4GlcNAcβ-sp3	2.70
189	3,6-O-Su ₂ -Galβ1-4(6-O-Su)GlcNAcβ-sp2	1.45
201	3,4-O-Su ₂ -Galβ1-4GlcNAcβ-sp3	2.66
203	Galβ1-4(6-O-Su)GlcNAcβ-sp2	2.58
220	Galα1-3Galβ1-4Glcβ-sp2	5.33
222	Galα1-3Galβ1-4GlcNAcβ-sp3	
224	Galα1-4Galβ1-4Glcβ-sp3	3.84
225	Galα1-4Galβ1-4GlcNAc-sp2	1.44
228	Galβ1-2Galα1-4GlcNAcβ-sp4	1.81
229	Galβ1-3Galβ1-4GlcNAcβ-sp4	2.06
231	Galβ1-4GlcNAcβ1-3GalNAcα-sp3	1.10
232	Galβ1-4GlcNAcβ1-6GalNAcα-sp3	1.68
254	Galβ1-3(GlcNAcβ1-6)GalNAcα-sp3	1.67
262	Galβ1-3GalNAcβ1-3Gal-sp4	1.26
264	Galβ1-4Galβ1-4GlcNAc-sp3	1.17
373	Galα1-3Galβ1-4GlcNAcβ1-3Galβ-sp3	1.43
375	Galα1-4GlcNAcβ1-3Galβ1-4GlcNAcβ-sp3	1.47
376	Galβ1-3GlcNAcβ1-3Galβ1-4Glcβ-sp4	
377	Galβ1-3GlcNAcβ1-3Galβ1-3GlcNAcβ-sp2	1.29
378	Galβ1-3GlcNAcα1-3Galβ1-4GlcNAcβ-sp3	2.17
379	Galβ1-3GlcNAcβ1-3Galβ1-4GlcNAcβ-sp3	2.17
380	Galβ1-3GlcNAcα1-6Galβ1-4GlcNAcβ-sp2	1.04
381	Galβ1-3GlcNAcβ1-6Galβ1-4GlcNAcβ-sp2	1.31
382	Galβ1-3GalNAcβ1-4Galβ1-4Glcβ-sp3	1.00
383	Galβ1-4GlcNAcβ1-3Galβ1-4Glcβ-sp2	1.51
385	Galβ1-4GlcNAcβ1-3Galβ1-4GlcNAcβ-sp3	1.77
387	Galβ1-4GlcNAcβ1-6Galβ1-4GlcNAcβ-sp2	2.17
388	Galβ1-3(Galβ1-4GlcNAcβ1-6)GalNAcα-sp3	1.28
401	Galβ1-3GlcNAcβ1-3Galβ1-3GlcNAcβ-sp3	1.32
419	3-O-SuGalβ1-4GlcNAcβ1-3Galβ1-4GlcNAcβ-sp3	1.64
420	4-O-SuGalβ1-4GlcNAcβ1-3Galβ1-4GlcNAcβ-sp3	1.40
481	Galα1-3Galβ1-4GlcNAcβ1-3Galβ1-4Glcβ-sp4	2.80

	488	Gal β 1-4GlcNAc β 1-3(Gal β 1-4GlcNAc β 1-6)GalNAc α -sp3	
	489	Gal β 1-4GlcNAc β 1-3(GlcNAc β 1-6)Gal β 1-4GlcNAc-sp2	1.93
	490	Gal β 1-4GlcNAc β 1-6(GlcNAc β 1-3)Gal β 1-4GlcNAc β -sp2	2.54
	498	(Gal β 1-4GlcNAc β 1-3) ₃ -sp3	2.10
	499	Gal β 1-4GlcNAc β 1-3(Gal β 1-4GlcNAc β 1-6)Gal β 1-4GlcNAc-sp2	
	501	Gal β 1-3GalNAc β 1-3Gal α 1-4Gal β 1-4Glc β -sp4	
	1A	Gal β 1-3GlcNAc	1.74
	1B	Gal β 1-4GlcNAc	
	1C	Gal β 1-4Gal	
	1D	Gal β 1-6GlcNAc	2.06
	1E	Gal β 1-3GalNAc	3.07
	1F	Gal β 1-3GalNAc β 1-4Gal β 1-4Glc	1.00
	1G	Gal β 1-3GlcNAc β 1-3Gal β 1-4Glc	1.91
	1H	Gal β 1-4GlcNAc β 1-3Gal β 1-4Glc	2.85
	1I	Gal β 1-4GlcNAc β 1-6(Gal β 1-4GlcNAc β 1-3)Gal β 1-4Glc	6.64
	1J	Gal β 1-4GlcNAc β 1-6(Gal β 1-3GlcNAc β 1-3)Gal β 1-4Glc	3.69
	1K	Gal α 1-4Gal β 1-4Glc	
	1L	GalNAc α 1-O-Ser	
	1M	Gal β 1-3GalNAc α 1-O-Ser	
	1N	Gal α 1-3Gal	1.28
	1O	Gal α 1-3Gal β 1-4GlcNAc	2.24
	1P	Gal α 1-3Gal β 1-4Glc	4.27
	2A	Gal α 1-3Gal β 1-4Gal α 1-3Gal	5.18
	2B	Gal β 1-6Gal	2.01
	2C	GalNAc β 1-3Gal	3.46
	2D	GalNAc β 1-4Gal	3.09
	2E	Gal α 1-4Gal β 1-4GlcNAc	2.12
	2F	GalNAc α 1-3Gal β 1-4Glc	1.90
	2G	Gal β 1-3GlcNAc β 1-3Gal β 1-4GlcNAc β 1-6(Gal β 1-3GlcNAc β 1-3)Gal β 1-4Glc	2.84
Terminal GlcNAc	10	GlcNAc β -sp3	1.33
	22	GlcNAc β -sp4	1.01
	43	6-O-Su-GlcNAc β -sp3	
	55	3-O-Su-GlcNAc β -sp3	
	113	GlcNAc β 1-3GalNAc α -sp3	1.03
	114	GlcNAc β 1-3Man β -sp4	
	115	GlcNAc β 1-4GlcNAc β -Asn	
	117	GlcNAc β 1-4GlcNAc β -sp4	
	118	GlcNAc β 1-6GalNAc α -sp3	
	149	GlcNAc β 1-4(6-O-Su)GlcNAc β -sp2	2.67
	167	GlcNAc β 1-4-[HOOC(CH ₃)CH]-3-O-GlcNAc β -sp4	1.63
	168	GlcNAc β 1--[HOOC(CH ₃)CH]-3-O-GlcNAc β -L-alanyl-D-i-glutaminy-L-lysine	
	246	GlcNAc β 1-2Gal β 1-3GalNAc α -sp3	
247	GlcNAc β 1-3Gal β 1-3GalNAc α -sp3	2.18	

	248	GlcNAc β 1-3Gal β 1-4Glc β -sp2	
	250	GlcNAc β 1-3Gal β 1-4GlcNAc β -sp3	1.05
	251	GlcNAc β 1-4Gal β 1-4GlcNAc β -sp2	1.33
	252	GlcNAc β 1-4GlcNAc β 1-4GlcNAc β -sp4	1.77
	253	GlcNAc β 1-6Gal β 1-4GlcNAc β -sp2	
	255	GlcNAc β 1-3(GlcNAc β 1-6)GalNAc α -sp3	2.10
	395	GlcNAc β 1-3(GlcNAc β 1-6)Gal β 1-4GlcNAc β -sp3	1.54
	493	(GlcNAc β 1-4) ₅ β -sp4	3.07
	503	(GlcNAc β 1-4) ₆ β -sp4	2.76
	504	(A-GN-M) ₂ -3,6-M-GN-GN β -sp4	1.65
	505	(GN-M) ₂ -3,6-M-GN-GN β -sp4	1.15
	4A	GlcNAc β 1-4GlcNAc	3.66
	4B	GlcNAc β 1-4GlcNAc β 1-4GlcNAc	3.58
	4C	GlcNAc β 1-4GlcNAc β 1-4GlcNAc β 1-4GlcNAc	3.23
	4D	GlcNAc β 1-4GlcNAc β 1-4GlcNAc β 1-4GlcNAc β 1-4GlcNAc β 1-4GlcNAc	
	4E	GlcNAc β 1-4MurNAc	4.22
Mannosyl	16	Man α -sp3	
	18	Man β -sp4	
	19	ManNAc β -sp4	
	47	6-H ₂ PO ₃ Man α -sp3	2.54
	119	Man α 1-2Man β -sp4	2.23
	120	Man α 1-3Man β -sp4	2.73
	121	Man α 1-4Man β -sp4	1.13
	122	Man α 1-6Man β -sp4	2.60
	123	Man β 1-4GlcNAc β -sp4	1.99
	124	Man α 1-2Man α -sp4	3.58
	258	Man α 1-3(Man α 1-6)Man β -sp4	1.92
	495	Man α 1-6(Man α 1-3)Man α 1-6(Man α 1-3) Man β -sp4	3.30
	5A	GlcNAc β 1-2Man	1.12
	5B	GlcNAc β 1-2Man α 1-6(GlcNAc β 1-2Man α 1-3)Man	2.27
	5C	Man α 1-2Man	1.14
	5D	Man α 1-3Man	2.28
	5E	Man α 1-4Man	3.06
5F	Man α 1-6Man	3.30	
5G	Man α 1-6(Man α 1-3)Man	2.88	
5H	Man α 1-6(Man α 1-3)Man α 1-6(Man α 1-3) Man	1.49	
Fucosyl	1	Fuc α -sp3	1.50
	71	Fuc α 1-2Gal β -sp3	1.67
	72	Fuc α 1-3GlcNAc β -sp3	
	73	Fuc α 1-4GlcNAc β -sp3	1.00
	215	Fuc α 1-2Gal β 1-3GlcNAc β -sp3	
	216	Fuc α 1-2Gal β 1-4GlcNAc β -sp3	2.80
	217	Fuc α 1-2Gal β 1-3GalNAc α -sp3	

219	Fuca1-2Galβ1-4Glcβ-sp4	3.66
226	Fuca1-2(Galα1-3)Galβ-sp3	1.00
233	Galβ1-3(Fuca1-4)GlcNAcβ-sp3	
234	Fuca1-3(Galβ1-4)GlcNAcβ-sp3	1.35
235	Fuca1-2(GalNAcα1-3)Galβ-sp3	1.77
287	3-O-Su-Galβ1-3(Fuca1-4)GlcNAcβ-sp3	
288	Fuca1-3(3-O-Su-Galβ1-4)GlcNAcβ-sp3	2.14
359	Fuca1-2(Galα1-3)Galβ1-3GlcNAcβ-sp3	
360	Fuca1-2(Galα1-3)Galβ1-4GlcNAcβ-sp3	1.11
362	Fuca1-2(Galα1-3)Galβ1-3GalNAcα-sp3	1.33
363	Fuca1-2(Galα1-3)Galβ1-3GalNAcβ-sp3	
364	Fuca1-3(Galα1-3Galβ1-4)GlcNAcβ-sp3	1.15
366	Fuca1-2(GalNAcα1-3)Galβ1-3GlcNAcβ-sp3	
368	Fuca1-2(GalNAcα1-3)Galβ1-4GlcNAcβ-sp3	
371	Fuca1-2Galβ1-3(Fuca1-4)GlcNAcβ-sp3	1.38
372	Fuca1-3(Fuca1-2Galβ1-4)GlcNAcβ-sp3	
392	Fuca1-2(GalNAcα1-6)GalNAcα1-6-sp3	2.84
479	Fuca1-2Galβ1-3GlcNAcβ1-3Galβ1-4Glcβ-sp4	3.60
480	Fuca1-2Galβ1-3GlcNAcβ1-3Galβ1-4GlcNAcβ-sp2	3.50
483	Galα1-3(Fuca1-2)Galβ1-4 (Fuca1-3)GlcNAcβ-sp3	2.27
496	Fuca1-2Galβ1-3(Fuca1-4)GlcNAcβ1-3Galβ1-4Glcβ-sp4	3.27
497	Fuca1-3(Fuca1-2Galβ1-4)GlcNAcβ1-3Galβ1-4Glcβ-sp4	3.27
538	Le ^x 1-6'(Le ^c 1-3')Lac-sp4	1.79
539	LacNAc1-6'(Le ^d 1-3')Lac-sp4	
540	Le ^x 1-6'(6'SLN1-3')Lac-sp4	2.59
541	Le ^x 1-6'(Le ^d 1-3')Lac-sp4	
542	Le ^c Le ^x 1-6'(Le ^c 1-3')Lac-sp4	
543	Le ^x 1-6'(Le ^b 1-3')Lac-sp4	1.90
7A	Fuca1-2Galβ1-3GlcNAcβ1-3Galβ1-4Glc	1.63
7B	Galβ1-3(Fuca1-4)GlcNAcβ1-3Galβ1-4Glc	2.03
7C	Galβ1-4(Fuca1-3)GlcNAcβ1-3Galβ1-4Glc	1.57
7D	Fuca1-2Galβ1-3(Fuca1-4)GlcNAcβ1-3Galβ1-4Glc	2.56
7E	Galβ1-3(Fuca1-4)GlcNAcβ1-3Galβ1-4(Fuca1-3)Glc	3.88
7F	Fuca1-2Gal	
7G	Fuca1-2Galβ1-4Glc	3.64
7H	Galβ1-4(Fuca1-3)Glc	2.46
7I	Galβ1-4(Fuca1-3)GlcNAc	2.43
7J	Galβ1-3(Fuca1-4)GlcNAc	2.01
7K	GalNAcα1-3(Fuca1-2)Gal	2.47
7L	Fuca1-2Galβ1-4(Fuca1-3)Glc	
7M	Galβ1-3(Fuca1-2)Gal	5.02
7N	Fuca1-2Galβ1-4(Fuca1-3)GlcNAc	2.54
7O	Fuca1-2Galβ1-3GlcNAc	3.59
7P	Fuca1-2Galβ1-3(Fuca1-4)GlcNAc	2.20

	8A	SO ₃ -3Galβ1-3(Fuca1-4)GlcNAc	1.25
	8B	SO ₃ -3Galβ1-4(Fuca1-3)GlcNAc	
	8C	Galβ1-3GlcNAcβ1-3Galβ1-4(Fuca1-3)GlcNAcβ1-3Galβ1-4Glc	
	8D	Galβ1-4(Fuca1-3)GlcNAcβ1-6(Galβ1-3GlcNAcβ1-3)Galβ1-4Glc	
	8E	Galβ1-4(Fuca1-3)GlcNAcβ1-6(Fuca1-2Galβ1-3GlcNAcβ1-3)Galβ1-4Glc	4.32
	8F	Galβ1-4(Fuca1-3)GlcNAcβ1-6(Fuca1-2Galβ1-3(Fuca1-4)GlcNAcβ1-3)Galβ1-4Glc	
	8G	Lacto-N-fucopentaose VI (LNFP VI)	
	8H	Lacto-N-neodifucohexaose I (LNnDFH I)	
	8I	Lacto-N-neodifucohexaose II (LNnDFH II)	
	8J	Trifucosyllacto-N-neotetraose I (TFLNnTI)	
	8K	Monofucosyllacto-N-neohexaose I (MFLNnH I)	
	8L	Difucosyllacto-N-neohexaose I (DFLNnH I)	
	8M	Difucosyllacto-N-neohexaose II (DFLNnH II)	
	8N	Monofucosyl(1-3)-iso-lacto-N-octaose (MFiLNO)	
	8O	Trifucosyl(1-2,1-2,1-3)-iso-lacto-N-octaose (TFiLNO (1-2,1-2,1-3))	5.19
Terminal Sialylated	48	Neu5Acα-sp3	1.77
	49	Neu5Acα-sp9	
	52	Neu5Gcα-sp3	
	54	9-NAc-Neu5Acα-sp3	
	169	Neu5Acα2-3Galβ-sp3	2.16
	170	Neu5Acα2-6Galβ-sp3	
	171	Neu5Acα2-3GalNAcα-sp3	
	172	Neu5Acα2-6GalNAcα-sp3	
	174	Neu5Gcα2-6GalNAcα-sp3	3.46
	186	Neu5Acα2-8Neu5Acα2-sp3	
	205	Neu5Acα2-6GalNAcβ-sp3	
	206	Neu5Gcα2-3Gal-sp3	3.71
	289	Galα1-3(Neu5Acα2-6)GalNAcα-sp3	1.42
	290	Galβ1-3(Neu5Acα2-6)GalNAcα-sp3	
	292	Neu5Acα2-3Galβ1-3GalNAcα-sp3	1.70
	293	Neu5Acα2-3Galβ1-4Glcβ-sp3	
	294	Neu5Acα2-3Galβ1-4Glcβ-sp4	2.18
	295	Neu5Acα2-6Galβ1-4Glcβ-sp2	
	298	Neu5Acα2-3Galβ1-4GlcNAcβ-sp3	1.22
	299	Neu5Acα2-3Galβ1-3GlcNAcβ-sp3	1.58
	300	Neu5Acα2-6Galβ1-4GlcNAcβ-sp3	1.55
	303	Neu5Gcα2-3Galβ1-4GlcNAcβ-sp3	
	304	Neu5Gcα2-6Galβ1-4GlcNAcβ-sp3	1.42
306	9-NAc-Neu5Acα2-6Galβ1-4GlcNAcβ-sp3		
315	Neu5Acα2-3Galβ1-4-(6-O-Su)GlcNAcβ-sp3	1.77	
317	Neu5Acα2-3Galβ1-3-(6-O-Su)GalNAcβ-sp3		
318	Neu5Acα2-6Galβ1-4-(6-O-Su)GlcNAcβ-sp3	1.62	
319	Neu5Acα2-3-(6-O-Su)Galβ1-4GlcNAcβ-sp3	1.00	

	321	(Neu5Ac α 2-8) ₃ -sp ₃	2.55
	323	Neu5Ac α 2-6Gal β 1-3GlcNAc-sp ₃	
	324	Neu5Ac α 2-6Gal β 1-3(6-O-Su)GlcNAc-sp ₃	
	331	Neu5Gc α 2-3Gal β 1-3GlcNAc β -sp ₃	
	421	Neu5Ac α 2-3(GalNAc β 1-4)Gal β 1-4Glc β -sp ₂	2.38
	422	Neu5Ac α 2-3Gal β 1-4GlcNAc β 1-3Gal β -sp ₃	1.86
	423	Fuc α 1-3(Neu5Ac α 2-3Gal β 1-4)GlcNAc β -sp ₃	
	426	Neu5Ac α 2-3Gal β 1-3(Fuc α 1-4)GlcNAc β -sp ₃	2.18
	428	Fuc α 1-3(Neu5Ac α 2-3Gal β 1-4)6-O-Su-GlcNAc β -sp ₃	1.96
	429	Fuc α 1-3(Neu5Ac α 2-3(6-O-Su)Gal β 1-4)GlcNAc β -sp ₃	2.12
	433	Neu5Ac α 2-3Gal β 1-3(Neu5Ac α 2-6)GalNAc α -sp ₃	
	434	Neu5Ac α 2-8Neu5Ac α 2-3Gal β 1-4Glc β -sp ₄	2.30
	527	Neu5Ac α 2-3Gal β 1-4GlcNAc β 1-3Gal β 1-4GlcNAc β -sp ₂	4.28
	528	Fuc α 1-3(Neu5Ac α 2-3Gal β 1-4)GlcNAc β 1-3Gal β -sp ₃	3.32
	529	Gal β 1-3(Neu5Ac α 2-6)GlcNAc β 1-3Gal β 1-4Glc β -sp ₄	1.98
	531	Neu5Ac α 2-8Neu5Ac α 2-3(GalNAc β 1-4)Gal β 1-4Glc-sp ₂	1.28
	532	Neu5Ac α 2-8Neu5Ac α 2-8Neu5Ac α 2-3Gal β 1-4Glc-sp ₂	1.85
	533	(Neu5Ac α 2-8) ₂ Neu5Ac α 2-3(GalNAc β 1-4)Gal β 1-4Glc-sp ₂	
	534	Neu5Ac α 2-3Gal β 1-4GlcNAc β 1-3Gal β 1-4GlcNAc β -sp ₃	3.32
	536	Neu5Ac α 2-3Gal β 1-3GlcNAc β 1-3Gal β 1-4Glc β -sp ₄	
	537	Neu5Ac α 2-3Gal β 1-4GlcNAc β 1-3Gal β 1-4Glc β -sp ₄	2.46
	627	(Sia2-6A-GN-M) ₂ -3,6-M-GN-GN β -sp ₄	2.46
	10A	Neu5Ac α 2-3Gal β 1-3(Fuc α 1-4)GlcNAc	
	10B	Neu5Ac α 2-3Gal β 1-4(Fuc α 1-3)GlcNAc	2.80
	10C	Neu5Ac α 2-3Gal β 1-3GlcNAc β 1-3Gal β 1-4Glc	
	10D	Gal β 1-4(Fuc α 1-3)GlcNAc β 1-6(Neu5Ac α 2-6Gal β 1-4GlcNAc β 1-3)Gal β 1-4Glc	
	10E	Disialyl-TF	2.10
	10H	Sialyllacto-N-fucopentaose VI (SLNFPVI)	7.56
	10K	Neu5Ac α 2-3Gal β 1-4GlcNAc	
	10L	Neu5Ac α 2-6Gal β 1-4GlcNAc	5.45
	10M	Neu5Ac α 2-3Gal β 1-3GlcNAc β 1-3Gal β 1-4Glc	4.50
	10N	Gal β 1-3(Neu5Ac α 2-6)GlcNAc β 1-3Gal β 1-4Glc	4.86
	10O	Neu5Ac α 2-6Gal β 1-4GlcNAc β 1-3Gal β 1-4Glc	
	10P	Neu5Ac α 2-3Gal β 1-3(Neu5Ac α 2-6)GlcNAc β 1-3Gal β 1-4Glc	4.01
	11A	Neu5Ac α 2-3Gal β 1-4Glc	2.85
	11B	Neu5Ac α 2-6Gal β 1-4Glc	3.14
	11C	(Neu5Ac α 2-8Neu5Ac) _n (n<50)	4.10
	11D	Neu5Ac α 2-6Gal β 1-4GlcNAc β 1-2Man α 1-6(Neu5Ac α 2-6Gal β 1-4GlcNAc β 1-2Man α 1-6)Man β 1-4GlcNAc β 1-4GlcNAc-Asn	8.73
GalNAc	4	GalNAc α -sp ₀	
	5	GalNAc α -sp ₃	
	6	GalNAc β -sp ₃	1.75
	38	3-O-Su-GalNAc α -sp ₃	
	101	GalNAc α 1-3GalNAc β -sp ₃	

	102	GalNAc α 1-3Gal β -sp3	1.29
	103	GalNAc α 1-3GalNAc α -sp3	
	104	GalNAc β 1-3Gal β -sp3	
	106	GalNAc β 1-4GlcNAc β -sp3	
	192	GalNAc β 1-4(6-O-Su)GlcNAc β -sp3	
	193	3-O-Su-GalNAc β 1-4GlcNAc β -sp3	2.38
	194	6-O-Su-GalNAc β 1-4GlcNAc β -sp3	1.00
	195	6-O-Su-GalNAc β 1-4-(3-O-Su)GlcNAc β -sp3	2.87
	196	3-O-Su-GalNAc β 1-4(3-O-Su)-GlcNAc β -sp3	
	197	3,6-O-Su ₂ -GalNAc β 1-4GlcNAc β -sp3	3.86
	198	4,6-O-Su ₂ -GalNAc β 1-4GlcNAc β -sp3	6.43
	199	4,6-O-Su ₂ -GalNAc β 1-4-(3-O-Ac)GlcNAc β -sp3	
	200	4-O-Su-GalNAc β 1-4GlcNAc β -sp3	2.18
	202	6-O-Su-GalNAc β 1-4(6-O-Su)GlcNAc β -sp3	
	204	4-O-Su-GalNAc β 1-4GlcNAc β -sp2	
	238	GalNAc β 1-4Gal β 1-4Glc β -sp3	
	389	GalNAc β 1-3Gal α Gal β 1-4Glc β -sp3	1.58
Terminal Glucose	7	Glc α -sp3	1.18
	9	Glc β -sp3	1.43
	46	6-H ₂ PO ₃ Glc β -sp4	
	110	Glc α 1-4Glc β -sp3	
	111	Glc β 1-4Glc β -sp4	1.24
	112	Glc β 1-6Glc β -sp4	
	240	(Glc α 1-4) ₃ β -sp4	1.26
	241	(Glc α 1-6) ₃ β -sp4	1.45
	390	(Glc α 1-4) ₄ β -sp4	2.29
	391	(Glc α 1-6) ₄ β -sp4	2.78
	492	(Glc α 1-6) ₅ β -sp4	2.36
	502	(Glc α 1-6) ₆ β -sp4	
Glycosaminoglycan digests (low molecular weight)	12A	Neocarratetraose-41, 3-di- <i>O</i> -sulphate (Na ⁺)	5.90
	12B	Neocarratetraose-41- <i>O</i> -sulphate (Na ⁺)	4.12
	12C	Neocarrahexaose-24,41, 3, 5-tetra- <i>O</i> -sulphate (Na ⁺)	5.07
	12D	Neocarrahexaose-41, 3, 5-tri- <i>O</i> -sulphate (Na ⁺)	3.96
	12E	Neocarraoctaose-41, 3, 5, 7-tetra- <i>O</i> -sulphate (Na ⁺)	6.38
	12F	Neocarradecaose-41, 3, 5, 7, 9-penta- <i>O</i> -sulphate (Na ⁺)	1.88
	12G	Δ UA-2S \rightarrow GlcNS-6S Na ₄ (I-S)	4.78
	12H	Δ UA \rightarrow GlucNS-6S Na ₃ (II-S)	2.36
	12I	Δ UA \rightarrow 2S-GlcNS Na ₃ (III-S)	3.38
	12J	Δ UA \rightarrow 2S-GlcNAc-6S Na ₃ (I-A)	3.59
	12K	Δ UA \rightarrow GlcNAc-6S Na ₂ (II-A)	4.30
	12L	Δ UA \rightarrow 2S-GlcNAc Na ₂ (III-A)	1.52

	12M	$\Delta\text{UA} \rightarrow \text{GlcNAc Na (IV-A)}$	3.22
	12N	$\Delta\text{UA} \rightarrow \text{GalNAc-4S Na}_2 (\Delta \text{ Di-4S})$	
	12O	$\Delta\text{UA} \rightarrow \text{GalNAc-6S Na}_2 (\Delta \text{ Di-6S})$	6.27
	12P	$\Delta\text{UA} \rightarrow \text{GalNAc-4S,6S Na}_3 (\Delta \text{ Di-disE})$	4.67
	13A	$\Delta\text{UA} \rightarrow 2\text{S-GalNAc-4S Na}_2 (\Delta \text{ Di-disB})$	3.13
	13B	$\Delta\text{UA} \rightarrow 2\text{S-GalNAc-6S Na}_3 (\Delta \text{ Di-disD})$	
	13C	$\Delta\text{UA} \rightarrow 2\text{S-GalNAc-4S-6S Na}_4 (\Delta \text{ Di-tisS})$	
	13D	$\Delta\text{UA} \rightarrow 2\text{S-GalNAc-6S Na}_2 (\Delta \text{ Di-UA2S})$	4.78
	13E	$\Delta\text{UA} \rightarrow \text{GlcNAc Na} (\Delta \text{ Di-HA})$	3.17
Glycosaminoglycans (high molecular weight)	13F	$(\text{GlcA}\beta 1-3\text{GlcNAc}\beta 1-4)_n (n=4)$	3.08
	13G	$(\text{GlcA}\beta 1-3\text{GlcNAc}\beta 1-4)_n (n=8)$	2.46
	13H	$(\text{GlcA}\beta 1-3\text{GlcNAc}\beta 1-4)_n (n=10)$	3.61
	13I	$(\text{GlcA}\beta 1-3\text{GlcNAc}\beta 1-4)_n (n=12)$	
	13J	$(\text{GlcA/IdoA}\alpha/\beta 1-4\text{GlcNAc}\alpha 1-4)_n (n=200)$	3.93
	13K	$(\text{GlcA/IdoA}\beta 1-3(\pm 4/6\text{S})\text{GalNAc}\beta 1-4)_n (n<250)$	4.61
	13L	$((\pm 2\text{S})\text{GlcA/IdoA}\alpha/\beta 1-3(\pm 4\text{S})\text{GalNAc}\beta 1-4)_n (n<250)$	4.16
	13M	$(\text{GlcA/IdoA}\beta 1-3(\pm 6\text{S})\text{GalNAc}\beta 1-4)_n (n<250)$	1.54
	13N	$(\text{GlcA}\beta 1-3\text{GlcNAc}\beta 1-4)_n (n=4)$	5.38
	13O	$(\text{GlcA}\beta 1-3\text{GlcNAc}\beta 1-4)_n (n=6)$	2.99
	13P	$(\text{GlcA}\beta 1-3\text{GlcNAc}\beta 1-4)_n (n=8)$	2.65
	14A	$(\text{GlcA}\beta 1-3\text{GlcNAc}\beta 1-4)_n (n=10)$	
	14B	$(\text{GlcA}\beta 1-3\text{GlcNAc}\beta 1-4)_n (n=12)$	2.18
	14C	$(\text{GlcA}\beta 1-3\text{GlcNAc}\beta 1-4)_n (n=14)$	
	14D	$(\text{GlcA}\beta 1-3\text{GlcNAc}\beta 1-4)_n (n=16)$	3.42
	14E	HA-30,000 Da	4.20
	14F	HA-107,000 Da	5.34
14G	HA-190,000 Da	3.75	
14H	HA-220,000 Da	3.00	
14I	HA-1,600,000 Da	1.25	
14J	Heparan Sulfate	1.69	
14K	$(\text{Glc}\beta 1-3\text{Glc}\beta 1-3)_n$	1.02	
Other	14	$\text{GlcN(Gc)}\beta\text{-sp4}$	
	15	$\text{HOCH}_2(\text{HOCH})_4\text{CH}_2\text{NH}_2$	
	20	$\text{Rha}\alpha\text{-sp3}$	1.60
	44	$\text{GlcA}\alpha\text{-sp3}$	
	45	$\text{GlcA}\beta\text{-sp3}$	1.10
	164	$\text{GlcA}\beta 1-3\text{GlcNAc}\beta\text{-sp3}$	2.55
	165	$\text{GlcA}\beta 1-3\text{Gal}\beta\text{-sp3}$	1.85
	166	$\text{GlcA}\beta 1-6\text{Gal}\beta\text{-sp3}$	5.10
	625	$(\text{GlcA}\beta 1-4\text{GlcNAc}\beta 1-3)_8\text{-NH}_2\text{-ol}$	2.93