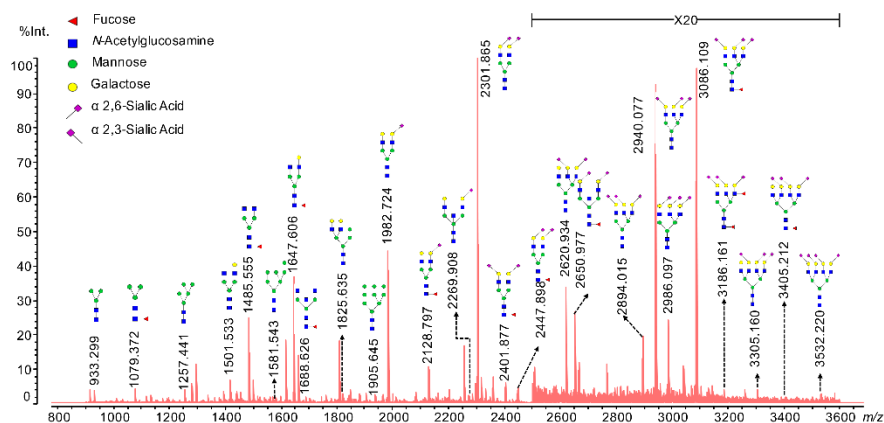
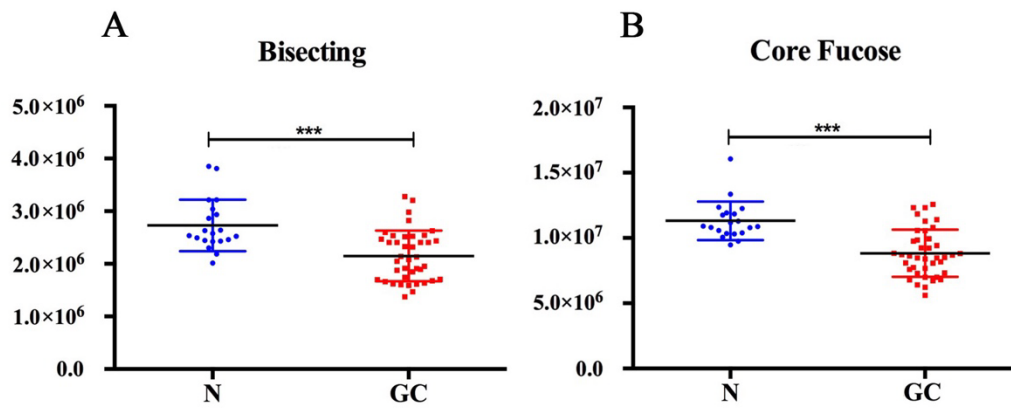


Supplementary materials

Supplementary Fig. S1. Representative MALDI-TOF spectra of serum N-glycomics profile. Representative peaks have been structurally annotated with putative structures in terms of N-acetylglucosamine, mannose, galactose, fucose, and Sialic acids. No linkage information is obtained; therefore, putative linkages are displayed.



Supplementary Fig. S2. The abundance of two great potential glyco-subclasses for GC diagnose in validation cohort. The bisecting type N-glycan (A) and core fucose (B) were significantly decreased in gastric cancer.



Supplementary Table S1 Compositions detected by reflectron positive mode MALDI-TOF-MS after ethyl esterification
H=hexose; N=*N*-acetylhexosamine; F=fucose; L= α 2,3-sialic acid; E= α 2,6-sialic acid.

Observed peaks	Input composition					Modifiers			Calculated Composition	Mass	Deviation (observed vs. calculated)	
	H	N	F	L	E	H ₂ O	Na ⁺	Ac			error (Da)	error (ppm)
<i>m/z</i>	162.05	203.08	146.06	273.08	319.13	18.01	22.99	42.01				
933.30	3	2	0	0	0	1	1	0	H3N2	933.32	-0.02	-18.29
1079.37	3	2	1	0	0	1	1	0	H3N2F1	1079.37	0.00	-2.29
1095.35	4	2	0	0	0	1	1	0	H4N2	1095.37	-0.02	-17.23
1136.41	3	3	0	0	0	1	1	0	H3N3	1136.40	0.01	12.56
1257.44	5	2	0	0	0	1	1	0	H5N2	1257.42	0.02	14.53
1282.44	3	3	1	0	0	1	1	0	H3N3F1	1282.45	-0.01	-8.04
1298.46	4	3	0	0	0	1	1	0	H4N3	1298.45	0.01	9.51
1339.48	3	4	0	0	0	1	1	0	H3N4	1339.48	0.01	4.80
1419.49	6	2	0	0	0	1	1	0	H6N2	1419.48	0.02	11.60
1444.49	4	3	1	0	0	1	1	0	H4N3F1	1444.51	-0.01	-8.38
1455.51	3	3	0	0	1	1	1	0	H3N3E1	1455.52	-0.01	-7.64
1460.51	5	3	0	0	0	1	1	0	H5N3	1460.50	0.01	7.23
1485.55	3	4	1	0	0	1	1	0	H3N4F1	1485.53	0.02	14.16
1501.53	4	4	0	0	0	1	1	0	H4N4	1501.53	0.00	3.00
1542.51	3	5	0	0	0	1	1	0	H3N5	1542.56	-0.04	-26.24
1581.54	7	2	0	0	0	1	1	0	H7N2	1581.53	0.01	9.20
1617.60	4	3	0	0	1	1	1	0	H4N3E1	1617.58	0.03	16.08
1622.56	6	3	0	0	0	1	1	0	H6N3	1622.55	0.01	5.32
1647.61	4	4	1	0	0	1	1	0	H4N4F1	1647.59	0.02	11.60

1663.58	5	4	0	0	0	1	1	0	H5N4	1663.58	0.00	1.63
1688.63	3	5	1	0	0	1	1	0	H3N5F1	1688.61	0.01	7.81
1704.60	4	5	0	0	0	1	1	0	H4N5	1704.61	0.00	-1.88
1743.59	8	2	0	0	0	1	1	0	H8N2	1743.58	0.01	7.32
1763.64	4	3	1	0	1	1	1	0	H4N3F1E1	1763.63	0.00	0.88
1779.65	5	3	0	0	1	1	1	0	H5N3E1	1779.63	0.02	13.61
1809.66	5	4	1	0	0	1	1	0	H5N4F1	1809.64	0.02	9.57
1820.67	4	4	0	0	1	1	1	0	H4N4E1	1820.66	0.02	10.05
1825.64	6	4	0	0	0	1	1	0	H6N4	1825.63	0.00	0.50
1850.68	4	5	1	0	0	1	1	0	H4N5F1	1850.67	0.01	6.09
1866.66	5	5	0	0	0	1	1	0	H5N5	1866.66	-0.01	-2.75
1905.64	9	2	0	0	0	1	1	0	H9N2	1905.63	0.01	5.69
1936.70	5	4	0	1	0	1	1	0	H5N4L1	1936.67	0.04	19.11
1941.70	6	3	0	0	1	1	1	0	H6N3E1	1941.68	0.02	11.48
1966.75	4	4	1	0	1	1	1	0	H4N4F1E1	1966.71	0.03	16.67
1982.72	5	4	0	0	1	1	1	0	H5N4E1	1982.71	0.02	8.26
2012.73	5	5	1	0	0	1	1	0	H5N5F1	2012.72	0.01	4.71
2023.78	4	5	0	0	1	1	1	0	H4N5E1	2023.73	0.05	24.47
2067.70	10	2	0	0	0	1	1	0	H10N2	2067.69	0.01	4.37
2082.78	5	4	1	1	0	1	1	0	H5N4F1L1	2082.72	0.05	24.72
2128.80	5	4	1	0	1	1	1	0	H5N4F1E1	2128.77	0.03	14.50
2158.76	5	5	2	0	0	1	1	0	H5N5F2	2158.78	-0.02	-7.00
2169.82	4	5	1	0	1	1	1	0	H4N5F1E1	2169.79	0.03	11.55
2185.80	5	5	0	0	1	1	1	0	H5N5E1	2185.79	0.01	3.96
2209.78	5	4	0	2	0	1	1	0	H5N4L2	2209.75	0.03	14.64
2227.79	5	5	0	0	1	1	1	1	H5N5E1Ac1	2227.80	0.00	-2.06
2231.78	6	6	0	0	0	1	1	0	H6N6	2231.79	-0.01	-6.56

2255.80	5	4	0	1	1	1	1	0	H5N4L1E1	2255.79	0.01	5.20
2269.91	5	5	0	0	1	1	1	2	H5N5E1Ac2	2269.81	0.10	43.77
2301.86	5	4	0	0	2	1	1	0	H5N4E2	2301.83	0.03	13.10
2331.87	5	5	1	0	1	1	1	0	H5N5F1E1	2331.85	0.02	9.98
2347.85	6	5	0	0	1	1	1	0	H6N5E1	2347.84	0.01	2.92
2355.82	5	4	1	2	0	1	1	0	H5N4F1L2	2355.81	0.01	3.25
2372.89	4	6	1	0	1	1	1	0	H4N6F1E1	2372.87	0.02	7.26
2377.85	6	6	1	0	0	1	1	0	H6N6F1	2377.85	0.00	-0.12
2401.88	5	4	1	1	1	1	1	0	H5N4F1L1E1	2401.85	0.03	10.86
2429.93	4	7	0	0	1	1	1	0	H4N7E1	2429.89	0.03	13.93
2447.90	5	4	1	0	2	1	1	0	H5N4F1E2	2447.89	0.01	2.23
2477.90	5	5	2	0	1	1	1	0	H5N5F2E1	2477.90	0.00	-0.58
2493.92	6	5	1	0	1	1	1	0	H6N5F1E1	2493.90	0.02	8.51
2504.94	5	5	0	0	2	1	1	0	H5N5E2	2504.91	0.02	8.91
2547.92	5	4	2	1	1	1	1	0	H5N4F2L1E1	2547.91	0.01	3.42
2550.89	6	6	0	0	1	1	1	0	H6N6E1	2550.92	-0.03	-12.92
2574.91	6	5	0	2	0	1	1	0	H6N5L2	2574.88	0.03	11.57
2604.96	5	5	1	1	1	1	1	0	H5N5F1L1E1	2604.93	0.03	9.82
2620.93	6	5	0	1	1	1	1	0	H6N5L1E1	2620.93	0.01	3.50
2650.98	5	5	1	0	2	1	1	0	H5N5F1E2	2650.97	0.01	1.96
2666.96	6	5	0	0	2	1	1	0	H6N5E2	2666.97	-0.01	-4.20
2720.95	6	5	1	2	0	1	1	0	H6N5F1L2	2720.94	0.01	2.05
2767.01	6	5	1	1	1	1	1	0	H6N5F1L1E1	2766.98	0.02	8.77
2813.03	6	5	1	0	2	1	1	0	H6N5F1E2	2813.02	0.00	1.29
2894.02	6	5	0	2	1	1	1	0	H6N5L2E1	2894.01	0.01	1.77
2940.08	6	5	0	1	2	1	1	0	H6N5L1E2	2940.05	0.02	8.10
2986.10	6	5	0	0	3	1	1	0	H6N5E3	2986.09	0.00	1.07

3040.09	6	5	1	2	1	1	1	0	H6N5F1L2E1	3040.07	0.02	6.65
3086.11	6	5	1	1	2	1	1	0	H6N5F1L1E2	3086.11	0.00	-0.13
3132.13	6	5	1	0	3	1	1	0	H6N5F1E3	3132.15	-0.02	-6.64
3186.16	6	5	2	2	1	1	1	0	H6N5F2L2E1	3186.13	0.04	11.00
3259.14	7	6	0	2	1	1	1	0	H7N6L2E1	3259.14	0.00	-1.01
3305.16	7	6	0	1	2	1	1	0	H7N6L1E2	3305.18	-0.02	-7.24
3405.21	7	6	1	2	1	1	1	0	H7N6F1L2E1	3405.20	0.01	3.39
3532.22	7	6	0	3	1	1	1	0	H7N6L3E1	3532.23	-0.01	-2.08

Supplementary Table S2. List of the 4 glyco-subclasses that were evaluated to be specific for EGC compared with normal controls by Receiver Operating Characteristic (ROC) Analysis.

glyco-subclass	AUC	Std.Error	0.95 CI	P value	Sensitivity%	Specificity%
bisecting	0.8484	0.05723	0.7362 to 0.9606	< 0.0001	90.32	75
hybrid	0.8129	0.06446	0.6865 to 0.9393	0.000184	93.55	65
core fucose	0.9226	0.03781	0.8485 to 0.9967	< 0.0001	77.42	90
multi- branch	0.6677	0.07488	0.5210 to 0.8145	0.04486	45.16	90

Supplementary Table S3. List of 2 great potential glyco-subclasses that were evaluated in validation cohort by Receiver Operating Characteristic (ROC) Analysis.

glyco-subclass	AUC	Std.Error	0.95 CI	P value	Sensitivity%	Specificity%
bisecting	0.8075	0.05491	0.7362 to 0.9606	0.0001	70.00	85.00
core fucose	0.8538	0.04822	0.7592 to 0.9483	< 0.0001	77.50	90.00