

The Alterations of Human Serum N-glycome in Patients with Primary and Metastatic Brain Tumors

Supplementary Information

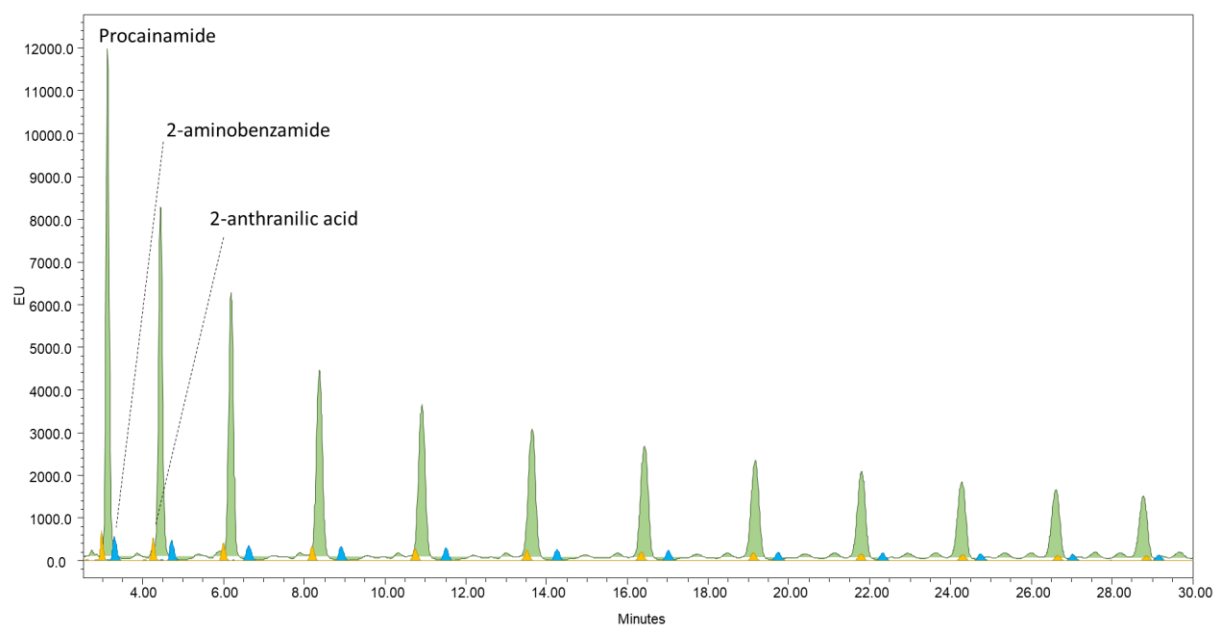
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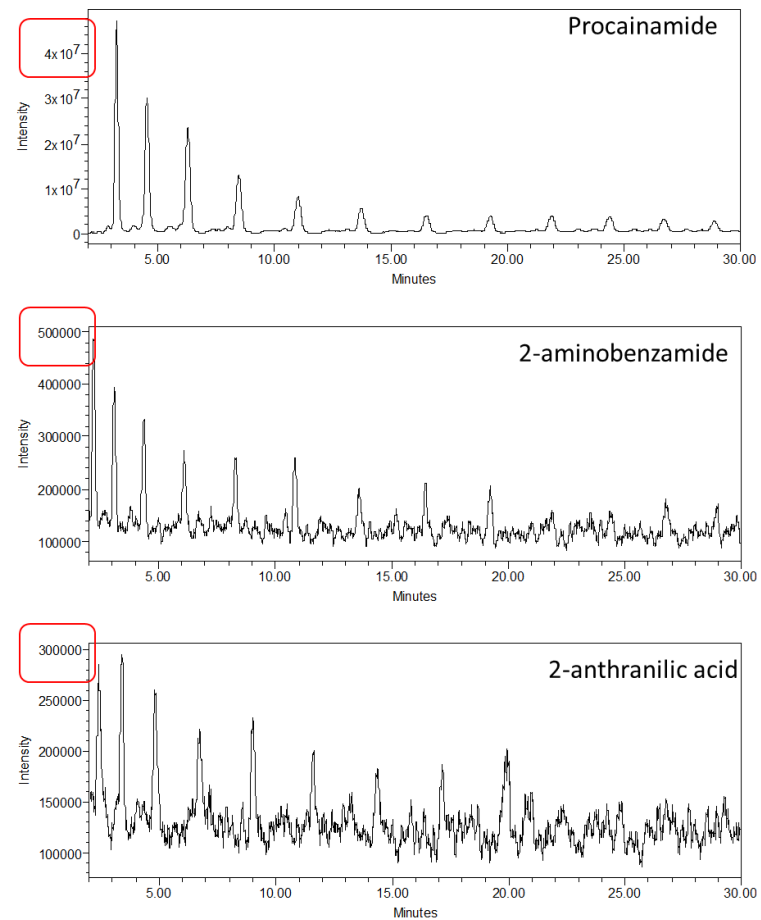
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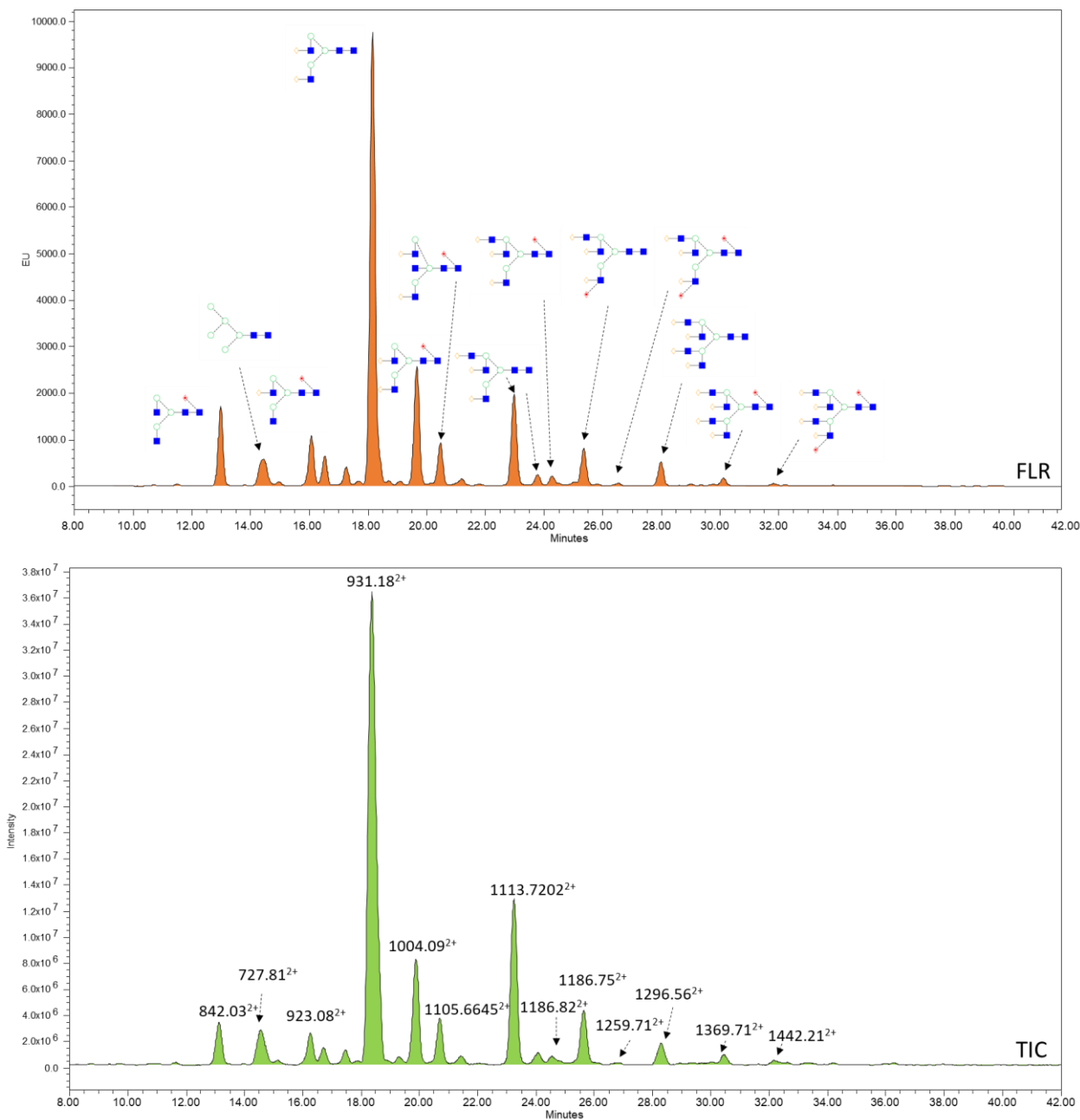
Supplementary Figure 1. Enhanced fluorescent signal intensity of procainamide labeled dextran ladder compared to 2-AB and 2-AA



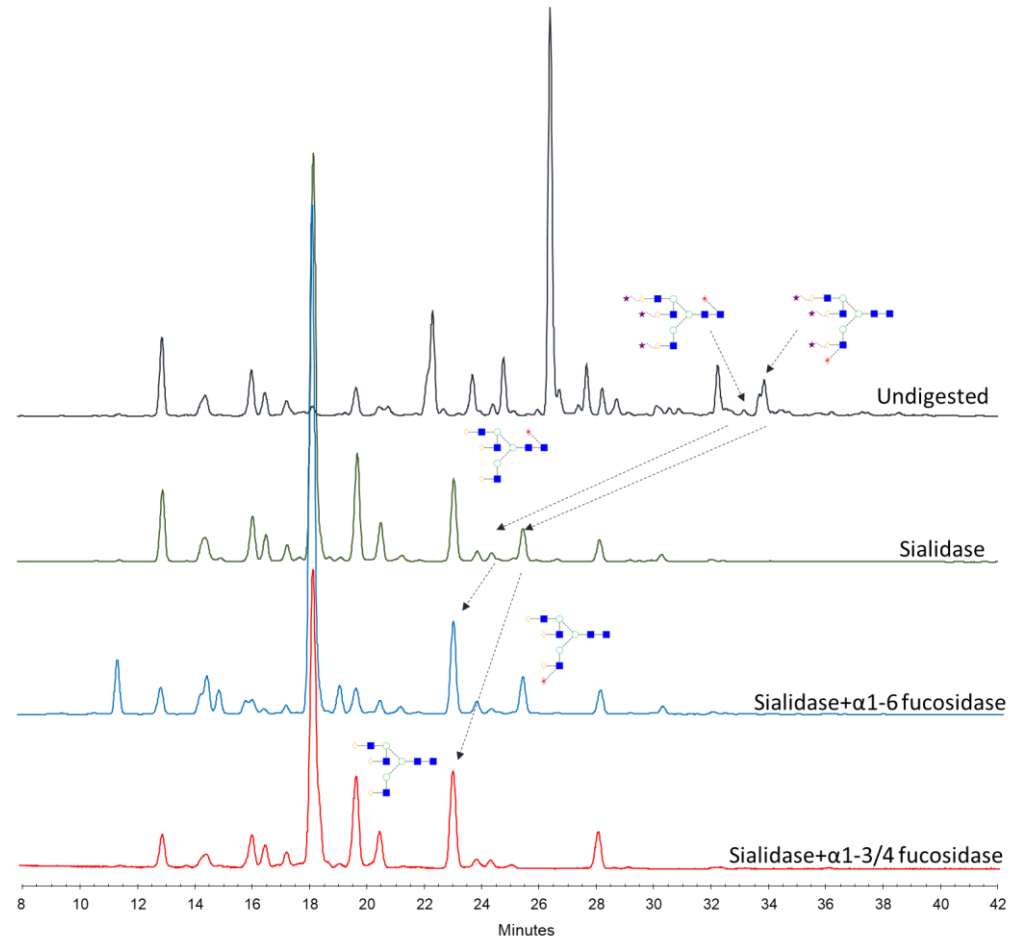
Supplementary Figure 2. Ionisation efficiency differences of procainamide, 2-AB and 2-AA labeled dextran ladders in positive MS mode



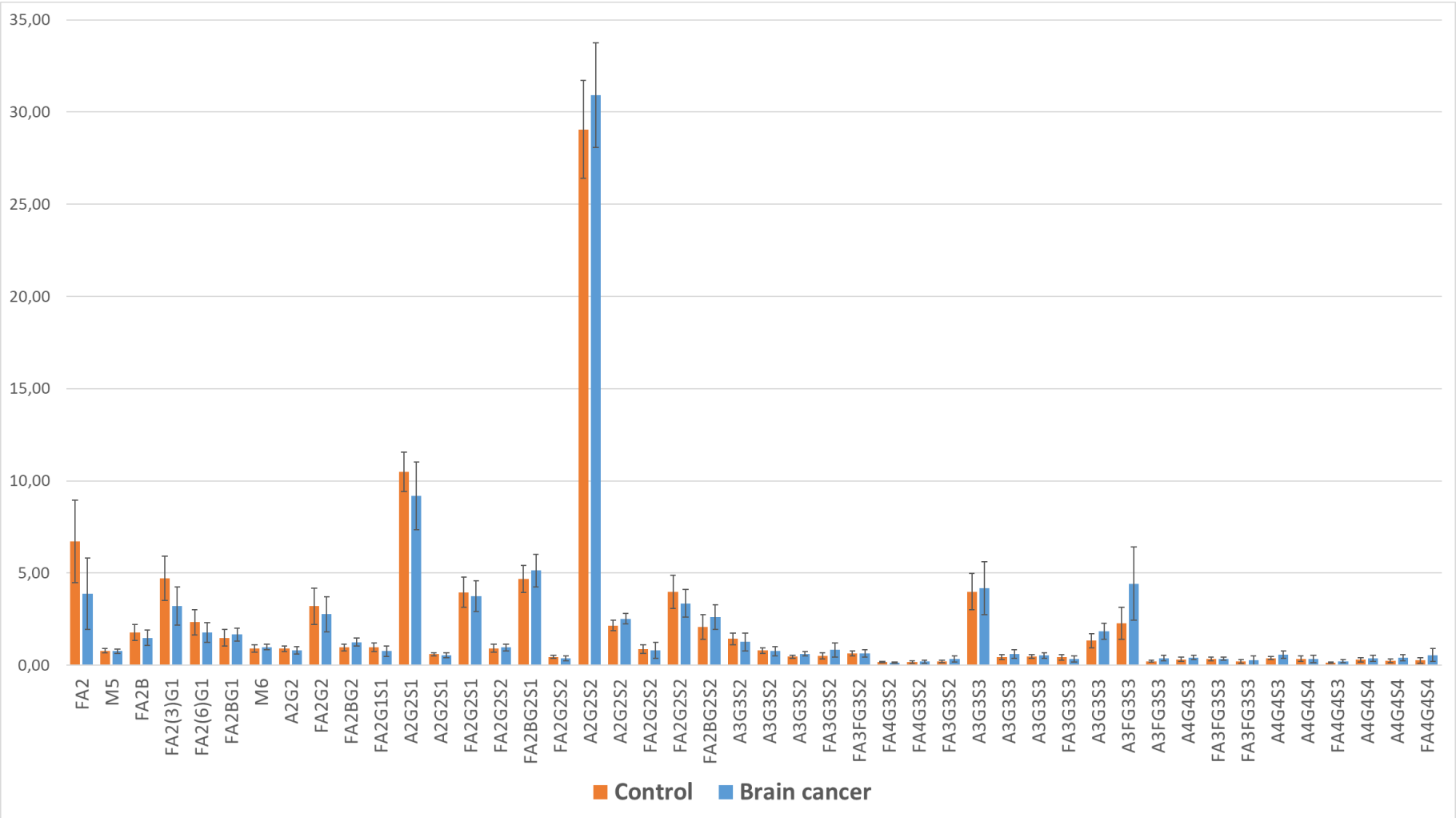
Supplementary Figure 3. Fluorescence and MS total ion chromatogram profile of sialidase digested serum N-glycome



Supplementary Figure 4: Linkage-specific fucosidase digestions of sialidase treated serum N-glycans to identify α 1-6 and α 1-3/4 linked fucose residues



Supplementary Figure 5: The main tendencies comparing healthy controls to the brain cancer patients were the higher level of bi-antennary neutral and lower level of highly sialylated structures



Supplementary Table 1: Quantified serum N-glycans in healthy controls and patients with different brain tumors (meningioma, glioblastoma, metastasis)

						Control		Meningeoma		Glioblastoma		Metastasis		
	Retention Time	Structure	Experimental m/z	Theoretical m/z	ppm	Area%_Mean	Std. Deviation	Area%_Mean	Std. Deviation	Area%_Mean	Std. Deviation	Area%_Mean	Std. Deviation	Significance (p value)
Peak1	12.76	FA2	842.03	841.94	106.30	6.71	2.23	4.72	1.82	5.00	1.73	5.72	2.34	0.02
Peak2	14.15	M5	727.81	727.88	-96.58	0.79	0.11	0.72	0.12	0.73	0.10	0.63	0.13	0.01
Peak3	14.25	FA2B	943.57	943.48	92.53	1.77	0.44	1.18	0.28	1.30	0.44	1.33	0.50	0.00
Peak4	15.83	FA2(3)G1	923.10	922.97	144.75	4.71	1.19	2.91	1.13	3.42	1.30	3.16	0.67	0.00
Peak5	16.29	FA2(6)G1	923.06	922.97	101.41	2.33	0.69	1.38	0.46	1.71	0.73	1.62	0.34	0.00
Peak6	17.04	FA2BG1	1024.57	1024.51	60.22	1.49	0.44	0.88	0.28	0.99	0.42	1.05	0.37	0.00
Peak7	17.63	M6	808.86	808.91	-57.24	0.90	0.19	0.70	0.15	0.78	0.13	0.74	0.16	0.00
Peak8	17.91	A2G2	931.07	930.96	117.41	0.89	0.14	0.83	0.22	0.89	0.16	0.73	0.18	0.06
Peak9	19.42	FA2G2	1004.09	1003.99	97.01	3.20	0.99	1.70	0.66	2.26	1.38	1.89	0.68	0.00
Peak10	20.23	FA2BG2	1105.35	1105.53	-165.08	0.96	0.19	0.71	0.16	0.78	0.29	0.80	0.21	0.00
Peak11	20.58	FA2G1S1	1068.62	1068.51	99.11	0.99	0.23	0.79	0.34	0.77	0.30	0.86	0.19	0.03
Peak12	22.10	A2G2S1	1076.63	1076.51	110.26	10.49	1.08	12.49	2.09	11.47	1.21	10.02	1.40	0.00
Peak13	22.48	A2G2S1	1076.53	1076.51	18.49	0.60	0.09	0.75	0.15	0.67	0.10	0.57	0.09	0.00
Peak14	23.48	FA2G2S1	1149.45	1149.54	-77.68	3.96	0.81	3.33	1.07	3.06	0.87	3.19	0.53	0.00
Peak15	24.22	FA2G2S2	1295.23	1295.09	106.63	0.92	0.21	0.74	0.19	0.68	0.16	0.66	0.19	0.00
Peak16	24.58	FA2BG2S1	1251.15	1251.08	55.79	4.69	0.74	4.67	0.98	4.85	1.02	4.79	0.73	0.98
Peak17	25.77	FA2G2S2	1295.30	1295.09	162.46	0.45	0.08	0.42	0.09	0.44	0.19	0.37	0.11	0.08
Peak18	26.21	A2G2S2	1222.24	1222.06	150.89	29.05	2.65	33.23	3.21	32.31	2.47	31.22	2.83	0.00
Peak19	26.52	A2G2S2	1222.25	1222.06	157.28	2.16	0.27	2.39	0.30	2.35	0.17	2.27	0.36	0.04
Peak20	27.18	FA2G2S2	1295.22	1295.09	101.77	0.88	0.25	1.03	0.33	1.40	0.30	1.61	0.46	0.00
Peak21	27.46	FA2G2S2	1295.20	1295.09	84.86	3.98	0.91	3.74	0.79	3.69	0.83	3.81	0.74	0.82
Peak22	28.02	FA2BG2S2	1396.42	1396.63	-148.86	2.08	0.66	1.79	0.49	1.39	0.43	2.48	0.56	0.00
Peak23	28.51	A3G3S2	1404.42	1404.63	-144.66	1.43	0.31	1.76	0.60	1.57	0.34	1.26	0.39	0.10
Peak24	29.90	A3G3S2	1404.44	1404.63	-130.57	0.80	0.15	0.89	0.31	0.69	0.14	0.60	0.20	0.02
Peak25	29.98	A3G3S2	1404.63	1404.63	5.84	0.47	0.08	0.54	0.11	0.44	0.14	0.46	0.12	0.15
Peak26	30.33	FA3G3S2	1477.45	1477.65	-140.63	0.50	0.17	0.64	0.31	0.75	0.43	1.00	0.33	0.00

Peak2 7	30.69	FA3FG3S 2	1550.60	1550.68	-50.88	0.63	0.14	0.72	0.22	0.72	0.19	0.64	0.21	0.46
Peak2 8	30.97	FA4G3S2	1053.19	1053.13	53.74	0.16	0.04	0.18	0.06	0.15	0.03	0.14	0.03	0.16
Peak2 9	31.15	FA4G3S2	1053.17	1053.13	37.89	0.17	0.07	0.19	0.06	0.24	0.07	0.24	0.09	0.01
Peak3 0	31.75	FA3G3S2	1477.73	1477.65	51.23	0.21	0.07	0.25	0.14	0.27	0.16	0.40	0.12	0.00
Peak3 1	32.04	A3G3S3	1033.65	1033.78	- 130.10	3.99	0.98	4.45	1.76	4.14	1.25	3.39	1.22	0.44
Peak3 2	32.32	A3G3S3	1033.69	1033.78	-95.67	0.43	0.13	0.48	0.20	0.54	0.26	0.60	0.21	0.07
Peak3 3	32.46	A3G3S3	1033.88	1033.78	92.38	0.46	0.11	0.56	0.18	0.51	0.17	0.51	0.14	0.22
Peak3 4	32.95	FA3G3S3	1082.53	1082.47	55.89	0.42	0.14	0.43	0.15	0.50	0.18	0.44	0.18	0.66
Peak3 5	33.51	A3G3S3	1033.65	1033.78	- 130.49	1.33	0.40	1.57	0.48	1.36	0.46	1.38	0.39	0.55
Peak3 6	33.65	A3FG3S3	1082.41	1082.47	-57.74	2.27	0.86	2.83	1.72	3.39	1.97	5.10	1.76	0.00
Peak3 7	33.90	A3FG3S3	1082.50	1082.47	27.71	0.21	0.05	0.26	0.14	0.28	0.13	0.39	0.15	0.00
Peak3 8	34.17	A4G4S3	1155.45	1155.50	-40.85	0.32	0.11	0.42	0.13	0.42	0.14	0.36	0.09	0.02
Peak3 9	34.26	FA3FG3S 3	1131.21	1131.16	46.77	0.35	0.10	0.38	0.09	0.37	0.11	0.39	0.08	0.30
Peak4 0	34.48	FA3FG3S 3	1131.30	1131.16	126.95	0.21	0.10	0.25	0.16	0.33	0.18	0.58	0.29	0.00
Peak4 1	35.47	A4G4S3	1155.58	1155.50	69.49	0.39	0.09	0.48	0.21	0.50	0.22	0.56	0.14	0.01
Peak4 2	36.00	A4G4S4	1252.58	1252.53	45.03	0.34	0.15	0.40	0.21	0.47	0.21	0.38	0.17	0.22
Peak4 3	36.87	FA4G4S3	1204.06	1204.18	- 102.31	0.13	0.04	0.15	0.11	0.21	0.10	0.21	0.07	0.01
Peak4 4	37.07	A4G4S4	1252.66	1252.53	106.19	0.29	0.11	0.36	0.18	0.39	0.20	0.35	0.15	0.07
Peak4 5	37.25	A4G4S4	1252.69	1252.53	127.50	0.25	0.09	0.29	0.17	0.35	0.17	0.42	0.19	0.01
Peak4 6	38.35	FA4G4S4	1301.12	1301.21	-68.01	0.26	0.14	0.41	0.32	0.48	0.29	0.72	0.38	0.00