

## Supplementary Tables

# LC-MS/MS Identification of the O-Glycosylation and Hydroxylation of Amino Acid Residues of Collagen $\alpha$ -1 (II) chain from Bovine Cartilage

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**Supplementary Table 1.** List of glycosylation sites of bovine CO2A1 protein that have been identified in 3 different studies compared to the results of this study.

Glycosylation site	Glc-Gal-HyK	Gal-HyK	HyK	Unmodified K
287	✓ <sup>a,c,d</sup>	✓ <sup>c,d</sup>	✓ <sup>d</sup>	N/D
299	✓ <sup>a,c,d</sup>	✓ <sup>a,d</sup>	✓ <sup>d</sup>	N/D
308	✓ <sup>a,c,d</sup>	✓ <sup>a,d</sup>	✓ <sup>d</sup>	N/D
374	✓ <sup>b,c,d</sup>	✓ <sup>b,d</sup>	✓ <sup>b,d</sup>	N/D
419	✓ <sup>b,c,d</sup>	✓ <sup>b,c,d</sup>	✓ <sup>b,d</sup>	N/D
452	✓ <sup>b,c,d</sup>	✓ <sup>b,c,d</sup>	✓ <sup>b,d</sup>	N/D
464	✓ <sup>b,d</sup>	✓ <sup>b,d</sup>	✓ <sup>b,d</sup>	✓ <sup>d</sup>
470	✓ <sup>b,d</sup>	✓ <sup>b,d</sup>	✓ <sup>b,d</sup>	✓ <sup>d</sup>
527	✓ <sup>b,c,d</sup>	✓ <sup>b,c,d</sup>	✓ <sup>b,d</sup>	✓ <sup>d</sup>
542	✓ <sup>b,c,d</sup>	✓ <sup>b,c,d</sup>	✓ <sup>b,d</sup>	✓ <sup>d</sup>
608	✓ <sup>c,d</sup>	✓ <sup>a,d</sup>	✓ <sup>a,d</sup>	✓ <sup>d</sup>
620	✓ <sup>c,d</sup>	✓ <sup>a,c,d</sup>	✓ <sup>a,d</sup>	✓ <sup>d</sup>
731	✓ <sup>a,c,d</sup>	✓ <sup>a,c,d</sup>	✓ <sup>a,d</sup>	✓ <sup>d</sup>
764	✓ <sup>c,d</sup>	✓ <sup>a,c,d</sup>	✓ <sup>d</sup>	✓ <sup>d</sup>
773	N/D	N/D	N/D	✓ <sup>d</sup>
803	✓ <sup>a,c,d</sup>	✓ <sup>a,c,d</sup>	✓ <sup>d</sup>	✓ <sup>d</sup>
848	✓ <sup>d</sup>	✓ <sup>d</sup>	✓ <sup>d</sup>	✓ <sup>d</sup>
857	✓ <sup>d</sup>	✓ <sup>d</sup>	✓ <sup>d</sup>	✓ <sup>d</sup>
884	✓ <sup>c,d</sup>	✓ <sup>d</sup>	✓ <sup>d</sup>	✓ <sup>d</sup>
929	✓ <sup>d</sup>	✓ <sup>d</sup>	✓ <sup>d</sup>	N/D
956	✓ <sup>c,d</sup>	✓ <sup>d</sup>	✓ <sup>d</sup>	✓ <sup>d</sup>
1055	✓ <sup>d</sup>	✓ <sup>d</sup>	✓ <sup>d</sup>	✓ <sup>d</sup>
1118	✓ <sup>d</sup>	✓ <sup>d</sup>	✓ <sup>d</sup>	N/D
1130	N/D	N/D	N/D	N/D

<sup>a</sup>. Butler & Francis *et al*,<sup>21-23</sup> <sup>b</sup>. Seyer *et al*,<sup>53</sup> <sup>c</sup>. Taga *et al*,<sup>47</sup> and <sup>d</sup>. This study

\* <sup>c</sup>. Taga *et al* have only reported the identification of glycosylated forms since they applied hydrazide chemistry based enrichment.

**Supplementary Table 2.** Lists of all modified peptide sequences used for quantitation including peptide sequence, observed  $m/z$  values, mass accuracy (ppm) and retention time (RT) associated with each modifications.

Glycosylation Site	Sequence	Glc-Gal-HyK			Gal-HyK			HyK			Unmodified K		
		Observed $m/z$	ppm	RT	Observed $m/z$	ppm	RT	Observed $m/z$	ppm	RT	Observed $m/z$	ppm	RT
K287	GFpGTPGLpGVkGHR	616.9712	1.15	19.07	562.9531	0.37	19.50	508.9358	-0.73	19.67	N/D		
	GFpGTpGLpGVkGHR	622.3024	0.23	16.55	568.2844	-0.45	16.81	514.2676	-0.73	17.22			
	GFpGTPGLpGVk	N/D			N/D			587.8090	0.36	37.65			
	GFpGTpGLpGVk	N/D			N/D			595.8071	-0.73	31.68			
K299	GYpGLDGAkGEAGApGVk GESGSPGENGSpGPMGPR	925.4091	3.34	27.03	884.8963	3.04	28.47	844.3880	-2.66	28.83	N/D		
	GYpGLDGAkGEAGApGVk GESGSPGEDGSpGPMGPR	N/D			885.1441	1.00	30.66	844.6310	0.90	30.58			
	GYpGLDGAkGEAGApGVk GESGSpGENGSpGPMGPR	929.4114	-0.52	25.67	888.8970	0.80	26.17	848.3858	-1.52	26.94			
	GYpGLDGAkGEAGApGVk GESGSpGEDGSpGPMGPR	929.6575	-0.62	27.54	889.1449	-1.33	28.38	848.6306	-0.11	29.06			
	GYpGLDGAkGEAGApGVk GESGSpGENGSpGPMGPR	933.4132	-3.81	21.09	892.8997	-3.65	21.59	852.3801	3.68	21.84			
	GYpGLDGAkGEAGApGVk GESGSpGEDGSpGPMGPR	933.6554	0.27	22.59	893.1426	-0.17	23.27	852.6287	0.63	24.13			
	GYpGLDGAkGEAGApGV(k GG)GESGSpGENGSpGPM GPR	1010.4374	-0.07	24.30	969.9250	-0.90	25.24	N/D					
	GYpGLDGAkGEAGApGV(k GG)GESGSpGEDGSpGPM GPR	1010.6834	-0.07	25.70	970.1700	0.13	26.86						
	GYpGLDGAkGEAGApGV(k G)GESGSpGENGSpGPMG PR	969.9250	-0.90	25.24	N/D								
	GYpGLDGAkGEAGApGV(k G)GESGSpGEDGSpGPMG PR	970.1700	0.13	26.86	N/D								
	GYpGLDGAkGEAGApGVk	1016.4667	-0.47	18.15	935.4372	2.81	18.57	854.4137	-1.17	19.33			
GYpGLDGAk	N/D			N/D			455.2206	-2.08	18.40				

Glycosylation Site	Sequence	Glc-Gal-HyK			Gal-HyK			HyK			Unmodified K				
		Observed m/z	ppm	RT	Observed m/z	ppm	RT	Observed m/z	ppm	RT	Observed m/z	ppm	RT		
K308	GEAGApGVkGESGSPGEDGSpGPMGPR	N/D			N/D			829.0360	-0.94	22.08	N/D				
	GEAGApGVkGESGSpGENGSpGPMGPR	942.0771	-3.21	17.49	888.0597	-3.64	17.87	834.0407	-2.21	18.08					
	GEAGApGVkGESGSpGEDGSpGPMGPR	942.4054	-3.53	18.48	888.3865	-2.28	19.11	834.3699	-3.64	19.52					
	GYpGLDGakGEAGApGVkGESGSPGENGSpGPMGPR	N/D			N/D			854.4137	-1.17	19.33					
	GYpGLDGakGEAGApGVkGESGSPGEDGSpGPMGPR							844.3880	-2.66	21.84					
	GYpGLDGakGEAGApGVkGESGSpGENGSpGPMGPR							844.6310	0.90	21.92					
	GYpGLDGakGEAGApGVkGESGSpGEDGSpGPMGPR							848.3858	-1.52	26.94					
	GYpGLDGakGEAGApGVkGESGSpGENGSpGPMGPR							848.6306	-0.11	29.06					
	GYpGLDGakGEAGApGVkGESGSpGEDGSpGPMGPR							852.3801	3.68	21.84					
	GYpGLDGakGEAGApGVkGESGSpGEDGSpGPMGPR							852.6287	0.63	24.13					
	GYpGLDGA(kG)GEAGApGVk							935.4372	2.81	18.57					
	GYpGLDGA(kG)GEAGApGVkGESGSPGENGSpGPMGPR							884.8963	3.04	28.47					
	GYpGLDGA(kG)GEAGApGVkGESGSPGEDGSpGPMGPR							885.1441	1.00	30.66					
	GYpGLDGA(kG)GEAGApGVkGESGSpGENGSpGPMGPR							969.9250	-0.90	25.24					
	GYpGLDGA(kG)GEAGApGVkGESGSpGEDGSpGPMGPR							970.1700	0.13	26.86					
GYpGLDGA(kG)GEAGApGVkGESGSpGENGSpGPMGPR	N/D							N/D			888.8970	0.80	26.17		
GYpGLDGA(kG)GEAGApGVkGESGSpGEDGSpGPMGPR											889.1449	-1.33	28.38		

Glycosylation Site	Sequence	Glc-Gal-HyK			Gal-HyK			HyK			Unmodified K		
		Observed m/z	ppm	RT	Observed m/z	ppm	RT	Observed m/z	ppm	RT	Observed m/z	ppm	RT
	GYpGLDGA(kG)GEAGApGVkGESGSpGENGSpGPmGPR	N/D						892.8997	-3.65	21.59	N/D		
	GYpGLDGA(kG)GEAGApGVkGESGSpGEDGSpGPmGPR							893.1426	-0.17	23.27			
	GYpGLDGA(kGG)GEAGApGVk							1016.4667	-0.47	18.15			
	GYpGLDGA(kGG)GEAGApGVkGESGSPGENGSpGPMGPR							925.4091	3.34	27.03			
	GYpGLDGA(kGG)GEAGApGVkGESGSpGENGSpGPMGPR	1010.4374	-0.07	24.30	969.9250	-0.90	25.24	929.4114	-0.52	25.67			
	GYpGLDGA(kGG)GEAGApGVkGESGSpGEDGSpGPMGPR	1010.6834	-0.07	25.70	970.1700	0.13	26.86	929.6575	-0.62	27.54			
	GYpGLDGA(kGG)GEAGApGVkGESGSpGENGSpGPMGPR	N/D			N/D			933.4132	-3.81	21.09			
	GYpGLDGA(kGG)GEAGApGVkGESGSpGEDGSpGPMGPR							933.6554	0.27	22.59			
K374	GNDGQpGPAGPpGPVGPAGGPGFPGApGAKGEAGPTGAR	930.6826	-0.12	36.42	890.1699	-0.69	36.93	849.6553	0.91	37.57	N/D		
	GNDGQpGPAGPpGPVGPAGGPGFPGApGAKGEAGPTGAR	930.6821	0.41	37.85	890.1693	-0.02	38.61	849.6579	-2.15	39.03			
	GNDGQpGPAGPpGPVGPAGGPGFPGApGAKGEAGPTGAR	934.6813	-0.09	34.97	894.1680	0.01	35.36	853.6544	0.47	35.99			

Glycosylation Site	Sequence	Glc-Gal-HyK			Gal-HyK			HyK			Unmodified K								
		Observed m/z	ppm	RT	Observed m/z	ppm	RT	Observed m/z	ppm	RT	Observed m/z	ppm	RT						
	GNDGQpGPAGPpGPVGP AGGPGFpGApGAKGEAGP TGAR	934.6804	0.87	36.34	N/D			N/D											
	GDDGQpGPAGPpGPVGP AGGPGFpGApGAKGEAGP TGAR	934.9276	-0.41	38.78															
	GNDGQpGPAGPpGPVGP AGGpGFpGApGAKGEAGP TGAR	938.6810	-1.13	31.13	898.1677	-1.07	31.81	857.6535	0.04	32.32	N/D								
	GNDGQpGPAGPpGPVGP AGGpGFpGApGAKGEAGP TGAR	938.6824	-2.62	33.00	898.1667	0.04	33.60	857.6534	0.15	34.12									
	GDDGQpGPAGPpGPVGP AGGpGFpGApGAKGEAGP TGAR	938.9268	-0.91	35.39	898.4138	-1.18	36.17	857.9000	-0.55	36.51									
	GNDGQpGPAGPpGPVGP AGGPGFPGApGAK	N/D			N/D			1300.1111	1.36	42.37									
	GNDGQpGPAGPpGPVGP AGGPGFpGApGAK							1308.1128	-1.89	38.53									
	GNDGQpGPAGPpGPVGP AGGpGFpGApGAK							1316.1046	2.42	34.80									
	K419	GPEGAQGPRGEpGTpGSp GPAGAAGNpGTDGlpGAK GSAGApGIAGApGFpGPR	1281.3408	0.08	38.95	1240.8229	3.67	39.88	1200.3109	2.78					40.23	N/D			
		GEpGTpGSpGPAGAAGNp GTDGlpGAKGSAGApGIAG ApGFpGPR	1068.9896	-1.24	41.42	1028.4764	-1.29	41.94	987.9631	-1.25					42.20				
GPEGAQGPRGEpGTpGSp GPAGAAGNpGTDGlpGAK		N/D			N/D			1072.8337	-1.81	20.70									
GEpGTpGSpGPAGAAGNp GTDGlpGAK								789.6943	1.22	20.37									
GEpGTpGSpGPAGAAGNp GTDGlpGAK								1192.0347	1.45	20.03									

Glycosylation Site	Sequence	Glc-Gal-HyK			Gal-HyK			HyK			Unmodified K		
		Observed m/z	ppm	RT	Observed m/z	ppm	RT	Observed m/z	ppm	RT	Observed m/z	ppm	RT
K452	GPpGPQGATGPLGPkGQT GEpGIAGFK	954.4603	1.47	36.93	900.4467	-2.89	37.85	841.0947	-0.01	38.86	N/D		
	GPpGPQGATGPLGPkGQT GEpGIAGFk	949.1299	0.17	36.51	895.1096	3.01	37.69	846.4249	1.89	38.11			
	GPpGPQGATGPLGPkGQT GEpGIAGFKGEQGPK	865.1710	0.27	30.33	824.6583	-0.42	31.00	784.1453	-0.61	32.02			
	GPpGPQGATGPLGPkGQT GEpGIAGFkGEQGPK	869.1708	-0.96	29.95	828.6561	0.80	30.62	788.1433	0.25	31.98			
	GPpGPQGATGPLGPkGQT GEpGIAGF(kG)GEQGPK	909.6833	-0.14	29.18	869.1708	-0.96	29.95	N/D	N/D	N/D			
	GPpGPQGATGPLGPkGQT GEpGIAGF(kGG)GEQGPK	946.1980	-0.38	28.85	N/D	N/D	N/D						
	GPpGPQGATGPLGPkGQT GEpGIAGF(kGG)GEQGPK	950.1942	2.29	28.43									
	GPpGPQGATGPLGPk	N/D	N/D	N/D	N/D	N/D	N/D	681.8550	-0.36	18.43			
	GppGPQGATGPLGPk							689.8516	0.88	17.24			
K464	GQTGEpGIAGFkGEQGPK	705.3309	0.27	17.41	651.3142	-1.41	18.01	597.2953	0.97	18.76	N/D		
	GQTGEpGIAGFkGEQGPK	710.6617	1.44	17.00	656.6449	0.29	17.67	602.6273	0.36	18.26			
	GQTGEpGIAGFkGEQGPK GEpGPAGPQGApGPAGEE GK	976.4493	-1.06	24.77	935.9318	3.48	37.10	N/D	N/D	N/D			
	GQTGEpGIAGFkGEQGP(k G)GEpGPAGPQGApGPAG EEGK	1016.9632	-1.71	24.18	N/D	N/D	N/D						
	GQTGEpGIAGFkGEQGP(k GG)GEpGPAGPQGApGPA GEEGK	1057.4783	-3.44	22.98									
	GQTGEpGIAGFk	N/D	N/D	N/D	N/D	N/D	N/D	597.2950	-1.84	21.03			
	GPpGPQGATGPLGPkGQT GEpGIAGFk							846.4249	1.89	38.11		841.0947	-0.01
GPpGPQGATGPLGPkGQT GEpGIAGFkGEQGPK	788.1433							0.25	31.98	784.1453	-0.61	32.02	

Glycosylation Site	Sequence	Glc-Gal-HyK			Gal-HyK			HyK			Unmodified K		
		Observed m/z	ppm	RT	Observed m/z	ppm	RT	Observed m/z	ppm	RT	Observed m/z	ppm	RT
	GPpGPQGATGPLGP(kG)G QTGEpGIAGFk							895.1096	3.01	37.69	900.4467	-2.89	37.85
	GPpGPQGATGPLGP(kG)G QTGEpGIAGFkGEQGPk				869.1708	-0.96	29.95	828.6561	0.80	30.62	824.6583	-0.42	31.00
	GPpGPQGATGPLGP(kGG) GQTGEpGIAGFk				N/D			949.1299	0.17	36.51	954.4603	1.47	36.93
	GPpGPQGATGPLGP(kGG) GQTGEpGIAGFkGEQGPk	950.1958	0.60	28.43	909.6833	-0.14	29.18	869.1708	-0.96	29.95	865.1710	0.27	30.33
	GPpGPQGATGPLGP(kGG) GQTGEpGIAGFkGEQGPk	946.2000	-2.49	28.85	N/D			N/D			N/D		
K470	GEQGPkGEpGPAGPQGAp GPAGEEGK	910.0754	-1.14	15.97	856.0572	-0.51	16.15	802.0389	0.31	16.43	N/D		
	GEQGPkGEpGPAGPQGAp GPAGEEGKR	721.8353	-3.18	14.84	681.3220	-3.22	15.07	640.8088	-3.44	14.72			
	GPpGPQGATGPLGPkGQT GEpGIAGFKGEQGPk							784.1453	-0.61	32.02			
	GPpGPQGATGPLGPkGQT GEpGIAGFKGEQGPk							788.1433	0.25	31.98			
	GPpGPQGATGPLGPkGQT GEpGIAGFKGEQGPk							824.6583	-0.42	31.00			
	GPpGPQGATGPLGPkGQT GEpGIAGFKGEQGPk							828.6561	0.80	30.62			
	GPpGPQGATGPLGP(kG)G QTGEpGIAGF(kG)GEQGP k			N/D			N/D	869.1708	-0.96	29.95			
	GPpGPQGATGPLGP(kGG) GQTGEpGIAGFKGEQGPk							865.1710	0.27	30.33			
	GPpGPQGATGPLGP(kGG) GQTGEpGIAGFKGEQGPk							869.1708	-0.96	29.95			
	GPpGPQGATGPLGP(kGG) GQTGEpGIAGF(kG)GEQGP Pk							909.6833	-0.14	29.18			



Glycosylation Site	Sequence	Glc-Gal-HyK			Gal-HyK			HyK			Unmodified K					
		Observed m/z	ppm	RT	Observed m/z	ppm	RT	Observed m/z	ppm	RT	Observed m/z	ppm	RT			
	GPpGPQGATGPLGP(kGG)GQTGEpGIAGF(kGG)GEQGPk							950.1942	2.29	28.43	946.2000	-2.49	28.85			
	GQTGEpGIAGFkGEQGPk							602.6273	0.36	18.26	597.2953	0.97	18.76			
	GQTGEpGIAGF(kG)GEQGPk							656.6449	0.29	17.67	651.3142	-1.41	18.01			
	GQTGEpGIAGF(kGG)GEQGPk							710.6617	1.44	17.00	705.3309	0.27	17.41			
	GQTGEpGIAGF(kG)GEQGPkGEpGPAGPQGAPpGPAGEEGK							935.9318	3.48	37.10	N/D					
	GQTGEpGIAGF(kGG)GEQGPkGEpGPAGPQGAPpGPAGEEGK	1057.4783	-3.44	22.98	1016.9632	-1.71	24.18	976.4493	-1.06	24.77						
K527	GFpGQDGLAGPkGAPGER	689.6556	0.28	23.40	635.6378	0.62	24.40	N/D			N/D					
	GFpGQDGLAGPkGApGER	1041.9760	1.18	20.42	960.9507	0.13	21.26	879.9239	0.58	21.75						
	GFpGQDGLAGPkGApGERGPSGLAGPK	949.7926	0.98	29.40	895.7766	-0.05	29.99	841.7577	0.73	30.41						
	GFpGQDGLAGPk							588.2888	-0.25	24.94		580.2916	-0.70	25.62		
	GApGNRGFpGQDGLAGPk	N/D			N/D			N/D				576.6209	-0.38	18.85		
	GApGDRGFpGQDGLAGPk	N/D			N/D			N/D				576.9482	0.84	22.20		
K542	GApGERGPSGLAGPkGANGDpGRpGEpGLpGAR	857.4053	0.99	15.33	N/D			N/D			N/D					
	GApGERGPSGLAGPkGADGDpGRpGEpGLpGAR	857.6525	-0.41	16.58	813.1399	0.39	18.85									
	GPSLAGPkGADGDpGRpGEpGLpGAR	938.1123	0.89	21.12	884.0952	0.38	21.53									
	GPSLAGPkGANGDpGRpGEpGLpGAR	943.1150	1.88	17.24	889.0993	-0.15	17.76					835.0817	-0.17	17.93		
	GPSLAGPkGADGDpGRpGEpGLpGAR	943.4453	-0.56	18.76	889.4262	1.09	19.53					835.4095	0.07	20.13		

Glycosylation Site	Sequence	Glc-Gal-HyK			Gal-HyK			HyK			Unmodified K		
		Observed m/z	ppm	RT	Observed m/z	ppm	RT	Observed m/z	ppm	RT	Observed m/z	ppm	RT
	GPSGLAGP <b>k</b> GANGD <b>p</b> GR <b>p</b> GE <b>p</b> GL <b>p</b> GAR	948.4490	-0.63	15.58	894.4300	0.90	15.84	840.4134	-0.25	16.17			
	GPSGLAGP <b>k</b> GADGD <b>p</b> GR <b>p</b> GE <b>p</b> GL <b>p</b> GAR	948.7755	0.96	16.92	894.7593	-0.55	17.24	840.7413	-0.12	17.59			
	GF <b>p</b> GGQDGLAGP <b>k</b> GAPGER GPSGLAGP <b>k</b>										841.7577	0.73	30.41
	GF <b>p</b> GGQDGLAGP( <b>kG</b> )GAPGER ERGPSGLAGP <b>k</b>		N/D			N/D			N/D		895.7766	-0.05	29.99
	GF <b>p</b> GGQDGLAGP( <b>kGG</b> )GAPGER GERGPSGLAGP <b>k</b>										949.7926	0.98	29.40
K608	GQ <b>p</b> GVMGF <b>p</b> GP <b>k</b> GADGEPGK		N/D		698.3197	2.96	26.90		N/D				
	GQ <b>p</b> GVMGF <b>p</b> GP <b>k</b> GANGEPGK	757.3408	2.91	18.41	703.3246	1.14	18.92	649.3071	1.07	19.53			
	GQ <b>p</b> GVMGF <b>p</b> GP <b>k</b> GAI <b>D</b> GEPGK	757.6685	3.31	21.21	703.6533	0.15	22.20	649.6359	-0.16	23.48			
	GQ <b>p</b> GVMGF <b>p</b> GP <b>k</b> GADGEPGK	757.6715	-0.65	22.79	703.6532	0.29	23.74	649.6353	0.76	24.68		N/D	
	GQ <b>p</b> GVMGF <b>p</b> GP <b>k</b> GADGEPGK	762.9992	4.52	16.13	708.6550	3.30	15.72		N/D				
	GQ <b>p</b> GVMGF <b>p</b> GP <b>k</b> GADGEPGKAGEK	886.0673	2.75	17.08	832.0504	2.09	17.71	778.0345	0.04	17.97			
	GQ <b>p</b> GVMGF <b>p</b> GP <b>k</b> GADGEPGKAGE <b>k</b>	891.3981	3.68	16.91	837.3870	-3.85	17.35	783.3637	3.15	17.89			
	GQ <b>p</b> GVMGF <b>p</b> GP <b>k</b>		N/D			N/D		610.2926	0.43	28.51	602.30	2.01	29.02
K620	AGE <b>k</b> GLPGAPGLR	521.6028	-1.05	18.40	467.5838	1.82	19.25	413.5665	0.38	19.33			
	AGE <b>k</b> GLPGAPGLR	526.9332	1.31	16.23	472.9162	0.19	16.55	418.9005	-4.35	16.64			
	AGE <b>k</b> GL <b>p</b> GAPGLR	532.2652	0.62	15.05	478.2478	0.26	15.30	424.2300	0.75	15.47			
	GADGEPGKAGE <b>k</b> GLPGAPGLR	764.0415	-1.72	17.50		N/D			N/D			N/D	
	GANGEPGKAGE <b>k</b> GL <b>p</b> GAPGLR	769.0427	1.48	14.83	715.0268	-0.81	15.00	661.0110	-3.60	15.25			

Glycosylation Site	Sequence	Glc-Gal-HyK			Gal-HyK			HyK			Unmodified K		
		Observed m/z	ppm	RT	Observed m/z	ppm	RT	Observed m/z	ppm	RT	Observed m/z	ppm	RT
	GADGEpGKAGEkGLpGAPGLR	769.3725	-0.86	15.50	715.3540	0.31	15.84	661.3371	-0.72	16.26			
	GADGEpGKAGEkGLpGAPGLR	774.7035	-0.03	14.83	720.6838	2.86	14.92	666.6688	-0.81	15.08			
	GQpGVMGFpGpKADGEpGKAGEk							783.3637	3.15	17.89	778.0345	0.04	17.97
	GQpGVMGFpGP(kG)ADGEpGKAGEk		N/D			N/D		837.3870	-3.85	17.35	832.0504	2.09	17.71
	GQpGVMGFpGP(kGG)ADGEpGKAGEk							891.3981	3.68	16.91	886.0673	2.75	17.08
K731	GLpGTPGTDGpKGAAGPAGPpGAQGPpGLQGMpGER	1203.5580	2.30	41.56	1149.5472	-3.50	42.16	1095.5287	-2.86	42.67			
	GLpGTPGTDGpKGAAGPAGPpGAQGPpGLQGMpGER	1208.8917	0.59	39.33	1154.8745	0.27	40.44	1100.8575	-0.27	40.96		N/D	
	GLpGTPGTDGpKGAAGPAGPpGAQGPpGLQGMpGER	1214.2234	0.54	36.51	1160.2040	2.11	37.19	1106.1854	3.10	37.69			
	GLpGTPGTDGpK		N/D			N/D		572.7765	2.90	15.00	564.7807	0.01	15.00
K764	GAAGIAGPkGDRGDVGEK	499.4916	4.40	19.15	458.9789	3.69	19.38	418.4658	3.79	19.57	414.4683	0.87	19.82
	GAAGIAGPkGDR		N/D			N/D		543.2901	-2.13	17.76		N/D	
K773	GDRGDVGEkGPEGAPGK										542.5997	2.95	16.76
	GDRGDVGEkGPEGApGK										547.9323	1.17	15.56
	GDVGEkGPEGAPGK										433.2192	-2.53	16.96
	GDVGEkGPEGApGK										438.5509	-2.64	16.55
	GDVGEkGPEGAPGKDGGRR		N/D			N/D					561.6068	2.97	16.60
	GDVGEkGPEGApGKDGGRR										566.9395	1.07	15.98
	GAAGIAGPKGDRGDVGEk										414.4683	0.87	19.82
	GAAGIAGPkGDRGDVGEk										418.4658	3.79	19.57

Glycosylation Site	Sequence	Glc-Gal-HyK			Gal-HyK			HyK			Unmodified K			
		Observed m/z	ppm	RT	Observed m/z	ppm	RT	Observed m/z	ppm	RT	Observed m/z	ppm	RT	
	GAAGIAGP( <b>kG</b> )GDRGDV <b>E</b> <b>k</b>										458.9789	3.69	19.38	
	GAAGIAGP( <b>kGG</b> )GDRGDV <b>G</b> <b>E</b> <b>k</b>										499.4916	4.40	19.15	
K803	GLTGPIGPPGPAGANG <b>E</b> <b>k</b> <b>G</b> EVGP <b>p</b> GPAGTAGAR							966.1584	-1.40	36.42	N/D			
	GLTGPIGPPGPAGAI <b>D</b> <b>G</b> <b>E</b> <b>k</b> GEVGP <b>p</b> GPAGTAGAR	N/D			N/D			966.4859	-0.88	38.86				
	GLTGPIGPPGPAGAD <b>G</b> <b>E</b> <b>k</b> <b>G</b> EVGP <b>p</b> GPAGTAGAR							966.4858	-0.78	40.74				
	GLTGPIG <b>p</b> GPAGANG <b>E</b> <b>k</b> <b>G</b> EVGP <b>p</b> GPAGTAGAR	1079.5249	-1.06	34.71	1025.5063	-0.14	35.48	971.4889	-0.22	36.08				
	GLTGPIG <b>p</b> GPAGAI <b>D</b> <b>G</b> <b>E</b> <b>k</b> GEVGP <b>p</b> GPAGTAGAR	1079.8521	-0.18	36.85	1025.8345	-0.20	37.52	971.8164	0.30	38.28				
	GLTGPIG <b>p</b> GPAGAD <b>G</b> <b>E</b> <b>k</b> <b>G</b> EVGP <b>p</b> GPAGTAGAR	1079.8518	0.09	38.36				971.8162	0.50	39.97				
	GLTGPIG <b>p</b> GPAGAI <b>D</b> <b>G</b> <b>E</b> <b>k</b> GEVGP <b>p</b> GPAGTAGAR	1085.1860	-2.27	34.03										
	GLTGPIG <b>p</b> GPAGAD <b>G</b> <b>E</b> <b>k</b> <b>G</b> EVGP <b>p</b> GPAGTAGAR	1085.1848	-1.16	35.39	1031.1624	3.42	36.25							
	GLTGPIG <b>p</b> GPAGANG <b>E</b> <b>k</b>							811.4140	-1.04	27.41		803.4161	-0.50	27.67
	GLTGPIG <b>p</b> GPAGAI <b>D</b> <b>G</b> <b>E</b> <b>k</b>	N/D						811.9060	-1.03	30.11		803.9083	-0.74	31.98
	GLTGPIG <b>p</b> GPAGAD <b>G</b> <b>E</b> <b>k</b>							811.9064	-1.53	31.47				
	K848	GETGP <b>p</b> GPAGFAG <b>p</b> GPAD GQPGAI <b>k</b> GEQGEAGQ <b>k</b>	1116.1705	-3.61	31.22	1062.1523	-3.24	32.23	1008.1351	-3.82		33.03	N/D	
GETGP <b>p</b> GPAGFAG <b>p</b> GPAD GQ <b>p</b> GAI <b>k</b> GEQGEAGQ <b>k</b>		1121.5005	-2.14	29.42	1067.4832	-2.53	30.01	1013.4656	-2.68	30.32				
GETGP <b>p</b> GPAGFAG <b>p</b> GPAD GQPGAI <b>k</b> GEQGEAGQ <b>k</b>		1121.5024	-3.83	31.03	1067.4834	-2.72	31.22	1013.4659	-2.97	32.63				
GETGP <b>p</b> GPAGFAG <b>p</b> GPAD GQ <b>p</b> GAI <b>k</b> GEQGEAGQ <b>k</b>		1126.8326	-2.54	29.01	1072.8142	-1.92	29.60	1018.7975	-2.92	30.01				
GAPGERGETGP <b>p</b> GPAGFA GP <b>p</b> GADGQPGAI <b>k</b>		N/D						907.7529	2.78	25.02	902.4232	0.65		25.37

Glycosylation Site	Sequence	Glc-Gal-HyK			Gal-HyK			HyK			Unmodified K			
		Observed m/z	ppm	RT	Observed m/z	ppm	RT	Observed m/z	ppm	RT	Observed m/z	ppm	RT	
	GApGERGETGPpGPAGFAGPpGADGQpGAK							913.0870	0.07	22.62	907.7544	1.13	22.87	
	GETGPpGPAGFAGPpGADGQpGAK							713.3334	-3.39	38.50	707.9988	1.62	38.23	
	GETGPpGPAGFAGPpGADGQpGAK							718.6655	-3.17	35.16	713.3340	-2.55	35.57	
K857	GEQGEAGQkGDAGApGPQGPSGApGPQGPTGVTGPK	1190.2136	-2.39	26.08	1136.1960	-2.50	26.69	1082.1779	-2.17	27.10	N/D			
	GEQGEAGQkGDAGApGPQGPSGApGPQGPTGVTGPK	1195.5427	-0.25	25.04	1141.5268	-1.75	25.46	1087.5093	-1.94	26.08				
	GEQGEAGQkGDAGApGPQGPSGApGPQGPTGVTGPK(kGG)GAR	1048.9772	-2.01	19.71	1008.4650	-3.08	19.91	N/D						
		GETGPpGPAGFAGPpGADGQpGAKGEQGEAGQk							1013.4659	-2.97	32.63	1008.1351	-3.82	33.03
		GETGPpGPAGFAGPpGADGQpGAKGEQGEAGQk							1018.7975	-2.92	30.01	1013.4656	-2.68	30.32
		GETGPpGPAGFAGPpGADGQPGA(kG)GEQGEAGQk							1067.4834	-2.72	31.22	1062.1523	-3.24	32.23
		GETGPpGPAGFAGPpGADGQpGA(kG)GEQGEAGQk		N/D			N/D		1072.8142	-1.92	29.60	1067.4832	-2.53	30.01
	GETGPpGPAGFAGPpGADGQPGA(kGG)GEQGEAGQk							1121.5024	-3.83	31.03	1116.1705	-3.61	31.22	
	GETGPpGPAGFAGPpGADGQpGA(kGG)GEQGEAGQk							1126.8326	-2.54	29.01	1121.5005	-2.14	29.42	
K884	GEQGEAGQkGDAGApGPQGPSGApGPQGPTGVTGPKGAR	963.9534	-3.57	16.39	923.4373	-0.59	16.72	N/D			N/D			

Glycosylation Site	Sequence	Glc-Gal-HyK			Gal-HyK			HyK			Unmodified K								
		Observed m/z	ppm	RT	Observed m/z	ppm	RT	Observed m/z	ppm	RT	Observed m/z	ppm	RT						
	GEQGEAGQ <b>k</b> GDAGApGP QGPSGApGPPQGPTGVTGP <b>k</b> GAR	967.9489	-0.22	16.14	927.4380	-2.72	16.47												
	GEQGEAGQ( <b>kGG</b> )GDAGAp pGPPQGPSGApGPPQGPTGV TGP <b>k</b> GAR	1048.9772	-2.01	19.71	N/D														
	GEQGEAGQ( <b>kG</b> )GDAGAp GPQGPSGApGPPQGPTGVT GP <b>k</b> GAR	1008.4650	-3.08	19.91															
	GDAGApGPPQGPSGApGP QGPTGVTGP <b>k</b> GAR	990.1309	0.10	18.23	936.1132	0.21	18.66	787.3779	-2.56	30.84									
	GEQGEAGQ <b>k</b> GDAGApGP QGPSGApGPPQGPTGVTGP <b>k</b>	N/D			N/D			1087.5093	-1.94	26.08					1082.1779	-2.17	27.10		
	GEQGEAGQ( <b>kG</b> )GDAGAp GPQGPSGApGPPQGPTGVT GP <b>k</b>							1141.5268	-1.75	25.46					1136.1960	-2.50	26.69		
	GEQGEAGQ( <b>kGG</b> )GDAGAp pGPPQGPSGApGPPQGPTGV TGP <b>k</b>							1195.5427	-0.25	25.04					1190.2136	-2.39	26.08		
K929	VGPpGSDGNpGppGPPGP SGKDGP <b>k</b> GAR	970.7800	-0.06	21.82	916.7634	-1.15	22.10	857.4141	-1.17	22.66	N/D								
	VGPpGSI <b>D</b> GNpGppGPPG PSGKDGP <b>k</b>	N/D			911.0986	4.51	21.71	768.0280	-4.12	25.02									
	VGPpGSDGNpGppGPPGP SGKDGP <b>k</b>				911.4334	-2.95	21.71												
K956	AGDpGLQGPAGPPGE <b>k</b> GE PGDDGSPGDGPpGPQGL AGQR	N/D			964.1921	-1.39	40.91	923.6767	0.53	40.10	919.6786	0.24	41.25						
	AGDpGLQGPAGPpGE <b>k</b> GE PGDDGSPGDGPpGPQGL AGQR				1008.7021	0.34	38.66	968.1893	-0.06	39.08	927.6749	1.23	39.76	923.6775	0.05	39.17			

Glycosylation Site	Sequence	Glc-Gal-HyK			Gal-HyK			HyK			Unmodified K		
		Observed m/z	ppm	RT	Observed m/z	ppm	RT	Observed m/z	ppm	RT	Observed m/z	ppm	RT
	AGD <b>p</b> GLQGPAG <b>p</b> GE <b>k</b> GE <b>p</b> GDDG <b>p</b> SGPDG <b>p</b> GPQGL AGQR	1012.7044	-3.07	36.55	972.1844	3.80	36.89	931.6742	0.75	37.32	927.6756	0.47	37.65
	AGD <b>p</b> GLQGPAG <b>p</b> GE <b>k</b> GE <b>p</b> GDDG <b>p</b> SGPDG <b>p</b> GPQGL AGQR	N/D			976.1900	-3.14	34.37	N/D			N/D		
	AGD <b>p</b> GLQGPAG <b>p</b> GE <b>k</b>	N/D			N/D			740.3579	-0.06	16.34	732.3578	3.54	17.84
	AGD <b>p</b> GLQGPAG <b>p</b> GE <b>k</b>	N/D			N/D			748.3542	1.48	16.26	N/D		
K1055	EGS <b>p</b> GADG <b>p</b> GRDGAAGV <b>k</b> GDR	599.5180	0.14	17.00	559.0040	1.58	17.27	518.4912	0.94	17.54	514.4920	1.61	17.82
	DGAAGV <b>k</b> GDRGETGAVGA PGAPG <b>p</b> GS <b>p</b> GPAGPIGK	N/D			N/D			782.6407	0.57	25.02	N/D		
	DGAAGV <b>k</b> GDRGETGAVGA <b>p</b> GAPG <b>p</b> GS <b>p</b> GPAGPIGK	N/D			827.1528	0.34	24.18	786.6400	-0.16	24.60	N/D		
	DGAAGV <b>k</b> GDRGETGAVGA <b>p</b> GAPG <b>p</b> GS <b>p</b> GPAGPIGK	871.6643	0.77	21.01	831.1508	1.17	21.67	790.6381	0.59	22.25	786.6398	-0.11	22.76
	EGS <b>p</b> GADG <b>p</b> GRDGAAGV <b>k</b>	N/D			N/D			N/D			432.4545	2.87	17.82
K1118	GM <b>p</b> GPQGPRGD <b>k</b> GETGE AGER	610.5205	-0.69	19.29	570.0060	1.54	19.40	529.4940	-0.60	19.59	N/D		
	GD <b>k</b> GETGEAGER	N/D			N/D			407.8509	-2.11	15.59	N/D		

\*All modified amino acid residues are written as lowercase. Glycosylation sites are in bold red while hydroxyproline, hydroxylysine, and oxidized methionine are in bold black. Bold G is Gal moiety while bold GG is Glc-Gal moiety attached to hydroxy lysine residue.

\*\* Every modified peptide sequences were supported by MS/MS.