

Supplementary Information

Implementing visible 473 nm photo-dissociation in a Q-Exactive mass spectrometer: towards specific detection of cysteine-containing peptides

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XIC= 671.82 m/z (AVMDDFAAFVEK)

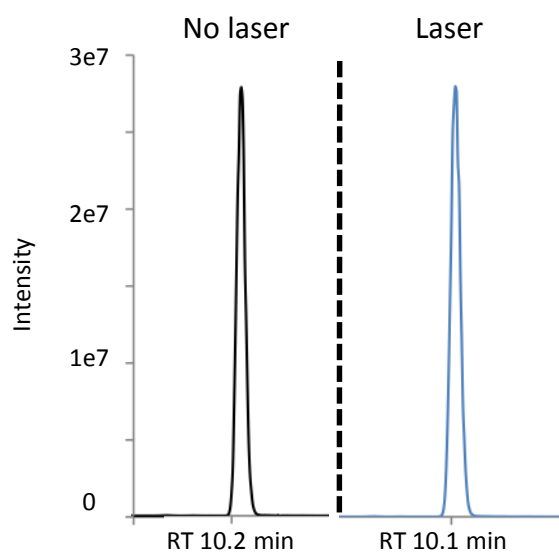


Figure S1: Extracted chromatogram of the doubly protonated AVMDDFAAFVEK m/z 671.82, with (blue) or without (black) laser.

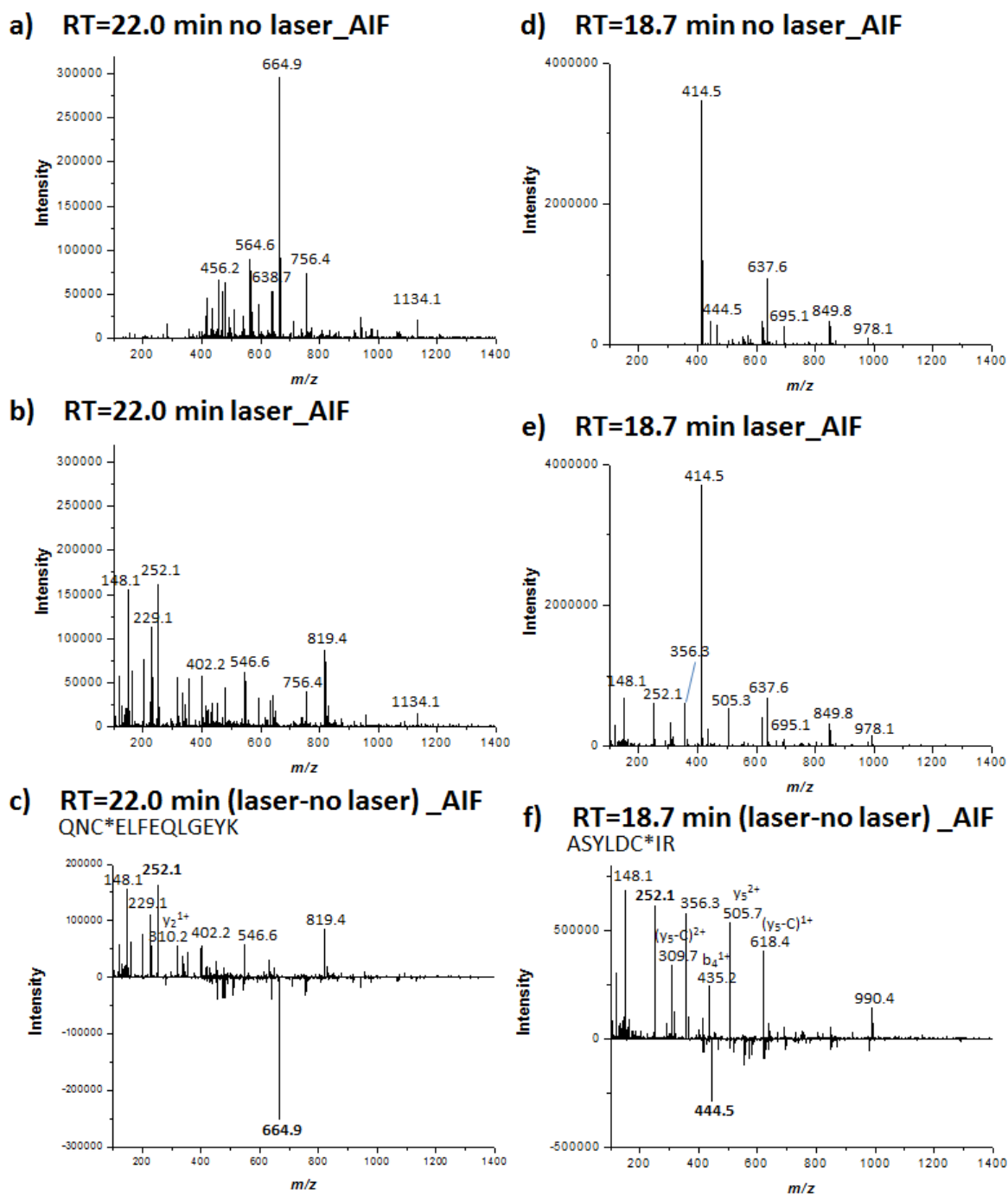
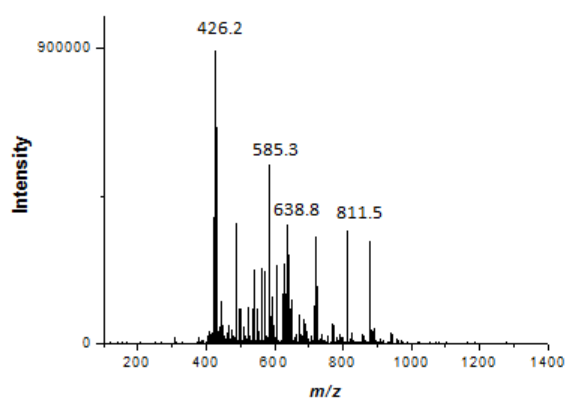
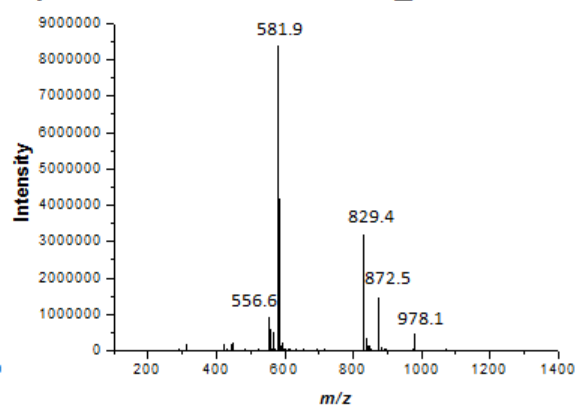


Figure S2. AIF spectra at RT= 22.0 min a) without laser and b) with laser. c) Subtract laser-no laser AIF spectrum at RT= 22.0 min. AIF spectra at RT= 18.7 min d) without laser and d) with laser. f) Subtract laser-no laser AIF spectrum at RT= 18.7 min.

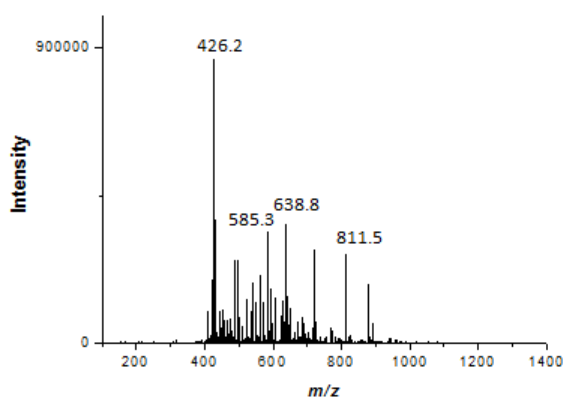
a) RT=1.9 min no laser_AIF



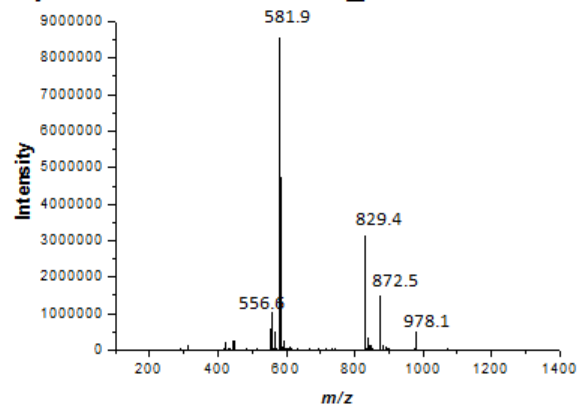
d) RT=17.9 min no laser_AIF



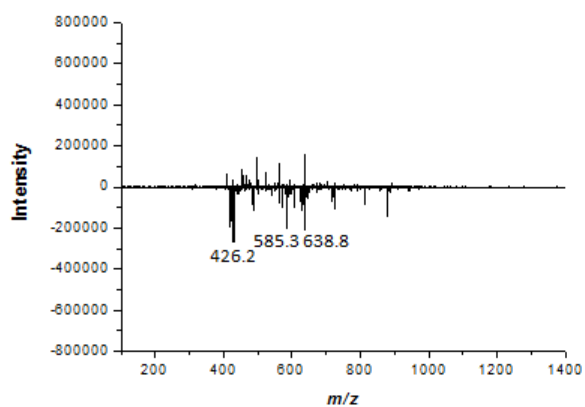
b) RT=1.9 min laser_AIF



e) RT=17.9 min laser_AIF



c) RT=1.9 min (laser-no laser)_AIF



f) RT=17.9 min (laser-no laser)_AIF

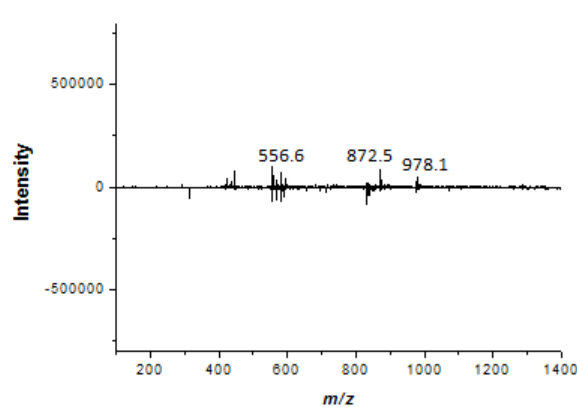


Figure S3. AIF spectra at RT= 1.9 min a) without laser and b) with laser. c) Subtract laser-no laser AIF spectrum at RT= 1.9 min. AIF spectra at RT= 17.9 min d) without laser and d) with laser. f) Subtract laser-no laser AIF spectrum at RT= 17.9 min.

Table S1:

Peptides and proteins identified in the 3 protein mixture by CID.

m/z	charge	DB Peptide	Variable Modification	Cysteine	Score	Expectation value	Protein Name
714.8293	2	FESNFNTQATNR		0	45.1	1.90E-10	Lysozyme C
440.7248	2	AEFAEVSK		0	30	4.60E-06	Serum albumin
613.8086	2	FKDLGEENFK		0	35.6	2.70E-07	Serum albumin
820.4739	2	KVPQVSTPTLVEVSR		0	53.7	8.30E-10	Serum albumin
746.384	2	SKEFQLFSSPHGK		0	42.1	6.30E-11	Serotransferrin
598.2813	2	DSGFQMNQLR		0	36.8	1.20E-07	Serotransferrin
575.3112	2	LVNEVTEFAK		0	42.1	1.70E-08	Serum albumin
564.8529	2	KQTALVELVK		0	39.1	4.20E-06	Serum albumin
539.2792	3	HSTIFENLANKADR		0	33.2	5.30E-07	Serotransferrin
689.355	2	KSASDLTWDNLK		0	48.9	2.00E-08	Serotransferrin
637.3302	2	HSTIFENLANK		0	44.5	4.10E-10	Serotransferrin
756.4262	2	VPQVSTPTLVEVSR		0	51.6	1.60E-10	Serum albumin
642.2871	2	EGYYGYTGAFR		0	42.6	1.60E-09	Serotransferrin
607.3021	3	KIVSDGNGMNAWVAWR	Oxidation@9	0	16.5	7.30E-04	Lysozyme C
464.2517	2	YLIEIAR		0	30.4	8.60E-06	Serum albumin
480.7852	2	FQNALLVR		0	37.2	2.30E-07	Serum albumin
485.7733	4	DLLFKDSAHLKVPVPR		0	46.5	3.90E-10	Serotransferrin
877.4201	2	NTDGSTDYILQINSR		0	58.5	1.20E-11	Lysozyme C
500.8053	2	QTALVELVK		0	35	1.40E-06	Serum albumin
426.2148	3	EFQLFSSPHGK		0	25.8	1.00E-07	Serotransferrin
625.3058	2	SASDLTWDNLK		0	39.7	1.60E-07	Serotransferrin
571.3503	2	KLVAASQAALGL		0	27.8	5.70E-07	Serum albumin
586.6431	3	EDPQTFYYAVAVVKK		0	39.1	8.90E-09	Serotransferrin
745.9037	2	DLLFKDSAHLK		0	29.9	1.90E-08	Serotransferrin
450.556	3	KSC*HTAVGR		1	19.1	3.80E-05	Serotransferrin
507.3028	2	LVAASQAALGL		0	21.3	6.00E-08	Serum albumin
846.4032	2	IVSDGNGMNAWVAWR	Oxidation@8	0	30.2	5.50E-08	Lysozyme C
747.8698	2	MYLGYEYVTAIR	Oxidation@1	0	34.8	1.90E-10	Serotransferrin
527.7901	4	SKEFQLFSSPHGKDLLFK		0	35.2	3.60E-09	Serotransferrin
679.8183	2	AVMDDFAAFVEK	Oxidation@3	0	32.9	1.00E-09	Serum albumin
489.9532	3	RHPDYSVLLLLR		0	41.9	3.60E-07	Serum albumin
902.455	2	KIVSDGNGMNAWVAWR		0	39.6	3.30E-10	Lysozyme C
721.6145	4	KPVDEYKDC*HLAQVPSHTVVAR		1	15.4	1.50E-06	Serotransferrin
815.4118	2	EDPQTFYYAVAVVKK		0	25.4	6.10E-08	Serotransferrin
407.8574	3	SC*HTAVGR		1	21.8	1.40E-05	Serotransferrin
492.2912	2	QTALVELVK	Gln->pyro-Glu@1	0	24.2	4.90E-05	Serum albumin
739.8711	2	MYLGYEYVTAIR		0	32.8	1.90E-11	Serotransferrin
656.3728	2	HPDYSVLLLLR		0	27.9	6.10E-09	Serum albumin
491.2237	4	ADDKETC*FAEEGKK		1	19.8	3.40E-05	Serum albumin

838.4041	2	IVSDGNGMNAWVAWR		0	55.5	4.40E-11	Lysozyme C
480.9838	4	KPVEEYANC*HLAR		1	45.2	9.50E-09	Serotransferrin
407.8578	3	SC*HTGLGR		1	19.1	1.10E-04	Serotransferrin
743.3489	4	QEPERNEC*FLQHKDDNPNLPR		1	21.3	1.10E-07	Serum albumin
531.9418	3	TAGWNIPMGLLYNK	Oxidation@8	0	22	2.80E-07	Serotransferrin
474.0034	4	EFQLFSSPHGKDLLFK		0	20.3	1.00E-06	Serotransferrin
725.6759	3	IMNGEADAMSLDGGFVYIAGK	Oxidation@2=16	0	16.7	8.10E-06	Serotransferrin
671.8219	2	AVMDDFAAFVEK		0	36.5	1.90E-10	Serum albumin
1080.011	2	IMNGEADAMSLDGGFVYIAGK		0	34.7	9.10E-10	Serotransferrin
405.6038	5	DC*HLAQVPSHTVVAR		1	29.4	1.40E-08	Serotransferrin
1023.0511	2	VFDEFKPLVEEPQLIK		0	36.9	4.10E-11	Serum albumin
739.0918	4	QEPERNEC*FLQHKDDNPNLPR	Gln->pyro-Glu@1	1	27.9	6.00E-09	Serum albumin
583.5249	4	NEC*FLQHKDDNPNLPR		1	32.9	7.60E-08	Serum albumin
685.7003	3	RHPYFYAPELFFAKR		0	33.6	3.70E-10	Serum albumin
415.1902	3	C*ELAAAMK	Oxidation@7	1	19.4	2.20E-06	Lysozyme C
413.6879	4	WC*AVSEHEATK		1	19.4	5.60E-05	Serotransferrin
461.8935	3	C*ELAAAMKR		1	30.2	3.50E-08	Lysozyme C
526.6091	3	TAGWNIPMGLLYNK		0	26.1	1.50E-08	Serotransferrin
550.9688	3	AEFAEVSKLVDTLK		0	22.4	2.50E-07	Serum albumin
429.21	4	C*LKDGAGDVAFVK		1	15	7.90E-05	Serotransferrin
626.507	5	LVRPEVDVMC*TAFHDNEETFLKK	Oxidation@9	1	20.1	4.80E-07	Serum albumin
475.5045	4	HPYFYAPELFFAKR		0	30.5	2.30E-09	Serum albumin
633.6696	3	RHPYFYAPELFFAK		0	45	1.60E-08	Serum albumin
583.9583	3	SVIPSDGPSVAC*VK		1	29.2	8.40E-08	Serotransferrin
425.4728	4	C*LVEKGDVAFVK		1	27.4	1.30E-06	Serotransferrin
556.6097	3	C*KGTDVQAWIR		1	26.6	2.50E-07	Lysozyme C
409.86	3	C*ELAAAMK		1	20.5	9.00E-07	Lysozyme C
930.4569	3	SMGGKEDLIWELLNQAQEHFGKDK	Oxidation@2	0	18.9	5.50E-07	Serotransferrin
820.3951	2	DVFLGMFLYEYAR	Oxidation@6	0	32	2.40E-09	Serum albumin
510.7297	4	FDEFFSEGC*APGSKK		1	16.2	3.90E-05	Serotransferrin
925.1262	3	SMGGKEDLIWELLNQAQEHFGKDK		0	39.4	1.90E-10	Serotransferrin
423.2249	3	LC*TVATLR		1	16.4	6.10E-05	Serum albumin
581.6371	3	HPYFYAPELFFAK		0	33.2	1.10E-08	Serum albumin
749.0302	3	RPC*FSALEVEDETYVPK		1	20.1	7.80E-05	Serum albumin
572.525	4	NLNEKDYELLC*LDGTR		1	38	1.40E-07	Serotransferrin
554.7616	4	ADRDQYELLC*LDNTR		1	24.9	1.00E-06	Serotransferrin
849.4166	3	SMGGKEDLIWELLNQAQEHFGK	Oxidation@2	0	30.5	1.70E-08	Serotransferrin
694.9386	5	HSTIFENLANKADRDQYELLC*LDNTR		1	36.4	6.20E-09	Serotransferrin
444.5439	3	ASYLDC*IR		1	16.9	4.60E-05	Serotransferrin
778.8802	4	LVRPEVDVMC*TAFHDNEETFLKK		1	35.1	1.30E-09	Serum albumin
1265.6202	2	SMGGKEDLIWELLNQAQEHFGK		0	45.2	2.10E-11	Serotransferrin
576.6669	5	EFNAETFTFHADIC*TLSEKER		1	19.1	1.90E-05	Serum albumin
454.0424	5	SLHTLFGDKLC*TVATLR		1	31.6	9.40E-08	Serum albumin
579.0418	4	EDLIWELLNQAQEHFGKDK		0	27.9	1.10E-07	Serotransferrin

812.3974	2	DVFLGMFLYEYAR		0	37.8	8.00E-10	Serum albumin
989.2602	4	AIAANEADAVTLDAGLVYDAYLAPNNLKPVVAEFYGSK		0	33	2.40E-09	Serotransferrin
768.1078	4	GYSLGNWVC*AAKFESNFNTQATNR		1	33.8	1.60E-10	Lysozyme C
597.6873	5	LVRPEVDVMC*TAFHDNEETFLK		1	35.9	7.30E-11	Serum albumin
553.93	3	GYSLGNWVC*AAK		1	34	1.60E-08	Lysozyme C
664.6386	3	QNC*ELFEQLGEYK		1	23.4	4.00E-07	Serum albumin
690.6833	3	EDLIWELLNQAQEHFGK		0	40	3.00E-10	Serotransferrin
827.8787	4	SHC*IAEVENDEMPADLPSLAADFVESK		1	24.6	1.00E-09	Serum albumin
978.4862	3	QNC*ELFEQLGEYKFNALLVR		1	33.5	1.70E-10	Serum albumin
804.9998	5	LVRPEVDVMC*TAFHDNEETFLKLYEYIAR		1	24.7	5.40E-09	Serum albumin
658.9614	3	QNC*ELFEQLGEYK	Gln->pyro-Glu@1	1	20.4	4.30E-07	Serum albumin
972.812	3	QNC*ELFEQLGEYKFNALLVR	Gln->pyro-Glu@1	1	37.5	1.60E-11	Serum albumin
835.7521	3	SAGWNIPIGLLYC*DLPEPR		1	31.5	1.60E-09	Serotransferrin

C* indicates that the cysteine residue is modified with the dabcyll chromophore

Document providing hyperlinks to all spectra and search results of top10 analyses. All spectra and searches of peptides listed in supplemental table S1 can be viewed using the viewer file available at http://prospector2.ucsf.edu/prospector/cgi-bin/mssearch.cgi?report_title=MS-Viewer&search_key=jks8ddhInc&search_name=msviewer

Table S2:

Peptides quantified by Skyline for the experiments with no laser (column 4 and 6) and with laser (column 5 and 7). Column 8: dissociation ratio (area in AIF_laser experiment/area in AIF_no laser experiment).

Peptide+modification	Cysteine	charge	area AIF_no laser	area AIF_laser	(total charge) area no laser	(total charge) area laser	ratio (total area laser/no laser)
C[+391.2]ELAAAM[+16]K	1	2	330494	32146	91335004	8017959	0.088
C[+391.2]ELAAAM[+16]K	1	3	3919469	501305			
C[+391.2]ELAAAM[+16]K	1	4	0	0			
C[+391.2]ELAAAMK	1	2	10520145	64596	87085041	7484508	0.086
C[+391.2]ELAAAMK	1	3	76564896	7419912			
C[+391.2]ELAAAMK	1	4	nd	0			
C[+391.2]ELAAAMKR	1	2	3054686	233804	36567248	1685204	0.046
C[+391.2]ELAAAMKR	1	3	33484736	1450048			
C[+391.2]ELAAAMKR	1	4	27826	1352			
C[+391.2]KGTDVQAWIR	1	2	267988	167402	12561882	1375136	0.109
C[+391.2]KGTDVQAWIR	1	3	4826047	113743			
C[+391.2]KGTDVQAWIR	1	4	7467847	1093991			
C[+391.2]LKDAGDVAFAVK	1	2	28305	16830	1627938	84682	0.052
C[+391.2]LKDAGDVAFAVK	1	3	226128	13257			
C[+391.2]LKDAGDVAFAVK	1	4	1373505	54595			
C[+391.2]LVEKGDVAFAVK	1	2	63835	134789	5148028	770369	0.150
C[+391.2]LVEKGDVAFAVK	1	3	997667	59957			
C[+391.2]LVEKGDVAFAVK	1	4	4086526	575623			
DC[+391.2]HLAQVPSHTVVAR	1	2	88568	115564	8044739	420902	0.052
DC[+391.2]HLAQVPSHTVVAR	1	3	1108818	20251			
DC[+391.2]HLAQVPSHTVVAR	1	4	6847353	285087			
LC[+391.2]TVATLR	1	2	403096	19322	3814481	266270	0.070
LC[+391.2]TVATLR	1	3	3411385	246948			
LC[+391.2]TVATLR	1	4	0	0			
SC[+391.2]HTAVGR	1	2	896447	210569	6063143	253346	0.042
SC[+391.2]HTAVGR	1	3	5166696	42655			
SC[+391.2]HTAVGR	1	4	0	122			
SC[+391.2]HTGLGR	1	2	1274022	12287	12373136	176358	0.014
SC[+391.2]HTGLGR	1	3	11098775	164071			
SC[+391.2]HTGLGR	1	4	339	0			
WC[+391.2]AVSEHEATK	1	2	nd	114298	14244719	1626803	0.114
WC[+391.2]AVSEHEATK	1	3	2968491	nd			
WC[+391.2]AVSEHEATK	1	4	11276228	1512505			
KSC[+391.2]HTAVGR	1	2	5325321	2822012	6313711	3139942	0.497

KSC[+391.2]HTAVGR	1	3	988390	317930				
KSC[+391.2]HTAVGR	1	4	0	0				
NEC[+391.2]FLQHKDDPNLPR	1	2	1543	6063	2192244	107994	0.049	
NEC[+391.2]FLQHKDDPNLPR	1	3	259230	51730				
NEC[+391.2]FLQHKDDPNLPR	1	4	1931471	50201				
Q[-17.1]NC[+391.2]ELFEQLGEYK	1	2	59715	1904	3091000	21937	0.007	
Q[-17.1]NC[+391.2]ELFEQLGEYK	1	3	110324	749				
Q[-17.1]NC[+391.2]ELFEQLGEYK	1	4	nd	0				
Q[-17.1]NC[+391.2]ELFEQLGEYKFQNALLVR	1	2	nd	2915	9301307	1257734	0.135	
Q[-17.1]NC[+391.2]ELFEQLGEYKFQNALLVR	1	3	638968	61960				
Q[-17.1]NC[+391.2]ELFEQLGEYKFQNALLVR	1	4	445785	65749				
QNC[+391.2]ELFEQLGEYK	1	2	73024	5707	3091000	21937	0.007	
QNC[+391.2]ELFEQLGEYK	1	3	2785945	1538				
QNC[+391.2]ELFEQLGEYK	1	4	61992	12039				
QNC[+391.2]ELFEQLGEYKFQNALLVR	1	2	6702	13474	9301307	1257734	0.135	
QNC[+391.2]ELFEQLGEYKFQNALLVR	1	3	816661	804785				
QNC[+391.2]ELFEQLGEYKFQNALLVR	1	4	7393191	308851				
RPC[+391.2]FSALEVDETYVPK	1	2	225786	333890	23387948	2086218	0.089	
RPC[+391.2]FSALEVDETYVPK	1	3	5429480	66158				
RPC[+391.2]FSALEVDETYVPK	1	4	17732682	1686170				
SHC[+391.2]IAEVENDEMPADLPSLAADFVESK	1	3	474181	252139	4781610	474388	0.099	
SHC[+391.2]IAEVENDEMPADLPSLAADFVESK	1	4	4307429	222249				
ASYLDC[+391.2]JR	1	2	290625	10831	4262635	240948	0.057	
ASYLDC[+391.2]JR	1	3	3972010	230117				
ASYLDC[+391.2]JR	1	4	nd	0				
ADDKETC[+391.2]FAEEGKK	1	2	44982	41738	2922949	143779	0.049	
ADDKETC[+391.2]FAEEGKK	1	3	421712	10114				
ADDKETC[+391.2]FAEEGKK	1	4	2456255	91927				
Q[-17.1]EPERNEC[+391.2]FLQHKDDPNLPR	1	2	332	0	2385172	1934701	0.811	
Q[-17.1]EPERNEC[+391.2]FLQHKDDPNLPR	1	3	58724	84901				
Q[-17.1]EPERNEC[+391.2]FLQHKDDPNLPR	1	4	777664	316384				
QEPERNEC[+391.2]FLQHKDDPNLPR	1	2	0	0	1548452	1533416	0.990	
QEPERNEC[+391.2]FLQHKDDPNLPR	1	3	0	0				
QEPERNEC[+391.2]FLQHKDDPNLPR	1	4	1548452	1533416				
FDEFFSEGC[+391.2]APGSKK	1	2	nd	35514	6007187	739649	0.123	
FDEFFSEGC[+391.2]APGSKK	1	3	829198	16437				
FDEFFSEGC[+391.2]APGSKK	1	4	5177989	687698				
GYSLGNWVC[+391.2]AAK	1	2	3878611	34916	77578633	2423012	0.031	
GYSLGNWVC[+391.2]AAK	1	3	73362112	2339103				
GYSLGNWVC[+391.2]AAK	1	4	337910	48993				
GYSLGNWVC[+391.2]AAKFESNFNTQATNR	1	3	27060	9379	521535	15315	0.029	
GYSLGNWVC[+391.2]AAKFESNFNTQATNR	1	4	494475	5936				

KPVDEYKDC[+391.2]HLAQVPSHTVVAR	1	2	nd	nd	3620292	3522518	0.973
KPVDEYKDC[+391.2]HLAQVPSHTVVAR	1	3	415204	590934			
KPVDEYKDC[+391.2]HLAQVPSHTVVAR	1	4	3205088	2931584			
KPVEEYANC[+391.2]HLAR	1	2	548764	456849	21286534	2143873	0.101
KPVEEYANC[+391.2]HLAR	1	3	3106504	69478			
KPVEEYANC[+391.2]HLAR	1	4	17631266	1617546			
ADRQYELLC[+391.2]LDNTR	1	2	61504	82843	2497433	332869	0.133
ADRQYELLC[+391.2]LDNTR	1	3	508794	168598			
ADRQYELLC[+391.2]LDNTR	1	4	1927135	81428			
LVRPEVDVM[+16]C[+391.2]TAFHDNEETFLKK	1	3	8178	45600	8328212	9134725	1.097
LVRPEVDVM[+16]C[+391.2]TAFHDNEETFLKK	1	4	173814	243935			
LVRPEVDVMC[+391.2]TAFHDNEETFLK	1	2	0	0	1011989	472503	0.467
LVRPEVDVMC[+391.2]TAFHDNEETFLK	1	3	76954	160766			
LVRPEVDVMC[+391.2]TAFHDNEETFLK	1	4	935035	311737			
LVRPEVDVMC[+391.2]TAFHDNEETFLKK	1	3	847617	1569906	8328212	9134725	1.097
LVRPEVDVMC[+391.2]TAFHDNEETFLKK	1	4	7298603	7275284			
LVRPEVDVMC[+391.2]TAFHDNEETFLKKYLYEIAR	1	3	8119	6059	75401	92861	1.232
LVRPEVDVMC[+391.2]TAFHDNEETFLKKYLYEIAR	1	4	67282	86802			
NLNEKDYELLC[+391.2]LDGTR	1	2	65961	114310	10005890	503661	0.050
NLNEKDYELLC[+391.2]LDGTR	1	3	2354286	38338			
NLNEKDYELLC[+391.2]LDGTR	1	4	7585643	351013			
SLHTLFGDKLC[+391.2]TVATLR	1	2	217445	365659	23620280	2506763	0.106
SLHTLFGDKLC[+391.2]TVATLR	1	3	4124389	102683			
SLHTLFGDKLC[+391.2]TVATLR	1	4	19278446	2038421			
SVIPSDGSPVAC[+391.2]VK	1	2	2424589	134632	53258706	1807152	0.034
SVIPSDGSPVAC[+391.2]VK	1	3	49241828	1375143			
SVIPSDGSPVAC[+391.2]VK	1	4	1592289	297377			
SAGWNIPIGLLYC[+391.2]DLPEPR	1	2	172699	172750	6480304	240033	0.037
SAGWNIPIGLLYC[+391.2]DLPEPR	1	3	5457241	40246			
SAGWNIPIGLLYC[+391.2]DLPEPR	1	4	850364	27037			
EFNAETFFHADIC[+391.2]TLSEKER	1	2	0	2205	163444	7393	0.045
EFNAETFFHADIC[+391.2]TLSEKER	1	3	9007	0			
EFNAETFFHADIC[+391.2]TLSEKER	1	4	154437	5188			
HSTIFENLANKADRQYELLC[+391.2]LDNTR	1	3	137083	219027	764863	578433	0.756
HSTIFENLANKADRQYELLC[+391.2]LDNTR	1	4	627780	359406			
AEFAEVSK	0	2	2188687	2848483	2188687	2848483	1.301
AEFAEVSK	0	3	nd	nd			
AEFAEVSK	0	4	nd	nd			
AEFAEVSKLVTDLTK	0	2	2851320	2701359	12623928	15320957	1.214
AEFAEVSKLVTDLTK	0	3	9772608	12619598			
AEFAEVSKLVTDLTK	0	4	nd	nd			
AIAANEADAVTL DAGLVYDAYLAPNNLKPVVAEFGYSK	0	3	353855	358571	1665457	1298245	0.780

AIAANEADAVTLDAGLVYDAYLAPNNLKPVVAEFYGSK	0	4	1311602	939674			
AVM[+16]DDFAAFVEK	0	2	9249218	16257838	356364536	372406406	1.045
AVM[+16]DDFAAFVEK	0	3	1820198	2033804			
AVM[+16]DDFAAFVEK	0	4	0	0			
AVMDDFAAFVEK	0	2	3.08E+08	315695776	345295120	354114764	1.026
AVMDDFAAFVEK	0	3	36889168	38418988			
AVMDDFAAFVEK	0	4	nd	nd			
DLLFKDSAHGFLK	0	2	1197933	1781045	8621877	11143588	1.292
DLLFKDSAHGFLK	0	3	7412324	9362543			
DLLFKDSAHGFLK	0	4	11620	0			
DLLFKDSAHGFLKVPPR	0	2	16333	20438	1891128	1880525	0.994
DLLFKDSAHGFLKVPPR	0	3	377862	440820			
DLLFKDSAHGFLKVPPR	0	4	1496933	1419267			
DSGFQMNQLR	0	2	12105384	9705003	12108110	9714054	0.802
DSGFQMNQLR	0	3	nd	9051			
DSGFQMNQLR	0	4	2726	0			
DVFLGM[+16]FLYEYAR	0	2	1275749	1335925	8655154	5314390	0.614
DVFLGM[+16]FLYEYAR	0	3	603564	524702			
DVFLGM[+16]FLYEYAR	0	4	nd	0			
DVFLGMFLYEYAR	0	2	4311581	2206412	6775841	3453763	0.510
DVFLGMFLYEYAR	0	3	2464260	1247351			
DVFLGMFLYEYAR	0	4	nd	nd			
EDLIWELLNQAQEHFGK	0	2	1132245	1517030	17142894	14864995	0.867
EDLIWELLNQAQEHFGK	0	3	15129593	12830356			
EDLIWELLNQAQEHFGK	0	4	881056	517609			
EDLIWELLNQAQEHFGKDK	0	2	114072	114095	10556471	8602199	0.815
EDLIWELLNQAQEHFGKDK	0	3	2601776	2522261			
EDLIWELLNQAQEHFGKDK	0	4	7840623	5965843			
EDPQTFYYAVAVVK	0	2	4322888	3875067	7937050	6543372	0.824
EDPQTFYYAVAVVK	0	3	3589621	2661006			
EDPQTFYYAVAVVK	0	4	24541	7299			
EDPQTFYYAVAVVKK	0	2	5265609	5828749	6938567	10111135	1.457
EDPQTFYYAVAVVKK	0	3	1550599	4006844			
EDPQTFYYAVAVVKK	0	4	122359	275542			
EFQLFSSPHGK	0	2	8910070	10609613	44731922	47674693	1.066
EFQLFSSPHGK	0	3	35821852	37065080			
EFQLFSSPHGK	0	4	0	nd			
EFQLFSSPHGKDLLFK	0	2	474771	550404	17700517	16982801	0.959
EFQLFSSPHGKDLLFK	0	3	4145807	4073475			
EFQLFSSPHGKDLLFK	0	4	13079939	12358922			
EGYYGYTGAFR	0	2	1284891	1069637	1451596	1115968	0.769
EGYYGYTGAFR	0	3	166705	46331			

EGYYGYTGAFR	0	4	0	0				
FESNFNTQATNR	0	2	12422005	9764729	12833210	9947625	0.775	
FESNFNTQATNR	0	3	411205	182896				
FESNFNTQATNR	0	4	nd	nd				
FKDLGEENFK	0	2	764967	922547	4610592	5308856	1.151	
FKDLGEENFK	0	3	3845625	4386309				
FKDLGEENFK	0	4	nd	nd				
FQNALLVR	0	2	21880114	30665094	21890602	30665094	1.401	
FQNALLVR	0	3	nd	nd				
FQNALLVR	0	4	10488	nd				
HPDYSVLLLLR	0	2	11908379	14757934	54574775	59711678	1.094	
HPDYSVLLLLR	0	3	42666396	44953744				
HPDYSVLLLLR	0	4	nd	nd				
HPYFYAPELFFAK	0	2	14805864	19458412	98759131	105514930	1.068	
HPYFYAPELFFAK	0	3	83744832	85837536				
HPYFYAPELFFAK	0	4	208435	218982				
HPYFYAPELFFAKR	0	2	17295368	22055644	356086968	352523260	0.990	
HPYFYAPELFFAKR	0	3	1.54E+08	153704944				
HPYFYAPELFFAKR	0	4	1.84E+08	176762672				
HSTIFENLANK	0	2	6669360	7789033	13224703	13533094	1.023	
HSTIFENLANK	0	3	6555343	5744061				
HSTIFENLANK	0	4	nd	0				
HSTIFENLANKADR	0	2	157547	196433	3482567	3331742	0.957	
HSTIFENLANKADR	0	3	3048675	2933168				
HSTIFENLANKADR	0	4	276345	202141				
IM[+16]NGEADAMSLDGGFVYIAGK	0	2	122356	201710	22764479	19061753	0.837	
IM[+16]NGEADAMSLDGGFVYIAGK	0	3	595626	703204				
IM[+16]NGEADAMSLDGGFVYIAGK	0	4	5261	8249				
IMNGEADAMSLDGGFVYIAGK	0	2	6359473	5738180	22041236	18148590	0.823	
IMNGEADAMSLDGGFVYIAGK	0	3	15610125	12382133				
IMNGEADAMSLDGGFVYIAGK	0	4	71638	28277				
IVSDGNM[+16]NAWVAWR	0	2	4628017	7993138	246099886	233825097	0.950	
IVSDGNM[+16]NAWVAWR	0	3	4698056	6444697				
IVSDGNM[+16]NAWVAWR	0	4	2051	4038				
IVSDGNMNAWVAWR	0	2	1.26E+08	118599520	236771762	219383224	0.927	
IVSDGNMNAWVAWR	0	3	1.11E+08	100783704				
IVSDGNMNAWVAWR	0	4	75466	nd				
KIVSDGNM[+16]NAWVAWR	0	2	71234	179911	54994099	56091788	1.020	
KIVSDGNM[+16]NAWVAWR	0	3	2329253	3650287				
KIVSDGNM[+16]NAWVAWR	0	4	21509	56771				
KIVSDGNMNAWVAWR	0	2	3247323	3914849	52572103	52204819	0.993	
KIVSDGNMNAWVAWR	0	3	48629096	47691868				

KIVSDGNGMNAWVAVR	0	4	695684	598102				
KLVAASQAALGL	0	2	21036352	23286800	21036352	23286800	1.107	
KLVAASQAALGL	0	3	nd	nd				
KLVAASQAALGL	0	4	nd	nd				
KQTALVELVK	0	2	5749277	5596557	5762116	5596557	0.971	
KQTALVELVK	0	3	12839	nd				
KQTALVELVK	0	4	nd	nd				
KSASDLTWDNLK	0	2	2194326	2623439	10363421	11966599	1.155	
KSASDLTWDNLK	0	3	8169095	9343160				
KSASDLTWDNLK	0	4	nd	nd				
KVPQVSTPTLVEVSR	0	2	14647606	18236294	93787153	103381044	1.102	
KVPQVSTPTLVEVSR	0	3	78799528	84942024				
KVPQVSTPTLVEVSR	0	4	340019	202726				
LVAASQAALGL	0	2	4.8E+08	535013856	479824064	535013856	1.115	
LVAASQAALGL	0	3	nd	nd				
LVAASQAALGL	0	4	nd	nd				
LVNEVTEFAK	0	2	60196604	66478204	60196604	66482247	1.104	
LVNEVTEFAK	0	3	0	0				
LVNEVTEFAK	0	4	0	4043				
M[+16]YLGYEYVTAIR	0	2	1876508	2108555	63015861	57293449	0.909	
M[+16]YLGYEYVTAIR	0	3	640358	607388				
M[+16]YLGYEYVTAIR	0	4	0	0				
MYLGYEYVTAIR	0	2	45472704	42366972	60498995	54577506	0.902	
MYLGYEYVTAIR	0	3	15026291	12210534				
MYLGYEYVTAIR	0	4	nd	nd				
NTDGSTDYGILQINSR	0	2	1.2E+08	128181000	252881424	249817798	0.988	
NTDGSTDYGILQINSR	0	3	1.33E+08	121189248				
NTDGSTDYGILQINSR	0	4	nd	447550				
Q[-17.1]TALVELVK	0	2	1809901	1230550	64314904	69858262	1.086	
Q[-17.1]TALVELVK	0	3	0	0				
Q[-17.1]TALVELVK	0	4	1431	0				
QTALVELVK	0	2	62503572	68627712	62503572	68627712	1.098	
QTALVELVK	0	3	nd	nd				
QTALVELVK	0	4	nd	nd				
RHPDYSVLLLLR	0	2	25616510	33127554	294977566	318502123	1.080	
RHPDYSVLLLLR	0	3	2.69E+08	285369120				
RHPDYSVLLLLR	0	4	nd	5449				
RHPYFYAPPELLFFAK	0	2	17295368	22055644	356086968	352523260	0.990	
RHPYFYAPPELLFFAK	0	3	1.54E+08	153704944				
RHPYFYAPPELLFFAK	0	4	1.84E+08	176762672				
RHPYFYAPPELLFFAKR	0	2	592611	843737	75759790	77733971	1.026	
RHPYFYAPPELLFFAKR	0	3	7978419	9034242				

RHPYFYAPELFFAKR	0	4	67188760	67855992				
SASDLTWDNLK	0	2	55302336	53269792	58158902	55377803	0.952	
SASDLTWDNLK	0	3	2856566	2108011				
SASDLTWDNLK	0	4	nd	nd				
SKEFQLFSSPHGK	0	2	730369	717035	5371958	5688196	1.059	
SKEFQLFSSPHGK	0	3	4631255	4968713				
SKEFQLFSSPHGK	0	4	10334	2448				
SKEFQLFSSPHGKDLLFK	0	2	688595	1003054	1741659	1977858	1.136	
SKEFQLFSSPHGKDLLFK	0	3	0	29604				
SKEFQLFSSPHGKDLLFK	0	4	1053064	945200				
SM[+16]GGKEDLIWELLNQAQEHFGK	0	2	56785	233763	166102063	168141619	1.012	
SM[+16]GGKEDLIWELLNQAQEHFGK	0	3	3005443	4476320				
SM[+16]GGKEDLIWELLNQAQEHFGK	0	4	8817857	10834651				
SM[+16]GGKEDLIWELLNQAQEHFGKDK	0	2	41922	8595	56301271	49330806	0.876	
SM[+16]GGKEDLIWELLNQAQEHFGKDK	0	3	449978	774997				
SM[+16]GGKEDLIWELLNQAQEHFGKDK	0	4	3463758	4331947				
SMGGKEDLIWELLNQAQEHFGK	0	2	1626238	1972741	166102063	168141619	1.012	
SMGGKEDLIWELLNQAQEHFGK	0	3	45049228	52151200				
SMGGKEDLIWELLNQAQEHFGK	0	4	1.08E+08	98472944				
SMGGKEDLIWELLNQAQEHFGKDK	0	2	151603	184410	56301271	49330806	0.876	
SMGGKEDLIWELLNQAQEHFGKDK	0	3	7540726	6725065				
SMGGKEDLIWELLNQAQEHFGKDK	0	4	44653284	37305792				
TAGWNIPM[+16]GLLYNK	0	2	3076311	4511467	170092104	151440459	0.890	
TAGWNIPM[+16]GLLYNK	0	3	2736429	3023389				
TAGWNIPM[+16]GLLYNK	0	4	24564	23257				
TAGWNIPMGLLYNK	0	2	1.15E+08	89259608	164254800	143882346	0.876	
TAGWNIPMGLLYNK	0	3	49583432	52747392				
TAGWNIPMGLLYNK	0	4	nd	1875346				
VFDEFKPLVEEPQNLK	0	2	42264092	46231684	469759615	439006686	0.935	
VFDEFKPLVEEPQNLK	0	3	4.19E+08	387111808				
VFDEFKPLVEEPQNLK	0	4	8179331	5663194				
VPQVSTPTLVEVSR	0	2	11525135	12296273	19660966	20096638	1.022	
VPQVSTPTLVEVSR	0	3	8135831	7800365				
VPQVSTPTLVEVSR	0	4	nd	nd				
YLYEIAR	0	2	1.27E+08	128999680	127011688	128999680	1.016	
YLYEIAR	0	3	nd	nd				
YLYEIAR	0	4	nd	nd				