

Unveiling the Diversity and Modifications of Short Peptides in *Buthus martensii* Scorpion Venom through Liquid Chromatography-High Resolution Mass Spectrometry

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Supplementary Table 1. List of de novo sequencing peptides in the filtrate of scorpion *Buthus martensii* Karsch venom.

No.	Ion for	RT	MS observed	Delta (Da)	sequence
	MS/MS (m/z) (charge)				
N-terminal modification					
1	432.1483(+1)	9.32	431.1405	0.0036	Carboxybenzoyl-AGH
2	497.2501(+1)	21.70	496.2423	0.0011	Bz-ARF
3	554.2719(+1)	19.92	553.2641	0.0008	Bz-ARFG
4	535.2359(+1)	20.63	534.2281	0.0059	Bz-A FGH
5	641.2937(+1)	22.71	640.2859	0.0007	pEDWI/LP
6	728.3301(+1)	21.05	727.3223	-0.0051	pEDWI/LPS
7	335.2074(+1)	14.13	334.1996	0.0009	FGI- NH ₂ ♦
C-terminal modification					
8	431.2364(+1)	10.92	430.2286	0.0043	WVGA- NH ₂
9	438.2336(+1)	6.68	437.2258	0.0016	YVTG- NH ₂
10	562.2607(+1)	8.20	561.2529	0.0018	DKWD- NH ₂
11	569.3072(+1)	19.91	568.2994	0.0015	SFGFI/L - NH ₂
12	321.1942 (+3)	2.08	960.5592	0.0215	I/LFQAI/LKNE-NH ₂
N-terminal and C-terminal modification					
13	496.2648(+1)	20.22	495.2570	0.0019	Bz-ARF-NH ₂
Non-modification					
14	507.2428(+1)	12.81	506.2350	0.0076	FFGH
15	309.7041 (+2)	7.84	617.3926	0.0002	KVI/LKM
16	317.6992(+2)	1.73	633.3828	0.0045	KVI/LKM(oxidation)
17	320.1854(+2)	19.74	638.3552	0.0022	FRFGI/L
18	321.1544(+2)	16.86	640.2932	0.0069	FRFGD
19	321.73 60(+2)	13.14	641.4564	0.0014	I/LR I/LI/LK
20	337.1757 (+2)	17.75	672.3358	0.0015	FFRFG
21	337.1757 (+1)	19.63	672.3358	0.0015	FRFGF
22	359.2374(+2)	11.73	716.4592	0.0016	KVIKMV #
23	364.2619(+2)	10.40	726.5082	0.0023	I/LVKVI/LR
24	371.2672 (+2)	13.18	740.5188	0.0074	VI/LRI/LI/LK
25	389.704 (+2)	9.47	777.3924	0.0026	TPSYI/LPT
26	785.4411(+1)	18.36	784.4333	0.0008	I/LI/LPDAI/LSG
27	413.2751 (+2)	18.04	824.5346	0.0015	I/LLEI/LIPK
28	413.2713 (+2)	21.35	824.5270	0.0091	I/LEI/LKI/LI/LP
29	430.265 (+2)	9.78	858.5144	0.0020	KIVDGI/LKS
30	431.2126 (+2)	18.37	860.4096	0.0074	WLDKWN
31	290.5471 (+3)	9.64	868.6179	0.0027	VI/LRI/LI/LKK
32	435.7661 (+2)	17.65	869.5166	0.0044	I/LAEKI/LLSP
33	438.7600 (+2)	15.07	875.5044	0.0062	FATKLI/LPS
34	306.1918 (+3)	9.90	915.5520	0.0006	I/LKKVWKD
35	477.3446 (+2)	17.82	952.6736	-0.0064	I/LVKVI/LRI/LI/L

Peptides matching with the database	36	477.3304(+2)	18.74	952.6452	0.0029	KI/LNKI/LI/LPK
	37	361.2627 (+3)	10.82	1080.7647	0.0084	I/LVKVI/LRI/LI/LK
	38	303.2243 (+4)	12.55	1208.8660	0.0016	I/LVKVIRI/LIKK
	Modified peptides					
	39	278.186(+1)	10.36	277.1782	0.0003	IF-NH ₂ ♦
	40	278.1883(+1)	9.67	277.1805	0.0020	FI/L-NH ₂
	41	293.1612(+1)	5.87	292.1534	0.0004	FGA-NH ₂
	42	293.1951(+1)	2.05	292.1873	0.0021	FK-NH ₂
	43	294.1452(+1)	6.05	293.1374	0.0004	EF-NH ₂
	44	319.1429(+1)	6.78	318.1351	0.0028	WD-NH ₂
	45	391.2695(+1)	18.07	390.2617	0.0009	I/LI/LF-NH ₂
	46	425.251(+1)	19.55	424.2432	0.0037	FI/LF-NH ₂
	47	429.281(+1)	9.44	428.2732	0.0009	IGAVA-NH ₂ *
	48	468.272(+1)	14.22	467.2642	0.0002	FRF-NH ₂
	49	576.3456(+1)	13.74	575.3378	0.0048	FI/LGAGI/L-NH ₂
	50	576.3528(+1)	15.89	575.3450	0.0024	FIGAVA-NH ₂ *
	51	291.1788(+1)	16.36	580.3420	0.0055	I/LFRF-NH ₂
	52	339.2201 (+1)	12.91	676.4246	0.0015	LISAFK-NH ₂ *
	53	699.4399(+1)	16.93	698.4321	0.0000	LIPSAIS-NH ₂ *
	Non-modification					
	54	231.1684(+1)	6.33	230.1606	0.0019	I/LV
	55	245.184(+1)	12.04	244.1762	0.0020	I/LI/L
	56	253.116(+1)	8.98	252.1082	0.0023	FS
	57	279.173(+1)	16.14	278.1652	0.0027	FI/L
	58	279.1732(+1)	16.33	278.1654	0.0029	IF ♦
	59	281.1107(+1)	3.48	280.1029	0.0025	FD
	60	281.1109(+1)	4.46	280.1031	0.0023	DF
	61	294.1421(+1)	3.27	293.1343	0.0027	FQ
	62	295.1647(+1)	11.75	294.1569	0.0005	YI/L
	63	304.1656(+1)	13.66	303.1578	0.0000	VW
	64	313.1593(+1)	16.84	312.1515	0.0046	FF
	65	318.1778(+1)	15.69	317.1700	0.0034	WI/L
	66	318.1778(+1)	15.92	317.1700	0.0034	I/LW
	67	318.1778(+1)	17.15	317.1700	0.0034	I/LW
	68	320.1279(+1)	7.86	319.1201	0.0038	WD
	69	322.1905(+1)	3.66	321.1827	0.0031	FR
	70	332.2187(+1)	8.68	331.2109	0.0007	LLS ♦
	71	336.1888(+1)	12.58	335.1810	0.0030	FI/LG
	72	342.2393(+1)	14.66	341.2315	0.0006	I/LI/LP
	73	360.1635(+1)	12.23	359.1557	0.0031	FGH
	74	360.213(+1)	11.94	359.2052	0.0001	I/LI/LD
	75	366.1989(+1)	13.76	365.1911	0.0034	I/LFS
	76	366.1989(+1)	18.27	365.1911	0.0034	I/LSF
	77	366.2000(+1)	23.33	365.1944	0.0001	FSI/L

78	366.2017(+1)	9.02	365.1939	0.0006	YI/LA
79	377.1816(+1)	11.24	376.1738	0.0003	FNP
80	378.1667(+1)	11.02	377.1589	0.0007	FDP
81	392.2173(+1)	13.43	391.2095	0.0007	YI/LP
82	392.2527(+1)	21.76	391.2449	0.0017	I/LFI/L
83	400.1903(+1)	18.78	399.1825	0.0036	FSF
84	403.259(+1)	11.55	402.2512	0.0039	I/LI/LSA
85	407.2331(+1)	14.14	406.2253	0.0042	FIGA ♦
86	407.2641(+1)	16.13	406.2563	0.0012	FI/LK
87	415.2385(+1)	17.45	414.2307	0.0045	WI/LP
88	420.2245(+1)	8.16	419.2167	0.0004	WKS
89	426.2440(+1)	22.46	425.2362	0.0053	FLF ♦
90	429.2700(+1)	12.48	428.2628	0.0002	I/LI/LPS
91	431.2516(+1)	13.78	430.2438	0.0016	I/LI/LDA
92	433.2087(+1)	16.46	432.2009	0.0005	WI/LD
93	435.2712(+1)	10.24	434.2634	0.0002	LFR ♦
94	441.2485(+1)	19.56	440.2407	0.0011	FKF
95	445.3008(+1)	20.64	444.2930	0.0013	I/LI/LSI/L
96	227.6713(+2)	19.54	453.3270	0.0016	I/LFKF
97	469.2563(+1)	16.65	468.2485	0.0005	FRF
98	469.2611(+1)	15.66	468.2533	0.0053	FFR
99	479.2845(+1)	21.92	478.2767	0.0019	I/LFSI/L
100	479.2850(+1)	20.66	478.2772	0.0014	I/LI/LSF
101	479.2800(+1)	19.3	478.2767	0.0019	I/LI/LFS
102	483.2086(+1)	8.54	482.2008	0.0000	FTTD
103	493.2657(+1)	11.23	492.2579	0.0000	YI/LPT
104	494.2300(+1)	5.15	493.2281	0.0001	GRFD
105	500.3072(+1)	14.05	499.2994	0.0013	LIPSA*
106	502.2668(+1)	15.53	501.2590	0.0008	WLPS ♦
107	506.2949 (+1)	17.76	505.2871	0.0024	FIGAV*
108	513.2692(+1)	23.87	512.2614	0.0016	FI/LSF
109	513.2731(+1)	21.03	512.2653	0.0023	FLFS ♦
110	513.275(+1)	22.36	512.2672	0.0042	FSI/LF
111	513.2755(+1)	21.34	512.2677	0.0047	I/LFSF
112	260.1513(+2)	8.17	518.2870	0.0022	VWSK
113	520.3459(+1)	19.14	519.3381	0.0034	I/LFI/LK
114	522.3276(+1)	10.75	521.3198	0.0010	I/LVYK
115	526.276(+1)	15.23	525.2682	0.0012	FRFG
116	529.2715(+1)	17.17	528.2637	0.0058	YI/LFS
117	541.2648(+1)	21.44	540.2570	0.0009	FI/LFD
118	541.2648(+1)	24.67	540.2570	0.0009	FI/LDF
119	545.3302(+1)	10.14	544.3224	0.0009	IIQTA*
120	550.3227(+1)	20.08	549.3149	0.0009	LISAF*
121	554.2716(+1)	20.68	553.2638	0.0107	FPSFG

122	554.3302(+1)	19.34	553.3224	0.0035	LFFK◆
123	279.1857(+2)	11.32	556.3558	0.0016	KIIPS*
124	296.1894(+2)	6.75	590.3632	0.0010	I/LRFR
125	307.1578 (+2)	13.26	612.3000	0.0009	FRFGS*
126	307.2200(+2)	16.84	612.4286	0.0026	VI/LRI/LI/L
127	309.6851(+2)	12.06	617.3546	0.0013	IMKNI*
128	634.3594(+1)	16.23	633.3516	0.0035	FIGAVAG*
129	321.7094(+2)	12.65	641.4032	0.0080	ATKIIP*
130	324.1973(+2)	6.97	646.3790	0.0002	KVWKS*
131	326.1894 (+2)	12.56	650.3632	0.0003	LLKDY*
132	337.2224(+2)	12.74	672.4292	0.0021	LKKVW*
133	697.4512(+1)	23.17	696.4434	0.0018	LEILIP*
134	365.2312(+2)	10.94	728.4468	0.0036	ATKIIPS*
135	378.2532(+2)	13.48	754.4908	0.0035	LATKIIP*
136	379.2250(+1)	14.34	756.4344	0.0027	ATKI/LI/LPD
137	757.4463(+1)	17.23	756.4385	0.0009	LIPSAISC*
138	380.6880(+2)	18.97	759.3620	0.0039	FGVFGSF
139	380.6923(+2)	20.23	759.3690	0.0004	FRFGSF*
140	391.2316(+2)	10.84	780.4476	0.0007	IIQTAVH*
141	785.4413(+1)	18.68	784.4335	0.0010	I/LI/LPSAI/LDG
142	416.257(+2)	11.75	830.4988	0.0020	VWWSKLA*
143	421.7700(+2)	15.67	841.5404	0.0019	LATKIIPS*
144	844.4780(+1)	19.98	843.4702	0.0005	SLIPSALSG*
145	292.5047(+3)	8.08	874.4907	0.0022	IMKNIKE*
146	296.1683(+3)	6.84	885.4815	0.0009	GLREKHF*#
147	444.7862 (+2)	5.36	887.5568	0.0014	LKKVWKS*#
148	303.8552 (+3)	7.87	908.5422	0.0007	IIQTAVKH*
149	478.3125 (+2)	18.96	954.6094	0.0009	LATKIIPSL*#
150	991.5486(+1)	22.84	990.5408	0.0028	FSLIPSALSG*#
151	338.8542(+3)	2.06	1013.5392	0.0002	GLREKHFQ
152	546.2400(+2)	21.56	1090.4768	0.0040	DNDIEEPFI/L
153	553.7953(+2)	15.57	1105.5750	0.0006	YAVPEGLT*RT*
154	410.9301(+3)	19.75	1229.7669	0.0062	LFKLATKIIPS*
155	439.5852(+3)	11.57	1315.7322	0.0010	NIKEKLT*EVKD*
156	354.2274(+4)	6.55	1412.8784	0.0021	KLRSGKQLLKD*

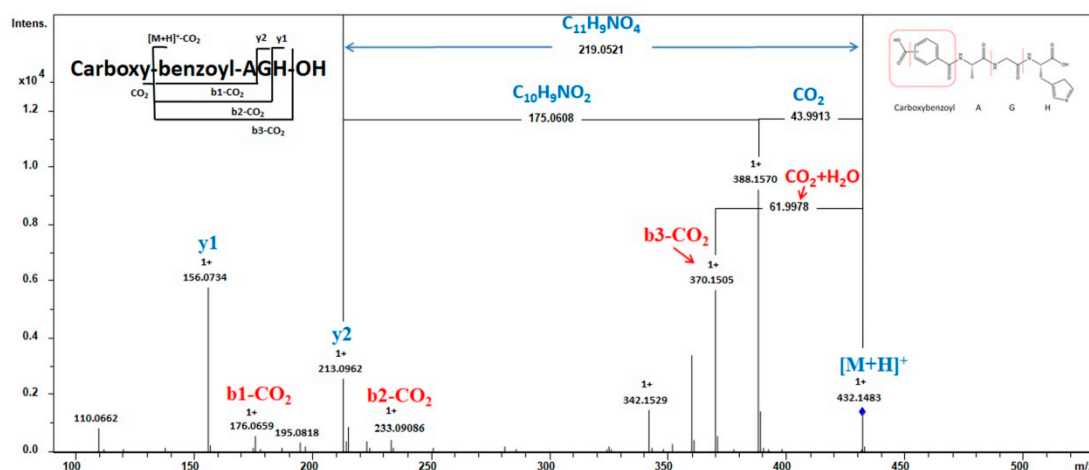
I/L means Leucine or Isoleucine. I/L refers to Leucine or Isoleucine. The identified I/L in the sequence confirmed by ETD-HCD-MS3 are indicated with #, those confirmed by HCD-MSn are indicated with ◆, and those identified through Mascot search are denoted with *.

Supplementary Table 2. De novo sequence peptides matching with the sequences of MASCOT research.

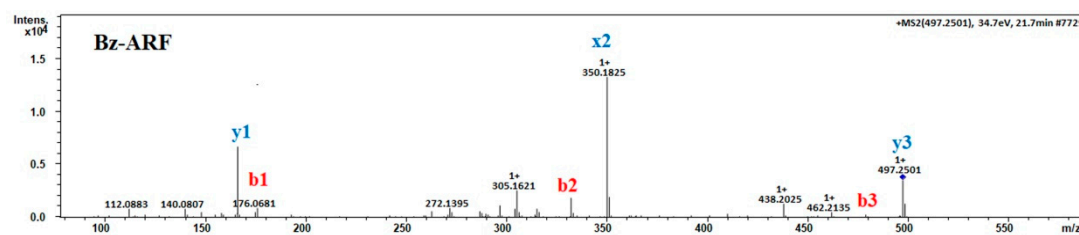
Mass	De novo sequence	MASCOT sequence	Range	Matched Toxins
650.3698	I/LI/LKDY	LLKDY	47-52	BmKbpp
672.452	I/LKKVW	LKKVW	29-33	BmKbpp
830.5062	VWFSKI/LA	VWFSKLA	42-48	BmKbpp
887.5524	LKKVWKS	LKKVWKS	29-35	BmKbpp
1412.887	KI/LRSKGKQI/LI/LKD	KLRSKGKQLLKD	40-51	BmKbpp
556.3673	KI/LI/LPS	KIIPS	34-38	marcin-18
641.411	ATKI/LI/LP	ATKIIP	32-37	marcin-18
728.4546	ATKI/LI/LPS	ATKIIPS	32-38	marcin-18
754.4922	I/LATKI/LI/LP	LATKIIP	31-37	marcin-18
841.5322	I/LATKI/LI/LPS	LATKIIPS	31-38	marcin-18
954.6122	I/LATKI/LIPSI/L	LATKIIPSL	31-39	marcin-18
1229.775	I/LFKLATKI/LI/LPS	LFKLATKIIPS	28-38	marcin-18
499.3072	I/LI/LPSA	LIPSA	27-31	toxin peptide
549.3227	I/LI/LSAF	LISAF	35-39	toxin peptide
676.4122	I/LI/LSAFK-NH ₂	LISAFK-NH ₂	35-40	toxin peptide
756.4463	I/LI/LPSAI/LSG	LIPSAISG	27-34	toxin peptide
843.478	SI/LI/LPSAI/LSG	SLIPSAISG	26-34	toxin peptide
698.4399	I/LI/LPSAI/LS-NH ₂	LIPSAIS-NH ₂	27-33	toxin peptide
990.5486	FSLIPSAI/LSG	FSLIPSAISG	25-34	toxin peptide
428.281	I/LGAVA-NH ₂	IGAVA-NH ₂	25-29	BmKn1
505.2924	FI/LGAV	FIGAV	24-28	BmKn1
575.3528	FI/LGAVA-NH ₂	FIGAVA-NH ₂	24-29	BmKn1
633.3594	FI/LGAVAG	FIGAVAG	24-30	BmKn1
544.3302	I/LI/LQTA	IIQTA	42-46	BmTXK-beta-2
780.4554	I/LLQTAVH	IIQTAVH	42-48	BmTXK-beta-2
885.4893	GLREKHF	GLREKHF	20-27	BmTXK-beta-2
908.5548	I/LI/LQTAVKH	IIQTAVHK	42-49	BmTXK-beta-2
1013.534	GI/LREKHFQ	GLREKHFQ	20-28	BmTXK-beta-2
1105.583	YAVPEGTI/LRT	YAVPEGTLRT	32-41	BmTXK-beta-2
617.3624	I/LMKNI/L	IMKNI	28-32	BmTXK-beta
874.509	I/LMKNI/LKE	IMKNIKE	28-34	BmTXK-beta
1315.741	NI/LKEKI/LTEVKD	NIKEKLTEVKD	31-41	BmTXK-beta

I/L: Leucine or Isolucine

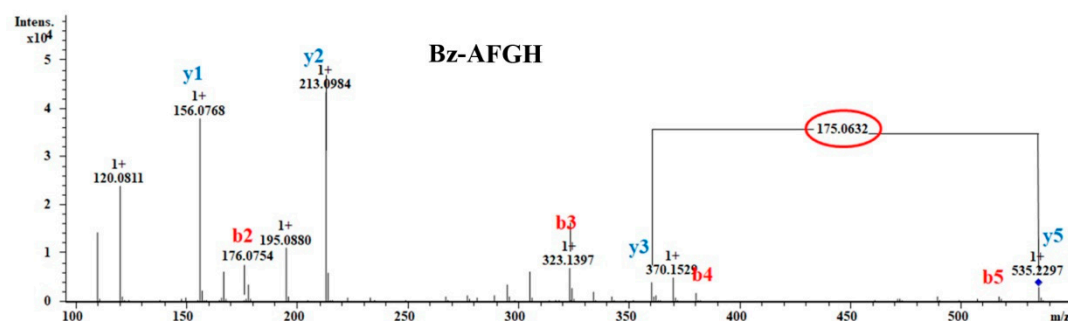
Supplementary Figure 1~156



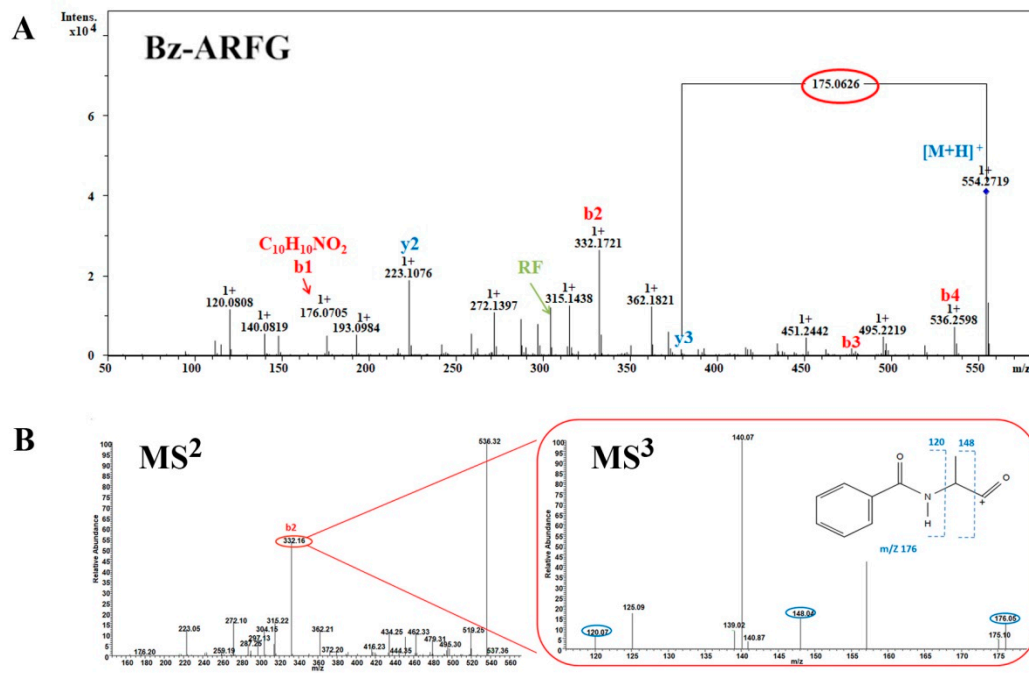
Supplementary Figure 1. Mass spectra and de novo sequencing analysis of carboxybenzoyl-AGH.



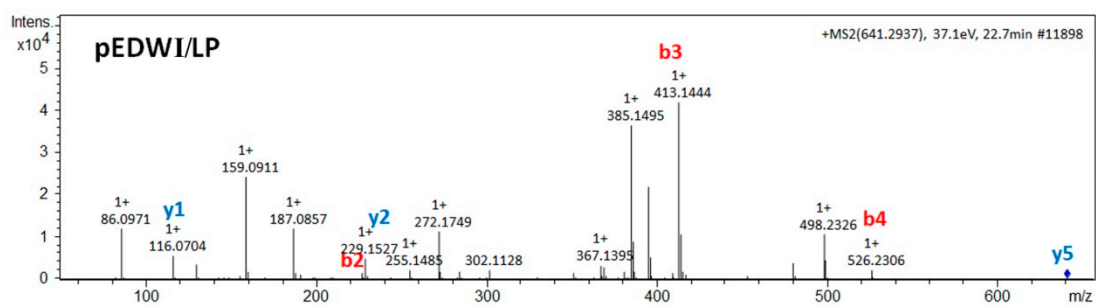
Supplementary Figure 2. Mass spectra and de novo sequencing analysis of Bz-ARF-NH₂



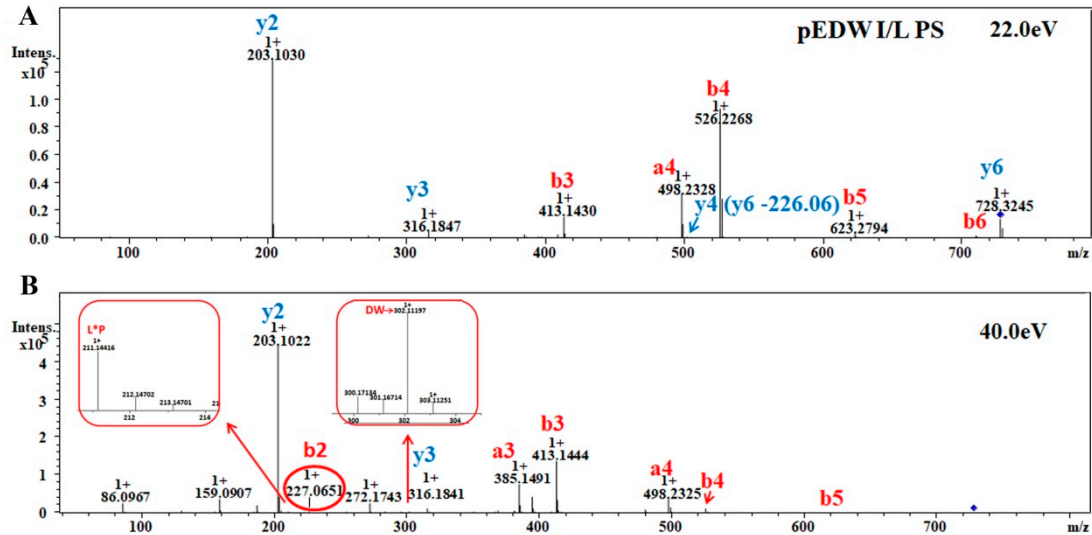
Supplementary Figure 3. Mass spectra and de novo sequencing analysis of Bz-AFGH



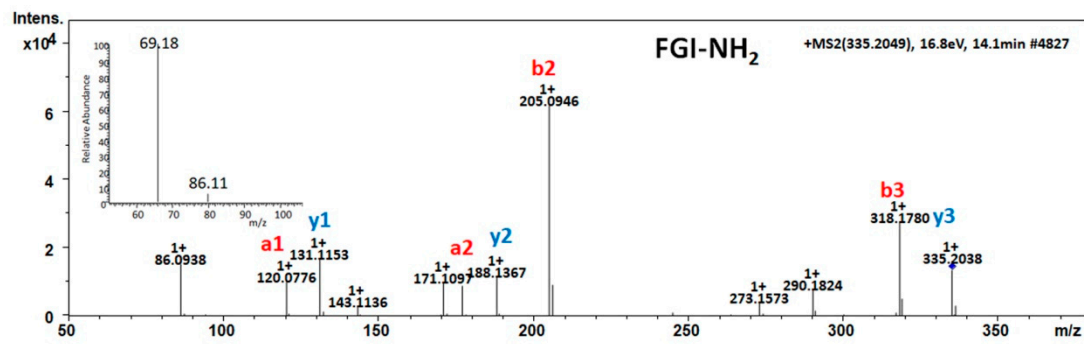
Supplementary Figure 4. Mass spectra and de novo sequencing analysis of Bz-ARFG



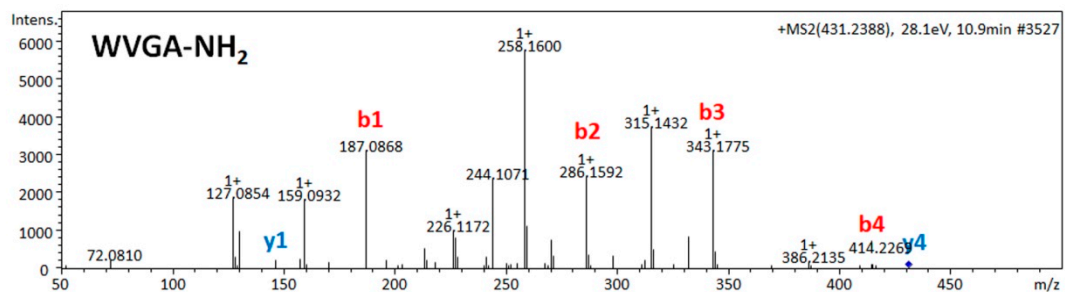
Supplementary Figure 5. Mass spectra and de novo sequencing analysis of pEDWI/LP



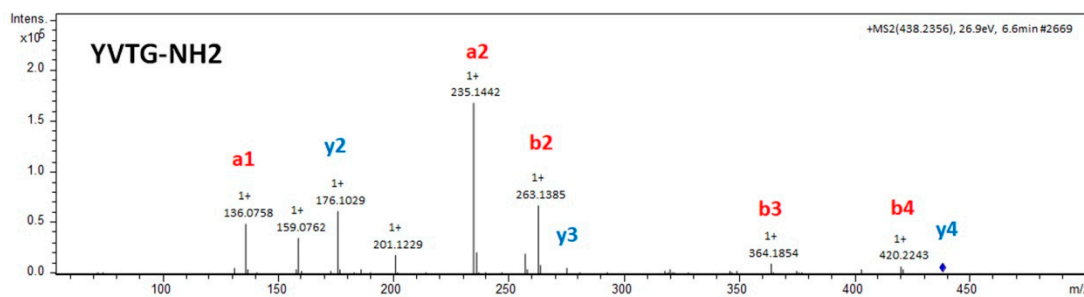
Supplementary Figure 6. Mass spectra and de novo sequencing analysis of pEDWI/LPS



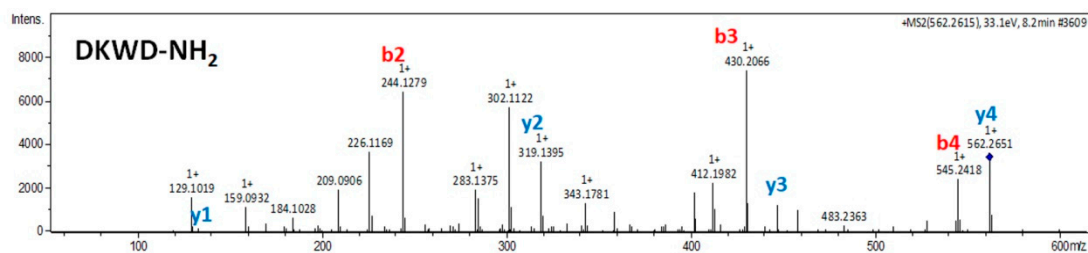
Supplementary Figure 7. Mass spectra and de novo sequencing analysis of FGI-NH₂



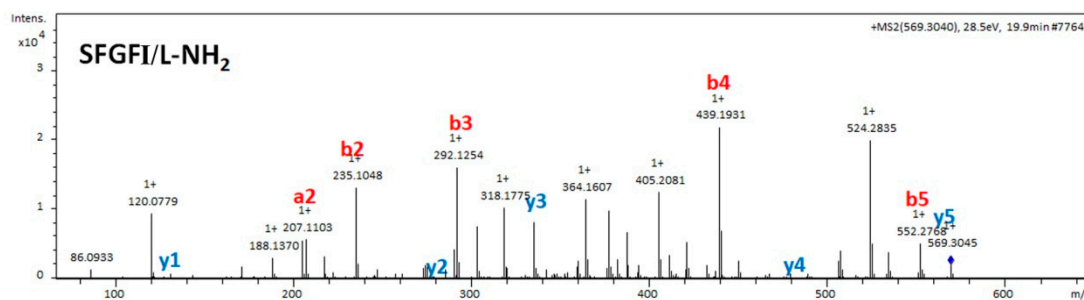
Supplementary Figure 8. Mass spectra and de novo sequencing analysis of WVGA-NH₂



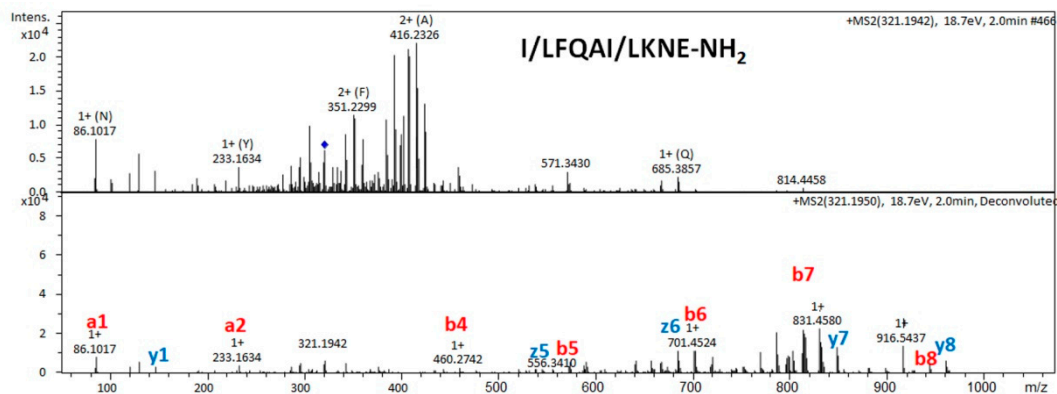
Supplementary Figure 9. Mass spectra and de novo sequencing analysis of YVTG-NH₂



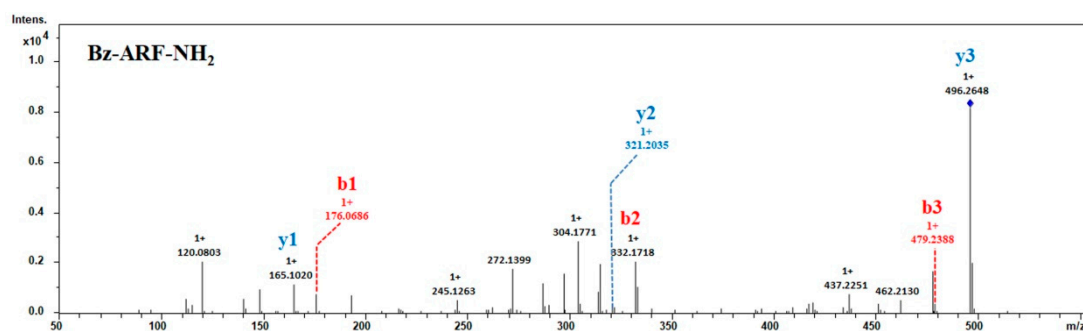
Supplementary Figure 10. Mass spectra and de novo sequencing analysis of DKWD-NH₂



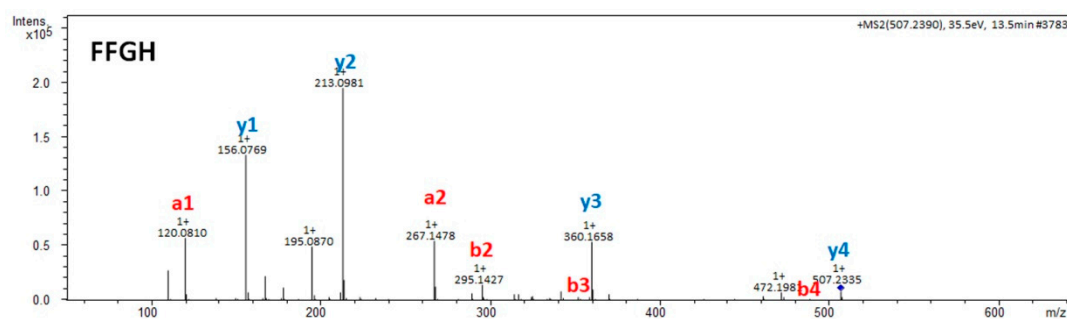
Supplementary Figure 11. Mass spectra and de novo sequencing analysis of SFGFI/L-NH₂



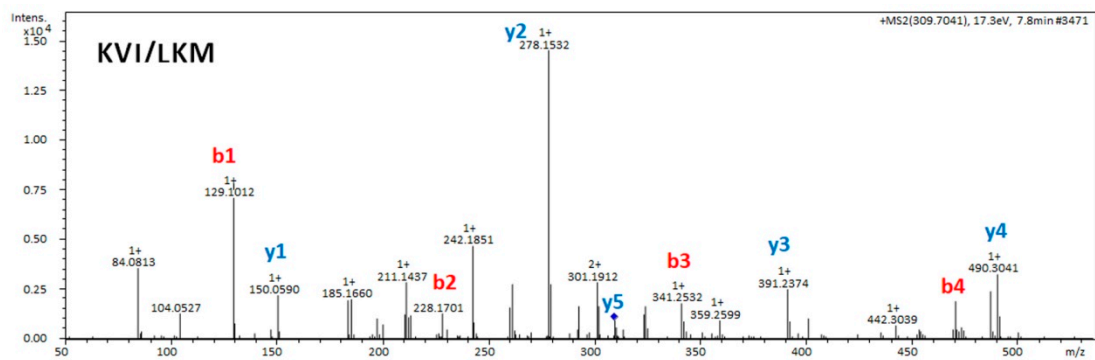
Supplementary Figure 12. Mass spectra and de novo sequencing analysis of
I/LFQAI/LKNE-NH₂



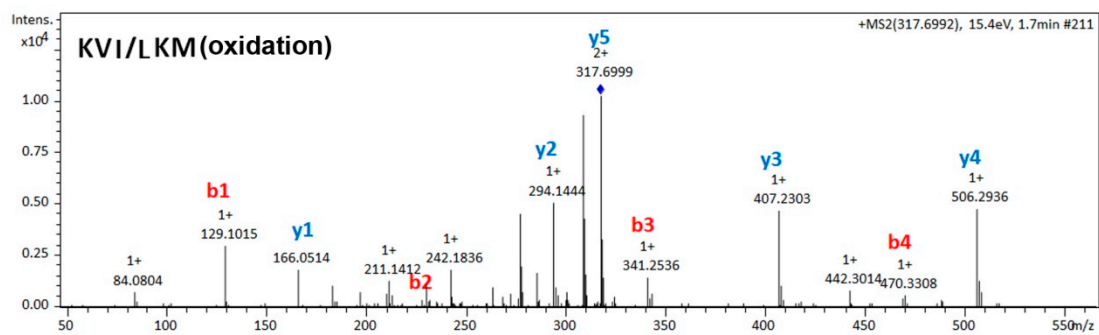
Supplementary Figure 13. Mass spectra and de novo sequencing analysis of
Bz-ARF-NH₂



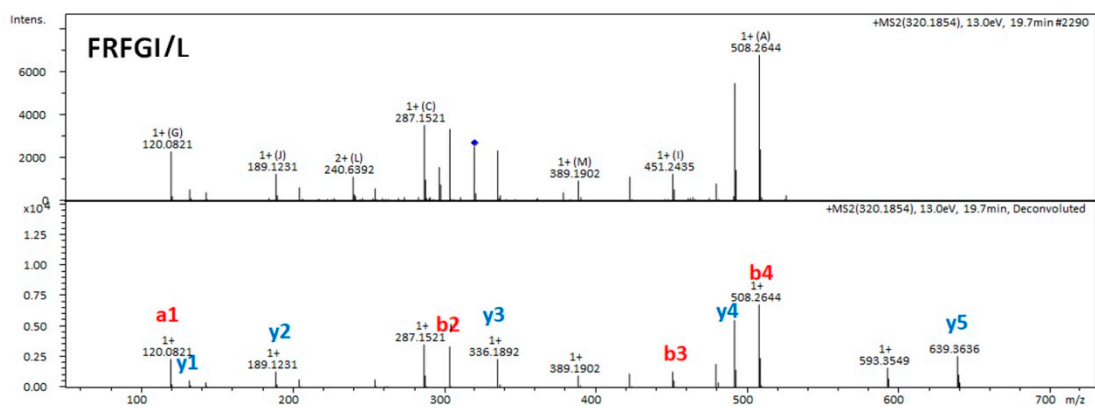
Supplementary Figure 14. Mass spectra and de novo sequencing analysis of
FFGH



Supplementary Figure 15. Mass spectra and de novo sequencing analysis of
KVI/LKM

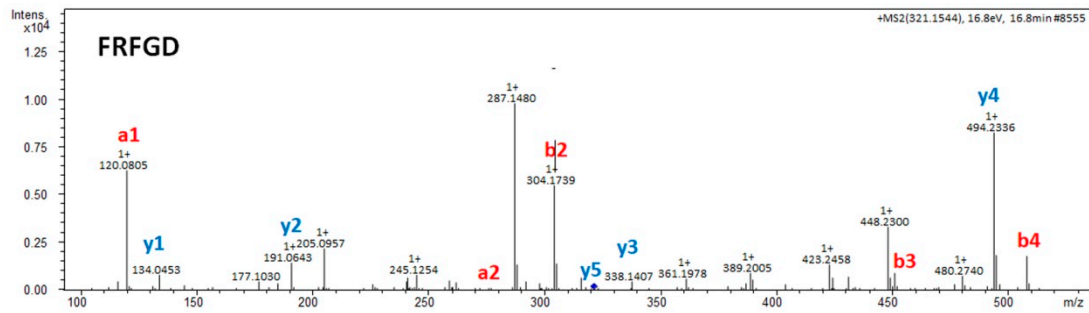


Supplementary Figure 16. Mass spectra and de novo sequencing analysis of
KVI/LKM(oxidation)



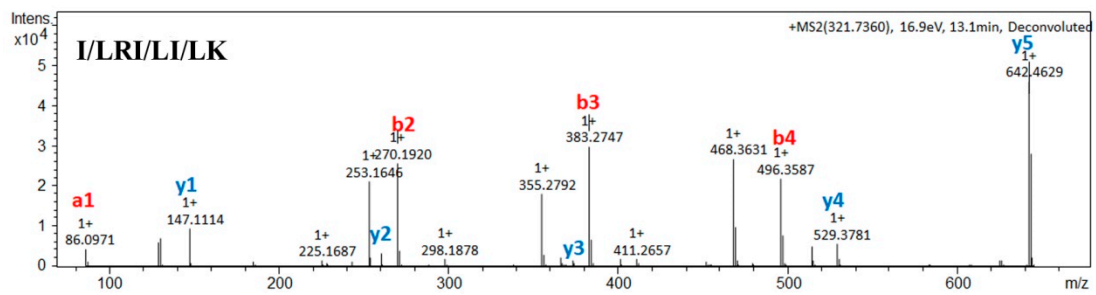
Supplementary Figure 17. Mass spectra and de novo sequencing analysis of

FRFGI/L



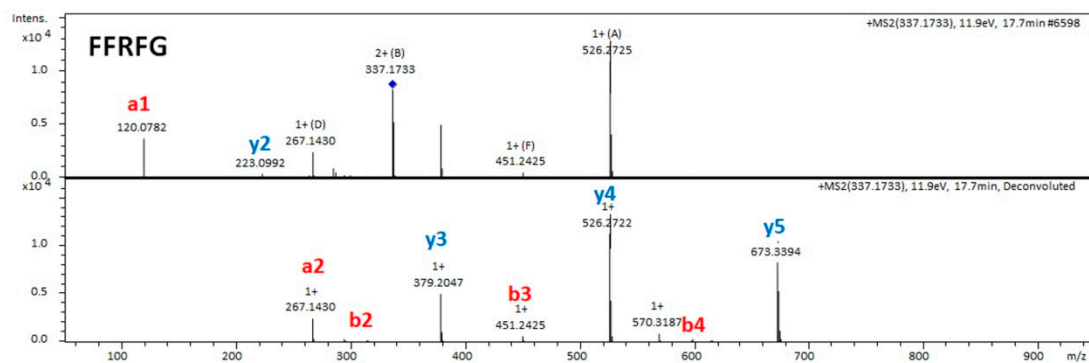
Supplementary Figure 18. Mass spectra and de novo sequencing analysis of

FRFGD



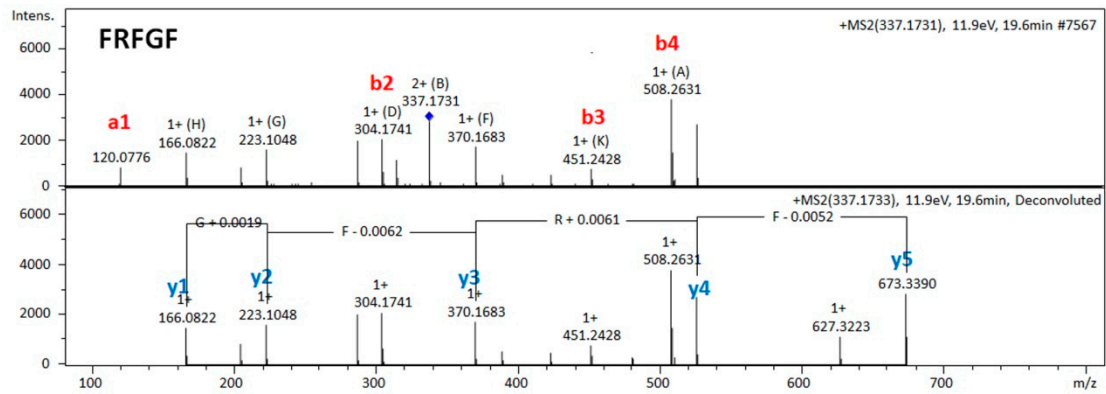
Supplementary Figure 19. Mass spectra and de novo sequencing analysis of

I/LRI/LI/LK



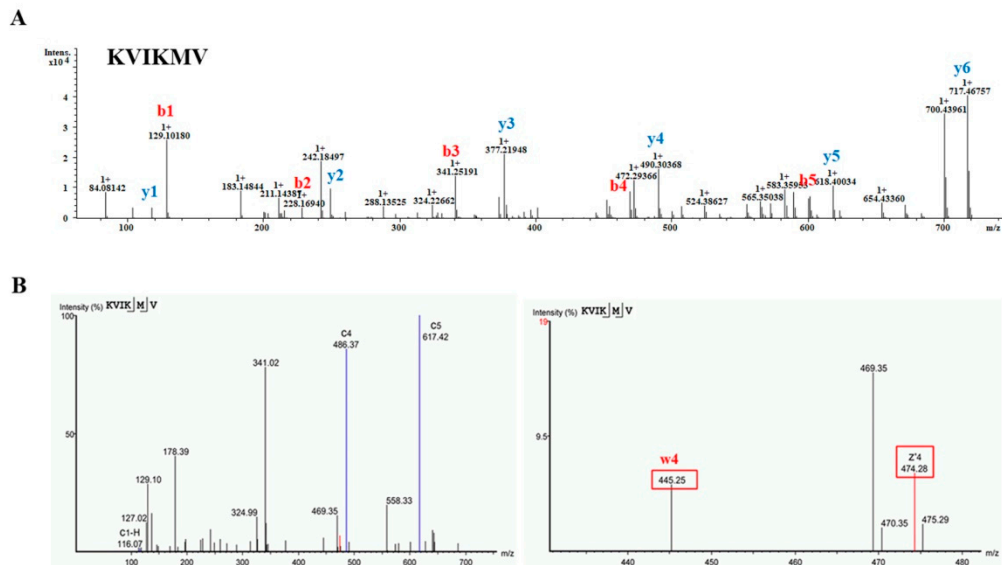
Supplementary Figure 20. Mass spectra and de novo sequencing analysis of

FFRFG



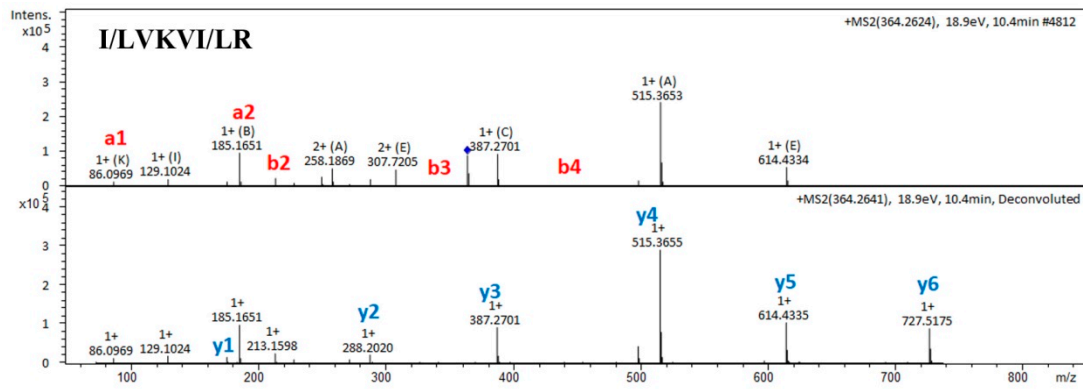
Supplementary Figure 21. Mass spectra and de novo sequencing analysis of

FFRFG

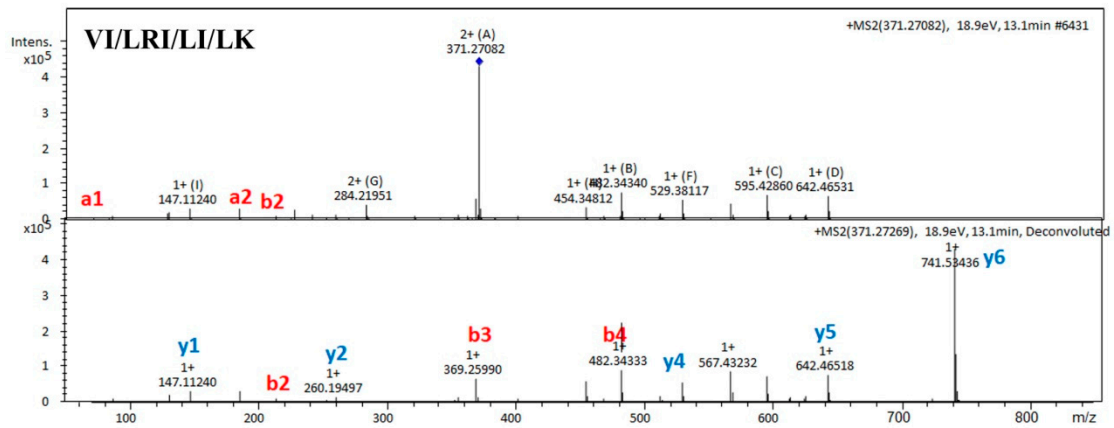


Supplementary Figure 22. Mass spectra and de novo sequencing analysis of

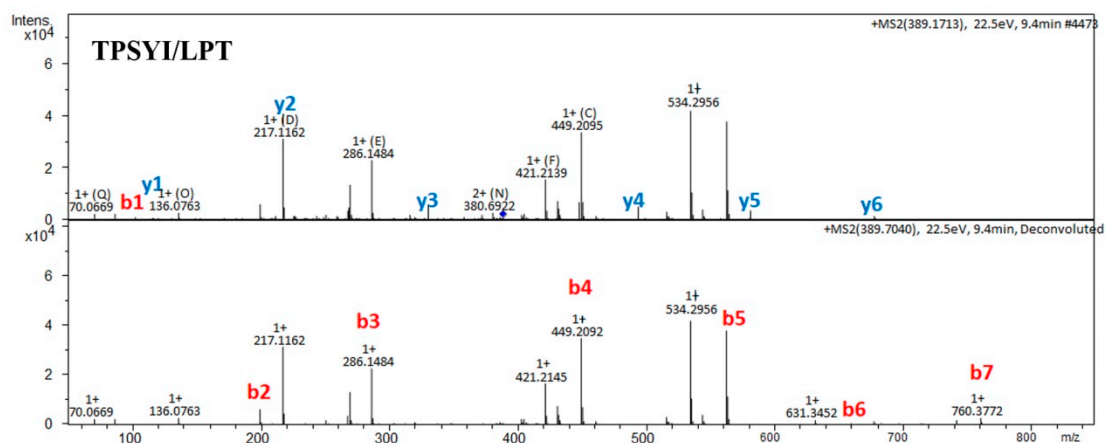
KVIKMV



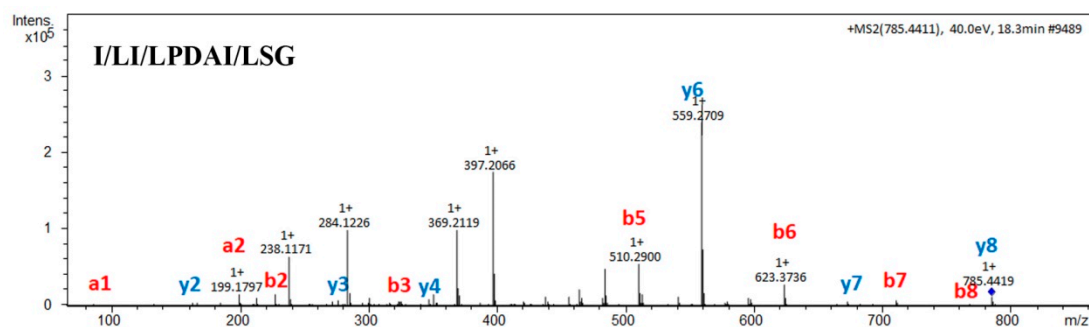
Supplementary Figure 23. Mass spectra and de novo sequencing analysis of
I/LVKVI/LR



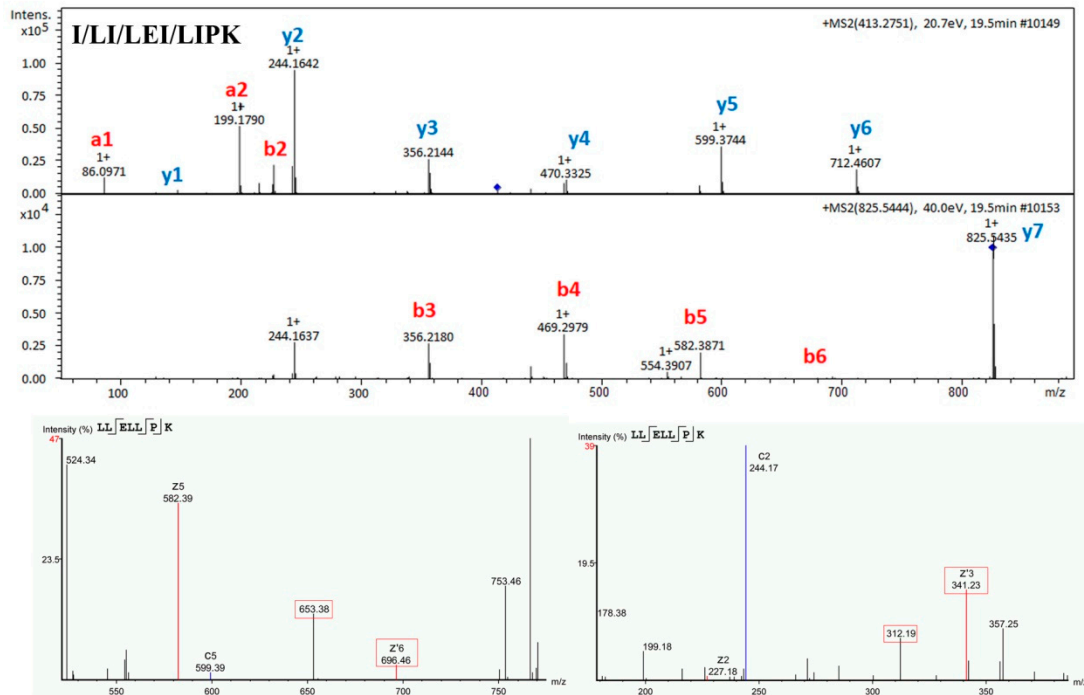
Supplementary Figure 24. Mass spectra and de novo sequencing analysis of
VI/LRI/LI/LK



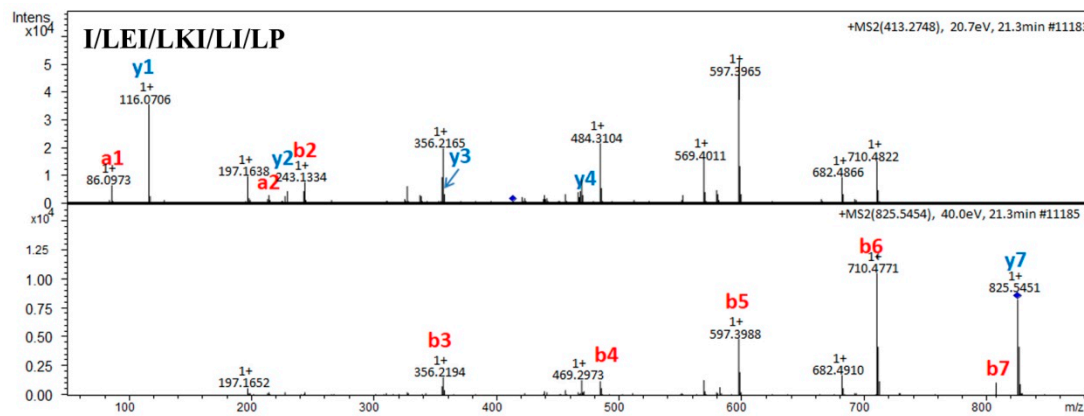
Supplementary Figure 25. Mass spectra and de novo sequencing analysis of
TPSYI/LPT



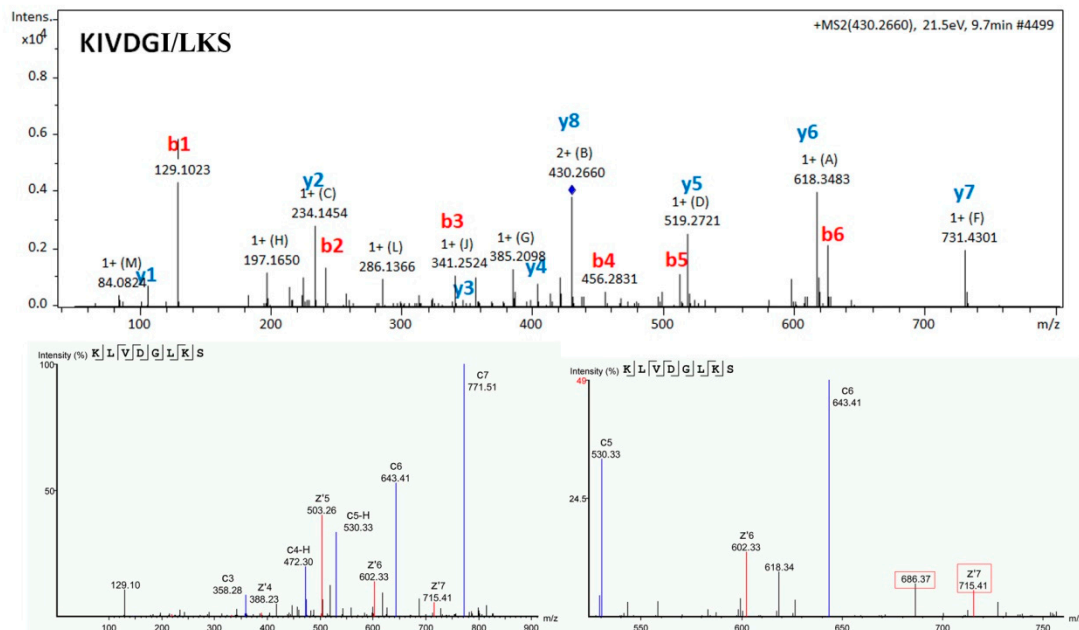
Supplementary Figure 26. Mass spectra and de novo sequencing analysis of
I/LI/LPDAI/LSG



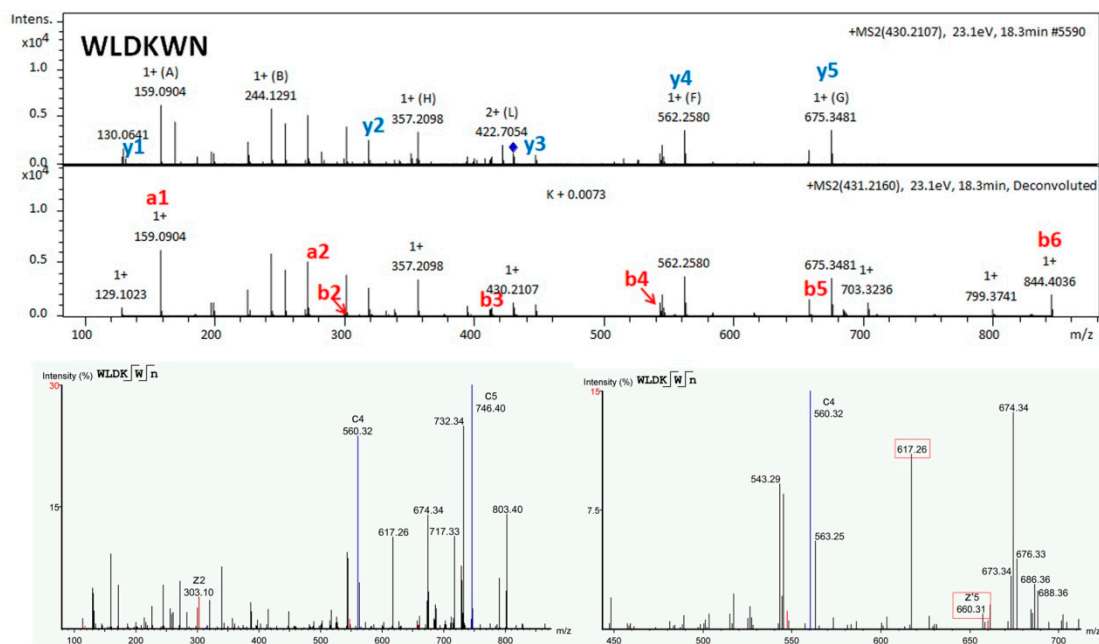
Supplementary Figure 27. Mass spectra and de novo sequencing analysis of
I/LI/LEI/LIPK



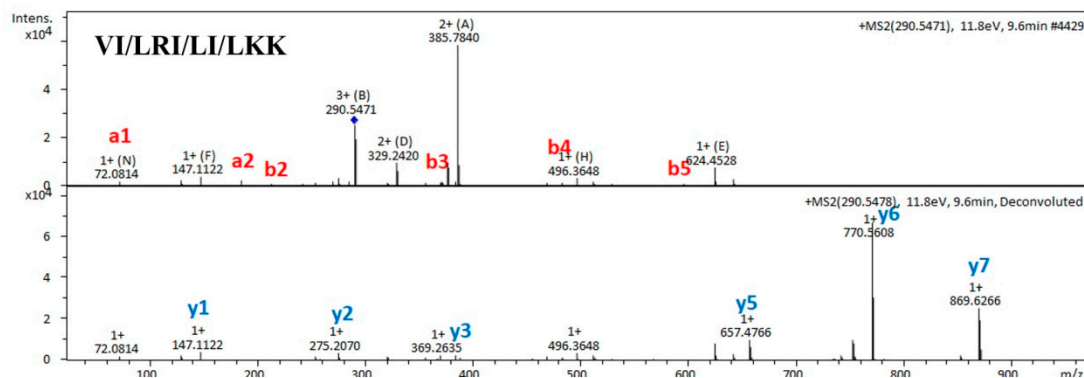
Supplementary Figure 28. Mass spectra and de novo sequencing analysis of
I/LEI/LKI/LI/LP



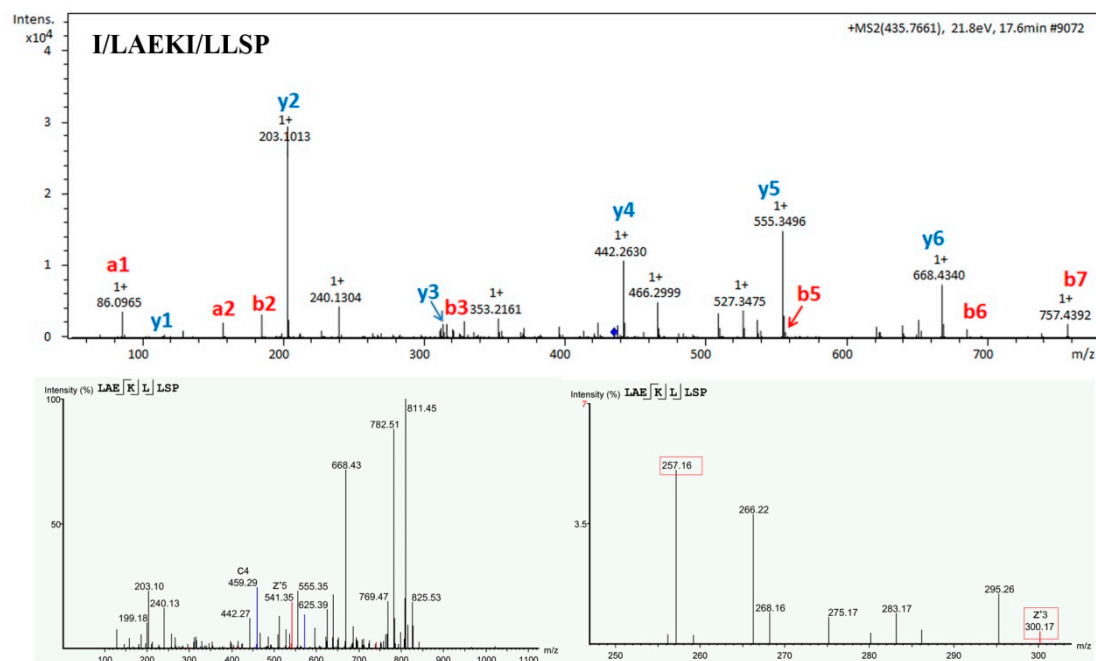
Supplementary Figure 29. Mass spectra and de novo sequencing analysis of
KIVDGI/LKS



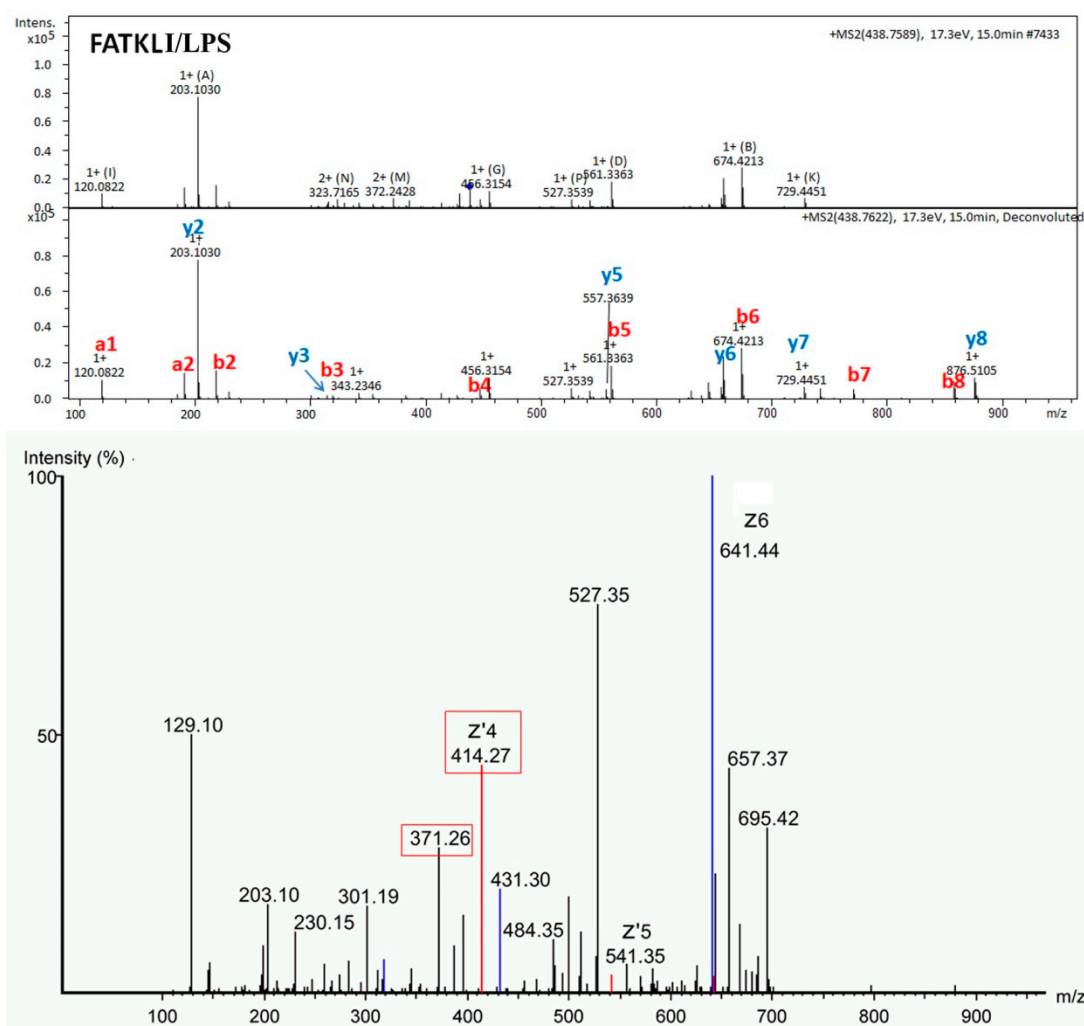
Supplementary Figure 30. Mass spectra and de novo sequencing analysis of
WLDKWN



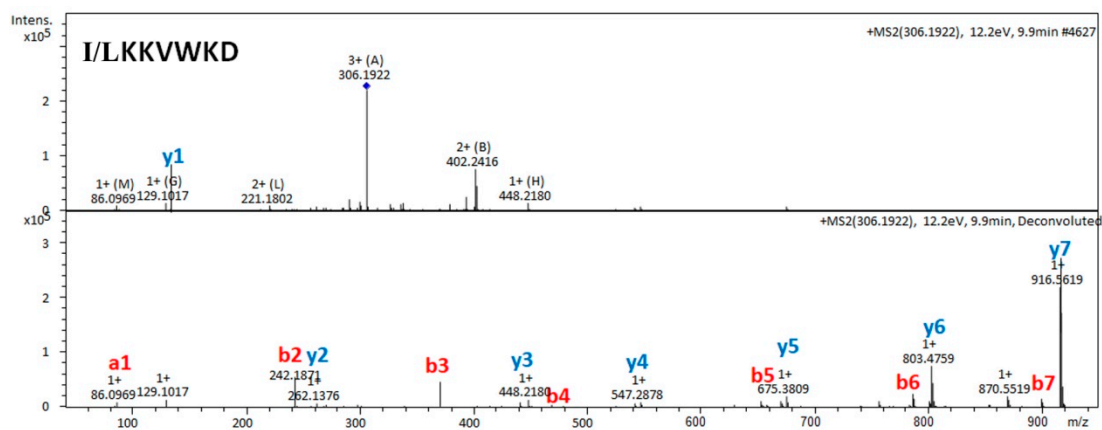
Supplementary Figure 31. Mass spectra and de novo sequencing analysis of
VI/LRI/LI/LKK



Supplementary Figure 32. Mass spectra and de novo sequencing analysis of
I/LAEKI/LLSP

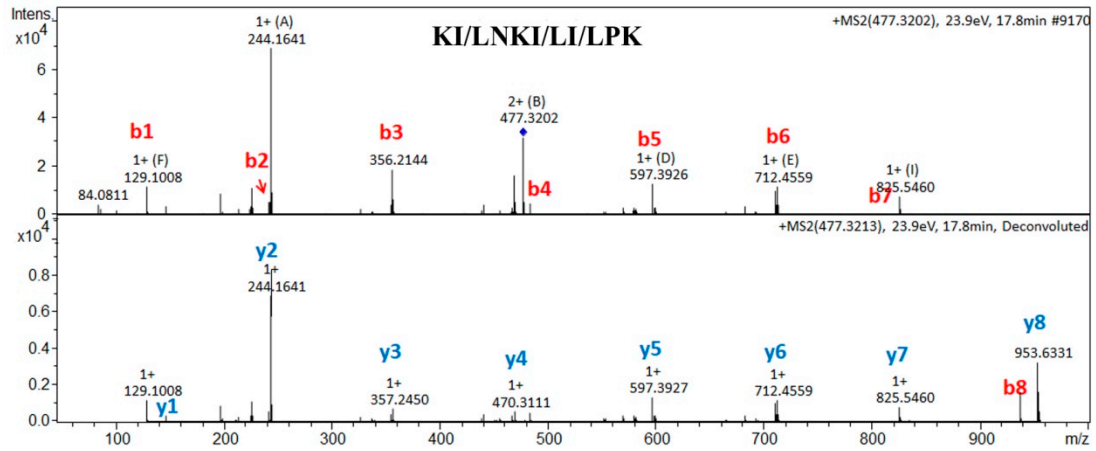


Supplementary Figure 33. Mass spectra and de novo sequencing analysis of
FATKLI/LPS



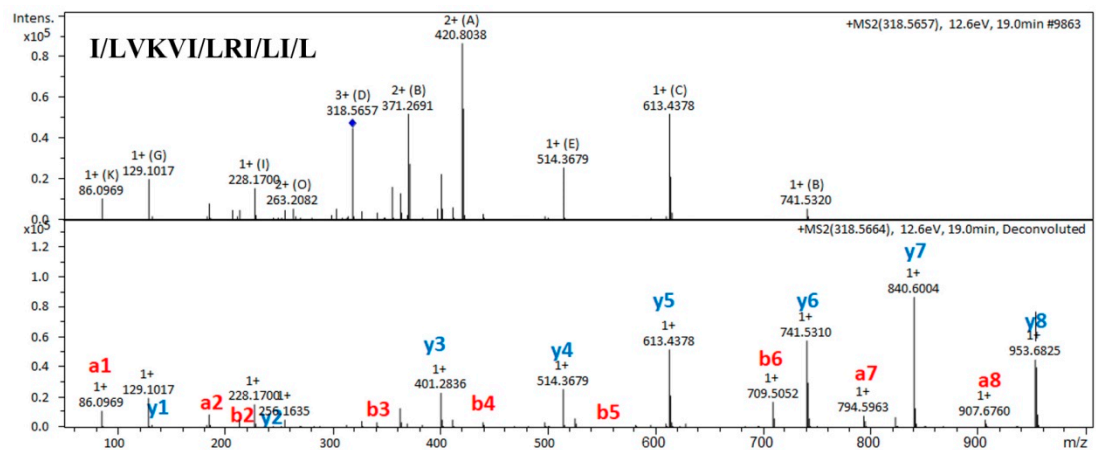
Supplementary Figure 34. Mass spectra and de novo sequencing analysis of

I/LKKVWKD



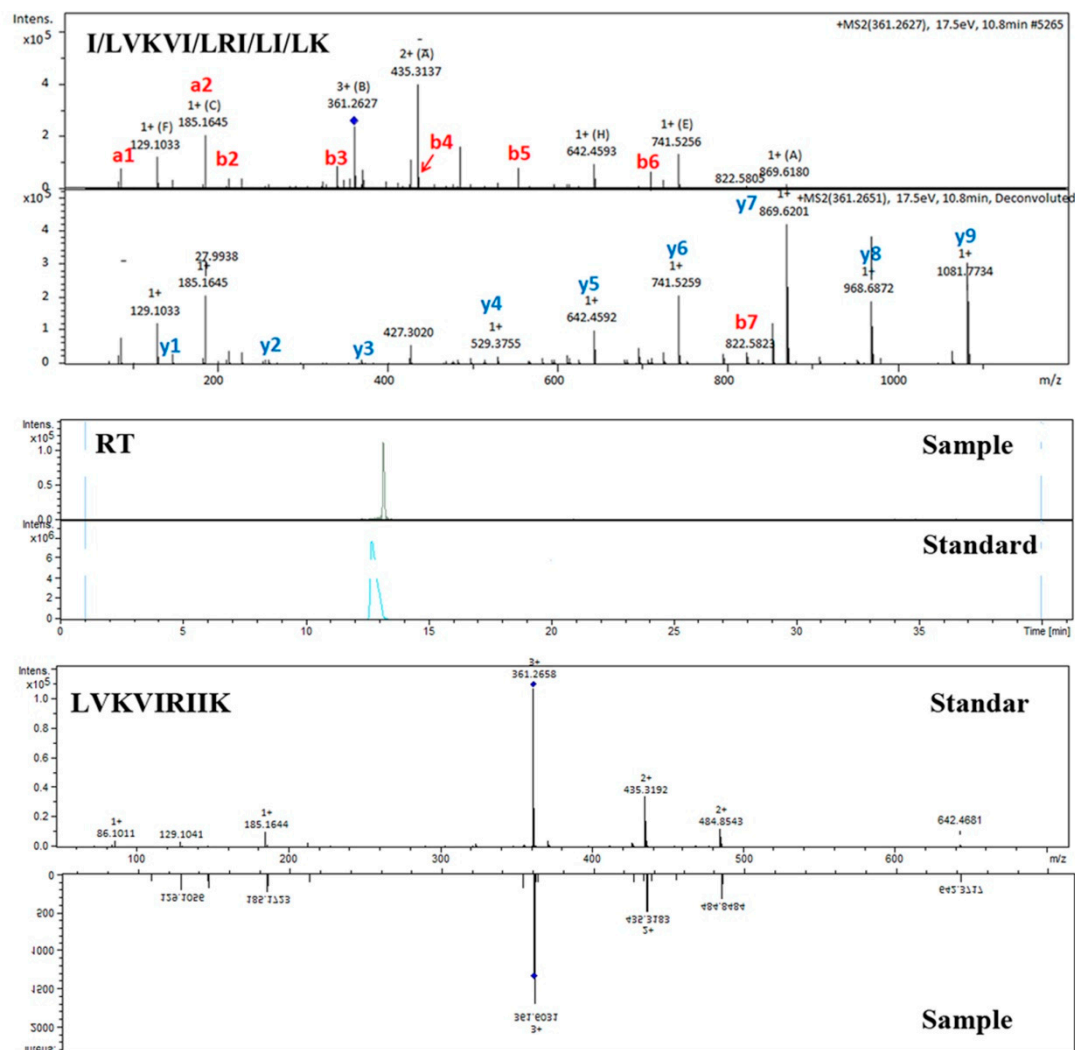
Supplementary Figure 35. Mass spectra and de novo sequencing analysis of

KI/LNKI/LI/LPK



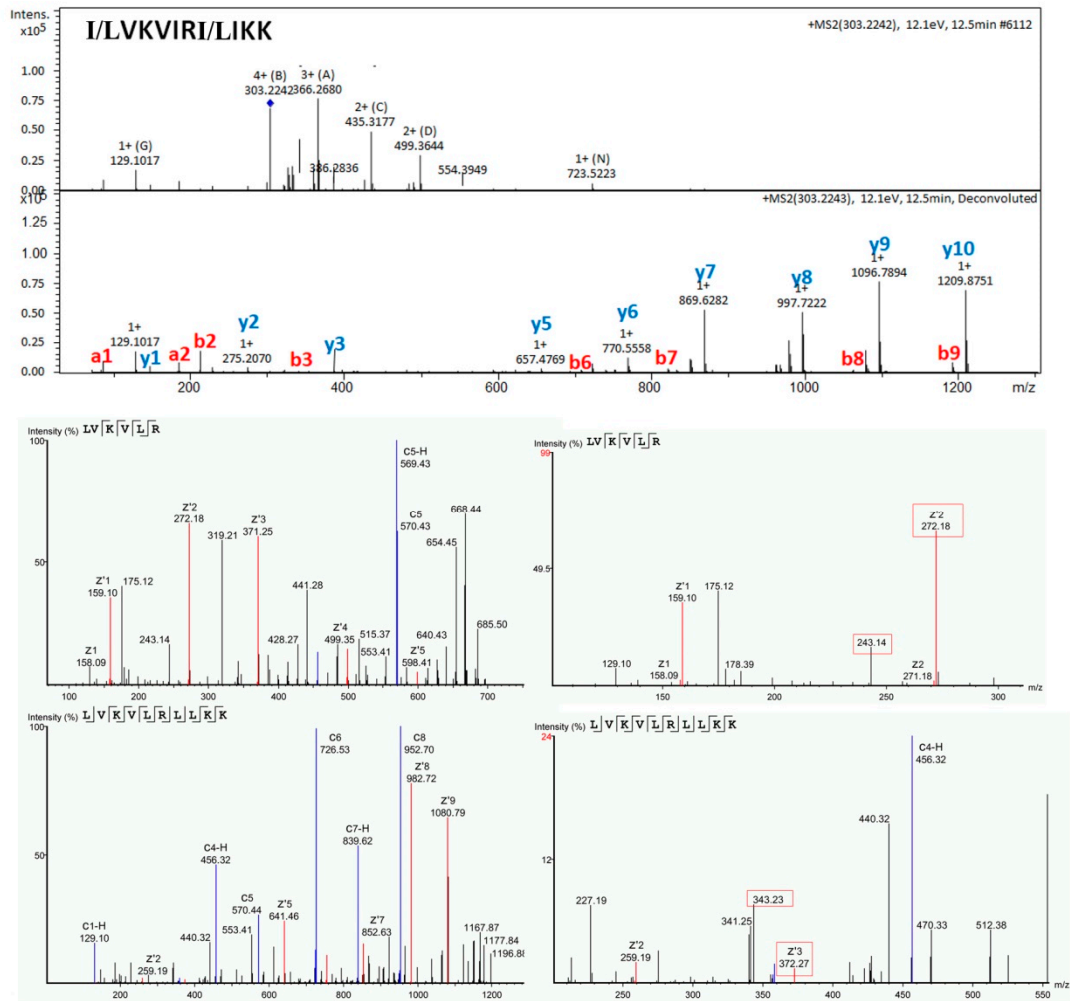
Supplementary Figure 36. Mass spectra and de novo sequencing analysis of

I/LVKVI/LRI/LI/L



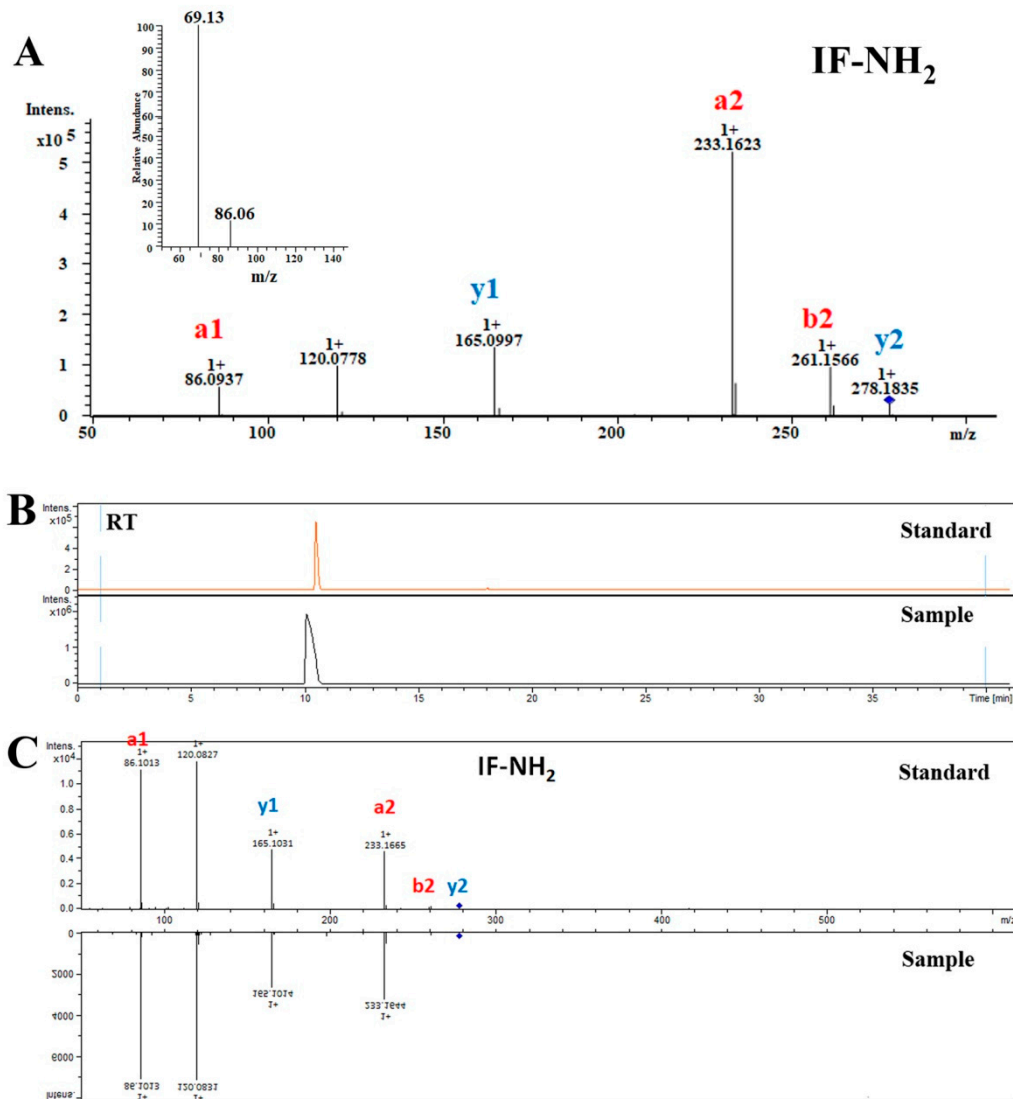
Supplementary Figure 37. Mass spectra and de novo sequencing analysis of

I/LVKVI/LRI/LI/LK

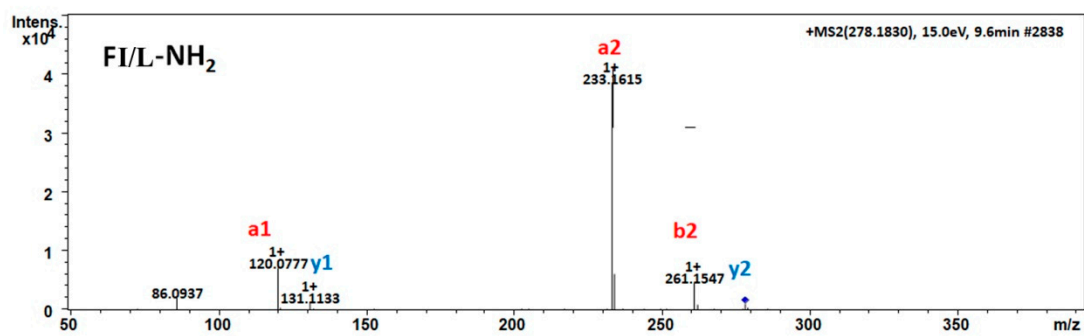


Supplementary Figure 38. Mass spectra and de novo sequencing analysis of

I/LVKVIRI/LIKK

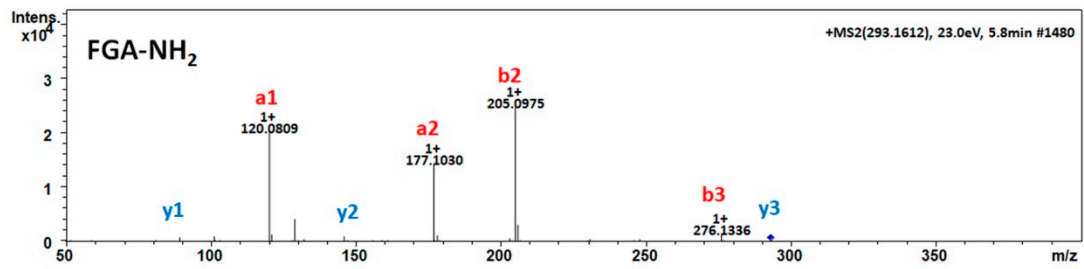


Supplementary Figure 39. Mass spectra and de novo sequencing analysis of IF-NH₂



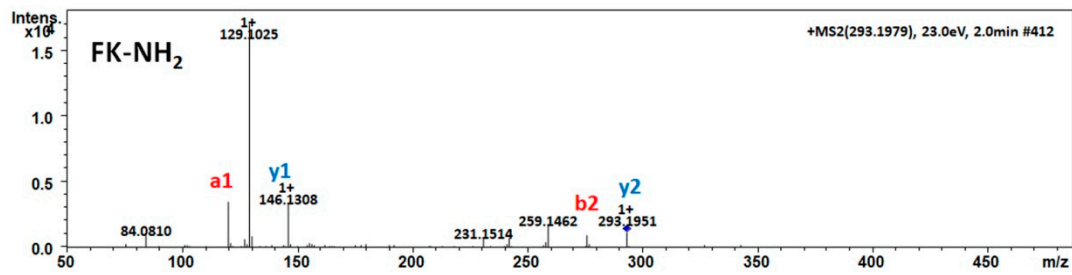
Supplementary Figure 40. Mass spectra and de novo sequencing analysis of FI/L-NH₂

FI/L-NH₂



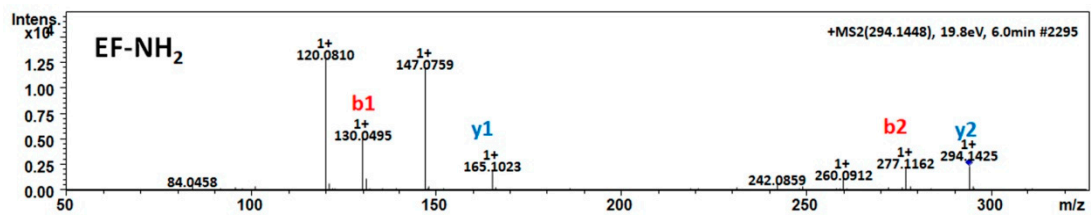
Supplementary Figure 41. Mass spectra and de novo sequencing analysis of

FGA-NH₂



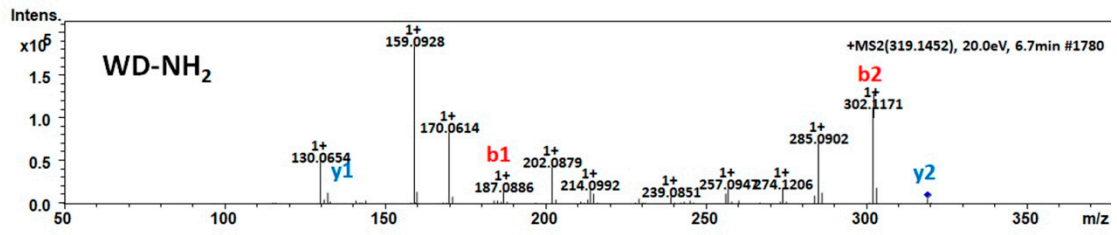
Supplementary Figure 42. Mass spectra and de novo sequencing analysis of

FK-NH₂

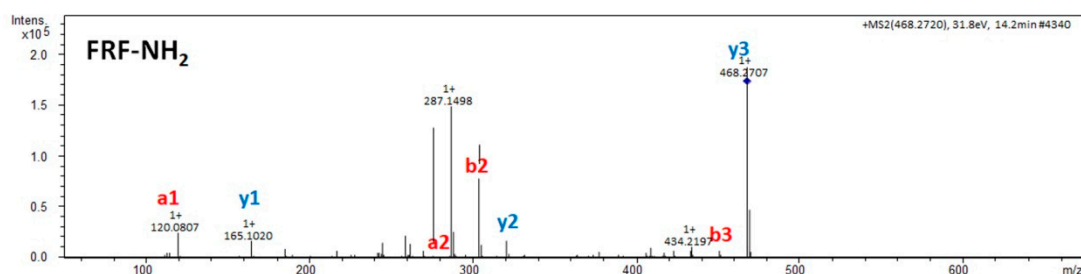


Supplementary Figure 43. Mass spectra and de novo sequencing analysis of

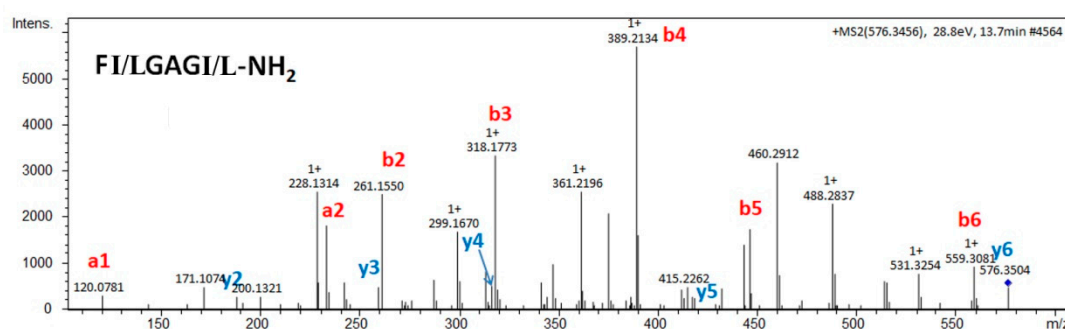
EF-NH₂



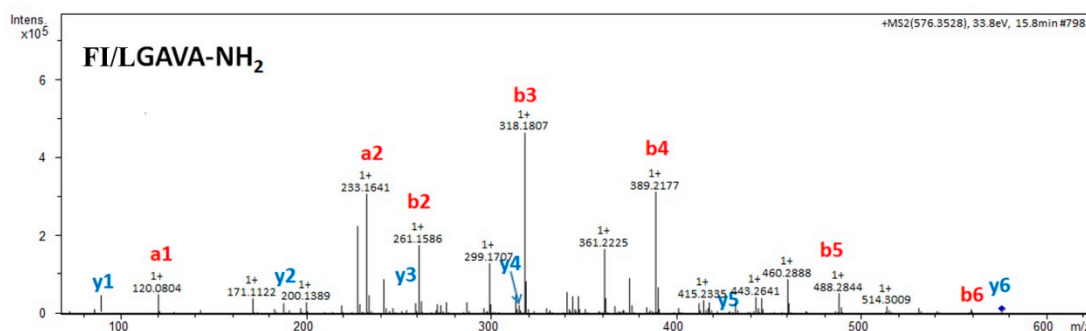
Supplementary Figure 47. Mass spectra and de novo sequencing analysis of
I/LGAVA-NH₂



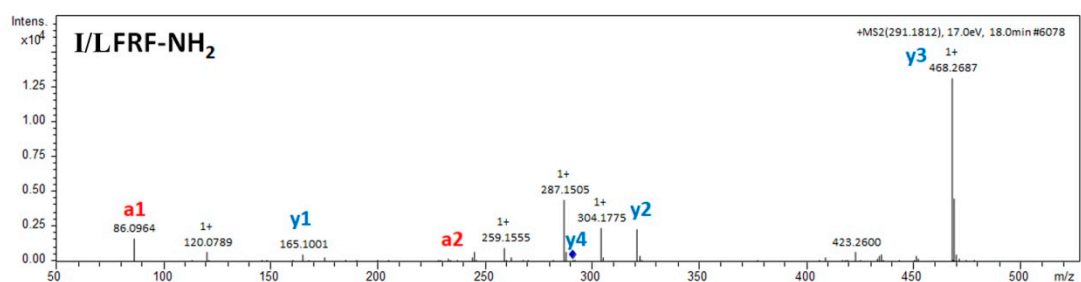
Supplementary Figure 48. Mass spectra and de novo sequencing analysis of
FRF-NH₂



Supplementary Figure 49. Mass spectra and de novo sequencing analysis of
FI/LGAGI/L-NH₂

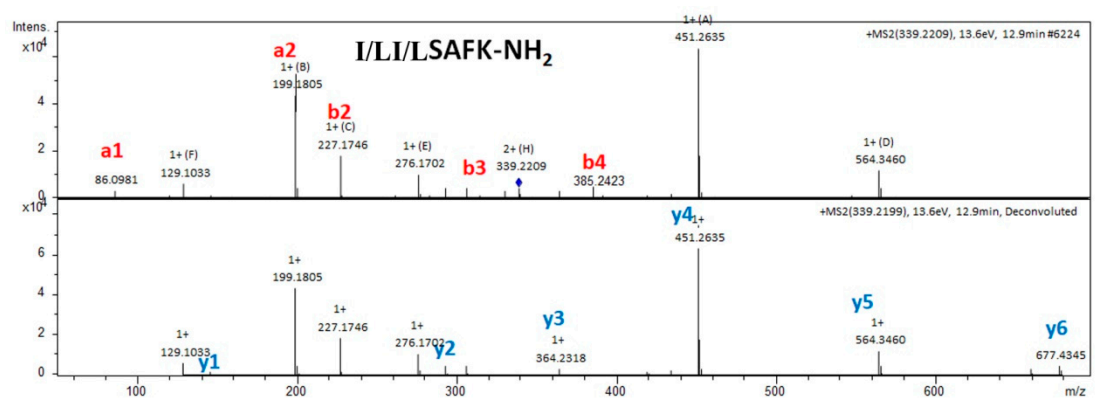


Supplementary Figure 50. Mass spectra and de novo sequencing analysis of
FI/LGAVA-NH₂



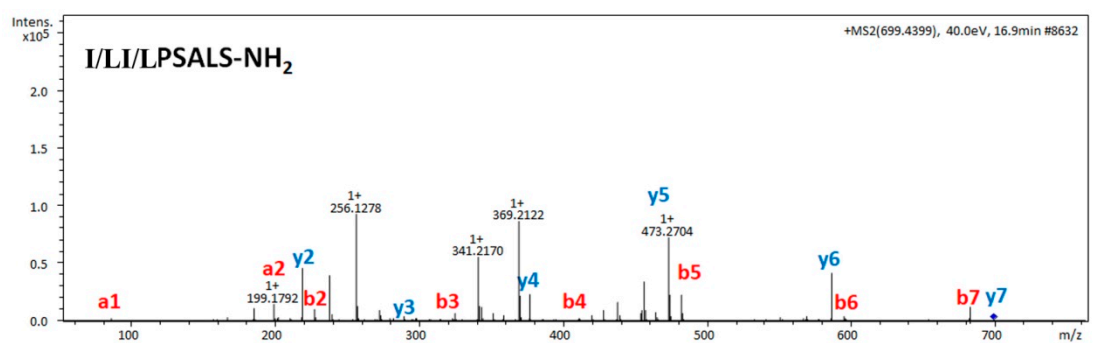
Supplementary Figure 51. Mass spectra and de novo sequencing analysis of

I/LFRF-NH₂



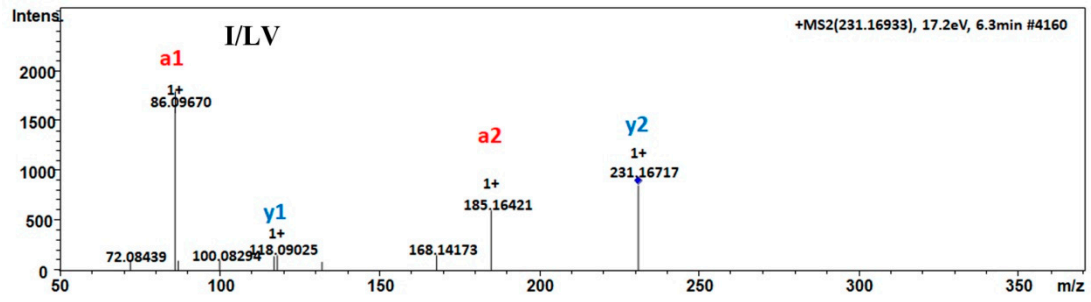
Supplementary Figure 52. Mass spectra and de novo sequencing analysis of

I/LI/LSAFK-NH₂



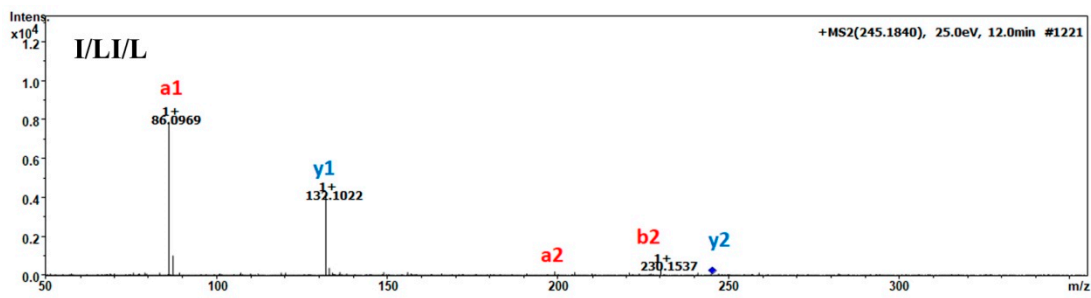
Supplementary Figure 53. Mass spectra and de novo sequencing analysis of

I/LI/LPSAI/LS-NH₂



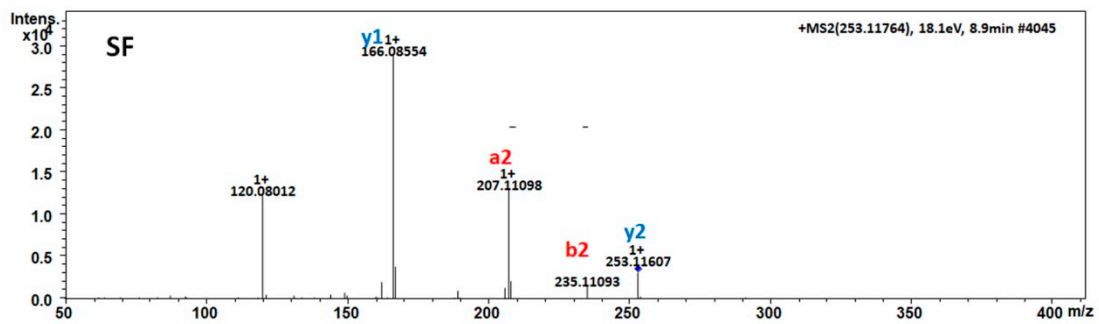
Supplementary Figure 54. Mass spectra and de novo sequencing analysis of

I/LV



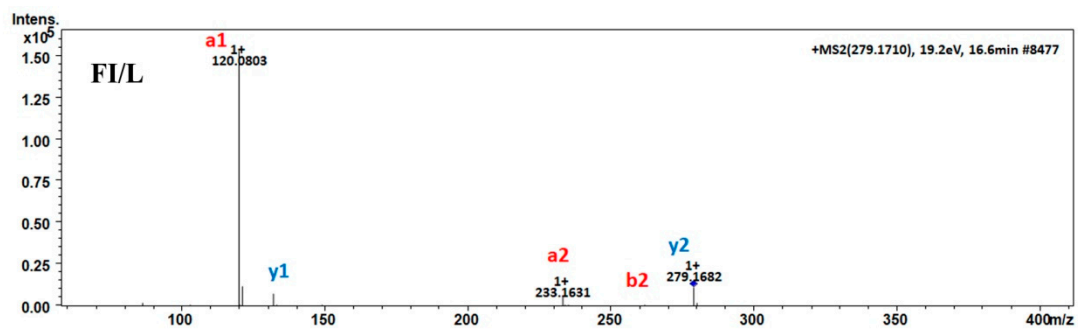
Supplementary Figure 55. Mass spectra and de novo sequencing analysis of

I/LI/L

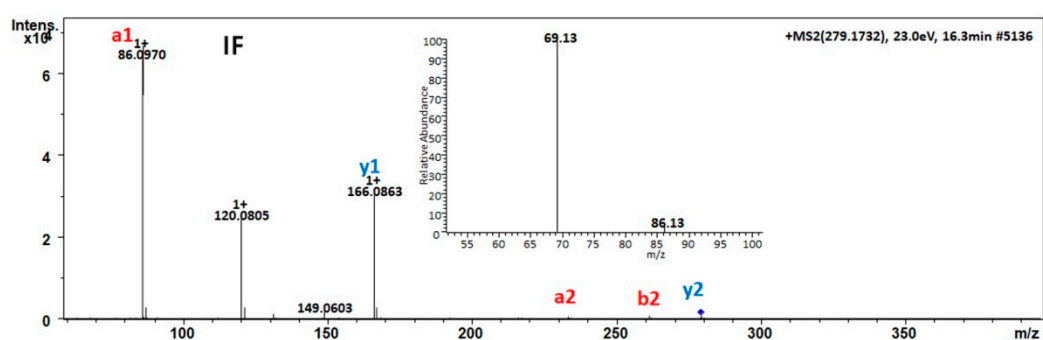


Supplementary Figure 56. Mass spectra and de novo sequencing analysis of

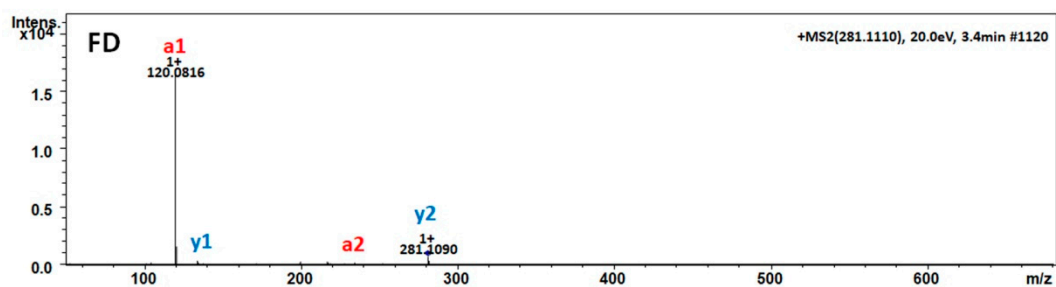
SF



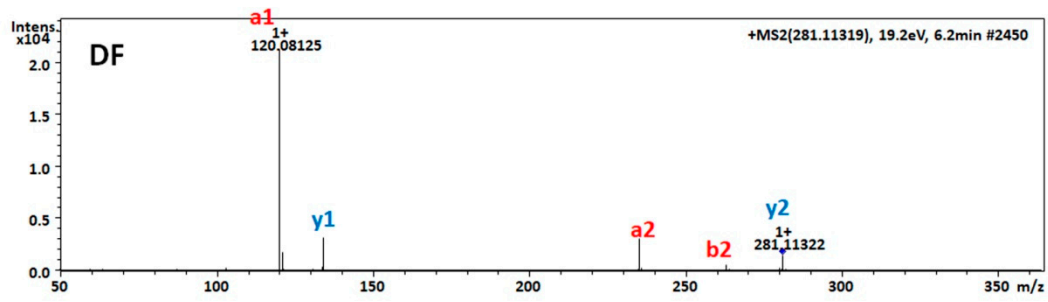
Supplementary Figure 57. Mass spectra and de novo sequencing analysis of
FI/L



Supplementary Figure 58. Mass spectra and de novo sequencing analysis of IF

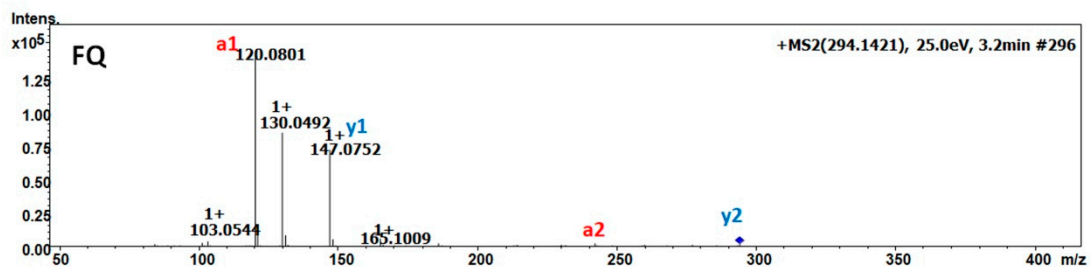


Supplementary Figure 59. Mass spectra and de novo sequencing analysis of
FD



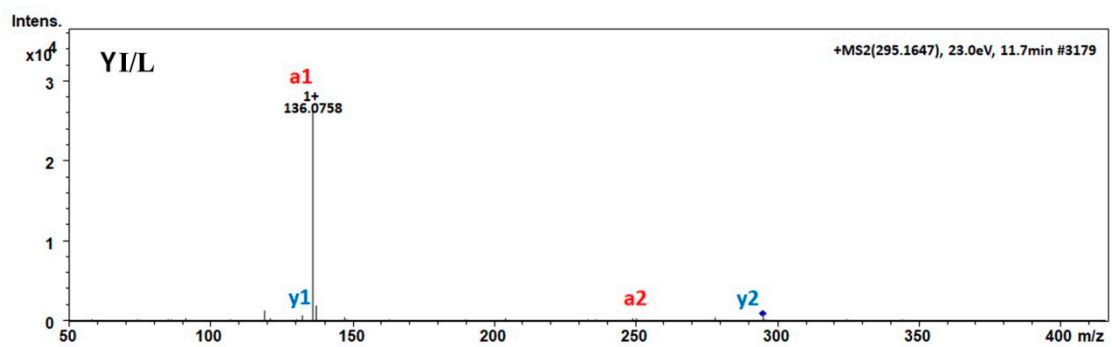
Supplementary Figure 60. Mass spectra and de novo sequencing analysis of

DF



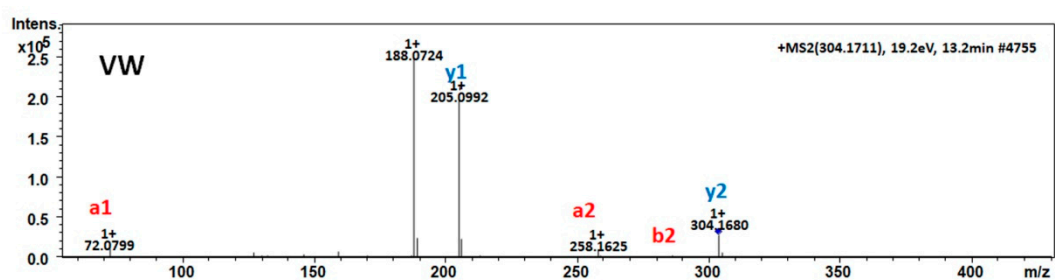
Supplementary Figure 61. Mass spectra and de novo sequencing analysis of

FQ

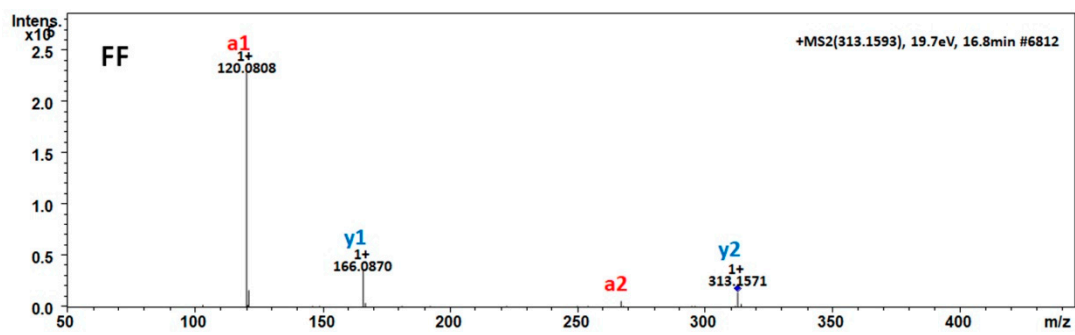


Supplementary Figure 62. Mass spectra and de novo sequencing analysis of

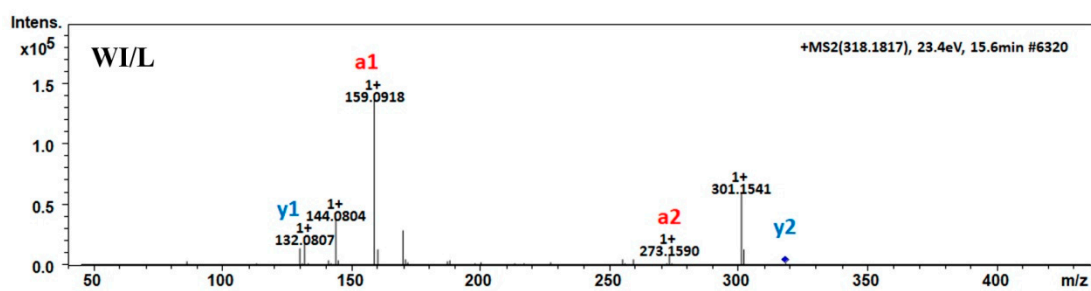
YI/L



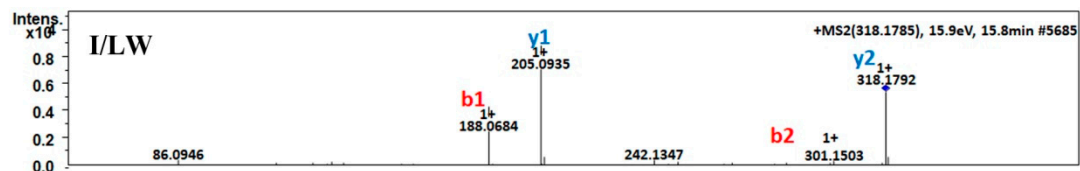
Supplementary Figure 63. Mass spectra and de novo sequencing analysis of
VW



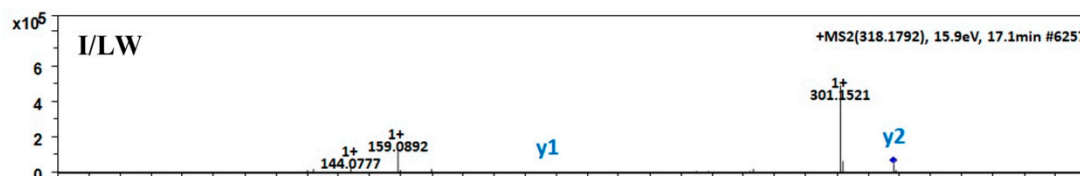
Supplementary Figure 64. Mass spectra and de novo sequencing analysis of
FF



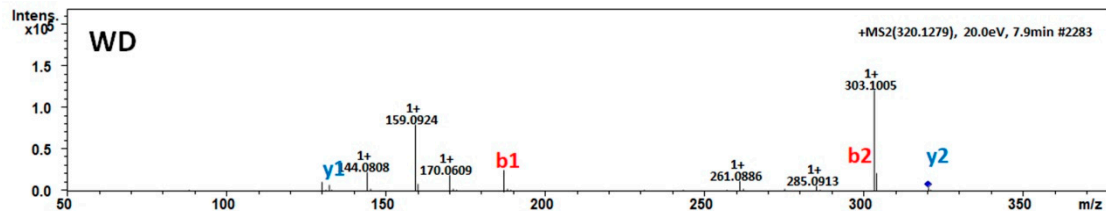
Supplementary Figure 65. Mass spectra and de novo sequencing analysis of
WI/L



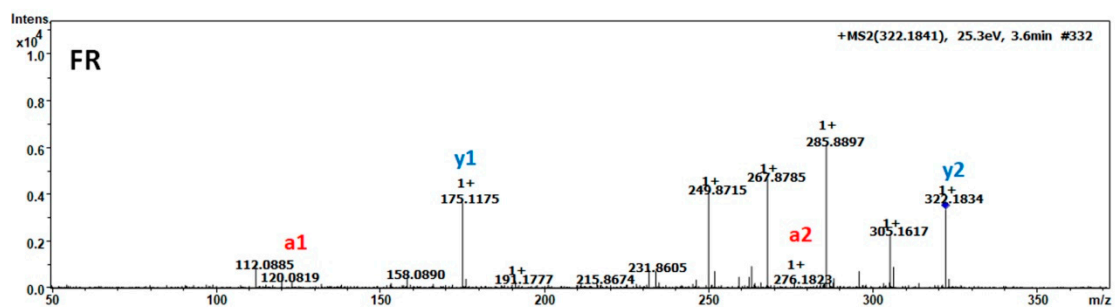
Supplementary Figure 66. Mass spectra and de novo sequencing analysis of I/LW



Supplementary Figure 67. Mass spectra and de novo sequencing analysis of I/LW

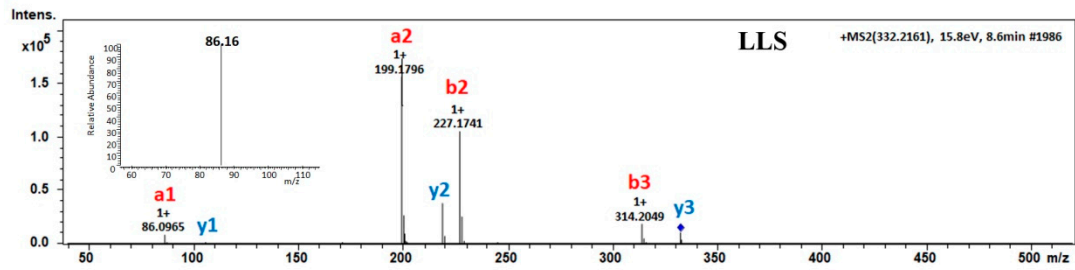


Supplementary Figure 68. Mass spectra and de novo sequencing analysis of WD



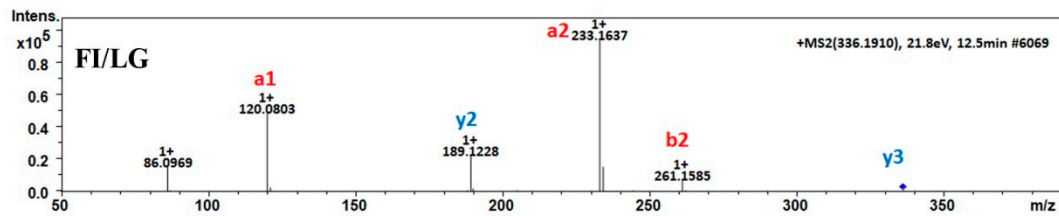
Supplementary Figure 69. Mass spectra and de novo sequencing analysis of FR

FR



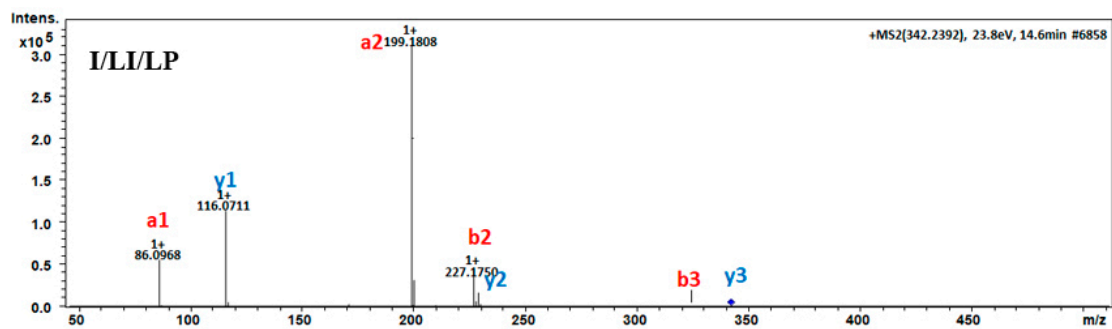
Supplementary Figure 70. Mass spectra and de novo sequencing analysis of

LLS



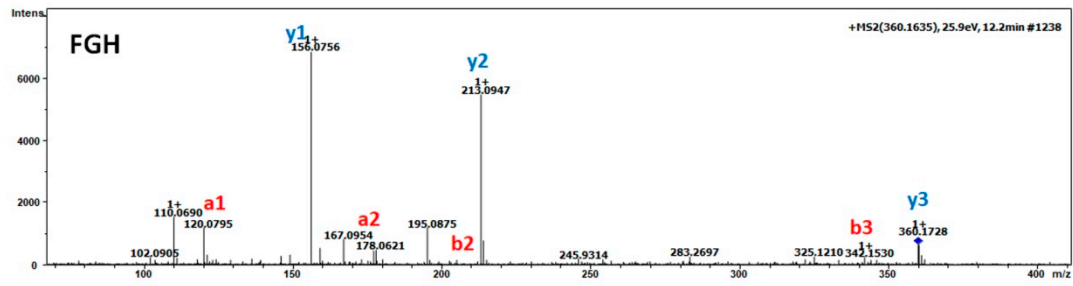
Supplementary Figure 71. Mass spectra and de novo sequencing analysis of

FI/LG

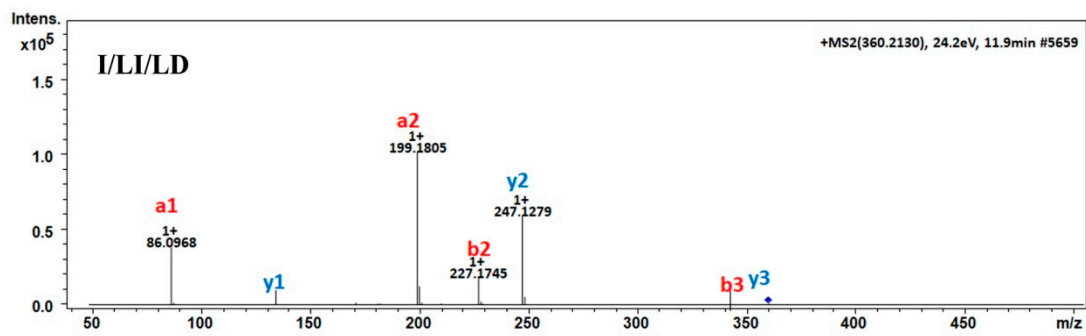


Supplementary Figure 72. Mass spectra and de novo sequencing analysis of

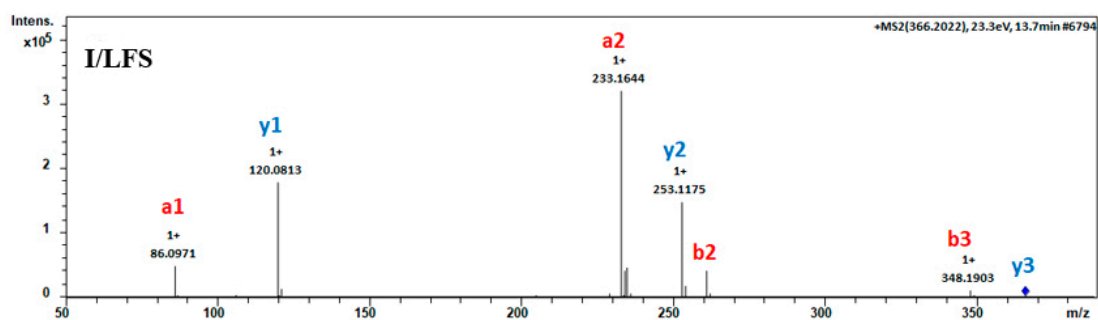
I/LI/LP



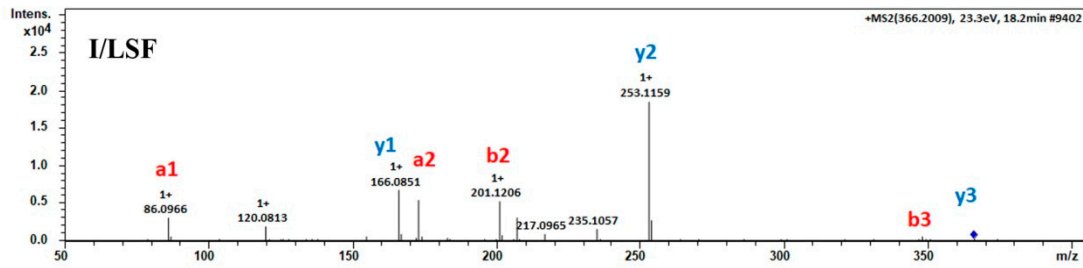
Supplementary Figure73. Mass spectra and de novo sequencing analysis of
FGH



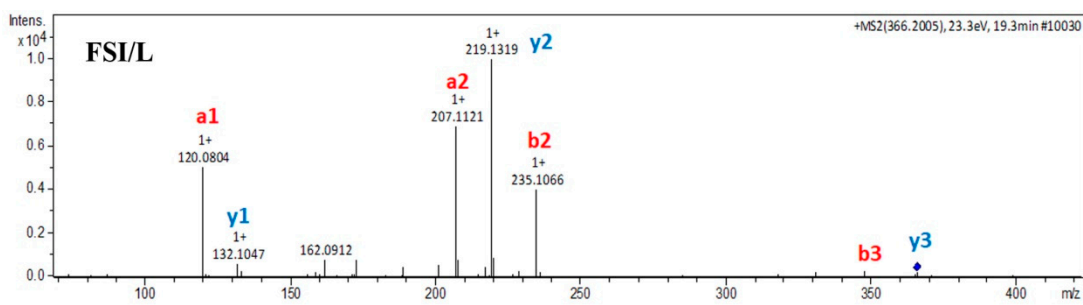
Supplementary Figure74. Mass spectra and de novo sequencing analysis of
I/LI/LD



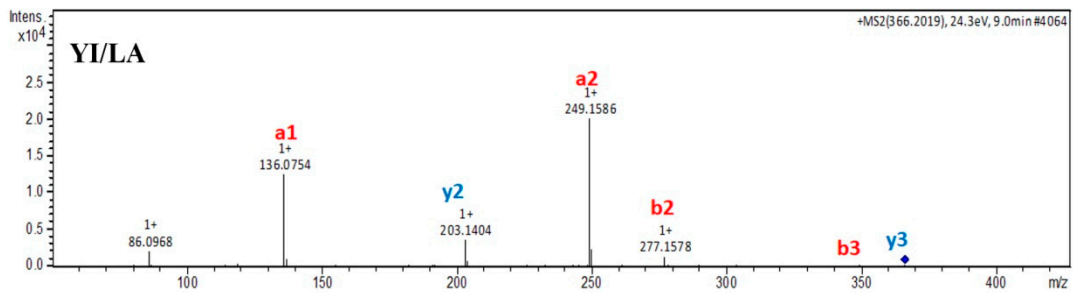
Supplementary Figure75. Mass spectra and de novo sequencing analysis of
I/LFS



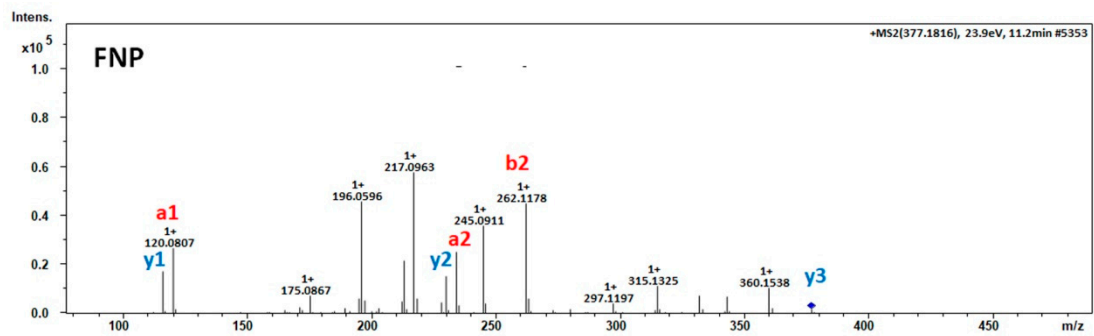
Supplementary Figure76. Mass spectra and de novo sequencing analysis of
I/LSF



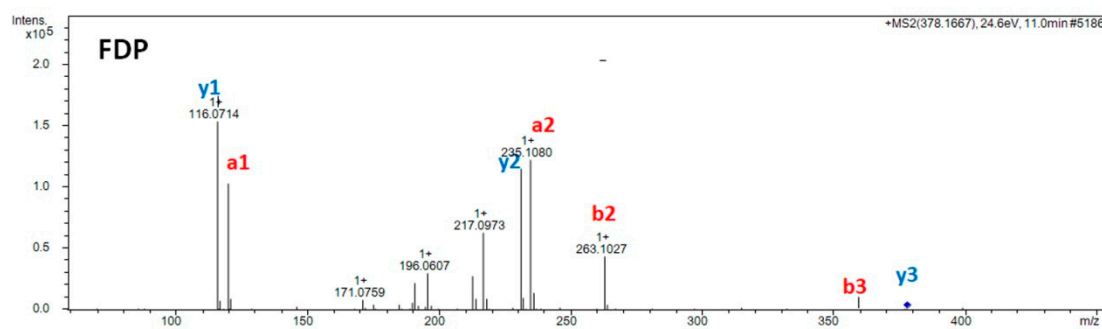
Supplementary Figure77. Mass spectra and de novo sequencing analysis of
FSI/L



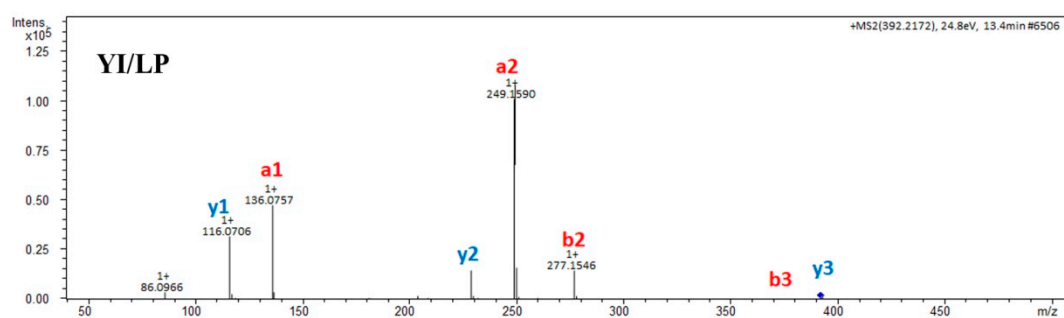
Supplementary Figure78. Mass spectra and de novo sequencing analysis of
YI/LA



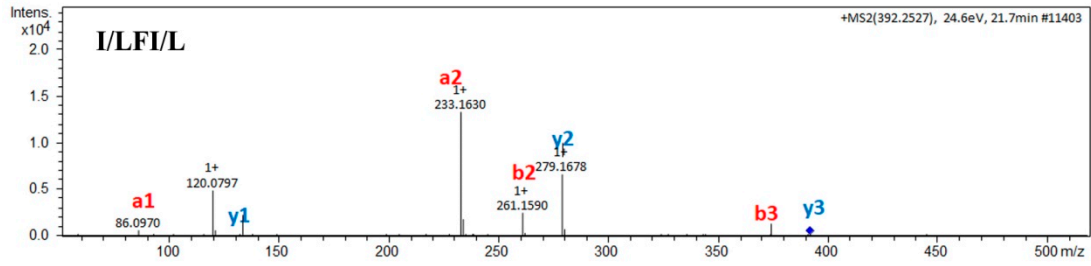
Supplementary Figure 79. Mass spectra and de novo sequencing analysis of FNP



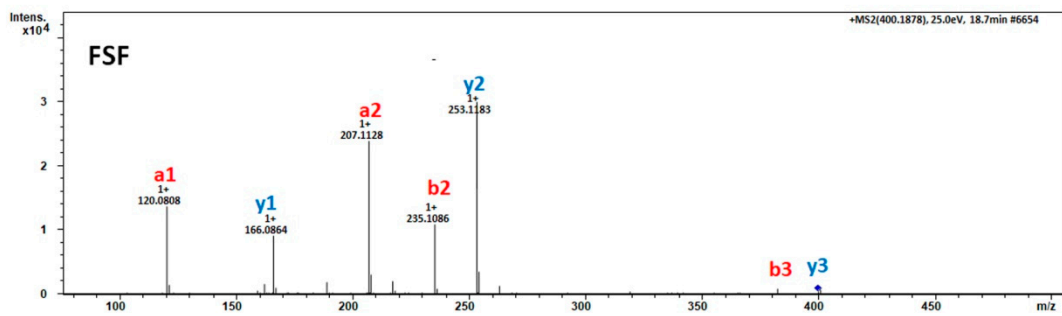
Supplementary Figure 80. Mass spectra and de novo sequencing analysis of FDP



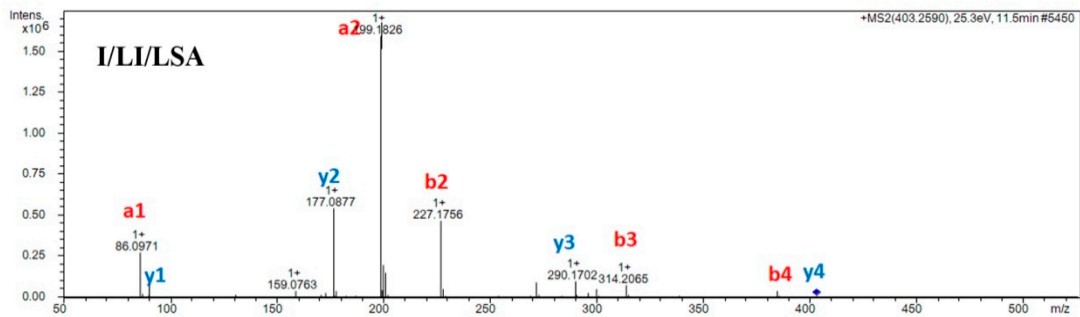
Supplementary Figure 81. Mass spectra and de novo sequencing analysis of YI/LP



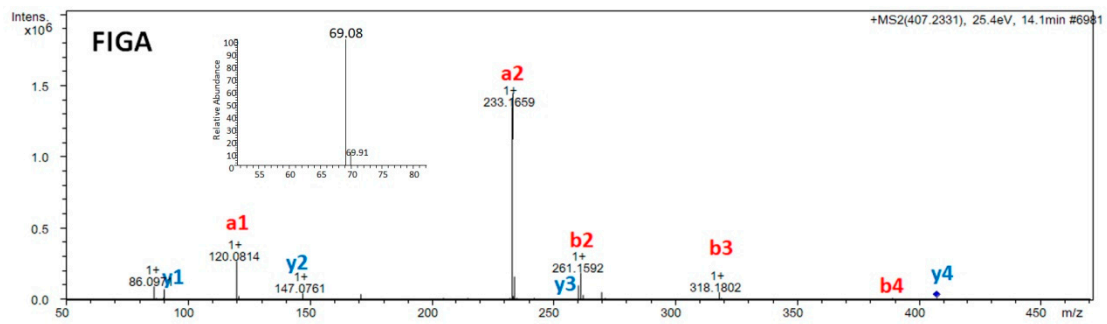
Supplementary Figure 82. Mass spectra and de novo sequencing analysis of
I/LFI/L



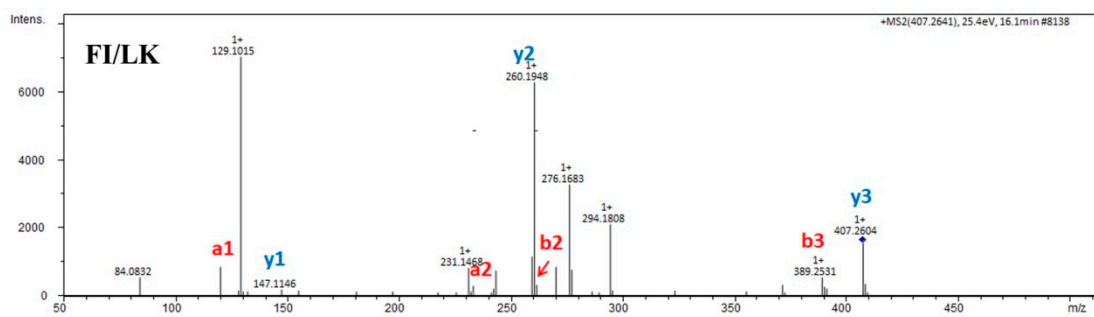
Supplementary Figure 83. Mass spectra and de novo sequencing analysis of
FSF



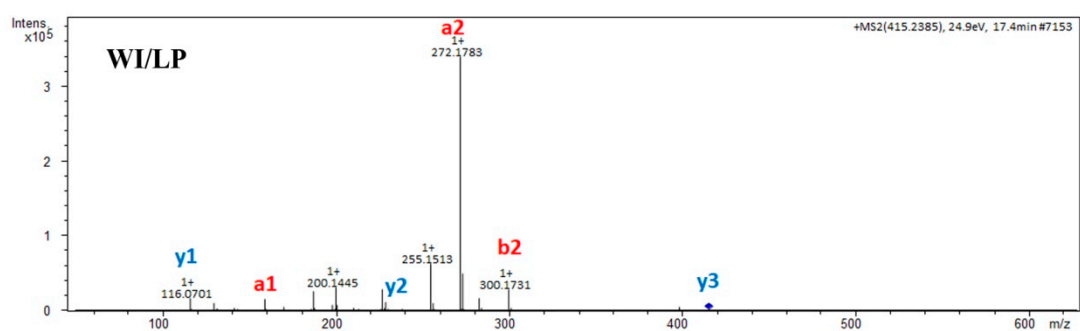
Supplementary Figure 84. Mass spectra and de novo sequencing analysis of
I/LI/LSA



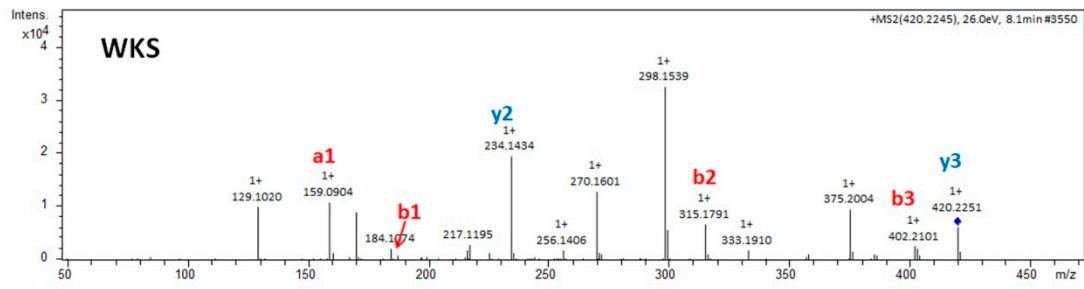
Supplementary Figure 85. Mass spectra and de novo sequencing analysis of
FIGA



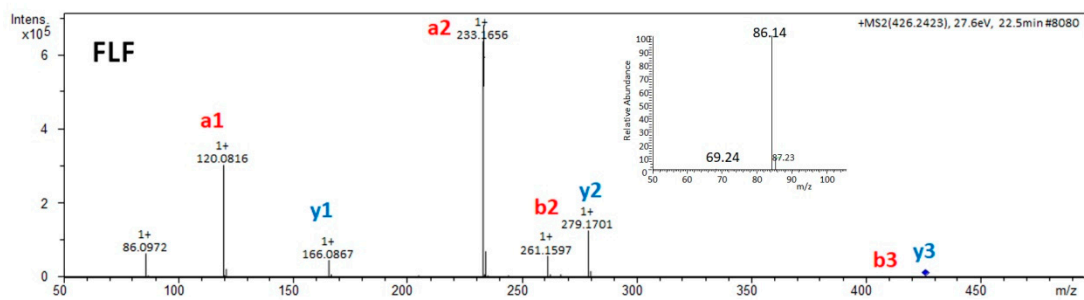
Supplementary Figure73. Mass spectra and de novo sequencing analysis of
FI/LK



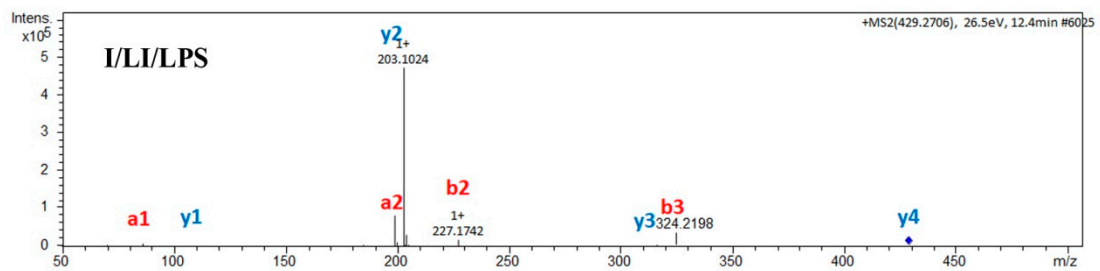
Supplementary Figure 87. Mass spectra and de novo sequencing analysis of
WI/LP



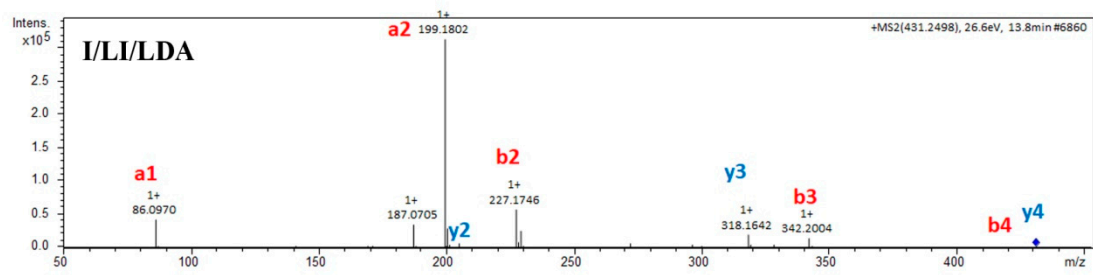
Supplementary Figure 88. Mass spectra and de novo sequencing analysis of
WKS



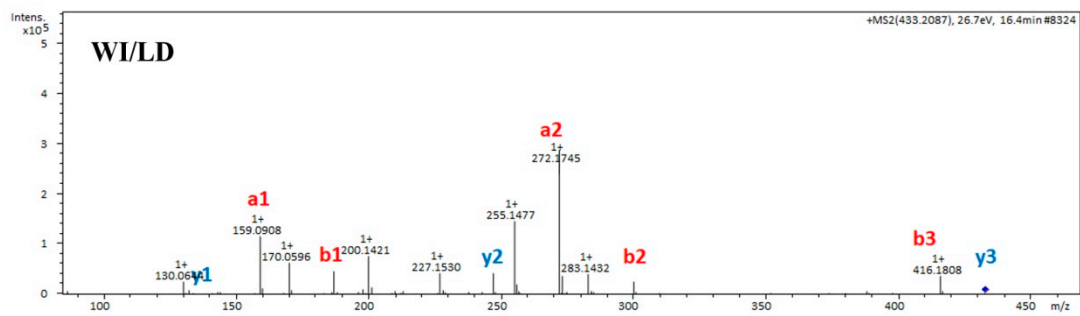
Supplementary Figure 89. Mass spectra and de novo sequencing analysis of
FLF



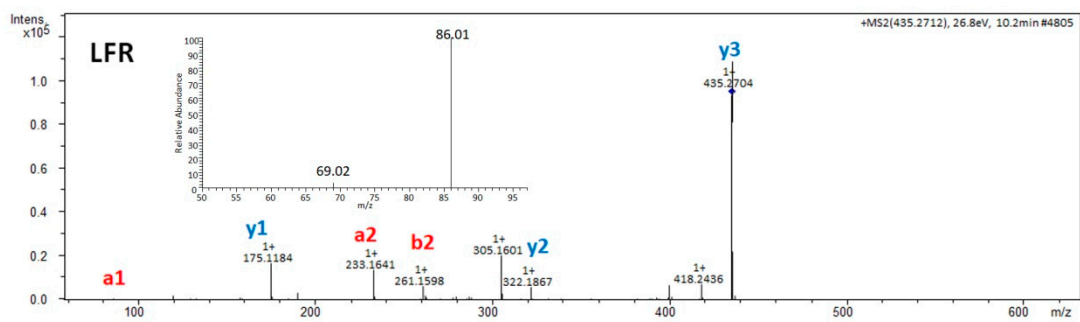
Supplementary Figure 90. Mass spectra and de novo sequencing analysis of
I/LI/LPS



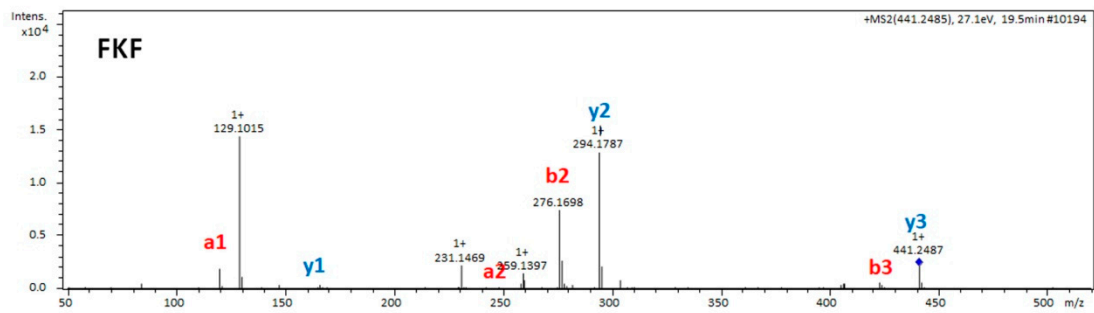
Supplementary Figure 91. Mass spectra and de novo sequencing analysis of
I/LI/LDA



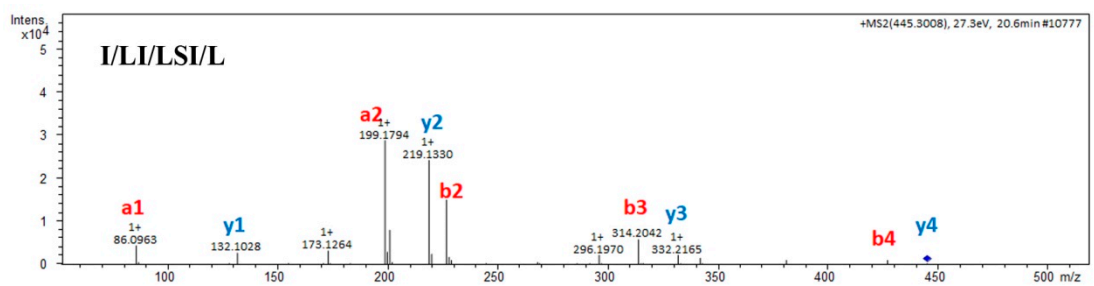
Supplementary Figure 92. Mass spectra and de novo sequencing analysis of
WI/LD



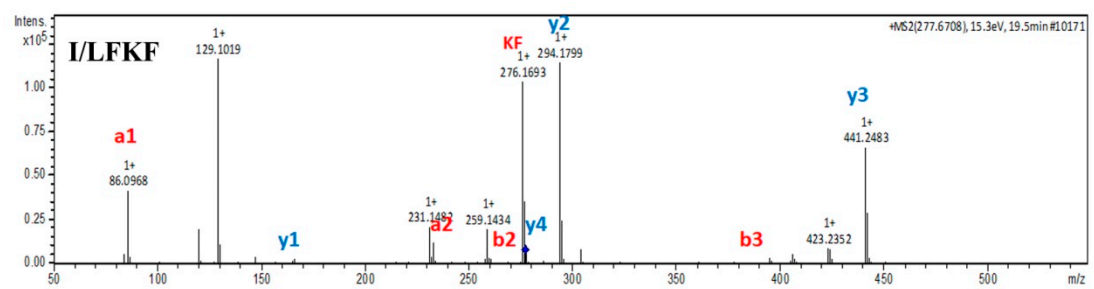
Supplementary Figure 93. Mass spectra and de novo sequencing analysis of
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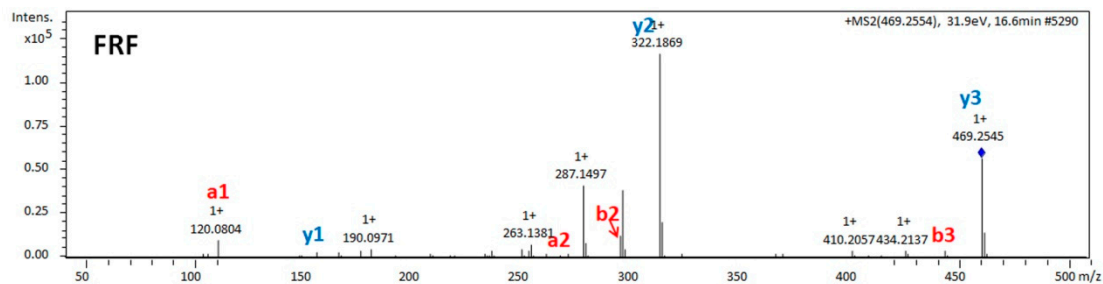
Supplementary Figure 94. Mass spectra and de novo sequencing analysis of
FKF



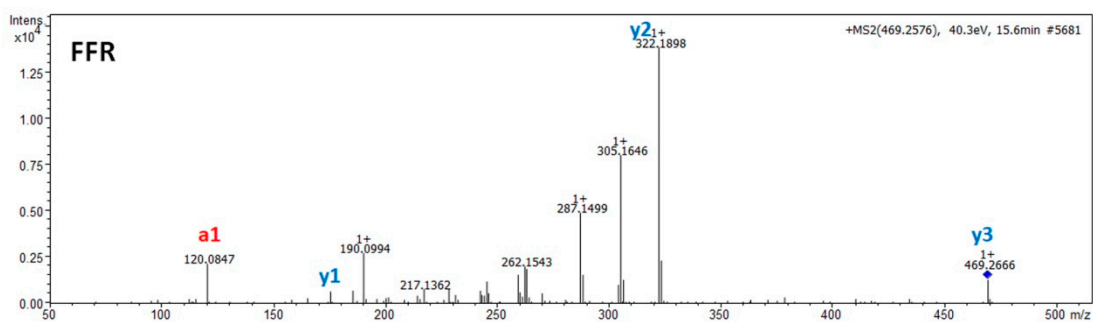
Supplementary Figure 95. Mass spectra and de novo sequencing analysis of
I/LI/LSI/L



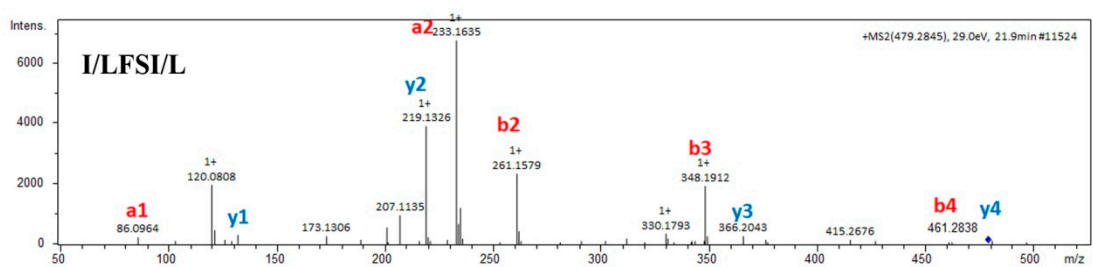
Supplementary Figure 96. Mass spectra and de novo sequencing analysis of
I/LFKF



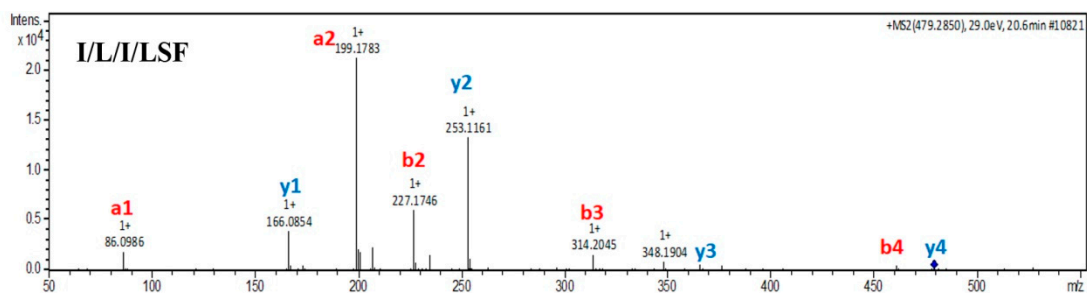
Supplementary Figure 97. Mass spectra and de novo sequencing analysis of
FRF



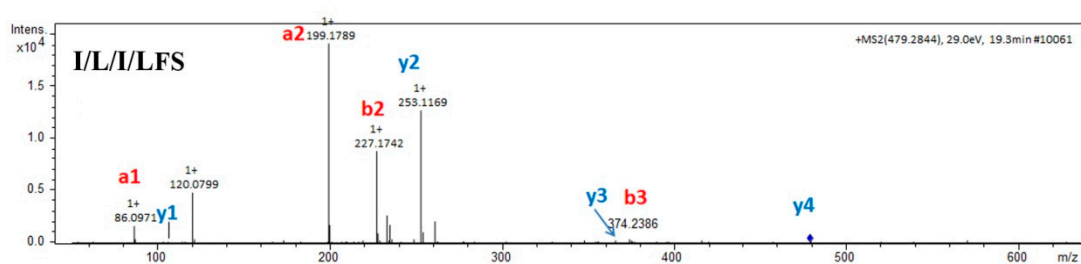
Supplementary Figure 98. Mass spectra and de novo sequencing analysis of
FFR



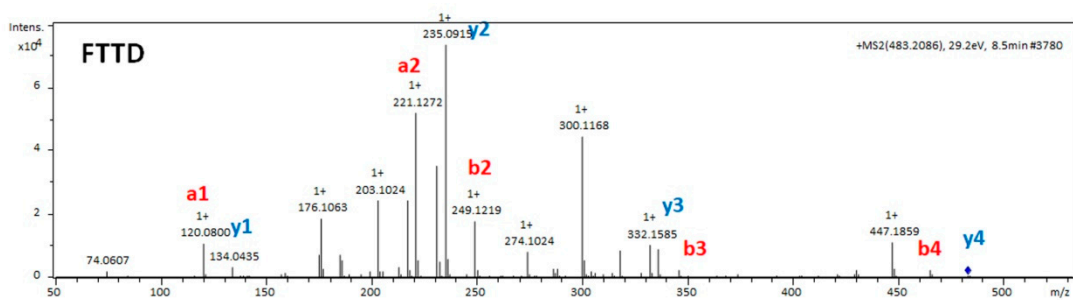
Supplementary Figure 99. Mass spectra and de novo sequencing analysis of
I/LFSI/L



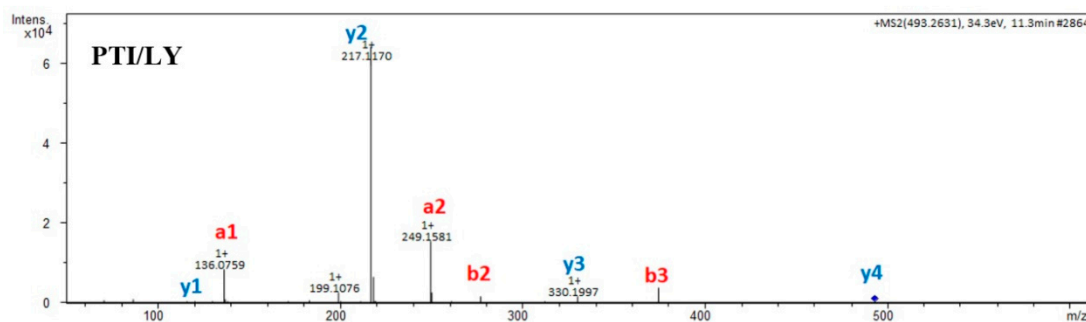
Supplementary Figure 100. Mass spectra and de novo sequencing analysis of I/L/I/LSF



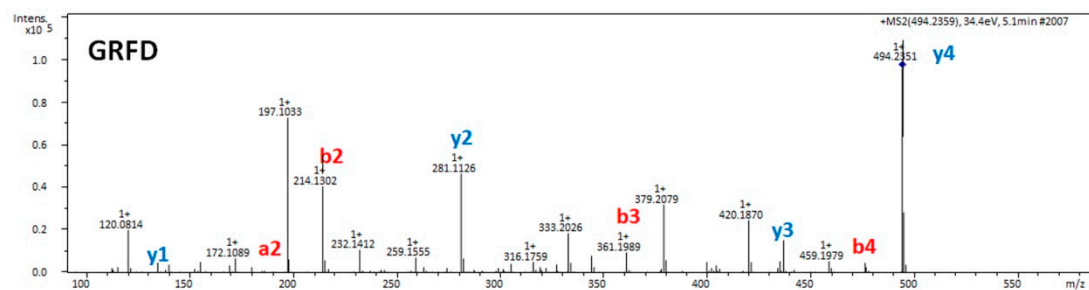
Supplementary Figure 101. Mass spectra and de novo sequencing analysis of I/L/I/LFS



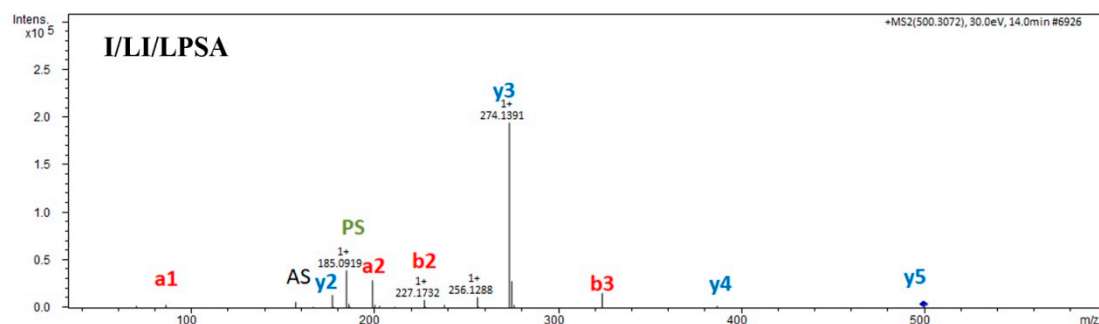
Supplementary Figure 102. Mass spectra and de novo sequencing analysis of FTTD



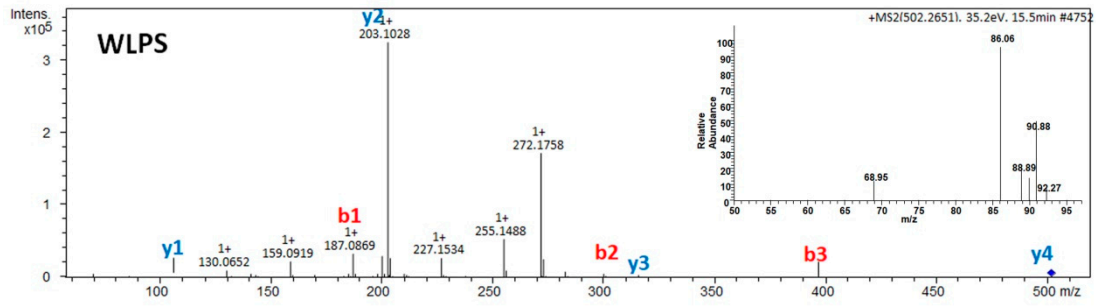
Supplementary Figure 103. Mass spectra and de novo sequencing analysis of PTI/LY



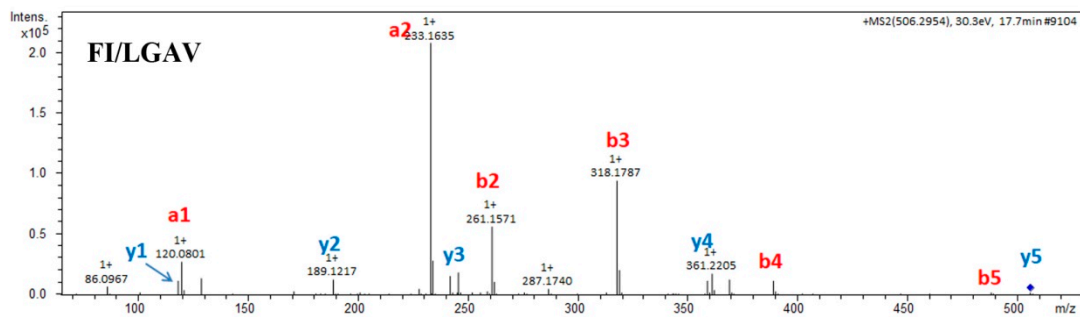
Supplementary Figure 104. Mass spectra and de novo sequencing analysis of GRFD



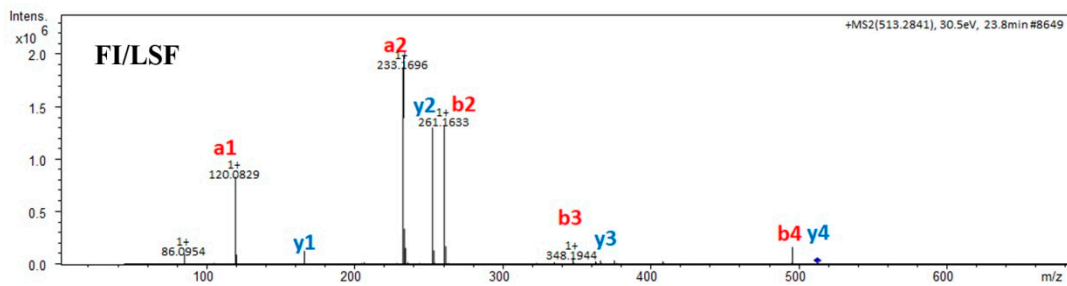
Supplementary Figure 105. Mass spectra and de novo sequencing analysis of I/LI/LPSA



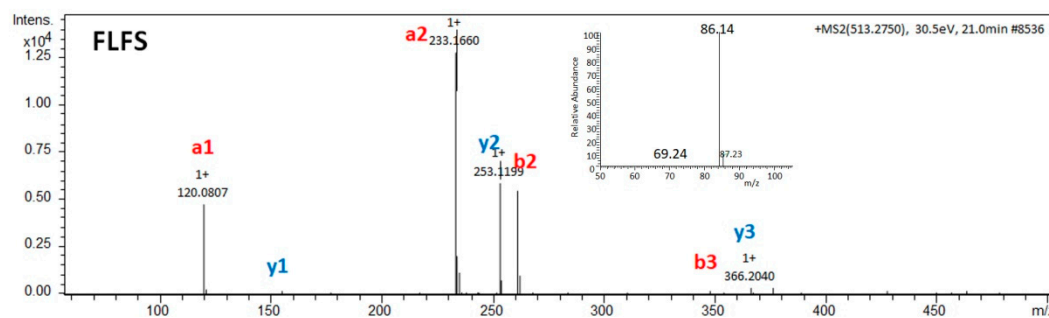
Supplementary Figure 106. Mass spectra and de novo sequencing analysis of WLPS



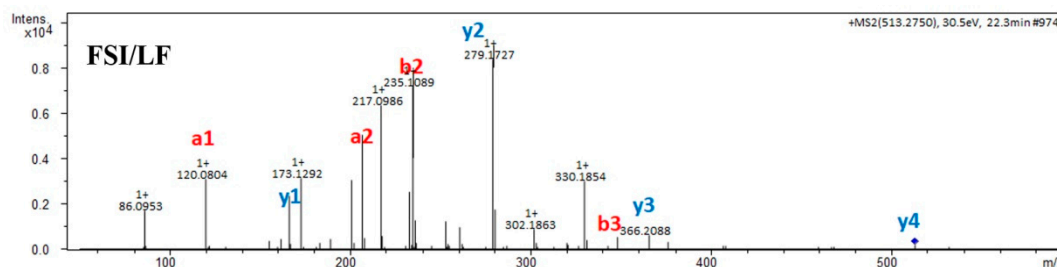
Supplementary Figure 107. Mass spectra and de novo sequencing analysis of FI/LGAV



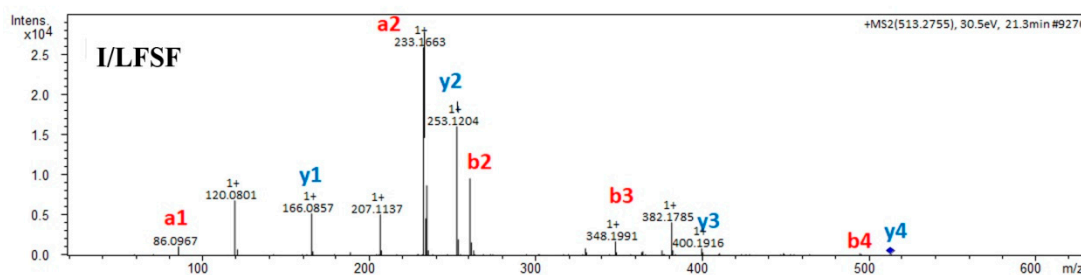
Supplementary Figure 108. Mass spectra and de novo sequencing analysis of FI/LSF



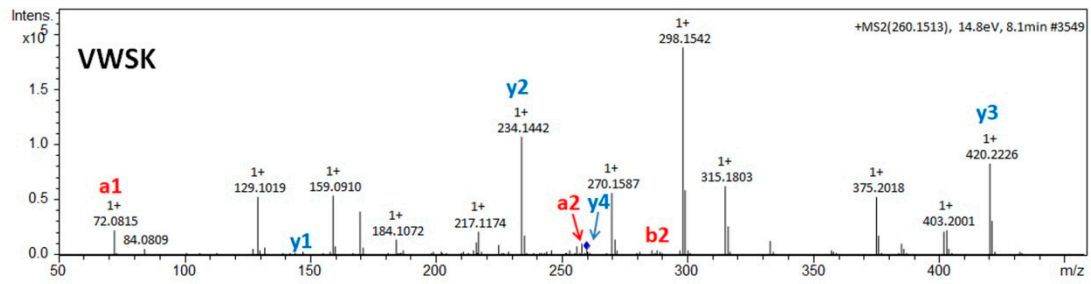
Supplementary Figure 109. Mass spectra and de novo sequencing analysis of
FLFS



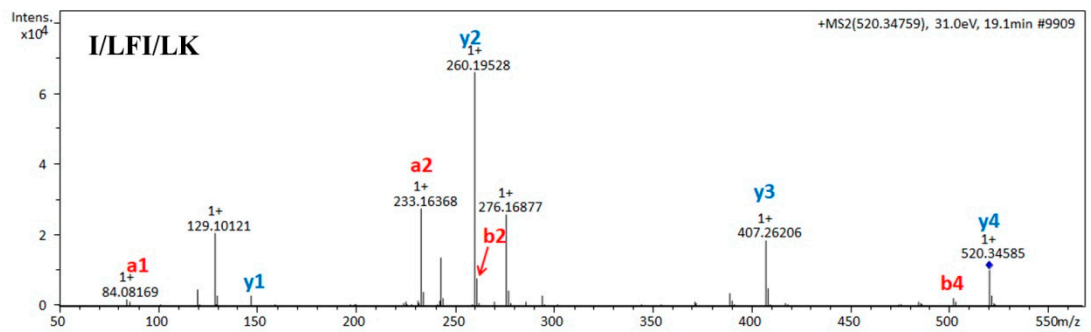
Supplementary Figure 110. Mass spectra and de novo sequencing analysis of
FSI/LF



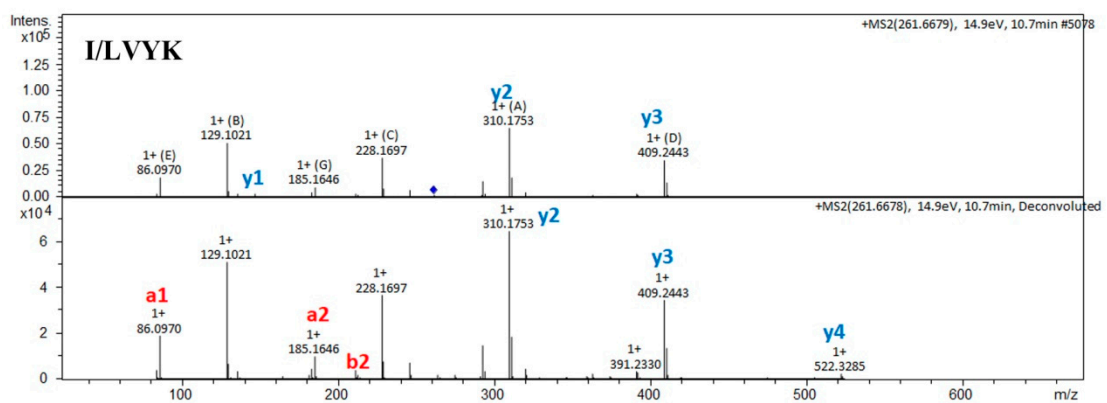
Supplementary Figure 111. Mass spectra and de novo sequencing analysis of
I/LFSF



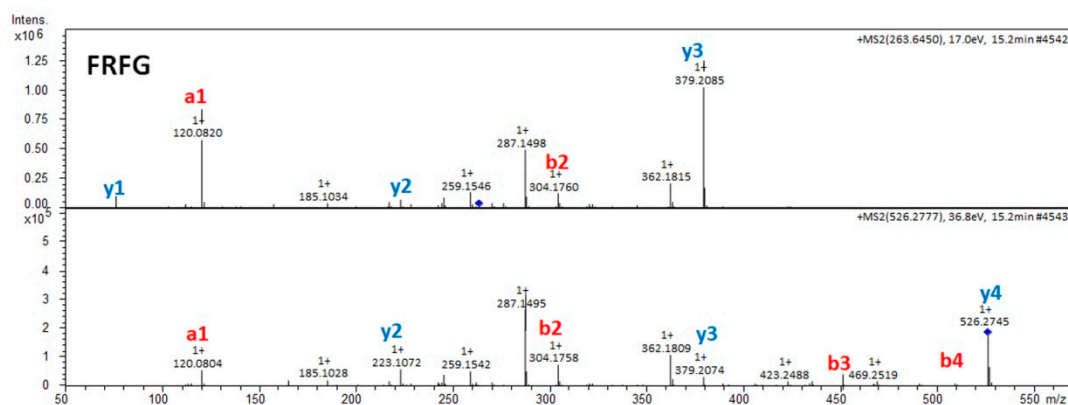
Supplementary Figure 112. Mass spectra and de novo sequencing analysis of
VWSK



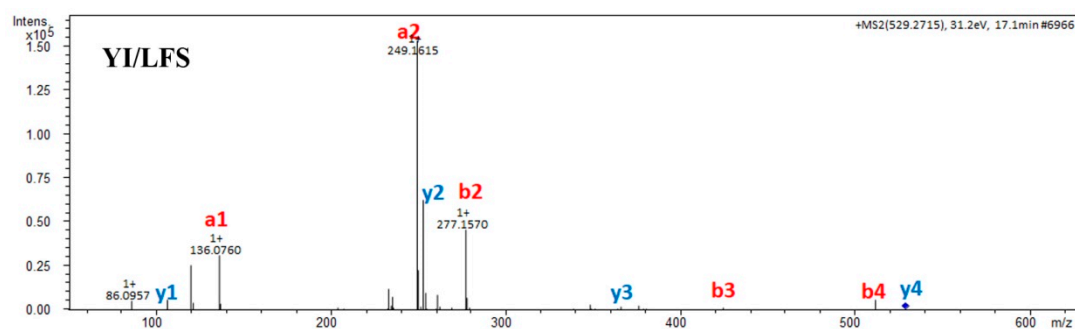
Supplementary Figure 113. Mass spectra and de novo sequencing analysis of
I/LFI/LK



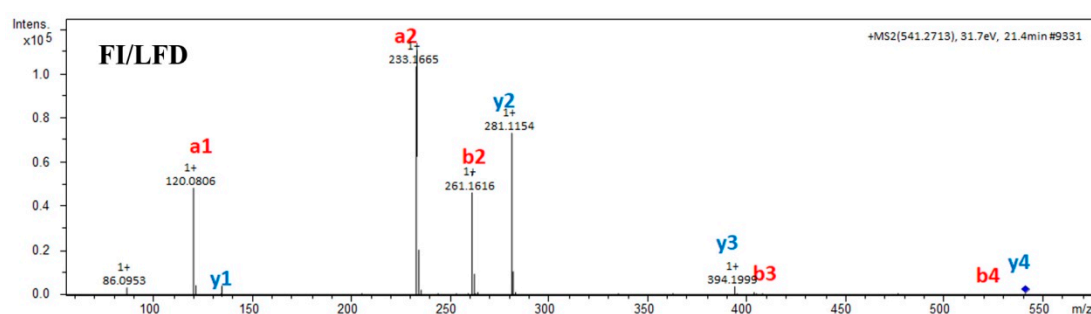
Supplementary Figure 114. Mass spectra and de novo sequencing analysis of
I/LVYK



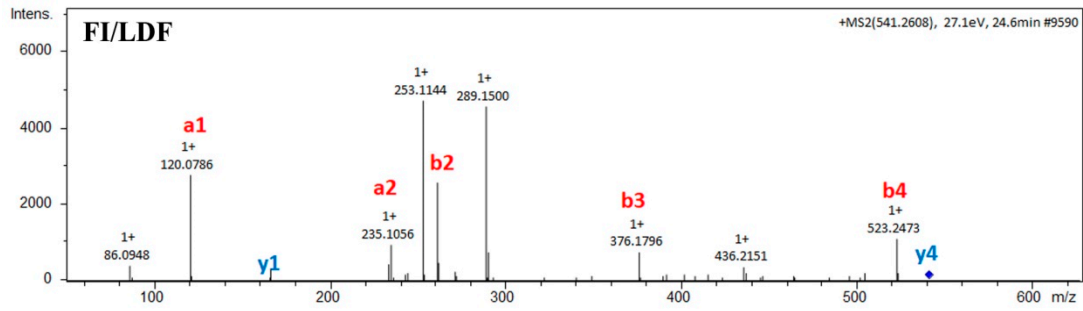
Supplementary Figure 115. Mass spectra and de novo sequencing analysis of
FRFG



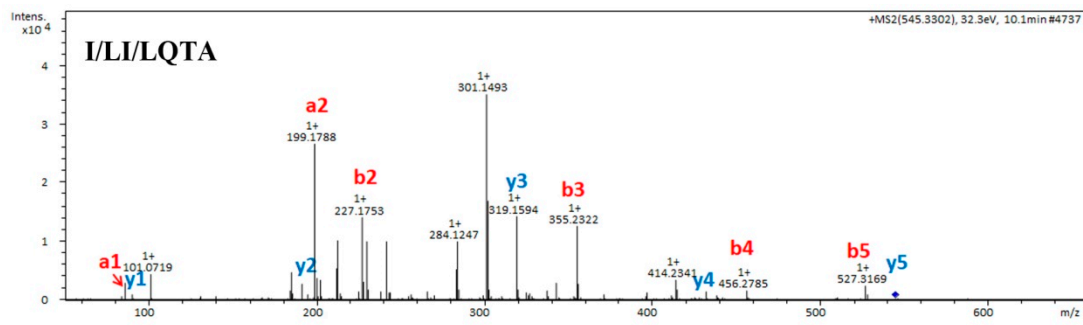
Supplementary Figure 116. Mass spectra and de novo sequencing analysis of
YI/LFS



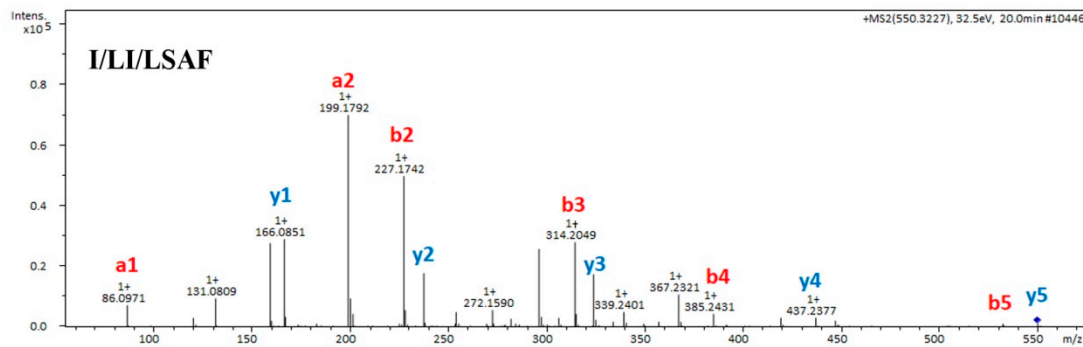
Supplementary Figure 117. Mass spectra and de novo sequencing analysis of
FI/LFD



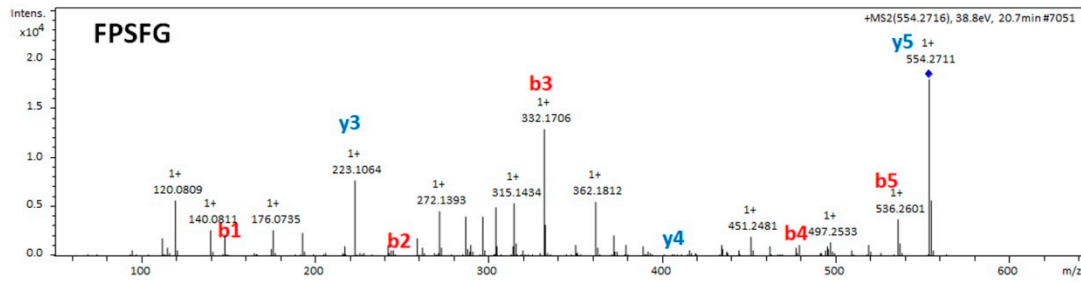
Supplementary Figure 118. Mass spectra and de novo sequencing analysis of
FI/LDF



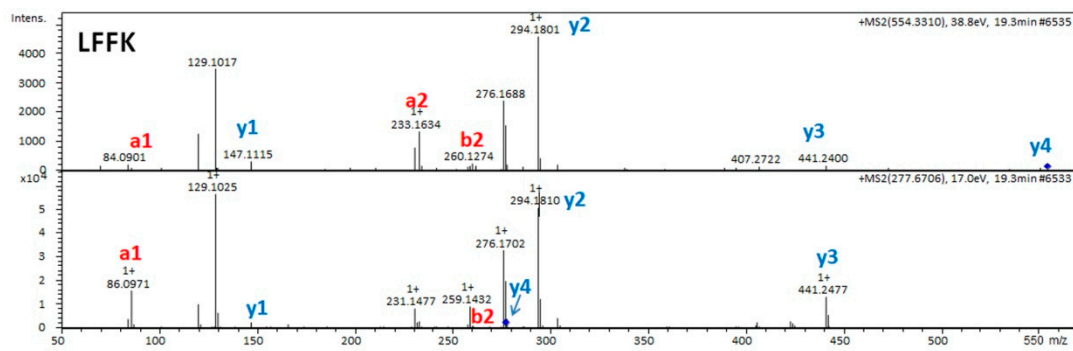
Supplementary Figure 119. Mass spectra and de novo sequencing analysis of
I/LI/LQTA



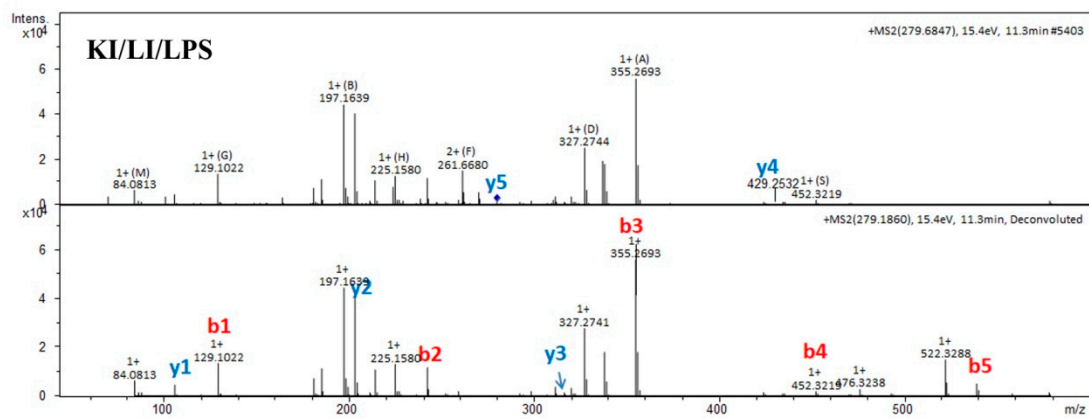
Supplementary Figure 120. Mass spectra and de novo sequencing analysis of
I/LI/LSAF



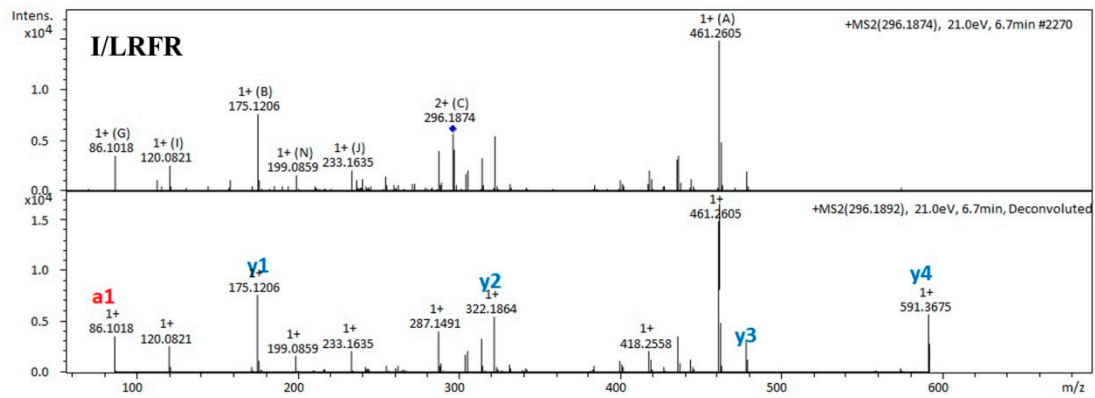
Supplementary Figure 121. Mass spectra and de novo sequencing analysis of FPSFG



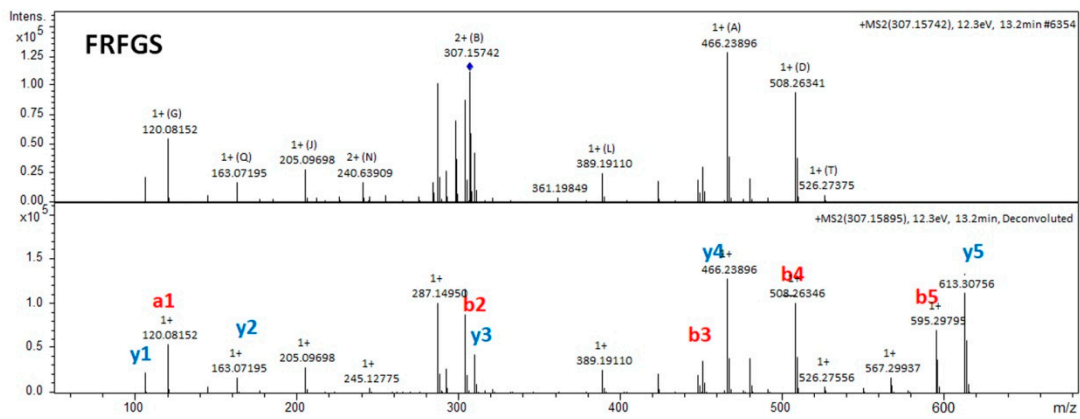
Supplementary Figure 122. Mass spectra and de novo sequencing analysis of LFFK



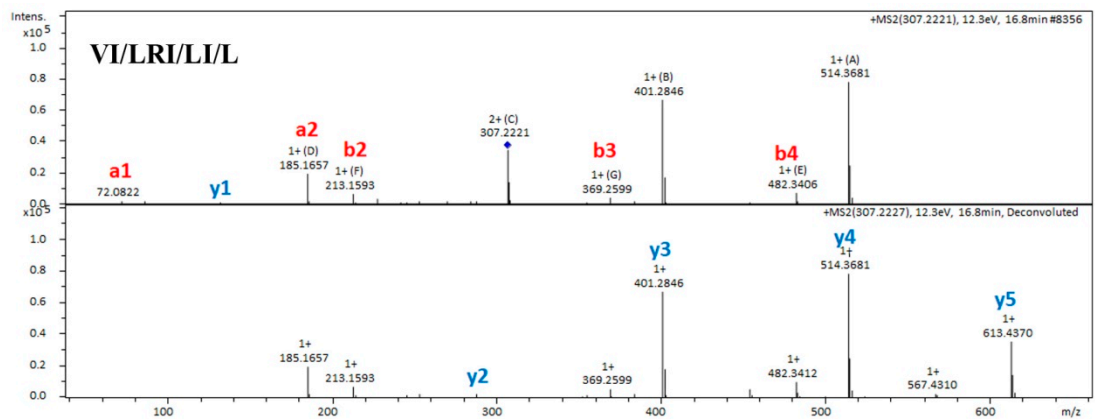
Supplementary Figure 123. Mass spectra and de novo sequencing analysis of KI/LI/LPS



Supplementary Figure 124. Mass spectra and de novo sequencing analysis of I/LRFR

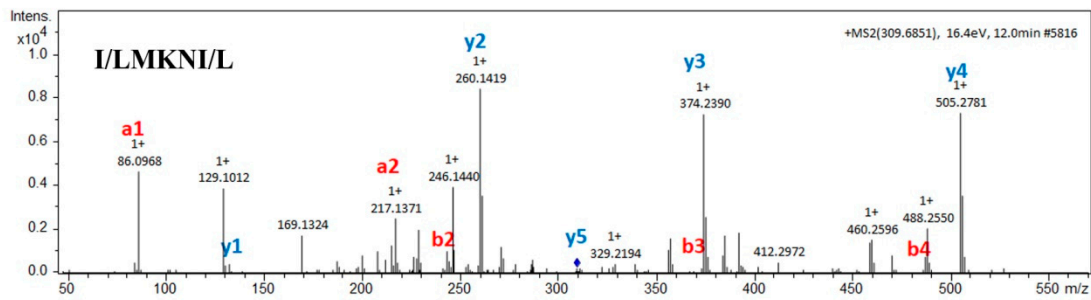


Supplementary Figure 125. Mass spectra and de novo sequencing analysis of FRFGS



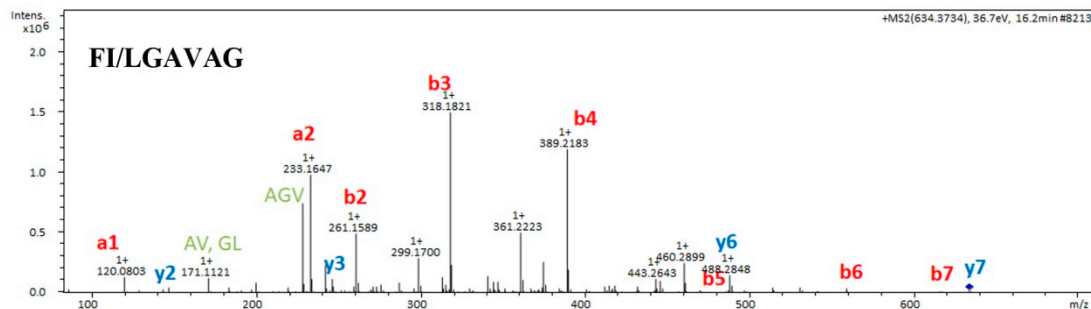
Supplementary Figure 126. Mass spectra and de novo sequencing analysis of VI/LRI/LI/L

VI/LRI/LI/L



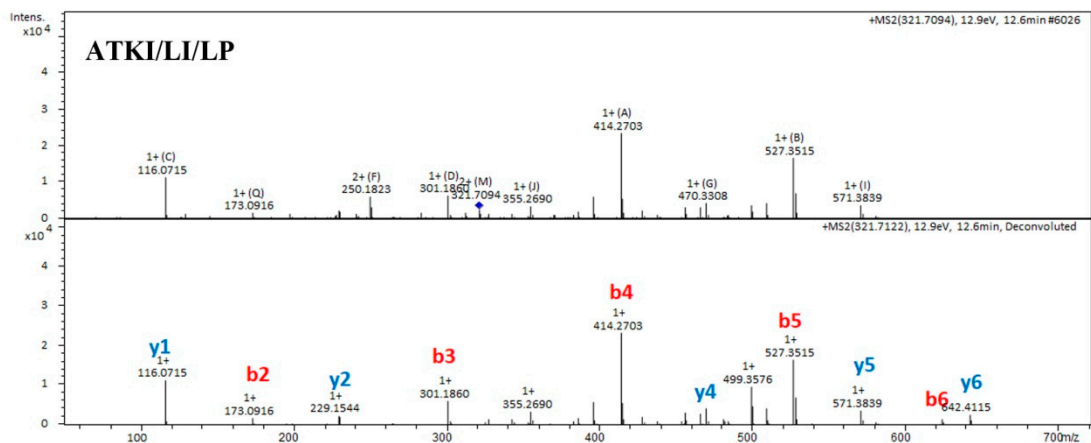
Supplementary Figure 127. Mass spectra and de novo sequencing analysis of

I/LMKNI/L



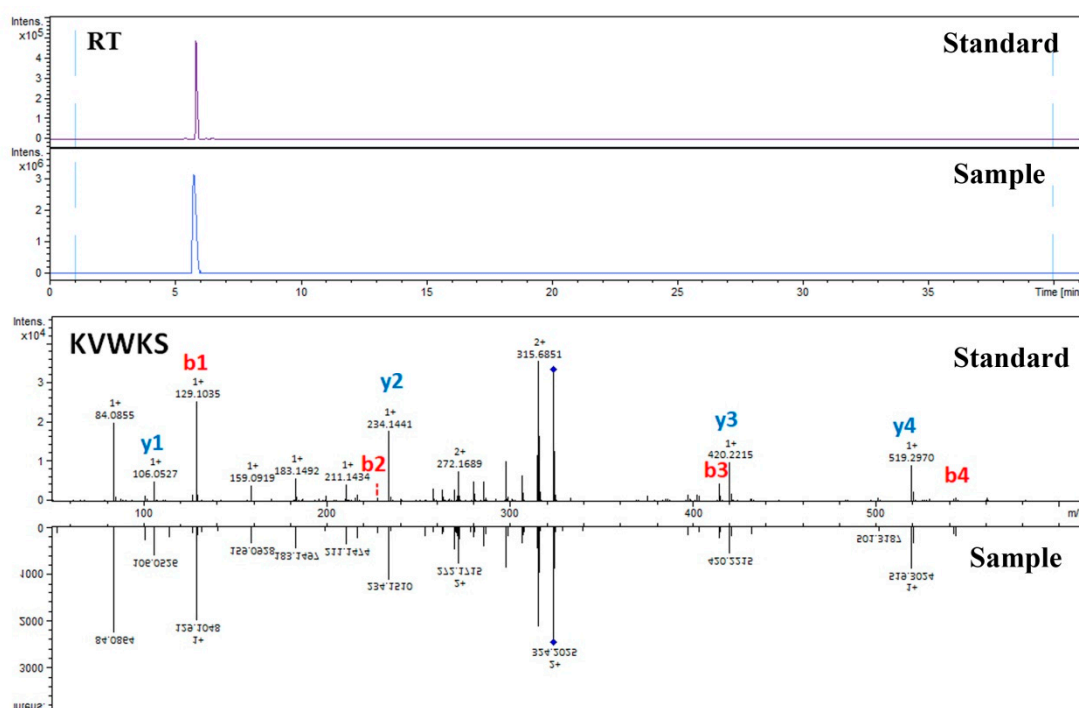
Supplementary Figure 128. Mass spectra and de novo sequencing analysis of

FI/LGAVAG

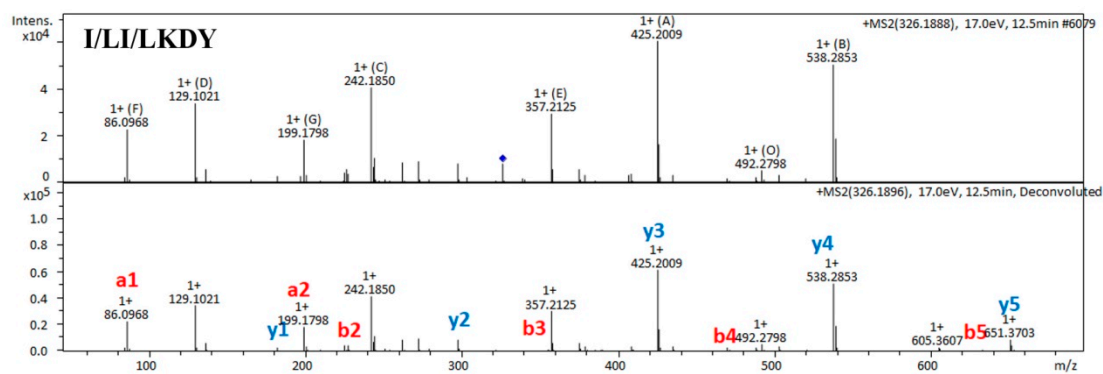


Supplementary Figure 129. Mass spectra and de novo sequencing analysis of

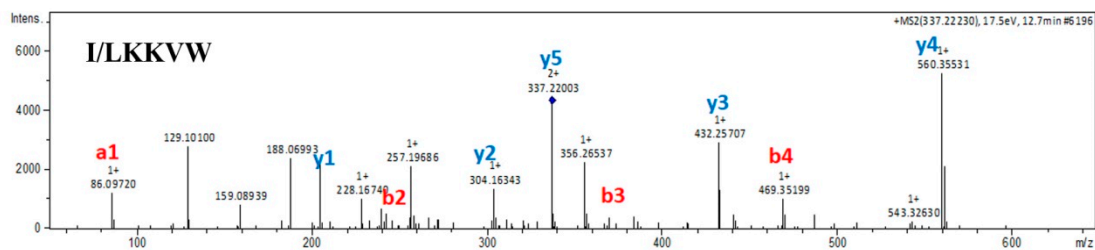
ATKI/LI/LP



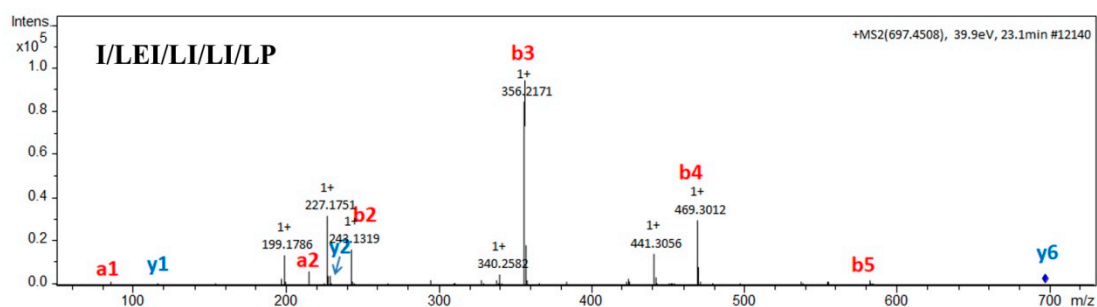
Supplementary Figure 130. Mass spectra and de novo sequencing analysis of KVVWS



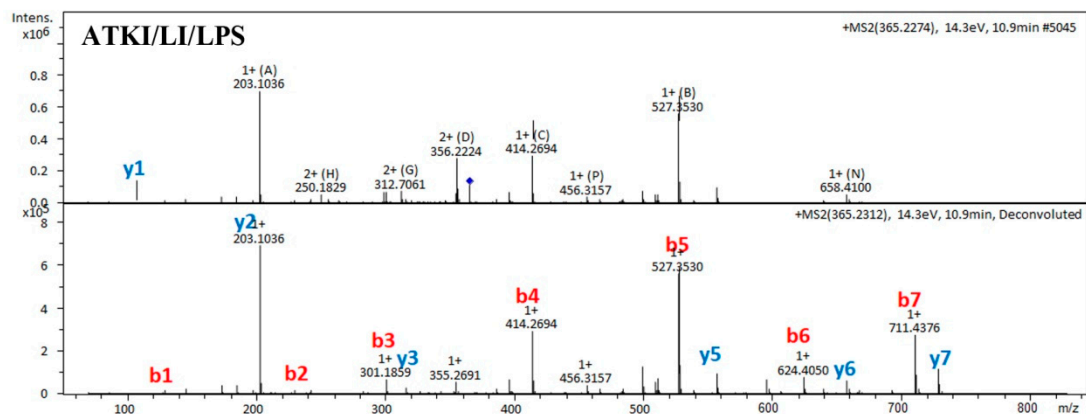
Supplementary Figure 131. Mass spectra and de novo sequencing analysis of I/LI/LKDY



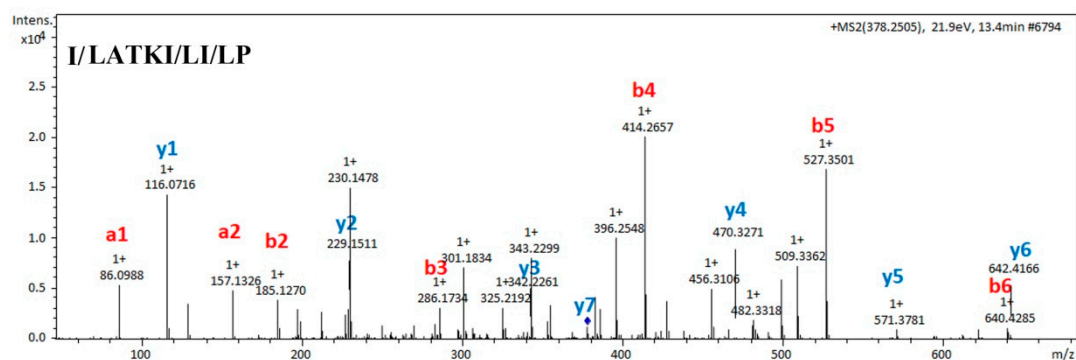
Supplementary Figure 132. Mass spectra and de novo sequencing analysis of
I/LKKVW



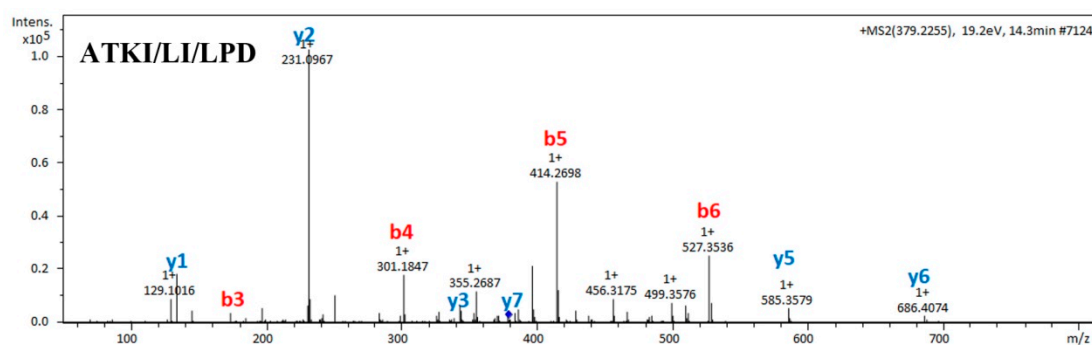
Supplementary Figure 133. Mass spectra and de novo sequencing analysis of
I/LEI/LI/LI/LP



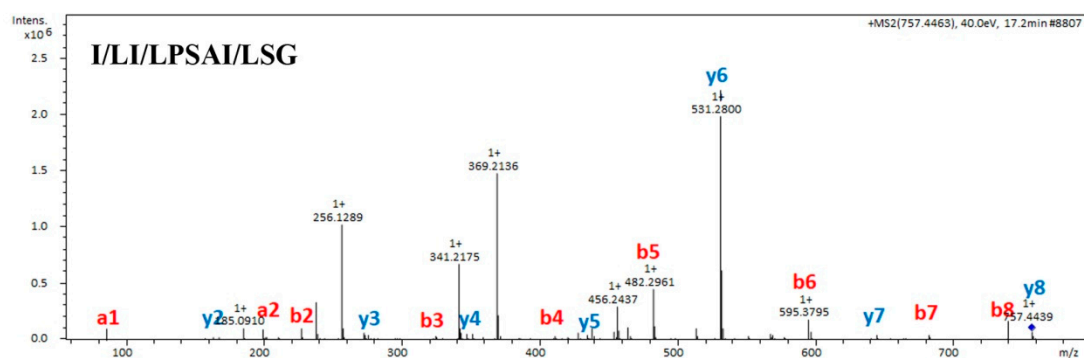
Supplementary Figure 134. Mass spectra and de novo sequencing analysis of
ATK I/LI/LPS



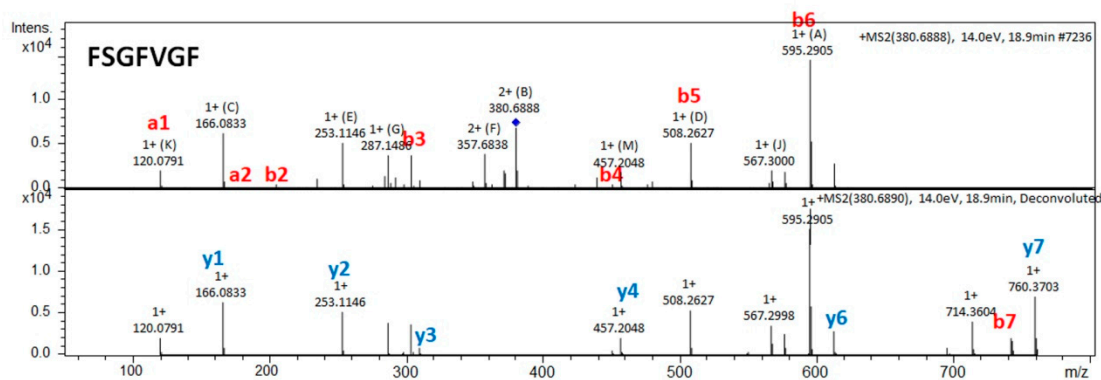
Supplementary Figure 135. Mass spectra and de novo sequencing analysis of
I/LATK I/LI/LP



Supplementary Figure 136. Mass spectra and de novo sequencing analysis of
ATK I/LI/LPD

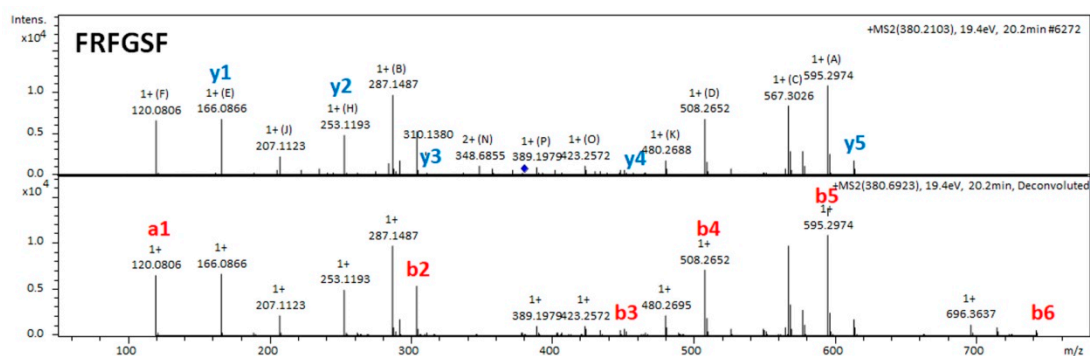


Supplementary Figure 137. Mass spectra and de novo sequencing analysis of
I/LI/LPSAI/LSG



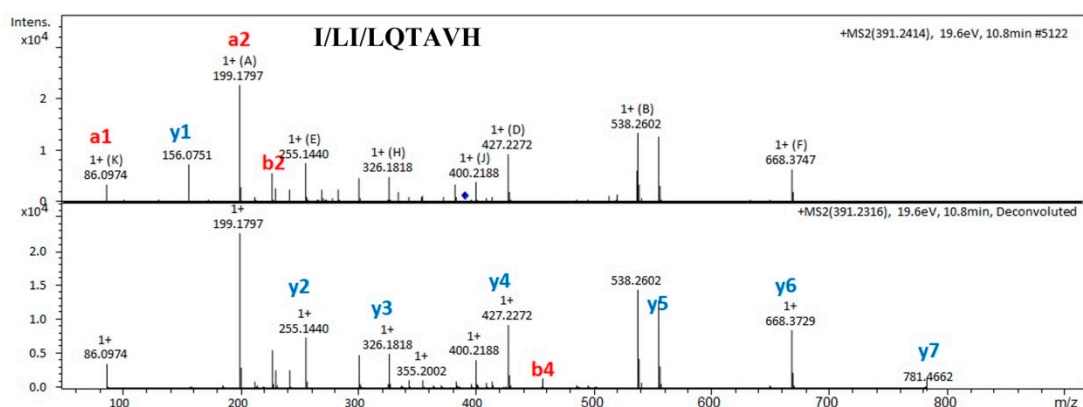
Supplementary Figure 138. Mass spectra and de novo sequencing analysis of

ESGFVGF



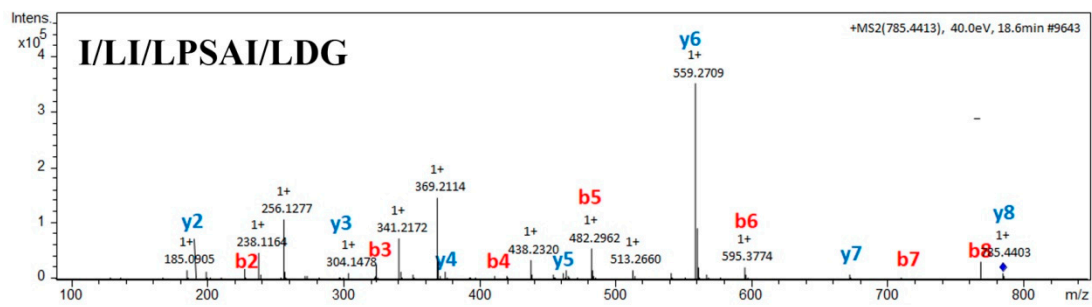
Supplementary Figure 139. Mass spectra and de novo sequencing analysis of

FRFGSF

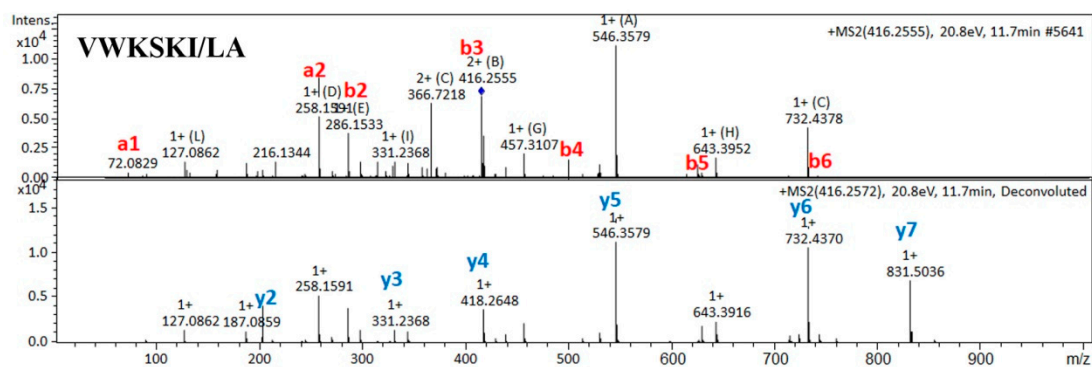


Supplementary Figure 140. Mass spectra and de novo sequencing analysis of

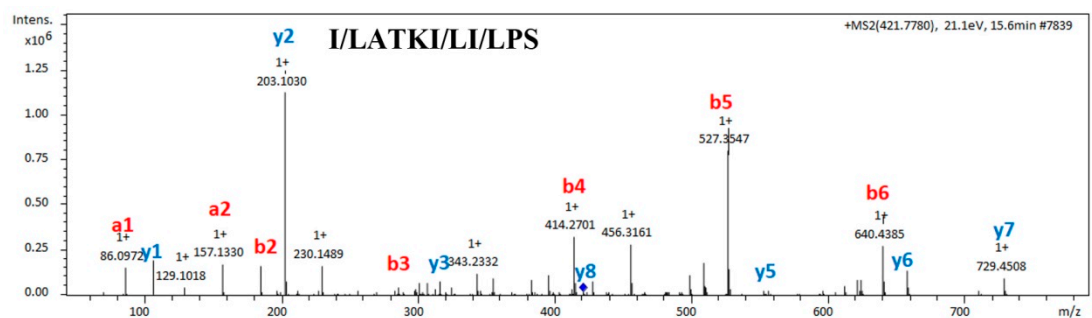
I/LI/LQTAVH



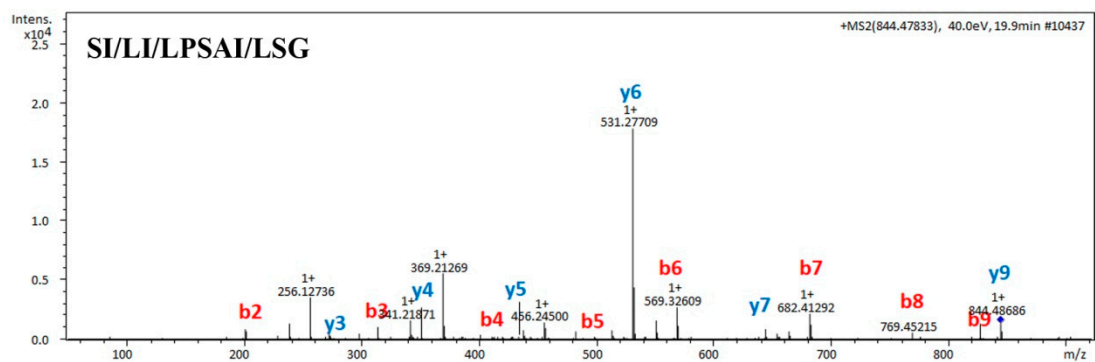
Supplementary Figure 141. Mass spectra and de novo sequencing analysis of
I/LI/LPSAI/LDG



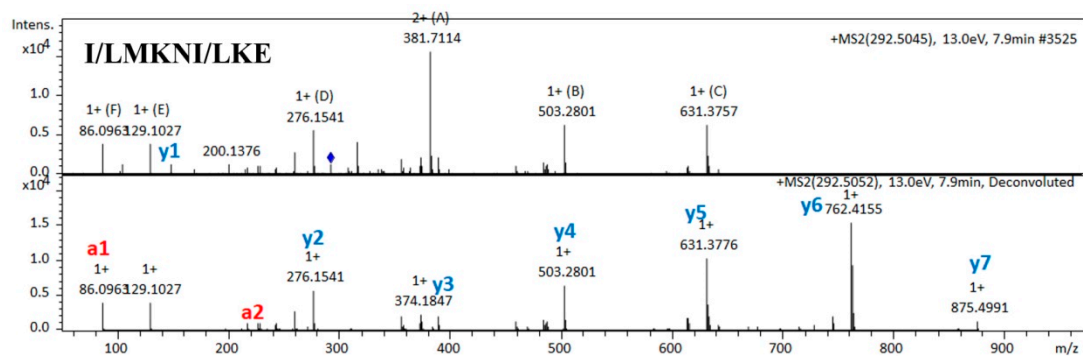
Supplementary Figure 142. Mass spectra and de novo sequencing analysis of
VWKSKI/LA



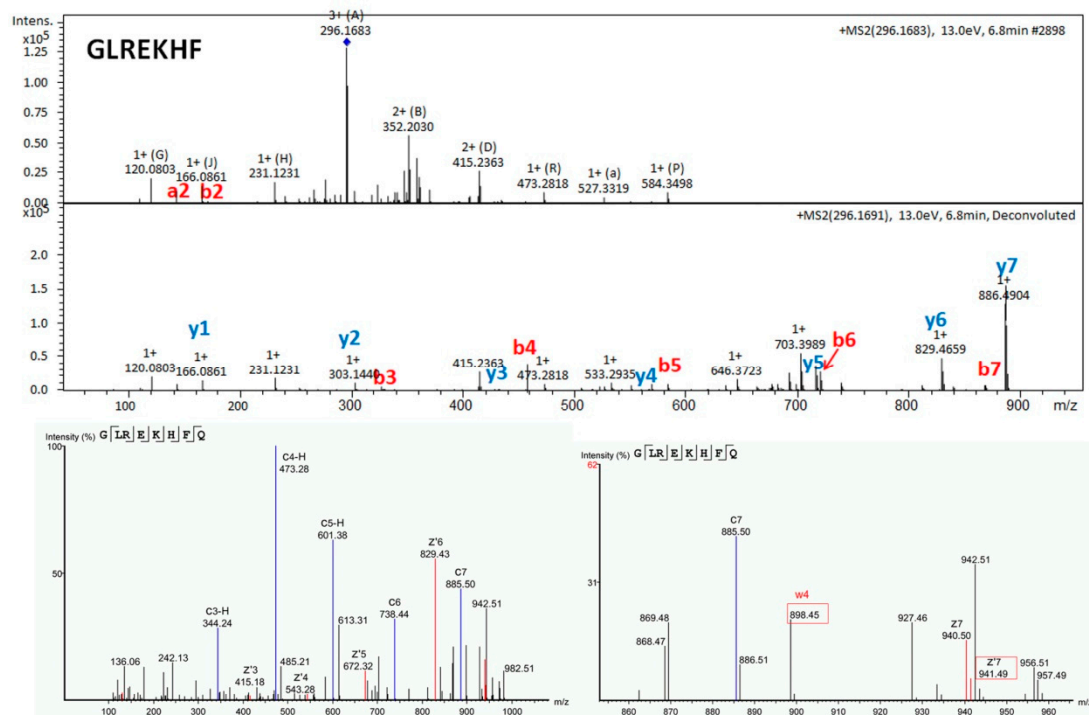
Supplementary Figure 143. Mass spectra and de novo sequencing analysis of
I/LATKI/LI/LPS



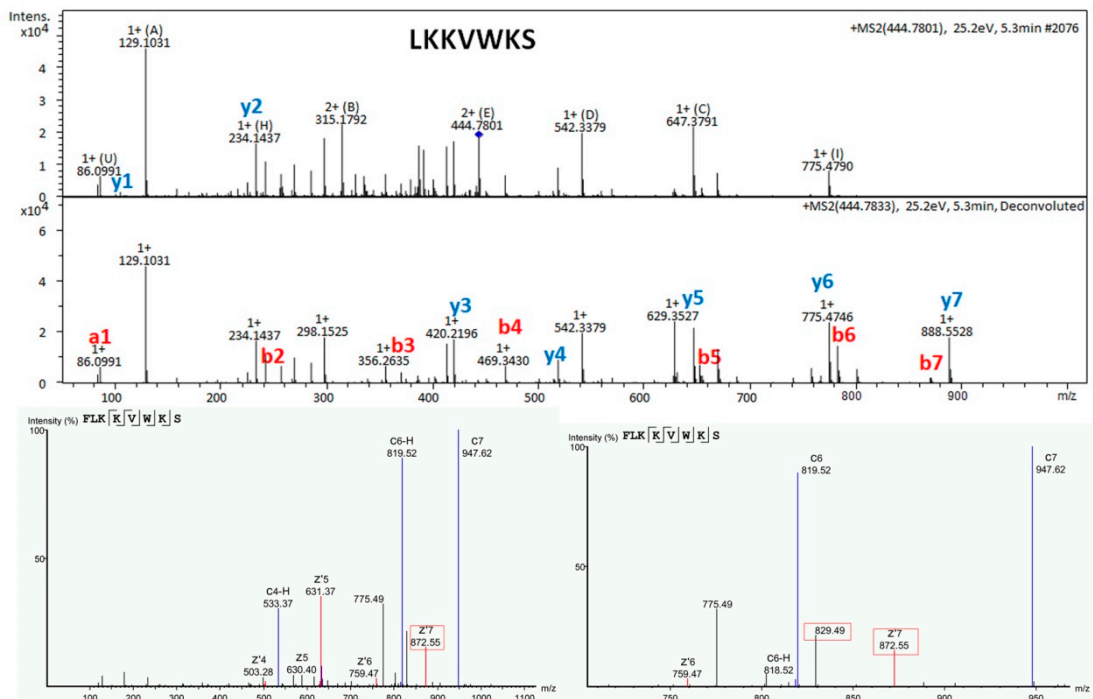
Supplementary Figure 144. Mass spectra and de novo sequencing analysis of
SI/LI/LPSAI/LSG



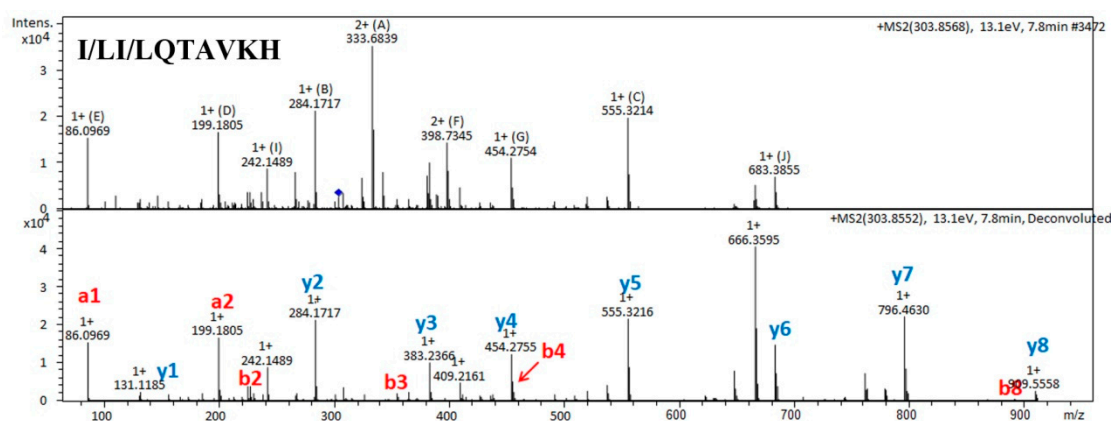
Supplementary Figure 144. Mass spectra and de novo sequencing analysis of
I/LMKNI/LKE



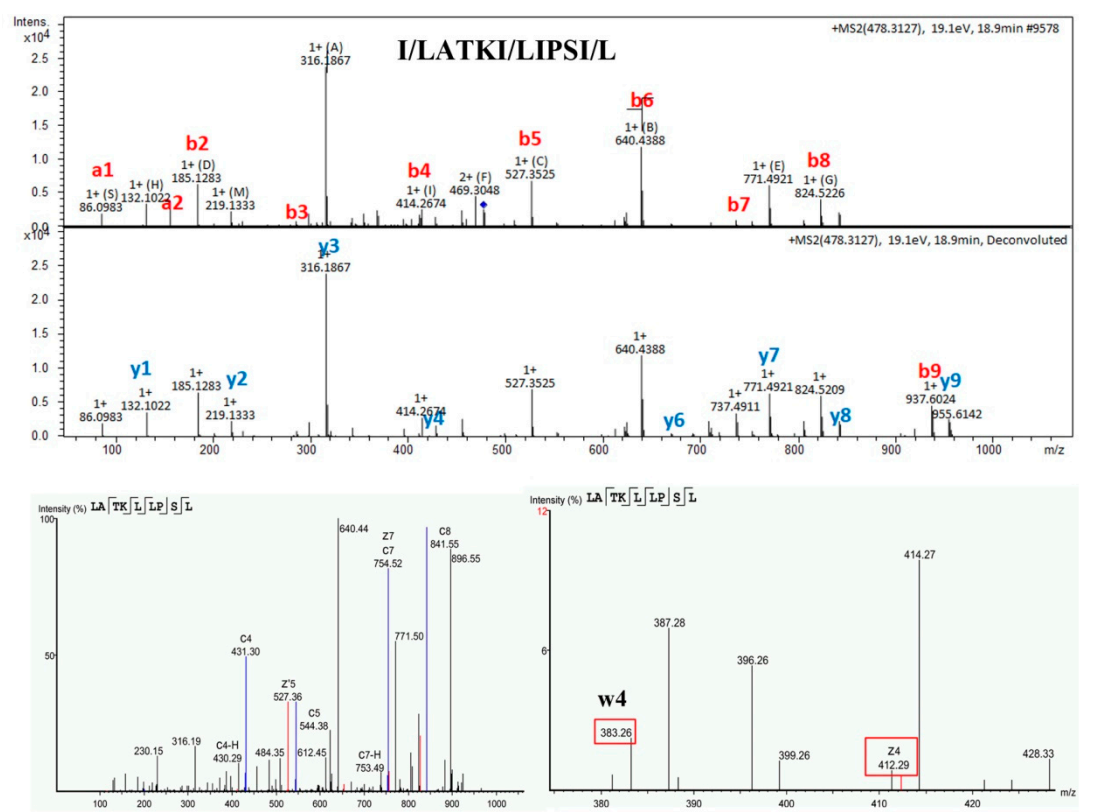
Supplementary Figure 146. Mass spectra and de novo sequencing analysis of
GLREKHF



Supplementary Figure 147. Mass spectra and de novo sequencing analysis of
LKKVWKS

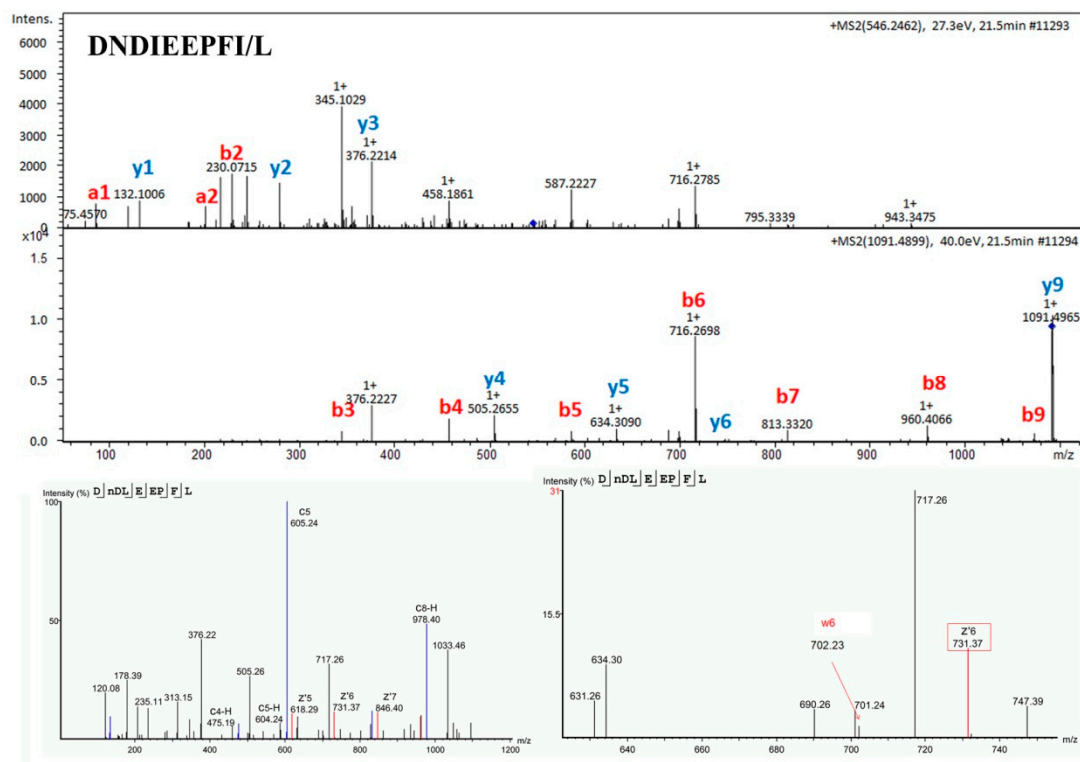


Supplementary Figure 148. Mass spectra and de novo sequencing analysis of
I/LI/LQTAVKH

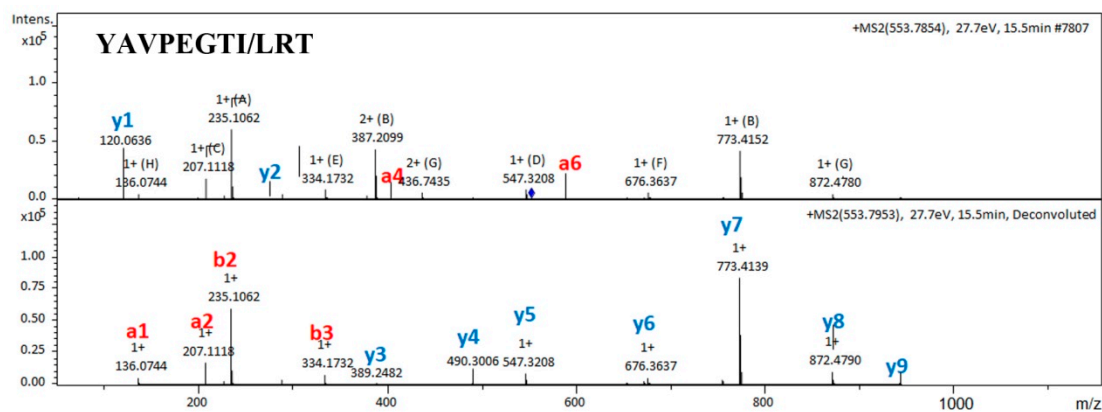


Supplementary Figure 149. Mass spectra and de novo sequencing analysis of
I/LATKI/LIPSI/L

GI/LREKHFQ

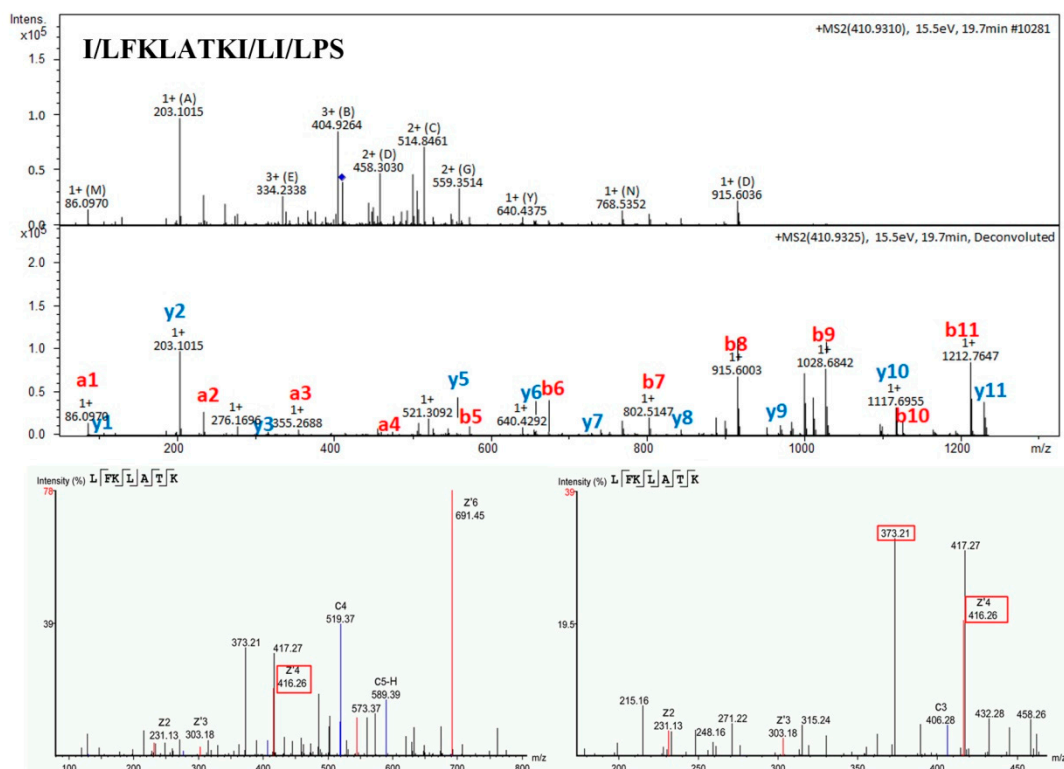


Supplementary Figure 152. Mass spectra and de novo sequencing analysis of

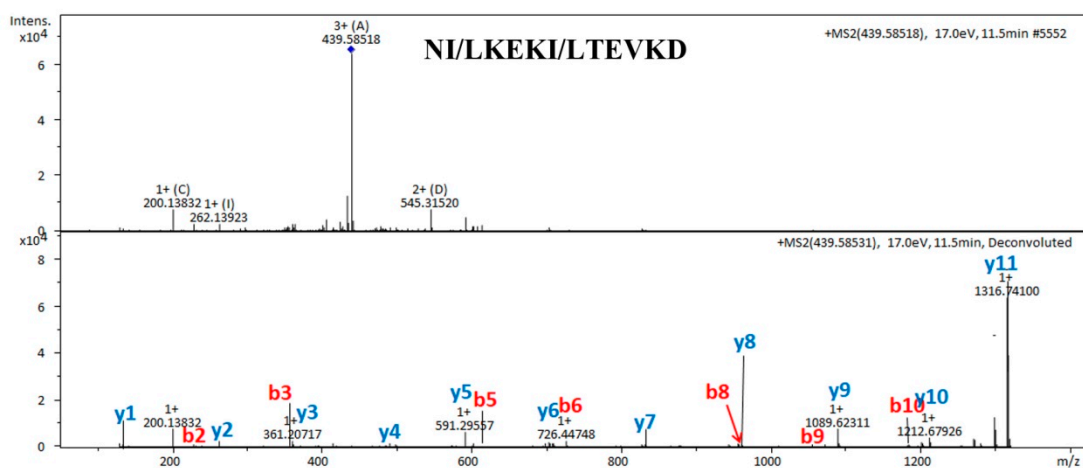


Supplementary Figure 153. Mass spectra and de novo sequencing analysis of

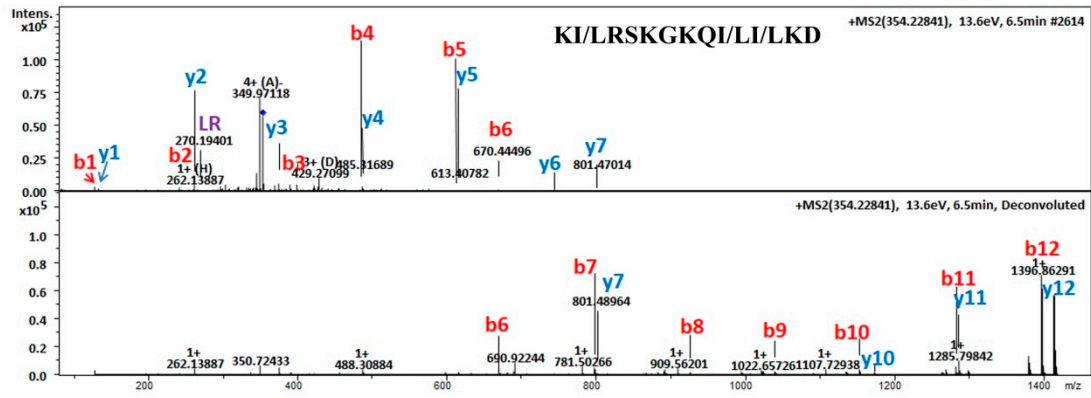
YAVPEGTI/LRT



Supplementary Figure 154. Mass spectra and de novo sequencing analysis of
I/LFKLATKI/LI/LPS



Supplementary Figure 155. Mass spectra and de novo sequencing analysis of
NI/LKEKI/LTEVKD



Supplementary Figure 156. Mass spectra and de novo sequencing analysis of
KI/LRSGKKQI/LI/LKD