Electronic Supplementary Material (ESI) for Nanoscale.

Supporting information

One-step functionalization of magnetic nanoparticles with 4-mercaptophenylboronic acid for highly efficient analysis of N-glycopeptides

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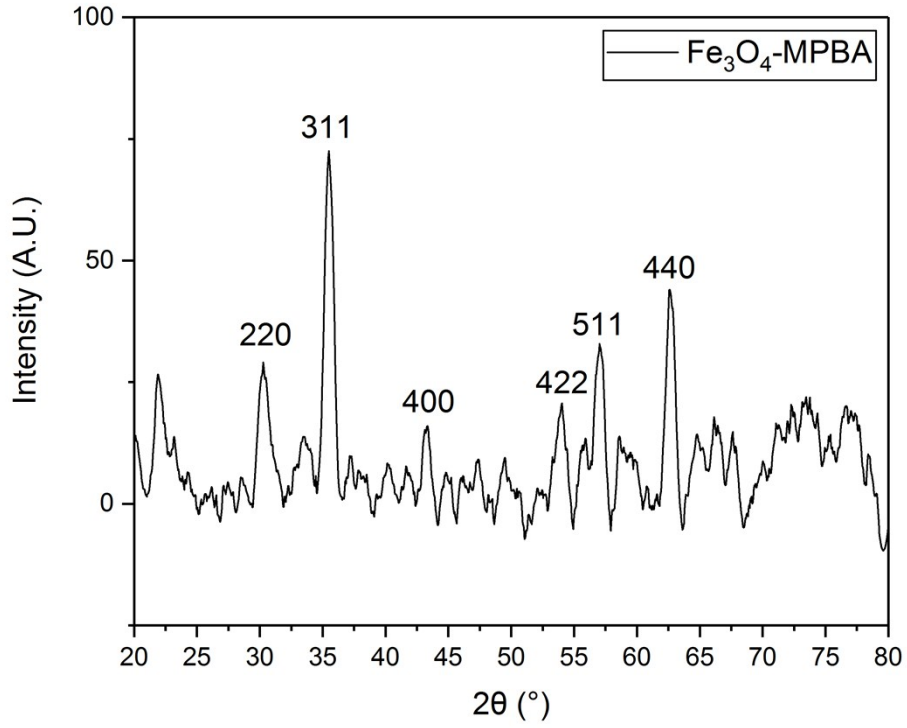
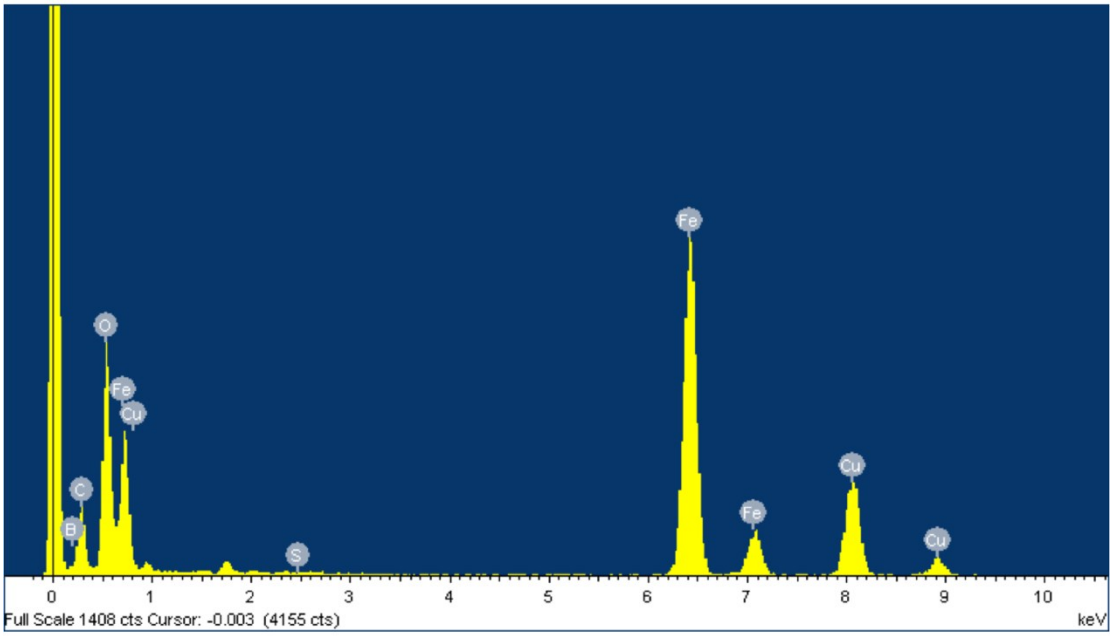
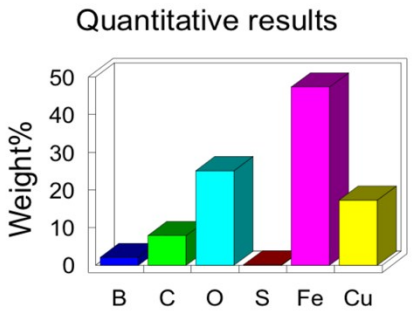


Fig. S1 The wide-angle X-ray diffraction pattern of Fe_3O_4-MPBA nanoparticles.





Element	Peak Area	k factor	Weight%	Atomic%
B	72	5.251	2.12	5.52
C	641	2.208	7.95	18.62
O	2471	1.810	25.13	44.20
S	32	0.940	0.17	0.15
Fe	7196	1.170	47.30	23.83
Cu	2260	1.366	17.34	7.68
Totals			**100.00**	

Fig. S2 The EDS analysis of Fe_3O_4-MPBA nanoparticles.

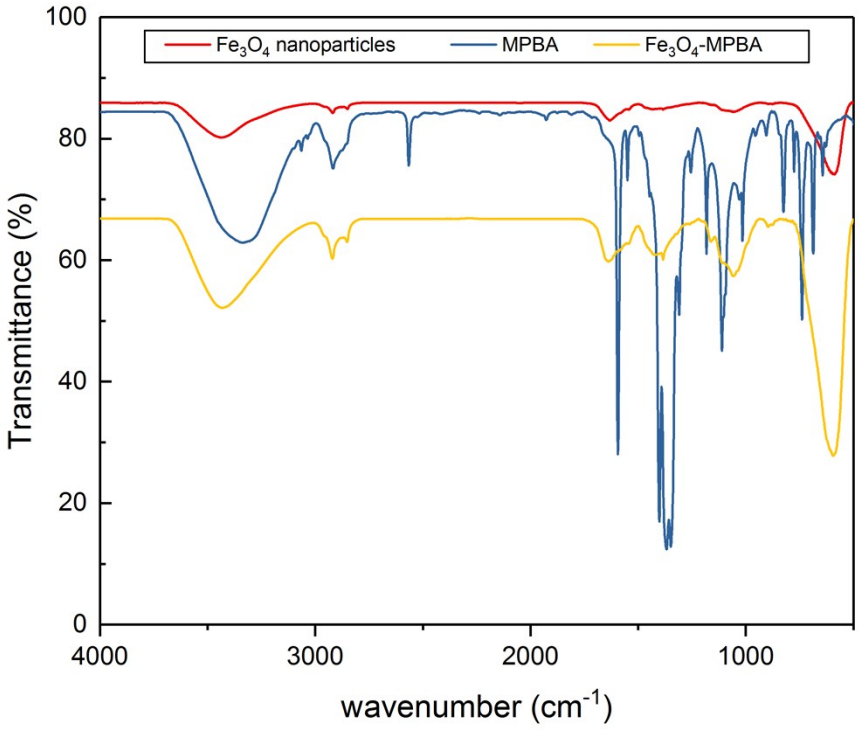


Fig. S3 The FTIR of magnetic nanoparticles, MPBA and Fe_3O_4-MPBA nanoparticles.

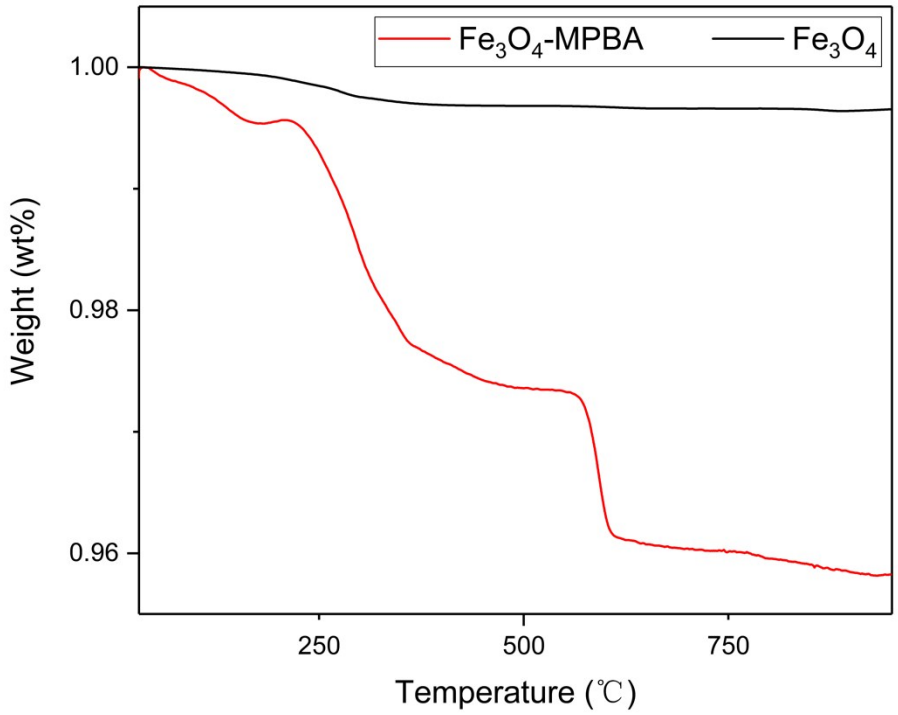


Fig. S4 The TGA of Fe_3O_4 nanoparticles and Fe_3O_4-MPBA nanoparticles.

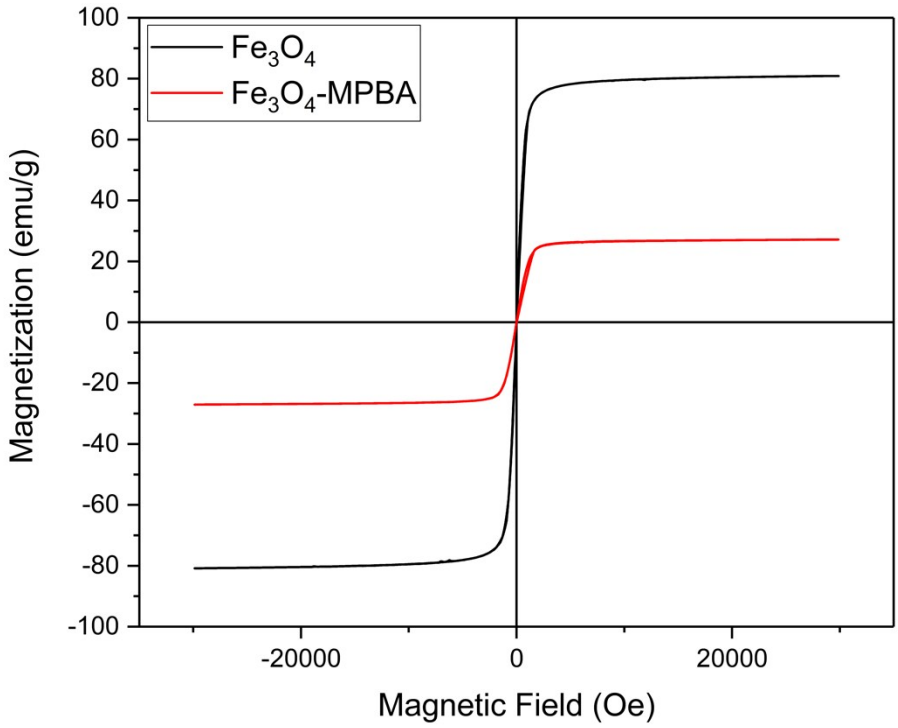


Fig. S5 Magnetic hysteresis curves of Fe_3O_4 and Fe_3O_4-MPBA. The saturation magnetization values of Fe_3O_4 and Fe_3O_4-MPBA were 80.9 emu·g^{-1} and 27.1 emu·g^{-1} respectively.

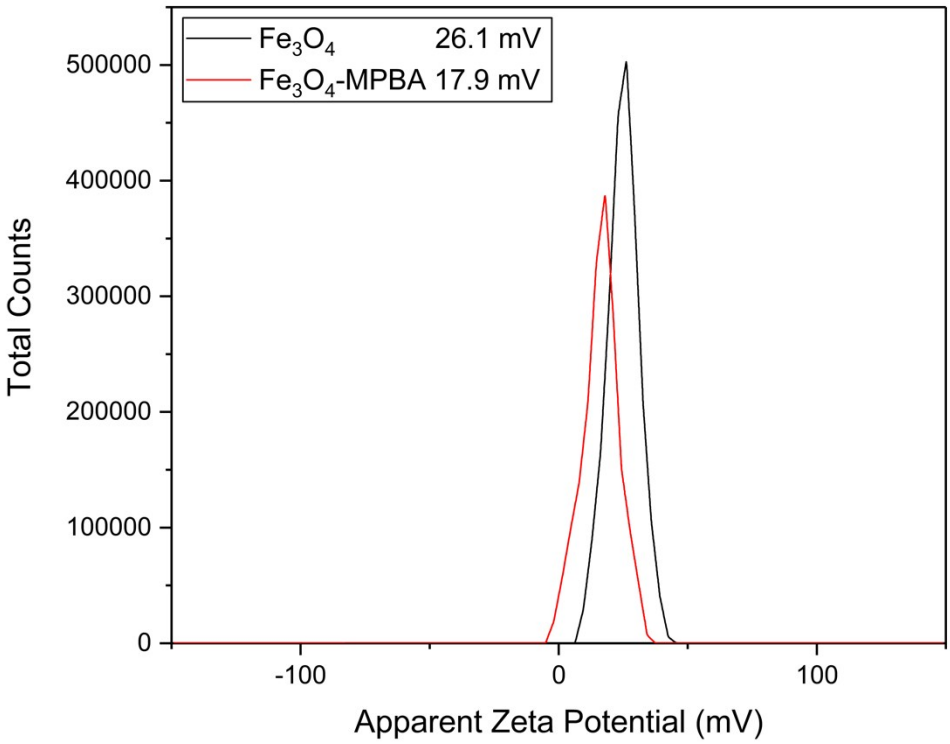


Fig. S6 Zeta potential distributions of Fe_3O_4 and Fe_3O_4-MPBA.

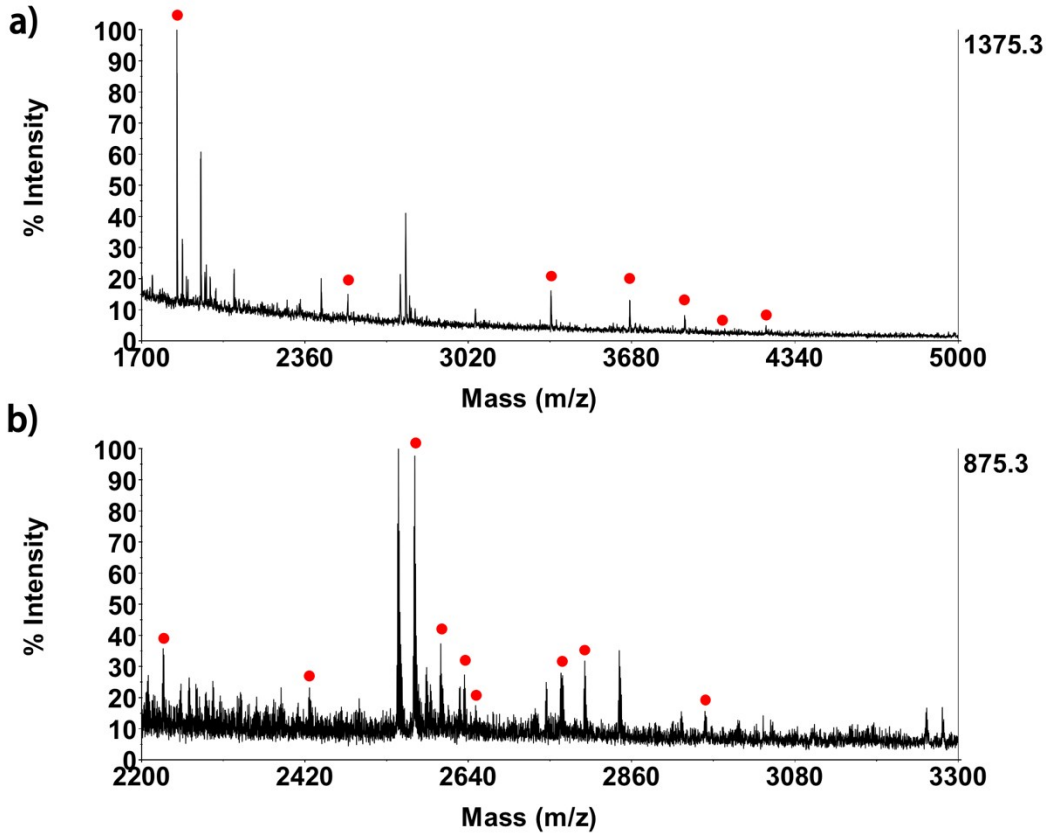


Fig. S7 The direct MALDI-TOF MS analysis of a) HRP trypsin digests (100 fmol/μL); b) IgG trypsin digests (100 fmol/μL). The identified glycopeptides were marked with ●.

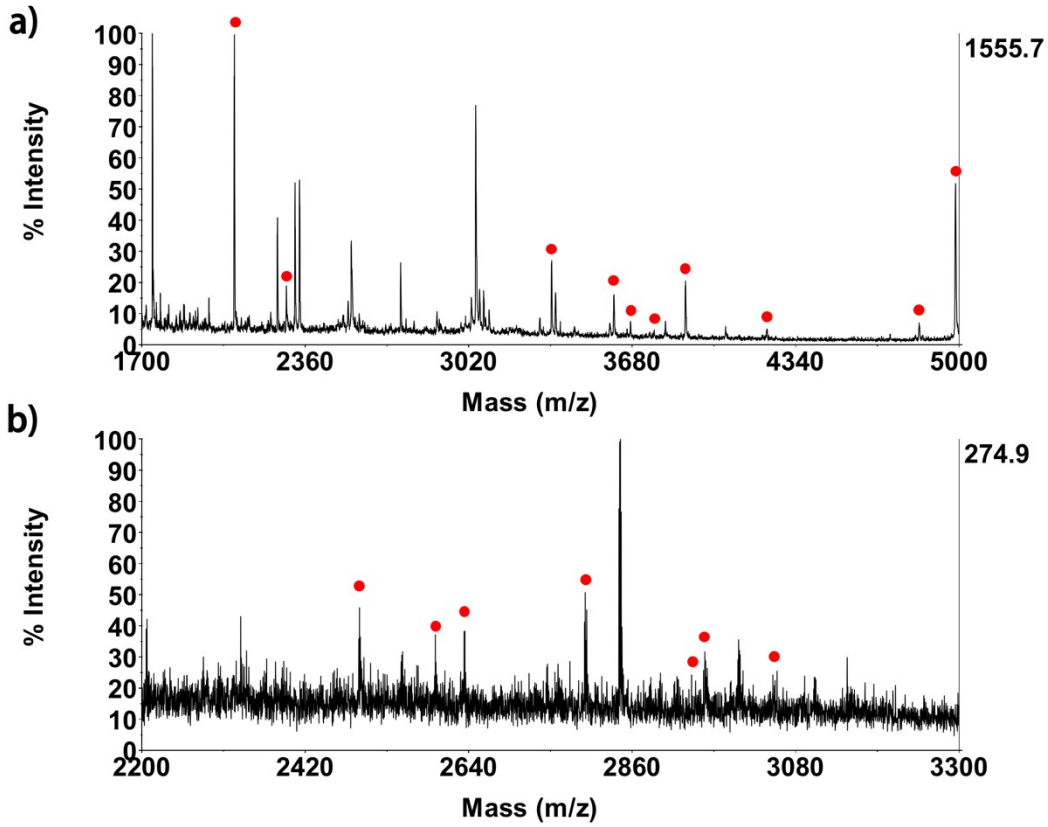


Fig. S8 The MALDI-TOF MS analysis of the eluent after enrichment by magnetic nanoparticles a) HRP trypsin digests (100 fmol/μL); b) IgG trypsin digests (100 fmol/μL). The identified glycopeptides were marked with ●.

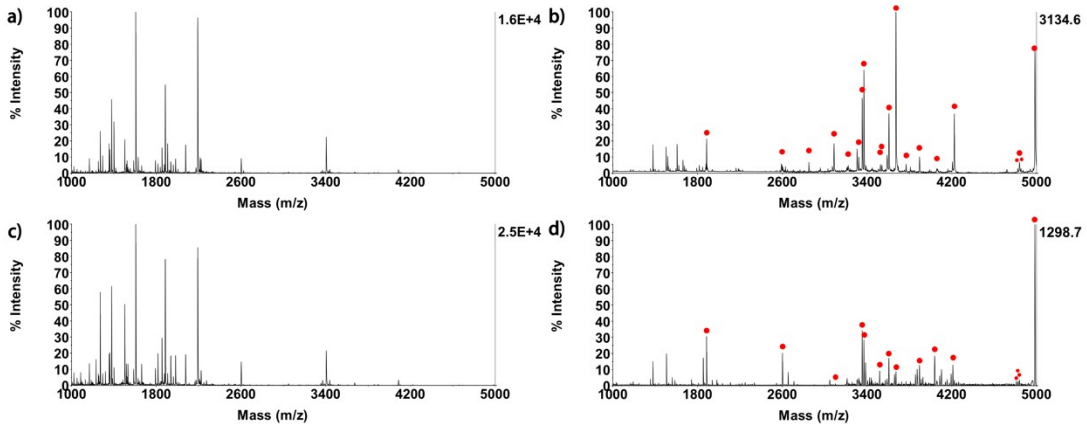


Fig. S9 The MALDI-TOF MS analysis of the mixture of HRP digests and MYO a) and c) direct analysis; b) and d) after enrichment by Fe_3O_4-MPBA nanoparticles. The molar ratio of HRP to MYO is 1:25 (a and b) and 1:130 (c and d). The identified glycopeptides were marked with ●.

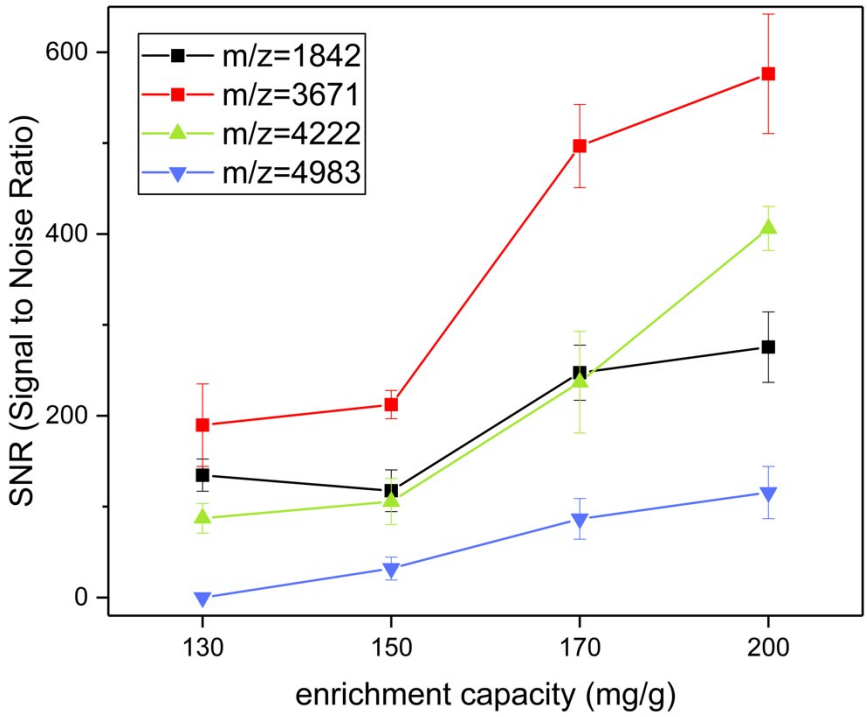


Fig. S10 The S/N ratio of glycopeptides derived from HRP in supernatant after enrichment by Fe_3O_4-MPBA nanoparticles.

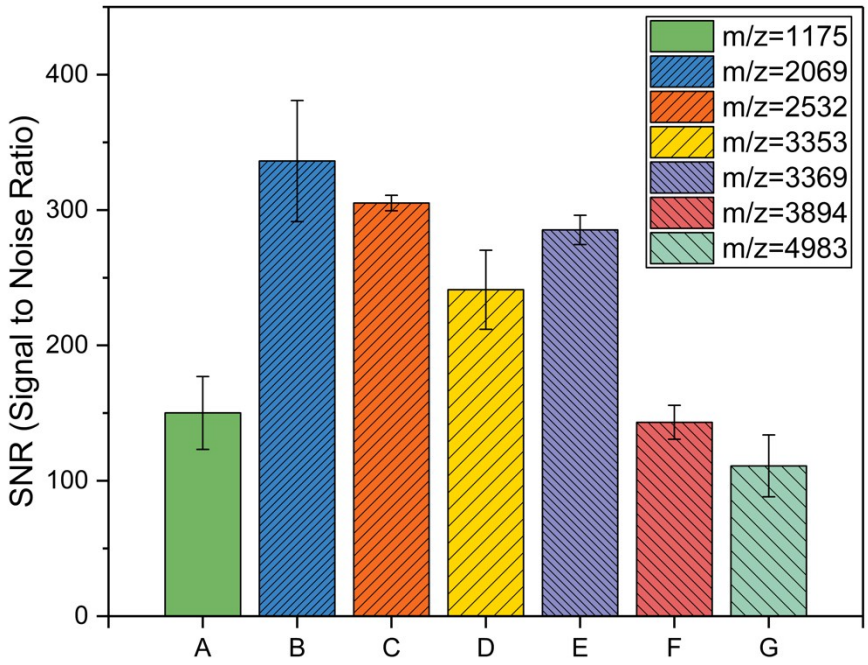


Fig. S11 The S/N ratio of maltoheptaose ($[M+Na^+]^+$ = 1175 Da) and glycopeptides derived from HRP after enrichment by Fe_3O_4-MPBA nanoparticles in parallel tests.

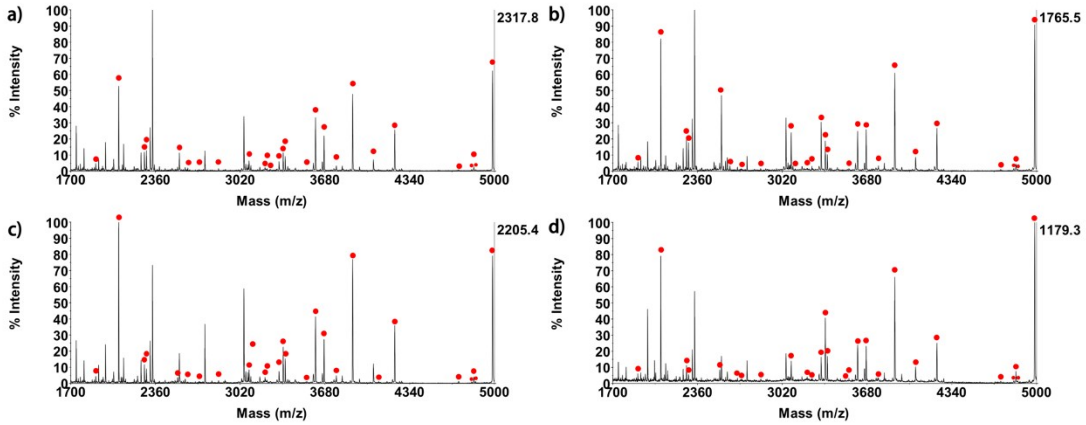


Fig. S12 The MALDI-TOF MS analysis of HRP digests after enrichment by Fe_3O_4-MPBA nanoparticles a) and c) are reusability test (a is 4 times, c is 5 times); b) and d) are stability test (b is stored after 2 weeks, d is 3 weeks). The identified glycopeptides were marked with ●.

Table S1 The sequence information and detailed glycan structures of the captured glycopeptides by Fe_3O_4-MPBA nanoparticles from HRP digests, N# denotes the N-linked glycosylation site.

No.	Observed m/z	Glycan composition	Amino acid sequence
H1	1842.3	XylMan3FucGlcNAc2	NVGLN#R
H2	1896.5	XylMan3FucGlcNAc2	N#TTSFR
H3	2068.9	XylMan3FucGlcNAc2	PN#VSNIVR
H4	2276.2	XylMan2FucGlcNAc2	SILLDN#TTSFR
H5	2290.1	XylMan2GlcNAc2	SILLDN#TTSFR
H6	2532.8	FucGlcNAc	SFAN#STQTFFNAFVEAMDR
H7	2591.1	XylMan3FucGlcNAc2	PTLN#TTYLQTLR
H8	2611.1	XylMan3GlcNAc2	MGN#ITPLTGTQGQIR
H9	2704.3	GlcNAc	GLIQSDQELFSSPN#ATDTIPLVR
H10	2850.4	FucGlcNAc	GLIQSDQELFSSPN#ATDTIPLVR
H11	3074.5	FucGlcNAc	LHFHDCFVNGCDASILLDN#TTSFR
H12	3088.3	XylMan3FucGlcNAc2	GLCPLNGN#LSALVDFDLR
H13	3190.9	XylMan2FucGlcNAc2	SFAN#STQTFFNAFVEAMDR
H14	3207.3	XylMan3GlcNAc2	SFAN#STQTFFNAFVEAMDR
H15	3222.4	Man3FucGlcNAc2	SFAN#STQTFFNAFVEAMDR
H16	3275.4	Man3GlcNAc2FucXyl	SC(AAVESACPR)PN#VSNIVR
H17	3321.1	XylMan3FucGlcNAc2	QLTPTFYDNSCPN#VSNIVR
H18	3353.5	XylMan3FucGlcNAc2	SFAN#STQTFFNAFVEAMDR
H19	3369.6	XylMan3FucGlcNAc2	SFAN#STQTFFNAFVEAM*DR
H20	3508.7	XylMan2FucGlcNAc2	GLIQSDQELFSSPN#ATDTIPLVR
H21	3525.7	XylMan3GlcNAc2	GLIQSDQELFSSPN#ATDTIPLVR
H22	3539.6	Man3FucGlcNAc2	GLIQSDQELFSSPN#ATDTIPLVR
H23	3605.2	XylMan3FucGlcNAc2	NQCRGLCPLNGN#LSALVDFDLR
H24	3671.4	XylMan3FucGlcNAc2	GLIQSDQELFSSPN#ATDTIPLVR
H25	3749.4	XylMan3GlcNAc2	LHFHDCFVNGCDASILLDN#TTSFR
H26	3894.1	XylMan3FucGlcNAc2	LHFHDCFVNGCDASILLDN#TTSFR
H27	4056.9	XylMan3GlcNAc2	QLTPTFYDNSC(AAVESACPR)PN#VSNIVR-H2O
H28	4222.1	XylMan3FucGlcNAc2	QLTPTFYDNSC(AAVESACPR)PN#VSNIVR
H29	4721.1	Man3FucGlcNAc2, Man3FucGlcNAc2	LYN#FSNTGLPDPTLN#TTYLQTLR
H30	4821.7	XylMan2FucGlcNAc2, XylMan2GlcNAc2	LYN#FSNTGLPDPTLN#TTYLQTLR
H31	4837.9	XylMan3FucGlcNAc2, XylMan3GlcNAc2	LYN#FSNTGLPDPTLN#TTYLQTLR
H32	4852.7	Man3FucGlcNAc2, XylMan3FucGlcNAc2	LYN#FSNTGLPDPTLN#TTYLQTLR
H33	4983.9	XylMan3FucGlcNAc2, XylMan3FucGlcNAc2	LYN#FSNTGLPDPTLN#TTYLQTLR

Table S2 The sequence information and detailed glycan structures of the captured glycopeptides by Fe_3O_4-MPBA nanoparticles from IgG digests, N# denotes the N-linked glycosylation site.

No.	Observed m/z	Glycan composition	Amino acid sequence
I1	2237.4	[Hex]3[HexNAc]2[Fuc]1	EEQFN#STFR
I2	2269.2	[Hex]3[HexNAc]2[Fuc]1	EEQYN#STYR
I3	2399.1	[Hex]3[HexNAc]3[Fuc]1	EEQFN#STFR
I4	2431.5	[Hex]3[HexNAc]3[Fuc]1	EEQYN#STYR
I5	2456.4	[Hex]3[HexNAc]4	EEQFN#STFR
I6	2488.4	[Hex]3[HexNAc]4	EEQYN#STYR
I7	2561.8	[Hex]4[HexNAc]3[Fuc]1	EEQFN#STFR
I8	2593.2	[Hex]4[HexNAc]3[Fuc]1	EEQYN#STYR
I9	2602.5	[Hex]4[HexNAc]4[Fuc]1	EEQFN#STFR
I10	2618.7	[Hex]4[HexNAc]4[Fuc]1, or[Hex]4[HexNAc]4	EEQFN#STYR, or EEQFN#STFR
I11	2634.8	[Hex]4[HexNAc]4[Fuc]1,or [Hex]4[HexNAc]4	EEQYN#STYR, or EEQFN#STYR,
I12	2650.5	[Hex]4[HexNAc]4	EEQYN#STYR
I13	2659.8	[Hex]3[HexNAc]5	EEQFN#STFR
I14	2691.9	[Hex]3[HexNAc]5	EEQYN#STYR
I15	2764.8	[Hex]4[HexNAc]4[Fuc]1	EEQFN#STFR
I16	2778.4	[Hex]5[HexNAc]4	EEQFN#STFR
I17	2781.2	[Hex]4[HexNAc]4[Fuc]1,or[Hex]5[HexNAc]4	EEQFN#STYR, or EEQFN#STFR
I18	2797.2	[Hex]4[HexNAc]4[Fuc]1,or[Hex]5[HexNAc]4	EEQYN#STYR, or EEQFN#STYR
I19	2806.8	[Hex]3[HexNAc]5[Fuc]1	EEQFN#STFR
I20	2811.6	[Hex]5[HexNAc]4	EEQYN#STYR
I21	2822.7	[Hex]3[HexNAc]5[Fuc]1, or [Hex]4[HexNAc]5	EEQFN#STYR, or EEQFN#STFR
I22	2927.5	[Hex]5[HexNAc]4[Fuc]1	EEQFN#STFR
I23	2943.6	[Hex]5[HexNAc]4[Fuc]1	EEQFN#STYR
I24	2959.6	[Hex]5[HexNAc]4[Fuc]1	EEQYN#STYR
I25	2968.1	[Hex]4[HexNAc]5[Fuc]1	EEQFN#STFR
I26	2985.1	[Hex]4[HexNAc]5[Fuc]1, or [Hex]5[HexNAc]5	EEQFN#STYR,or EEQFN#STFR
I27	3002.5	[Hex]4[HexNAc]5[Fuc]1,or[Hex]5[HexNAc]5	EEQYN#STYR, or EEQFN#STYR
I28	3057.4	[Hex]4[HexNAc]4[Fuc]1[NeuAc]1	EEQFN#STFR
I29	3131.2	[Hex]5[HexNAc]5[Fuc]1	EEQFN#STFR
I30	3162.9	[Hex]5[HexNAc]5[Fuc]1	EEQYN#STYR
I31	3219.5	[Hex]5[HexNAc]4[Fuc]1[NeuAc]1	EEQFN#STFR

Table S3 the comparison table of Fe_3O_4-MPBA and other published works

materials	graft yield	capacity	Enrichment recovery	selectivity	LOD (fmol/ μ L)	glycopeptides	glycosylation sites	glycoproteins
Fe_3O_4@SiO_2@PSV[1]	-*	-	-	HRP:BSA 1:80(mol/mol)	1.14	103	-	46
Fe_3O_4@Au-B$(OH)_2$@mTiO_2[2]	-	-	-	HRP:BSA 1:100(mol/mol)	2	-	-	-
GO/PEI/Au/4-MPB[3]	14.3%	-	-	ASF:BSA 1:46(mol/mol)	1.13	-	-	-
Fe_3O_4@SiO_2-APB & PMMA[4]	-	150 mg/g	90%	HRP:MYO 1:100(mol/mol)	2.23	147	153	66
Fe_3O_4-MPBA	5.26%	150 mg/g	90.6%	HRP:MYO 1:130(mol/mol)	0.5	230	247	93

* - means not mentioned

1. M. Wang, X. Zhang and C. Deng, *Proteomics*, 2015, **15**, 2158-2165.
2. D. Xu, G. Yan, M. Gao, C. Deng and X. Zhang, *Talanta*, 2017, **166**, 154-161.
3. B. Jiang, Y. Qu, L. Zhang, Z. Liang and Y. Zhang, *Anal. Chim. Acta*, 2016, **912**, 41-48.
4. Y. Wang, M. Liu, L. Xie, C. Fang, H. Xiong and H. Lu, *Anal. Chem.*, 2014, **86**, 2057-2064.

Table S4 Detail information of the glycopeptides enriched from tryptic digests of human serum using Fe_3O_4-MPBA nanoparticles, n: N-glycosylation site.

No.	Protein Group Accessions	Sequence	MH+ [Da]
1	P00736	cnYSIR	813.35637
2	P05546	DFVnASSK	868.40471
3	P22792	AFGSNPnLTK	1049.52605
4	P43652	DIENFnSTQK	1196.54656
5	Q08380	DAGVVcTnETR	1222.53874
6	Q96KN2	LVPHMnVSAVEK	1324.69379
7	Q08380	ALGFEnATQALGR	1348.68572
8	P29622	DFYVDEnTTVR	1359.60686
9	P01011	KLINDYVKnGTR	1421.77668
10	P02765	KVcQDcPLLAPLnDTR	1421.77668
11	P07996	KVScPIMPcSnATVPDGEccPR	1421.77668
12	Q06033	KNAHGEEKEnLTAR	1421.77668
13	Q96IY4	KQVHFFVnASDVDNVK	1421.77668
14	P08185	AQLLQGLGFnLTER	1560.84014
15	P01008	AAINKWVSnKTEGR	1574.82932
16	P02790	ALPQPQnVTSLLGcTH	1736.86760
17	O75882	nHScSEGQISIFR	1826.97727
18	P00738	QLVEIEKVVLHPnYSQVDIGLIK	1826.97727
19	P00739;P00738	MVSHHnLTTGATLINEQWLLTTAK	1826.97727
20	P00739;P00738	mVSHHnLTTGATLINEQWLLTTAK	1826.97727
21	P00739;P00738	MVSHHnLTTGATLInEQWLLTTAK	1826.97727
22	P00739;P00738	NLFLnHSENATAK	1826.97727
23	P00739;P00738	NLFLnHSEnATAK	1826.97727
24	P00739;P00738	nLFLnHSEnATAK	1826.97727
25	P00748	RnHScEPcQTLAVR	1826.97727
26	P01008	LVSANRLFGDKSLTFnETYQDISELVYGAK	1826.97727
27	P01009	QLAHQSnSTNIFFSPVSIATAFAmLSLGTK	1826.97727
28	P01009	QLAHQSnSTNIFFSPVSIATAFAMLSLGTK	1826.97727
29	P02745	NPPMGGNVVIFDTVITNQEEPYQnHSGR	1826.97727
30	P02763	QDQcIYnTTYLNVQR	1826.97727
31	P02787	QQQHLFGSnVTDcSGNFcLFR	1826.97727
32	P02790	nGTGHGnSTHHGPEYmR	1826.97727
33	P02790	nGTGHGnSTHHGPEYMR	1826.97727
34	P04004	nnATVHEQVGGPSLTSDLQAQSK	1826.97727
35	P04114	QVFPGLNYcTSGAYSnASSTDSASYYPLTGDTR	1826.97727
36	P05546	nLSMPLLPADFHK	1826.97727
37	P08603	MDGASnVTcINSR	1826.97727
38	P0C0L5;P0C0L4	nTTcQDLQIEVTVK	1826.97727
39	P10643	nYTLTGR	1826.97727
40	P10909	MLnTSSLLEQLNEQFNWVSR	1826.97727
41	P10909	mLnTSSLLEQLNEQFNWVSR	1826.97727

42	P12259	nSVLnSSTAEHSSPYSEDPIEDPLQPDVTGIR	1826.97727
43	P19652	QNQcFYnSSYLNVQR	1826.97727
44	P22792	LYLGSNnLTALHPALFQnLSK	1826.97727
45	P43251	NPVGLIGAEnATGETDPSHSK	1826.97727
46	P55058	nWSLPNR	1826.97727
47	Q06033	NAHGEEKEnLTAR	1826.97727
48	Q96IY4	QVHFFVnASDVDNVK	1826.97727
49	O75882	ISnSSDTVEcEcSENWK	1878.88994
50	O75882	GIcnSSDVR	1878.88994
51	P00450	EnLTAPGSDSAVFFEQGTTR	1878.88994
52	P00450	EHEGAIYPDnTTDFQR	1878.88994
53	P00450	ELHHLQEQnVSNAFLDK	1878.88994
54	P00450	ELHHLQEQnVSNAFLDKGEFYIGSK	1878.88994
55	P01009	ITPnLAEFAFSLYRQLAHQSnSTNIFFSPVSIATAFAMLSLGTK	1878.88994
56	P01011	FnLTETSEAEIHQSFQHLLR	1878.88994
57	P01023	GcVLLSYLnETVTVSASLESVR	1878.88994
58	P01591	IIVPLNNREnISDPTSPLR	1878.88994
59	P01763	FTISRnbSK	1878.88994
60	P01763	GRFTISRnbSK	1878.88994
61	P01857	EEQYnSTYR	1878.88994
62	P01859	EEQFnSTFR	1878.88994
63	P01861	EEQFnSTYR	1878.88994
64	P01871	GLTFQQnASSmcVPDQDTAIR	1878.88994
65	P01871	GLTFQQnASSMcVPDQDTAIR	1878.88994
66	P02749	DTAVFEcLPQHAMFGnDTITcTTHGnWTKLPEcR	1878.88994
67	P02749	DTAVFEcLPQHAmFGnDTITcTTHGnWTK	1878.88994
68	P02749	DTAVFEcLPQHAMFGnDTITcTTHGnWTK	1878.88994
69	P02751	GGNSNGALcHFPFLYNNHnYTDcTSEGR	1878.88994
70	P02751	DQcIVDDITYNVnDTFHK	1878.88994
71	P02751	DQcIVDDITYNVnDTFHKR	1878.88994
72	P02751	GGnSNGALcHFPFLYNNHnYTDcTSEGR	1878.88994
73	P02751	GGNSnGALcHFPFLYNnHnYTDcTSEGR	1878.88994
74	P02790	GHGHRnGTGHGnSTHHGPEYMR	1878.88994
75	P03952	GVNFnVSK	1878.88994
76	P03952	IYSGILnLSDITK	1878.88994
77	P04003	FSLLGHASIScTVEnETIGVWRPSPPTcEK	1878.88994
78	P04070	EVFVHPnYSK	1878.88994
79	P04114	FVEGSHnSTVSLTTK	1878.88994
80	P04114	FEVDSPVYnATWSASLK	1878.88994
81	P04114	FnSSYLQGTNQITGR	1878.88994
82	P04217	FQSPAGTEALFELHnISVADSANYScVYVDLKPPFGGSAPSER	1878.88994
83	P04275	HcDGnVSScGDHPSEGcFcPPDK	1878.88994
84	P05155	DTFVnASR	1878.88994
85	P05155	GVTSVSQIFHSPDLAIRDTFVnASR	1878.88994

86	P05156	FLNnGTcTAEGK	1878.88994
87	P05156	FLnnGTcTAEGK	1878.88994
88	P05160	EHETcLAPELYNGnYSTTQK	1878.88994
89	P05160	KEHETcLAPELYNGnYSTTQK	1878.88994
90	P05160	KEHETcLAPELYnGnYSTTQK	1878.88994
91	P05546	GGETAQSADPQWEQLNNKnLSMPLLPADFHK	1878.88994
92	P05546	GGETAQSADPQWEQLnnKnLSMPLLPADFHK	1878.88994
93	P06276	EnETEIIK	1878.88994
94	P06276	DnNSIITR	1878.88994
95	P08603	ISEEnETTcYmGK	1878.88994
96	P08603	ISEEnETTcYMGK	1878.88994
97	P08603	IPcSQPPQIEHGTInSSR	1878.88994
98	P0C0L5;P0C0L4	GLnVTLSSTGR	1878.88994
99	P0C0L5;P0C0L4	FSDGLESnSSTQFEVK	1878.88994
100	P0C0L5;P0C0L4	FSDGLESnSSTQFEVKK	1878.88994
101	P10909	EDALnETR	1878.88994
102	P10909	ELPGVcnETmMALWEEcKPcLK	1878.88994
103	P10909	ELPGVcnETMMALWEEcKPcLK	1878.88994
104	P14151	FcRDnYTDLVAIQNK	1878.88994
105	P19827	DKIcDLLVAnNHFAHFFAPQnLTNMNK	1878.88994
106	P20851	EWDnTTTEcR	1878.88994
107	P25311	DIVEYYNDSnGSHVLQGR	1878.88994
108	P25311	DIVEYYnDSnGSHVLQGR	1878.88994
109	P26927	GTAnTTTAGVPcQR	1878.88994
110	P27169	HAnWTLTPLK	1878.88994
111	P29622	FLnDTMAVYEAK	1878.88994
112	P43251	FnDTEVLQR	1878.88994
113	P43251	DVQIIVFPEDGIHGFnFTR	1878.88994
114	P51884	KLHINHNnLTESVGPLPK	1878.88994
115	P55058	IYSnHSALESLALIPLQAPLK	1878.88994
116	P55058	EGHFYYnISEVK	1878.88994
117	Q02985	FVQGnSTEVAcHPGYGLPK	1878.88994
118	Q08380	GLnLTEDTYKPR	1878.88994
119	Q13201	FNPGAESVVLSnSTLK	1878.88994
120	Q16610	HIPGLIHnMTAR	1878.88994
121	Q96PD5	GFGVAIVGnYTAALPTEAALR	1878.88994
122	Q9UK55	ETFFnLSK	1878.88994
123	P00734	SRYPHKPEInSTTHPGADLQENFcR	1904.94634
124	P01008	SLTFnETYQDISELVYGAK	1904.94634
125	P01023	SLGNVnFTVSAEALESQELcGTEVPSVPEHGR	1904.94634
126	P01023	SLGNVnFTVSAEALESQELcGTEVPSVPEHGRK	1904.94634
127	P01023	SLGnVnFTVSAEALESQELcGTEVPSVPEHGR	1904.94634
128	P01023	SLGnVnFTVSAEALESQELcGTEVPSVPEHGRK	1904.94634
129	P01871;P04220	STGKPTLYnVSLVMSDTAGTcY	1904.94634

130	P02790	SWPAVGncSSALR	1904.94634
131	P08603	SPDVInGSPISQK	1904.94634
132	P29622	SQILEGLGFnLTELSESDVHR	1904.94634
133	P02748	AVnITSENLIDDVVSLIR	1972.06182
134	P17936	AYLLPAPPAPGnASESEEDR	2084.98100
135	P01008	LGAcnDTLQQLmEVFK	2092.10845
136	P01008	LGAcnDTLQQLmEVFKFDTISEK	2092.10845
137	P01008	LGAcnDTLQQLMEVFK	2092.10845
138	P01008	LGAcnDTLQQLMEVFKFDTISEK	2092.10845
139	P01008	LFGDKSLTFnETYQDISELVYGAK	2092.10845
140	P01019	LQAILGVPWKDKncTSR	2092.10845
141	P01042	LNAENnATFYFK	2092.10845
142	P01876	LAGKPTHVnVSVVMAEVDGTcY	2092.10845
143	P02749	LGnWSAmPScK	2092.10845
144	P02751	LDAPTNLQFVnETDSTVLVR	2092.10845
145	P02751	LDAPTnLQFVnETDSTVLVR	2092.10845
146	P02774	LcDnLSTK	2092.10845
147	P03952	LQAPLnYTEFQKPIcLPSK	2092.10845
148	P10909	LAnLTQGEDQYYLR	2092.10845
149	P10909	LKELPGVcnETMMALWEEcKPcLK	2092.10845
150	P20851	LGHcPDPVLVNGEFSSSGPVnVSDK	2092.10845
151	P20851	LGHcPDPVLVnGEFSSSGPVnVSDK	2092.10845
152	P36980	LQNNENnIScVER	2092.10845
153	P36980	LQnNENnIScVER	2092.10845
154	P51884	LHINHNnLTESVGPLPK	2092.10845
155	P51884	LGSFEGLVnLTFIHLQHNR	2092.10845
156	P80108	LGTSLSSGHVLMnGTLK	2092.10845
157	Q14624	LPTQnITFQTESSVAEQEAEFQSPK	2092.10845
158	Q96PD5	LEPVHLQLQcMSQEQLAQVAAnATK	2092.10845
159	P01024	LVLSSEKTVLTPATNHMGnVTFTIPANR	2234.14092
160	P01876;P01877	LSLHRPALEDLLLGSEAnLTcTLTGLR	2234.14092
161	P04003	LSVDKDQYVEPEnVTIQcDSGYGVVGPQSITcSGnR	2234.14092
162	P05156	LSDLSInSTEcLHVHcR	2234.14092
163	P05090	ADGTVNQIEGEATPVnLTEPAK	2255.10747
164	P05546	DFVnASSKYEITTIHNLFR	2256.12734
165	P02765	AALAAFNAQNnGSNFQLEEISR	2367.13188
166	P02765	AALAAFnAQNnGSNFQLEEISR	2367.13188
167	O75882	AATcINPLnGSVcERPAnHSAK	2369.09818
168	P13598	AAPAPQEATATFnSTADREDGHR	2414.10239
169	P02766	ALGISPFHEHAEVVFTAnDSGPR	2452.21084
170	P02766	ALGISPFHEHAEVVFTAnDSGPRR	2608.31240
171	P51884	AFEnVTDLQWLILDHNLLENSK	2613.31949
172	P05090	ADGTVNQIEGEATPVnLTEPAKLEVK	2724.39658
173	P08185	AVLQLNEEGVDTAGSTGVTLnLTSKPIILR	3111.70823

174	P08185	AVLQLnEEGVDTAGSTGVTLnLTSKPIILR	3111.70823
175	P01009	ADTHDEILEGLnFnLTEIPEAQIHEGFQELLR	3693.81338
176	O95445	TELFSSScPGGIMLnETGQGYQR	4419.25063
177	P00734	WVLTAAHcLLYPPWDKnFTENDLLVR	4419.25063
178	P00738	VVLHPnYSQVDIGLIK	4419.25063
179	P00738	VVLHPnYSQVDIGLIKLK	4419.25063
180	P01008	WVSnKTEGR	4419.25063
181	P01011	TLnQSSDELQLSMGNAMFVK	4419.25063
182	P01023	VSnQTLSLFFTVLQDVPVR	4419.25063
183	P01024	TVLTPATNHMGnVTFTIPANR	4419.25063
184	P01024	TVLTPATNHMGnVTFTIPANREFK	4419.25063
185	P01024	TVLTPATNHmGnVTFTIPANR	4419.25063
186	P01024	TVLTPATnHMGnVTFTIPANR	4419.25063
187	P01833	WnNTGcQALPSQDEGPSK	4419.25063
188	P01857	TKPREEQYnSTYR	4419.25063
189	P01859	TKPREEQFnSTFR	4419.25063
190	P01861	TKPREEQFnSTYR	4419.25063
191	P01871	THTnISESHPnATFSAVGEASIcEDDWNSGER	4419.25063
192	P01871	THTnISESHPnATFSAVGEASIcEDDWnSGER	4419.25063
193	P01877	TPLTAnITK	4419.25063
194	P02749	VYKPSAGnnSLYR	4419.25063
195	P02765	VcQDcPLLAPLnDTR	4419.25063
196	P04114	YDFnSSmLYSTAK	4419.25063
197	P04114	VNQNLVYESGSLnFSK	4419.25063
198	P04114	VNQNLVYESGSLnFSKLEIQSQVDSQHVGHSVLTAK	4419.25063
199	P04196	VIDFncTTSSVSSALAnTK	4419.25063
200	P04220	THTnISESHPnATFSAVGEASIcEDDWDSGER	4419.25063
201	P05154	VVGVPYQGnATALFILPSEGK	4419.25063
202	P05155	VGQLQLSHnLSLVILVPQNLK	4419.25063
203	P05155	VGQLQLSHnLSLVILVPQNLKHR	4419.25063
204	P05543	VTAcHSSQPnATLYK	4419.25063
205	P05543	TLYETEVFSTDFSnISAAK	4419.25063
206	P06276	WSDIWnATK	4419.25063
207	P06681	TMFPnLTDVR	4419.25063
208	P07996	VVnSTTGPGEHLR	4419.25063
209	P07996	VScPIMPcSnATVPDGEccPR	4419.25063
210	P13473	VQPFnVTQGK	4419.25063
211	P13473	VASVININPnTTHSTGScR	4419.25063
212	P13671	VLnFTTK	4419.25063
213	P20851	TLFcnASK	4419.25063
214	P20851	TLFcnASKEWDnTTTEcR	4419.25063
215	P27169	VTQVYAEnGTVLQGSTVASVYK	4419.25063
216	P36955	VTQnLTLIEESLTSEFIHDIDR	4419.25063
217	P43251	WNPcLEPHRFnDTEVLQR	4419.25063

218	P43652	YAEDKFnETTEK	4419.25063
219	P55058	VSnVScQASVSR	4419.25063
220	Q08380	TVIRPFYLTnSSGVD	4419.25063
221	P00734	YPHKPEInSTTHPGADLQENFcR	4928.43325
222	P01009	YLGnATAIFFLPDEGK	4928.43325
223	P01011	YTGnASALFILPDQDK	4928.43325
224	P01011	YTGnASALFILPDQDKMEEVEAMLLPETLKR	4928.43325
225	P01031	YnFSFR	4928.43325
226	P01042	YNSQnQSNNQFVLYR	4928.43325
227	P01871	YKnnSDISSTR	4928.43325
228	P06276	YGNPnETQnnSTSWPVFK	4928.43325
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230	Q9Y6R7	YLPVnSSLLTSDcSER	4928.43325