Electronic Supporting Information for:

Preparation of thickness-controlled Mg-MOFs based magnetic graphene composite as a novel hydrophilic matrix for the effective identification of glycopeptide in human urine

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EXPERIMENTAL SECTION

Recovery Estimation of Glycopeptides Enrichment

Stable isotope dimethyl labeling was used to investigate the recovery yield of glycopeptides.[1] The human IgG tryptic digests were labeled by light (CH_2O) and heavy (CD_2O) isotopes, respectively.[2-4] The heavy-tagged peptides were extracted by MagG@Mg-MOFs-1C and the eluent was collected. Then the eluent was added into the light-tagged IgG digest. The mixture was further enriched by MagG@Mg-MOFs-1C, and the eluent was deglycosylated, followed by MALDI-TOF-MS analysis. The recovery (D/H) was calculated by the peak intensity ratio of the heavy to the light tagged deglycosylated peptides.

Measurements and Characterization

Transmission electron microscopy (TEM) images and energy dispersive x-ray spectra were taken on a JEOL 2011 microscope (Japan) operated at 200 kV. Fourier transform infrared spectra (FT-IR) was operated on a Nicolet Fourier spectrophotometer (U.S.A.). Powder X-ray diffraction patterns were recorded on a Bruker D4 X-ray diffractometer with Ni-filtered Cu Kαradiation (40 kV, 40 mA). Nitrogen adsorption-desorption isotherms were measured with a Micromeritcs Tristar 3000 analyzer (USA) at 77 K. Thermogravimetric analyses (TGA) were performed on a Mettler Toledo TGA/SDTA851 analyzer in the temperature range of 30-950 °C at a heating rate of 10 °C min^{-1} under flowing air. Water contact angles of Mg-MOFs and magnetic graphene composites were measured on a contact angle system (XG-CAMC3).

Nano-Liquid chromatography tandem mass spectrometry (Nano-LC-MS/MS) analysis of glycopeptides

Glycopeptides enriched from the urine of bladder cancer patients were resuspended with 20 μL solvent A (A: water with 0.1 % formic acid; B: ACN with 0.1 % formic acid) and then

separated by nanoLC and analyzed by on-line electrospray tandem mass spectrometry. The experiments were performed on an EASY-nLC 1000 system (Thermo Fisher Scientific, Waltham, MA) connected to an Orbitrap Fusion mass spectrometer (Thermo Fisher Scientific, San Jose, CA) equipped with an online nano-electrospray ion source. 6 µL peptide sample was loaded onto the trap column (Thermo Scientific Acclaim PepMap C18, 100µm x 2cm), with a flow of 10 µL/min for 3 min and subsequently separated on the analytical column (Acclaim PepMap C18, 75 µm x 25 cm) with a linear gradient, from 2 % B to 30 % B in 85 min. The column was re-equilibrated at initial conditions for 5 min. The column flow rate was maintained at 300 nL/min and column temperature was maintained at 40 °C. The electrospray voltage of 2.0 kV versus the inlet of the mass spectrometer was used. The Orbitrap Fusion mass spectrometer was operated in the data-dependent mode to switch automatically between MS and MS/MS acquisition. Survey full-scan MS spectra (m/z 350-1550) were acquired in Orbitrap with a mass resolution of 60 000 at m/z 200. The AGC taget was set to 500 000, and the maximum injection time was 50 ms. MS/MS acquisition was performed in Orbitrap with 3 s cycle time, the resolution was 15 000 at m/z 200. The intensity threshold was 50 000, and the maximum injection time was 120 ms. The AGC target was set to 10 000, and the isolation window was 2 m/z. Ions with charge states 2^+, 3^+, and 4^+ were sequentially fragmented by higher energy collisional dissociation (HCD) with a normalized collision energy (NCE) of 35 %, fixed first mass was set at 110. In all cases, one microscan was recorded using dynamic exclusion of 21 seconds.

Database search

Tandem mass spectra were extracted by Proteome Discoverer software (Thermo Fisher Scientific, version 1.4.0.288). Charge state deconvolution and deisotoping were not performed. All MS/MS samples were analyzed using Mascot (Matrix Science, London, UK;

version 2.3.2). The database was the Human UniProtKB/Swiss-Prot database (Release 2018-01-26, with 20245 sequences). Raw files generated by the Orbitrap Fusion were searched directly using a 10 ppm precursor mass tolerance and a 50 mmu fragment mass tolerance. The enzyme specificity with trypsin was used. Up to two missed cleavages were allowed and peptides with at least 7 amino acids were retained. Carbamidomethyl on cysteine was set as a fixed modification. Oxidation on methionine and Deamidation on asparagine were set as variable modifications. Use the percolator algorithm to control peptide level false discovery rates (FDR) lower than 1%. The Asn modification that did not occur in the N-X-S/T (X≠P) sequon was eliminated to ensure the false positive rate below 1% for the identified glycosylation sites.

References

[1] P. J. Boersema, R. Raijmakers, S. Lemeer, S. Mohammed and A. J. R. Heck, *Nat. Protoc.*, 2009, **4**, 484-494.

[2] B. Jiang, Y. Liang, Q. Wu, H. Jiang, K. G. Yang, L. H. Zhang, Z. Liang, J. X. Peng and Y. K. Zhang, *Nanoscale*, 2014, **6**, 5616-5619.

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[4] X. D. Sun, J. Dong, J. N. Li, M. L. Ye, W. B. Zhang and J. J. Ou, *J. Chromatogr. A*, 2017, **1498**, 72-79.

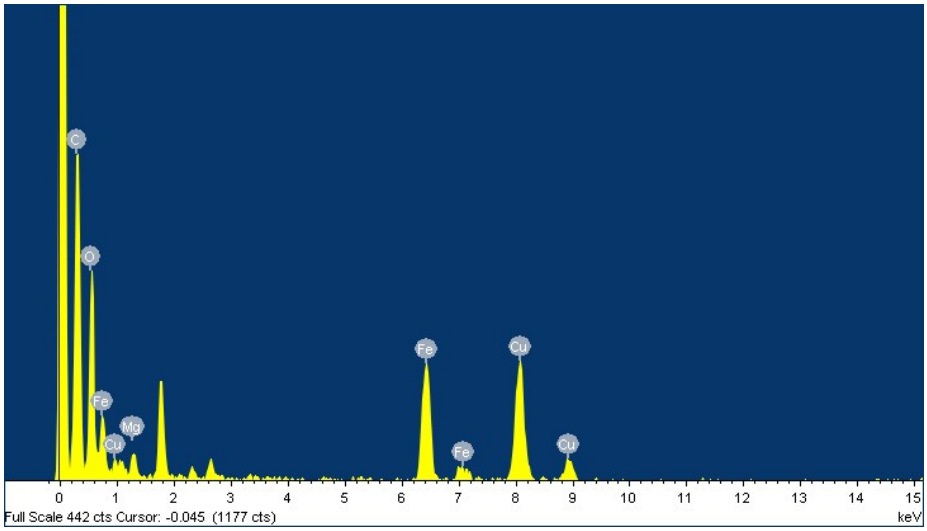


Fig. S1 The energy dispersive X-ray (EDX) spectrum data of MagG@Mg-MOFs-1C composite.

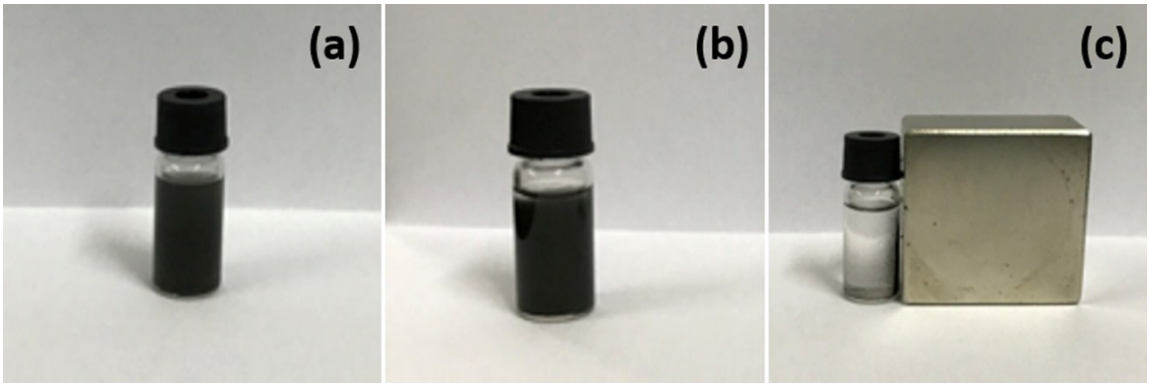
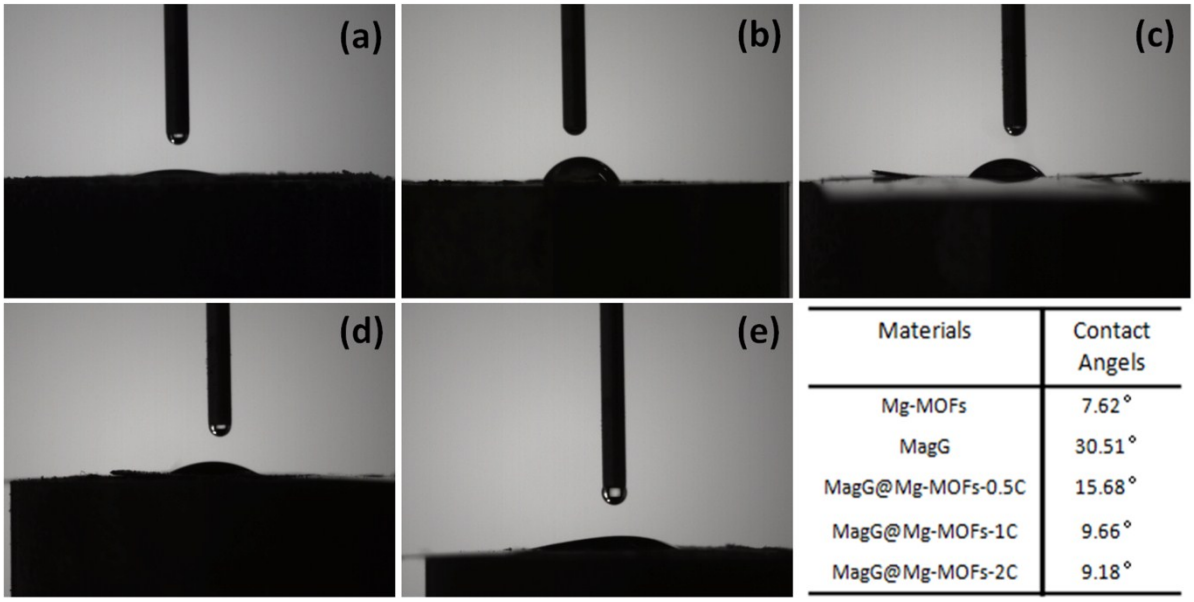


Fig. S2 MagG@Mg-MOFs-1C composites dispersed in loading buffer solution: (a) 2 min, (b) 10 min without magnetic field and (d) 5 seconds under magnetic separation.



Materials	Contact Angels
Mg-MOFs	7.62°
MagG	30.51°
MagG@Mg-MOFs-0.5C	15.68°
MagG@Mg-MOFs-1C	9.66°
MagG@Mg-MOFs-2C	9.18°

Fig. S3 Water contact angels of (a) pristine Mg-MOFs, (b) MagG, (c) MagG@Mg-MOFs-0.5C, (d) MagG@Mg-MOFs-1C and (e) MagG@Mg-MOFs-2C.

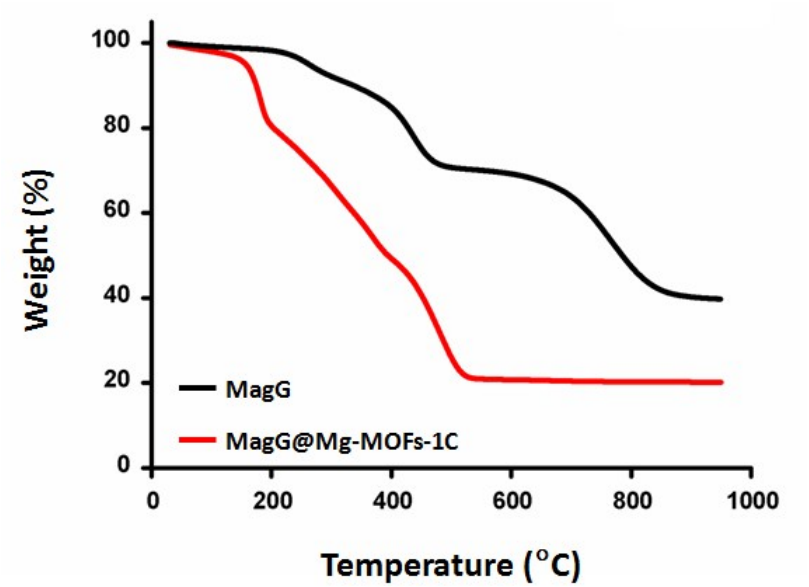


Fig. S4 TGA curves of MagG and MagG@Mg-MOFs-1C composites.

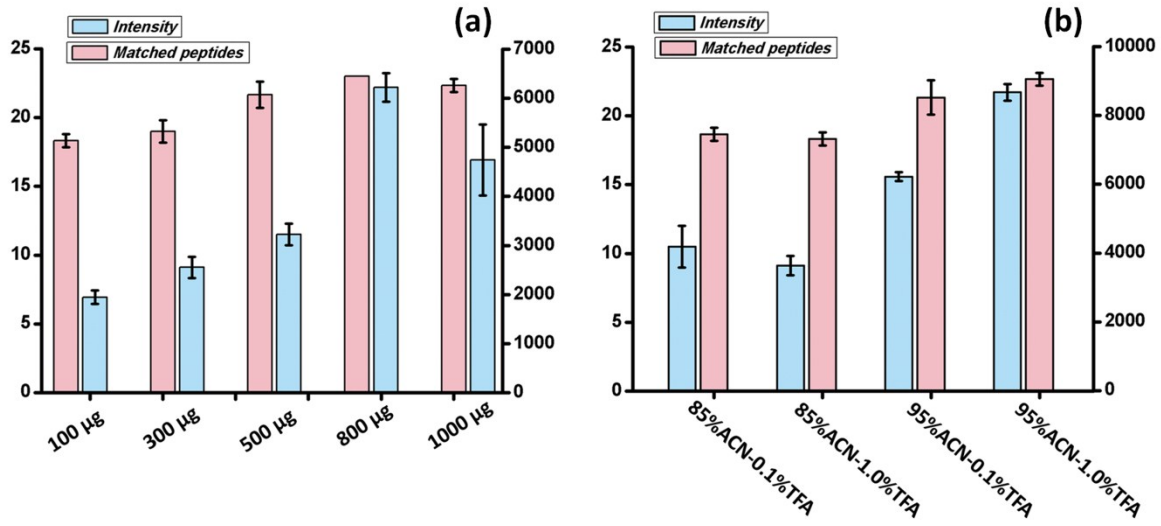


Fig. S5 The effect of different quantity of the MagG@Mg-MOFs-1C composite (a) and different buffer solution (b) in glycopeptides enriched from 10^{-6} M HRP tryptic digest through three parallel tests.

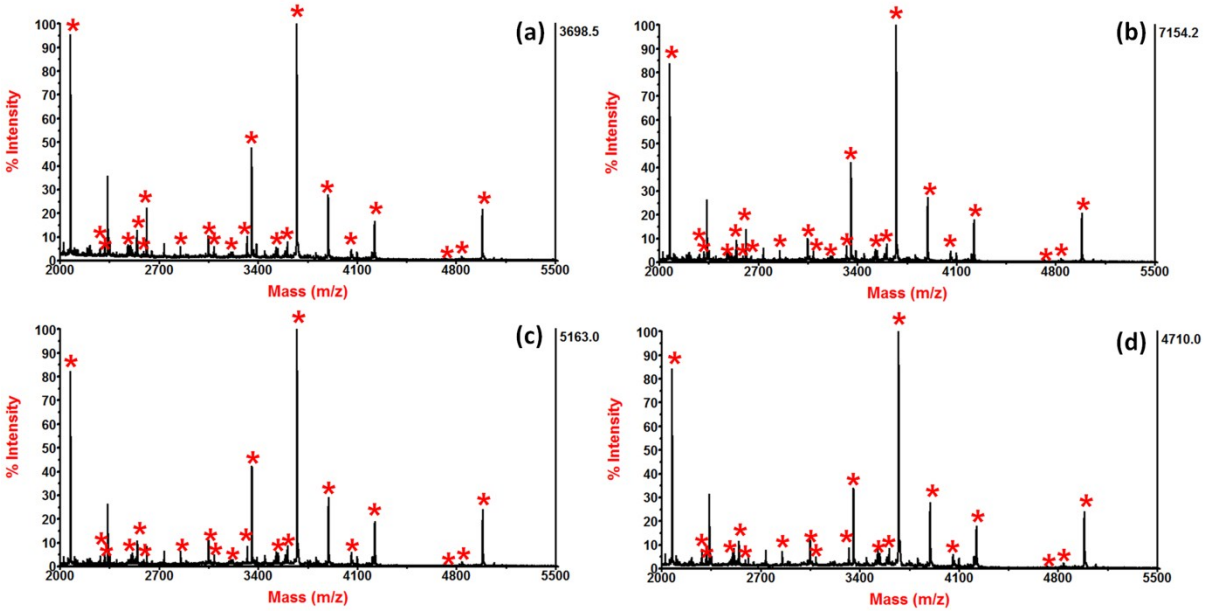


Fig. S6 MALDI-TOF-MS analysis of peptides derived from HRP enriched by MagG@Mg-MOFs-1C composite with different incubation time (a) 5 min; (b) 20 min; (c) 40 min and (d) 60 min.

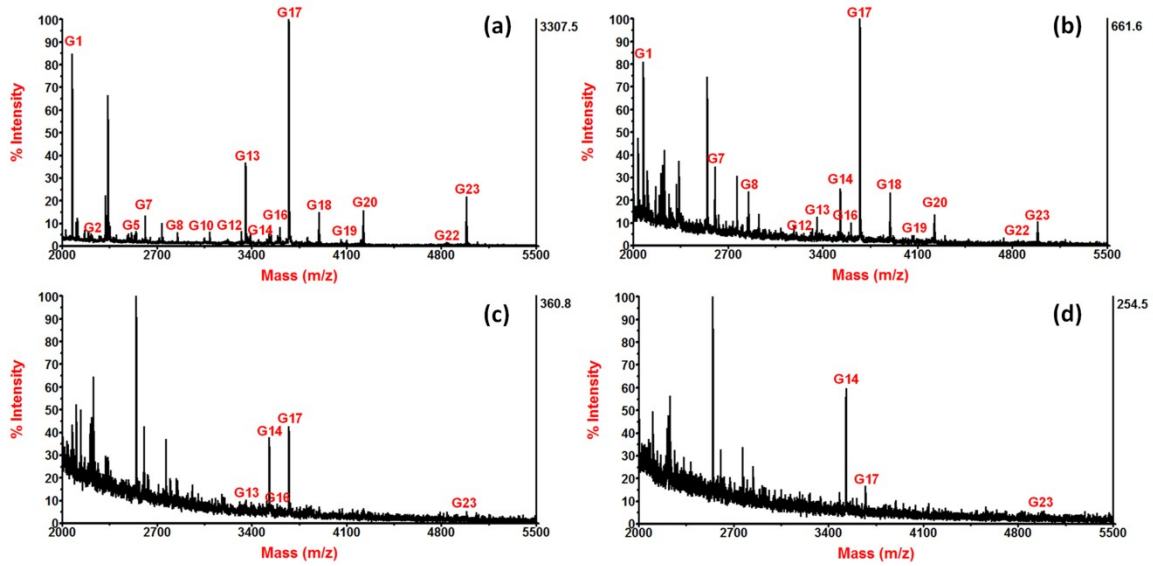


Fig. S7 MALDI-TOF-MS spectra of different concentrations of the HRP tryptic digests after enrichment by MagG@Mg-MOFs-1C composite: (a) 100 fmol/μL; (b) 10 fmol/μL; (c) 1 fmol/μL and (d) 0.1 fmol/μL.

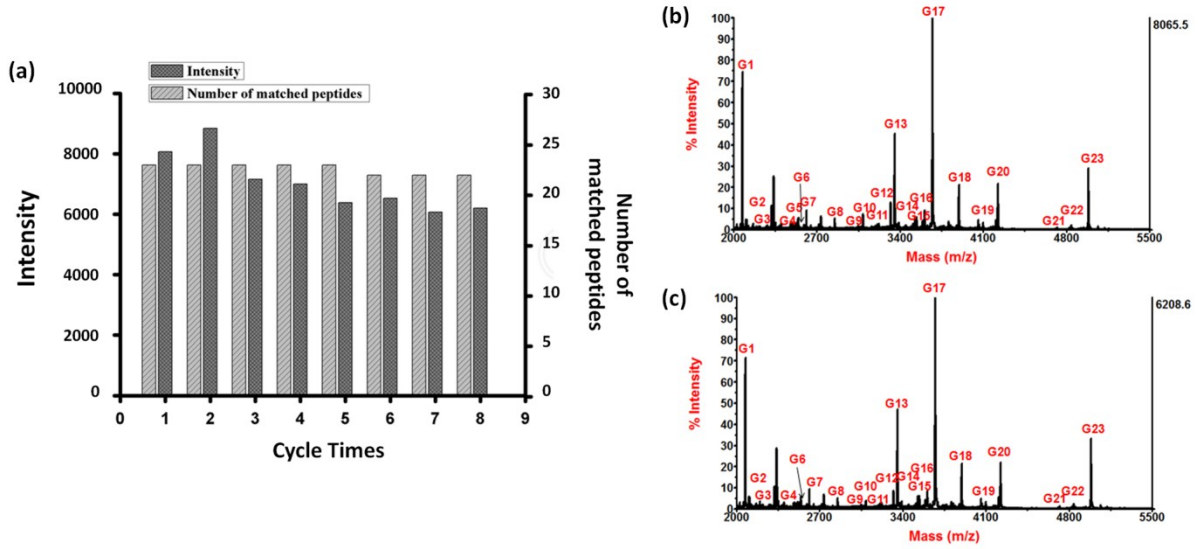


Fig. S8 (a) Cycling performance of MagG@Mg-MOFs-1C composite for glycopeptides enrichment. MALDI-TOF-MS for the glycopeptides derived from HRP tryptic digest: (b) after treatment with MagG@Mg-MOFs-1C used for the first time and (c) after enrichment with MagG@Mg-MOFs-1C recycled 8 times.

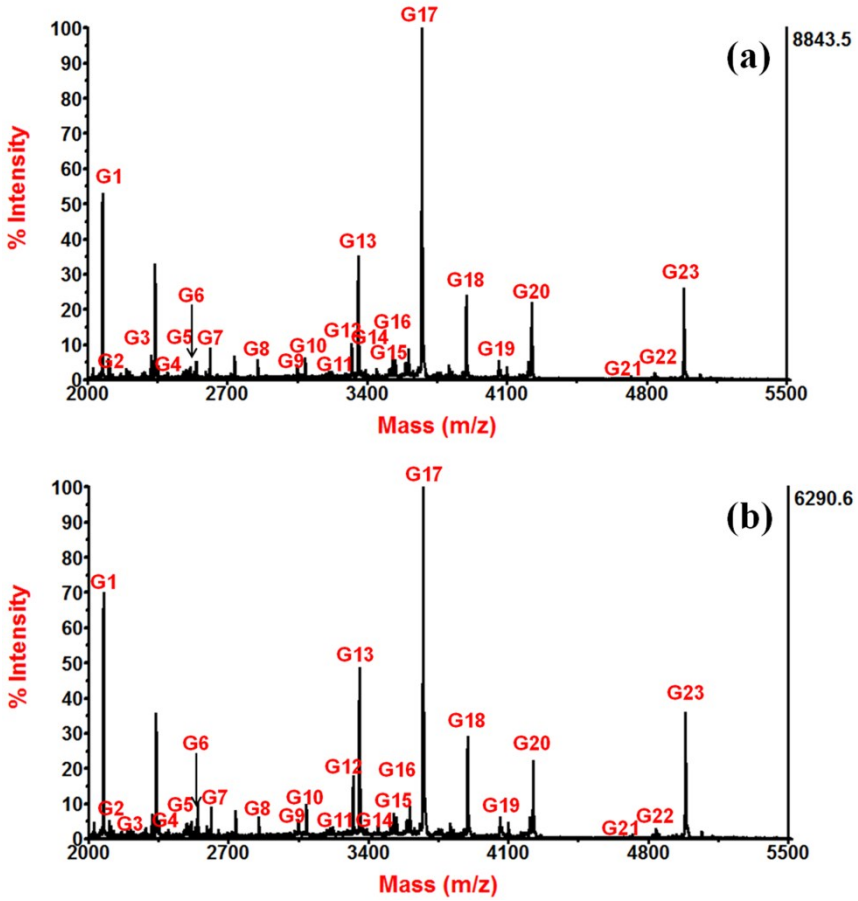


Fig. S9 MALDI-TOF-MS for the glycopeptides derived from HRP tryptic digest: (a) after treatment with the MagG@Mg-MOFs-1C used for the first time and (b) after enrichment with the MagG@Mg-MOFs-1C which had been placed for one month.

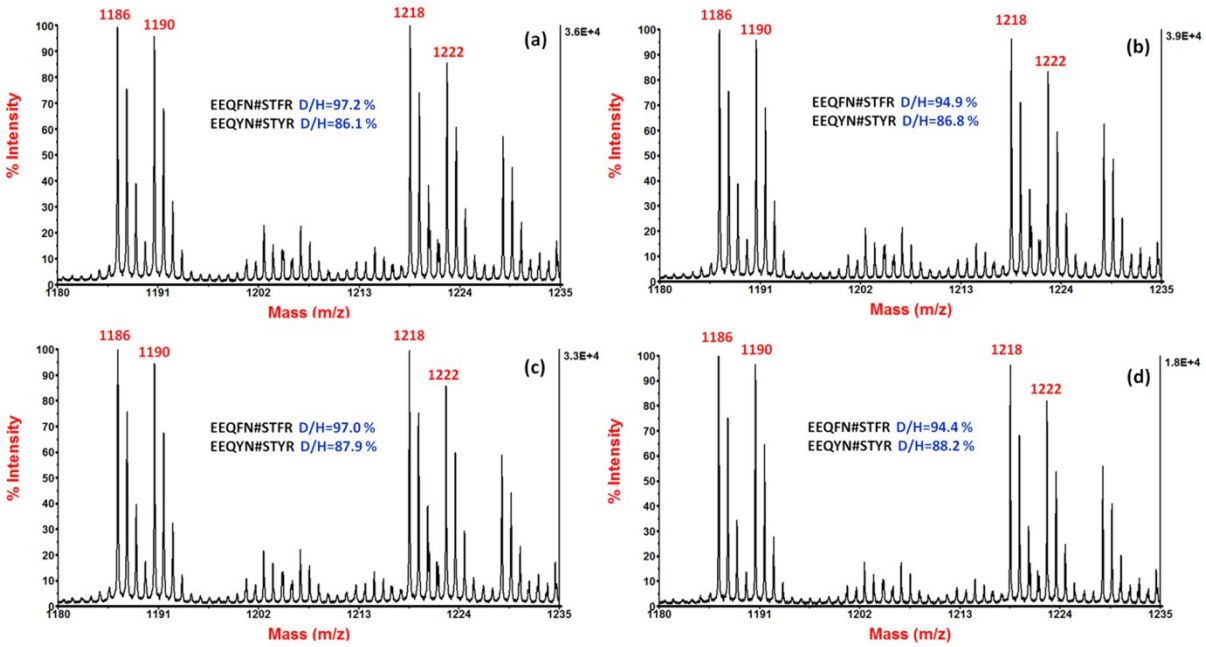


Fig. S10 Recovery of deglycosylated peptides from human IgG tryptic digest.

Table S1. Detailed information of the observed glycopeptides in HRP tryptic digest**.** N# denotes the N-glycosylation site.

No.	m/z	Glycan composition	Amino acid sequence
G1	2074	XylMan3GlcNAc2	PN#VSNIVR
G2	2290	XylMan2GlcNAc2	SILLDN#TTSFR
G3	2321	Man2GlcNAc2	MGN#ITPLTGTQGQIR
G4	2532	FucGlcNAc	SFAN#STQTFFNAFVEAMDR
G5	2543	XylMan3FucGlcNAc2	SSPN#ATDTIPLVR
G6	2591	XylMan3FucGlcNAc2	PTLN#TTYLQTLR
G7	2612	XylMan3GlcNAc2	MGN#ITPLTGTQGQIR
G8	2850	FucGlcNAc	GLIQSDQELFSSPN#ATDTIPLVR
G9	3048	XylMan2GlcNAc2	SFAN#STQTFFNAFVEAMDR
G10	3087	XylMan3FucGlcNAc2	GLCPLNGN#LSALVDFDLR
G11	3206	XylMan3GlcNAc2	SFAN#STQTFFNAFVEAMDR
G12	3323	XylMan3FucGlcNAc2	QLTPTFYDNSCPN#VSNIVR
G13	3354	XylMan3FucGlcNAc2	SFAN#STQTFFNAFVEAMDR
G14	3526	XylMan3GlcNAc2	GLIQSDQELFSSPN#ATDTIPLVR
G15	3539	Man3FucGlcNAc2	GLIQSDQELFSSPN#ATDTIPLVR
G16	3606	XylMan3FucGlcNAc2	NQCRGLCPLNGN#LSALVDFDLR
G17	3672	XylMan3FucGlcNAc2	GLIQSDQELFSSPN#ATDTIPLVR
G18	3894	XylMan3FucGlcNAc2	LHFHDCFVNGCDASILLDN#TTSFR
G19	4057	XylMan3GlcNAc2	QLTPTFYDNSC(AAVESACPR)PN#VSNIVR-H_2O
G20	4222	XylMan3FucGlcNAc2	QLTPTFYDNSC(AAVESACPR)PN#VSNIVR
G21	4721	Man3FucGlcNAc2	LYN#FSNTGLPDPTLN#TTYLQTLR
G22	4839	XylMan3FucGlcNAc2 XylMan3GlcNAc2	LYN#FSNTGLPDPTLN#TTYLQTLR
G23	4984	XylMan3FucGlcNAc2 XylMan3FucGlcNAc2	LYN#FSNTGLPDPTLN#TTYLQTLR

Table S2. Detail information of the N-glycopeptides enriched from the bladder cancer patient urine by MagG@Mg-MOFs-1C composite. **N#** denotes the N-lycosylation site.

No.	Sequence	MH+ [Da]	Protein Group Accessions
1	AALAAFNAqN**N#**GSNFQLEEISR	P02765	2367.11844
2	ATTDEHGLVqFSI**N#**TTNVMGTSLTVR	P01023	2794.34543
3	mEGGGGSG**N#**KTTGGL	O14925	1365.59453
4	aRASSG**N#**GSEEAWGA	Q96G27	1492.62969
5	sTN**N#**MSDPRRP	Q9Y284	1317.58513
6	aS**N#**NTASIAQARKL	P59768	1487.78349
7	m**N#**DTVTIR	P62847	1008.46739
8	GNEANYYS**N#**ATTDEHGLVqFSI**N#**TTNVMGTSLTVR	P01023	3807.73789
9	LGDAAQPR**N#**LT	Q8IWU5	1156.59380
10	SPAGGSTQ**N#**STNV	P62324	1220.53923
11	AWEEPSSG**N#**GTARAGP	Q9P258	1587.70683
12	AFLSLGAH**N#**TTLTEILK	P01011	1830.00176
13	FEVDSPVY**N#**ATWSASLK	P04114	1914.91472
14	LAGKPTHV**N#**VSVVMAEVDGT	P01876	2025.04795
15	GFGVAIVG**N#**YTAALPTEAALR	Q96PD5	2092.11357
16	GNEANYYS**N#**ATTDEHGLVQF	P01023	2230.95024
17	ELHHLQEQ**N#**VSNAFLDKGEFYIGSK	P00450	2904.41819
18	VTQVYAE**N#**GTVLqGSTVASVYK	P27169	2316.17388
19	SEVGVPA**N#**RT	Q8NDA2	1030.51653
20	VDAGPST**N#**RTV	O95954	1117.55120
21	PAGGSTQ**N#**STNV	P62324	1133.50749
22	HGSTGAV**N#**ATRP	Q9HBL0	1168.57353
23	GGGGSQI**N#**STRY	P47974	1197.55010
24	DDEGAAQ**N#**STKP	P08240	1233.51982
25	VGNLGIG**N#**GTTKN	Q13492	1245.64653
26	DDFQHSS**N#**STY	Q9BZD2	1301.49114
27	SPLVAPD**N#**GSSRT	Q8IUW5	1301.63310
28	LYRQGGV**N#**ATQV	Q13790	1306.67583
29	SGGDQYQ**N#**ITVH	P13010	1319.58745
30	DDGEEKN**N#**ATVH	P04004	1329.55254
31	DVAQNPA**N#**MSKY	P50502	1338.59844
32	TRDGQVI**N#**ETSQ	P08670	1348.63408
33	WEEPSSG**N#**GTARA	Q9P258	1362.59453
34	VDDLKNLN**#**TTAVT	P10632	1404.72258
35	LVPVPIT**N#**ATLDR	P19652	1409.79997
36	SPLVAPD**N#**GSSRTLH	Q8IUW5	1551.77689
37	SSPRVLS**N#**NSDANLE	P05155	1603.74846
38	DATTLDD**N#**GTMLFFK	P02790	1689.76470
39	FSDGLES**N#**SSTQFEVK	P0C0L5	1775.79668
40	LVPVPIT**N#**ATLDQITGK	P02763	1781.00699
41	FSDGLES**N#**SSTQFEVKK	P0C0L5	1903.89189
42	IYVLDYLN**#**ETQQLTPEIK	P01023	2181.13364
43	VTQVYAE**N#**GTVLQGSTVASVYK	P27169	2315.17705
44	DDGEEKN**N#**ATVHEQVGGPSLTSDLQAQSK	P04004	3055.41446
45	VFDKEG**N#**GTVm	P60660	1213.53899
46	GSTGAVN**#**ATRP	Q9HBL0	1031.51189
47	AERPGTN**#**STGP	Q13263	1087.50115
48	YRQGGV**N#**ATQ	Q13790	1094.52312
49	DEGAAQ**N#**STKP	P08240	1118.49651
50	GGGSQI**N#**STRY	P47974	1140.53105
51	VGSTSE**N#**ITQK	O15523	1164.57427
52	YRQGGV**N#**ATQV	Q13790	1193.59136
53	VFDKEG**N#**GTVM	P60660	1197.54595
54	SPPLIT**N#**VTTR	Q16633	1199.66350
55	AVFDAT**N#**TTRE	Q16877	1225.57048
56	GGDQYQ**N#**ITVH	P13010	1232.55400

57	GSTGAV**N**#ATRPTL	Q9HBL0	1245.64446
58	RDGQVI**N**#ETSQ	P08670	1247.58647
59	HDFPSG**N**#GTGGSF	Q14669	1280.51531
60	YRQGGV**N**#ATQVL	Q13790	1306.67571
61	LLDPDS**N**#VTRPS	P15144	1314.65532
62	VFDKEG**N**#GTVMGA	P60660	1325.60381
63	DFYVDE**N**#TTVR	P29622	1359.60600
64	LAGRKT**N**#ESVSEP	Q13433	1388.70256
65	LLDPDS**N**#VTRPSE	P15144	1443.69780
66	FVEGSH**N**#STVSLTTK	P04114	1607.79827
67	LSLGAH**N**#TTLTEILK	P01011	1611.90642
68	QVHFFV**N**#ASDVDNVK	Q96IY4	1719.83391
69	QLAHQS**N**#STNIFFSPVSIATAF	P01009	2381.17900
70	EHEAQS**N**#ASLDVFLGHTNVEELMK	P00736	2699.25272
71	VVLHP**N**#YSqVDIGLIK	P00738	1796.99576
72	DGEEKn**N**#ATVHEQVGGPSLTSDLQAQSK	P04004	2941.37929
73	AVLQLnEEGVDTAGSTGVTL**N**#LTSKPIILR	P08185	3111.70053
74	GAFIS **N**#FSmTVDGK	P19823	1490.68559
75	AGPST**N**#RTV	O95954	903.45195
76	STGAV**N**#ATRP	Q9HBL0	974.49053
77	TRSIT**N**#TTV	Q15637	993.52141
78	RQGGV**N**#ATQV	Q13790	1030.52764
79	TQDLG**N**#STKA	Q9Y490	1035.49565
80	GGSQI**N**#STRY	P47974	1083.50774
81	NLGIG**N**#GTTKN	Q13492	1089.55474
82	DLKNL**N**#TTAV	P10632	1089.57903
83	FDKEG**N**#GTVM	P60660	1098.47563
84	TPSSS**N**#STSKL	Q13492	1109.53252
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86	DVEEI**N**#KTVS	P46939	1134.55290
87	AASSG**N**#ATGPGPR	Q99835	1143.53716
88	VFDAT**N**#TTRE	Q16877	1154.53191
89	DYNTK**N**#GTIK	Q02413	1154.56951
90	SSDFD**N**#ATKIA	Q96TA2	1169.53166
91	TVDEK**N**#YTKA	Q9BV57	1169.56767
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94	EPSSG**N**#GTARAGP	Q9P258	1201.54399
95	LDPDS**N**#VTRPS	P15144	1201.56975
96	DEAYL**N**#ITKH	Q9UBT6	1204.58708
97	TPSSS**N**#STSKLP	Q13492	1206.58525
98	DGQVI**N**#ETSQH	P08670	1228.54619
99	EKAFE**N**#VTDLQ	P51884	1294.61614
100	LDPDS**N**#VTRPSE	P15144	1330.61089
101	KDAQA**N**#ITNTNY	P20929	1353.63140
102	LVAPD**N**#GSSRTLH	Q8IUW5	1367.69182
103	ISAVD**N**#GSLANTPH	P07585	1396.67107
104	VSRLA**N**#LTQGEDQ	P10909	1431.70745
105	LNAEN**N**#ATFYFK	P01042	1432.67497
106	GAFIS**N**#FSMTVDGK	P19823	1474.68901
107	DGLES**N**#SSTQFEVK	P0C0L5	1541.70171
108	KEDAL**N**#ETRESETK	P10909	1650.77616
109	VVLHP**N**#YSQVDIGLIK	P00738	1795.99651
110	FSYSK**N**#ETYQLFLSY	P02748	1890.88152
111	FYFTP**N**#KTEDTIFLR	P02763	1892.95159
112	MVSHH**N**#LTTGATLINEQW	P00738	2052.98087
113	MVSHH**N**#LTTGATLINEQWLL	P00738	2279.14981
114	MVSHH**N**#LTTGATLINEQWLLTTAK	P00738	2680.37986
115	LPSR**N**#VTV**N**#ESE	P19652	1346.64470
116	NLFL**N**#HSE**N**#ATAK	P00738	1460.70244
117	GNEA**N**#YYS**N**#ATTDEHGLVQF	P01023	2231.93706
118	SNLY**N**#WSASYSGG**N**#TSTDHF	P04114	2209.89458
119	PEGT**N**#GTEERm	Q16555	1237.50078

120	VDEK**N**#YTKAm	Q9BV57	1215.55766
121	VLNP**N**#KTK	P34810	914.52971
122	ESVG**N**#STRI	Q15257	963.47637
123	PVVR**N**#STVL	Q12774	985.56731
124	GPST**N**#RTVY	O95954	995.47893
125	VDEK**N**#YTK	Q9BV57	997.48088
126	TPQT**N**#VTHV	Q8IVH8	997.49559
127	NTAS**N**#KTRL	P49207	1005.52904
128	VDDF**N**#STSH	O95684	1022.40587
129	GSGQ**N**#KTQGF	O14832	1024.47246
130	VVPG**N**#ATIPR	Q5T5P2	1024.57866
131	ETEI**N**#ITKT	P15924	1049.53838
132	IENV**N**#STKF	Q92887	1052.52605
133	RPGT**N**#STGPAP	Q13263	1055.51238
134	DDHK**N**#STGAL	P21439	1058.47515
135	IDDT**N**#ITRL	P05783	1061.54753
136	VDEK**N**#YTKA	Q9BV57	1068.52104
137	DKEG**N**#GTVMGA	P60660	1079.46770
138	SDFD**N**#ATKIA	Q96TA2	1082.50041
139	FENT**N**#HTQV	P51911	1090.48039
140	VIYI**N**#ETHT	Q9HCL2	1090.54131
141	SPHS**N**#RTTPP	Q7Z5L9	1094.52287
142	VEDG**N**#VTVQH	P52306	1098.50688
143	TGAV**N**#ATRPTL	Q9HBL0	1101.59087
144	PSSS**N**#STSKLP	Q13492	1105.53691
145	GQVI**N**#ETSQH	P08670	1113.51763
146	DQYQ**N**#ITVH	P13010	1118.51152
147	IDNK**N**#KTITA	Q96TA2	1118.60564
148	AGIY**N**#ETTKQ	P15924	1125.54241
149	VLNP**N**#KTKVQ	P34810	1141.65898
150	PSGN**N**#STVTRL	Q9NRX5	1146.57536
151	NVNR**N**#ATVEM	Q15796	1148.53642
152	DVQG**N**#ITQKF	P49754	1150.57329
153	SPDY**N**#RTNSP	Q14669	1151.49443
154	EEQF**N**#STFR	P01859	1158.50652
155	EEQF**N**#STYR	P01861	1174.50188
156	EEQY**N**#STFR	P01860	1174.50310
157	AVGQ**N**#VTVTER	Q14126	1174.60307
158	DKFL**N**#DTTKP	Q9P287	1179.58977
159	EEQY**N**#STYR	P0DOX5	1190.49651
160	TGSL**N**#MTLQRA	Q96HC4	1192.59392
161	VGKQ**N**#GTVVQY	P35658	1193.61687
162	VDEK**N**#YTKAM	Q9BV57	1199.56182
163	AEGI**N**#GTVGGSKL	Q5T7W7	1203.62175
164	PEGT**N**#GTEERM	Q16555	1221.50517
165	DRDT**N**#STVSSY	Q96RV3	1245.52434
166	QQIS**N**#DTVSPR	Q96IY4	1245.61150
167	NNSK**N**#KTLVTQ	P14923	1247.65923
168	VAPD**N**#GSSRTLH	Q8IUW5	1254.60807
169	NVNR**N**#STIENT	Q15797	1262.59783
170	EEQY**N**#STYRV	P0DOX5	1289.56670
171	PAYF**N**#DSQRQA	P54652	1297.58220
172	EEQF**N**#STYRVV	P01861	1372.63909
173	EEQY**N**#STFRVV	P01860	1372.63957
174	LAPL**N**#DTRVVHAA	P02765	1377.74858
175	EEQY**N**#STYRVV	P0DOX5	1388.63310
176	EEQY**N**#STYRVVS	P0DOX5	1475.66521
177	SPYY**N**#VSDEISFH	P00751	1558.66814
178	YFTP**N**#KTEDTIFLR	P02763	1745.87473
179	NEEY**N**#KSVQEIQATFF	P19652	1947.89470
180	SLTF**N**#ETYQDISELVYGAK	P01008	2179.04386
181	LPH**N**#SSA**N**#STETLQ	P19652	1500.67583
182	VNQnLVYESGSL**N**#FSK	P04114	1800.87322

183	DEK**N#**YTKAm	Q9BV57	1116.48735
184	YDF**N#**SSmLYSTAK	P04114	1543.65825
185	NEG**N#**RTLT	P13796	905.43193
186	LAY**N#**TTSH	Q01543	907.41716
187	TSG**N#**TTHSL	Q12888	918.41655
188	APP**N#**ATLEH	Q96G23	950.45879
189	KEG**N#**GTVMGA	P60660	964.44066
190	SGQ**N#**KTQGF	O14832	967.44817
191	NDK**N#**RTFS	P02763	982.45860
192	SSG**N#**ATGPGPR	Q99835	1001.46526
193	STS**N#**DTIIR	Q9BXC9	1007.49913
194	TTG**N#**NTVRF	Q9H832	1010.48802
195	TTG**N#**ATVDHL	Q06587	1029.48320
196	SHT**N#**DTIGSV	O00507	1031.46453
197	KED**N#**NTVVL	Q8NI08	1032.52178
198	GIY**N#**ETTKQ	P15924	1054.50249
199	ISN**N#**RTLEL	P15924	1060.56487
200	KFL**N#**DTTKP	Q9P287	1064.56157
201	APP**N#**ATLEHF	Q96G23	1097.52104
202	DEK**N#**YTKAM	Q9BV57	1100.49358
203	VGQ**N#**VTVTER	Q14126	1103.57121
204	THA**N#**NTVSNF	Q92598	1105.49211
205	VGT**N#**TTGISEK	Q8TCB0	1107.55193
206	APL**N#**DTRVVH	P02765	1122.59001
207	NDD**N#**VTQVRA	P04040	1132.52312
208	EGI**N#**GTVGGSKL	Q5T7W7	1132.58452
209	NSK**N#**KTLVTQ	P14923	1133.61626
210	DQG**N#**RTTPSY	P54652	1139.49748
211	NDV**N#**LTHIES	P00439	1142.53301
212	PAW**N#**ETGRQP	Q9UPQ9	1156.53813
213	DAE**N#**QTVVKY	Q12769	1167.55327
214	NPQ**N#**DTVILR	O94972	1170.61113
215	AVD**N#**GSLANTPH	P07585	1196.55644
216	GYY**N#**QSEAGSH	P13747	1213.47698
217	RLA**N#**LTQGEDQ	P10909	1245.60759
218	NNI**N#**NTQTTTH	P35869	1258.56597
219	APL**N#**DTRVVHAA	P02765	1264.66826
220	VGT**N#**TTGISEKY	Q8TCB0	1270.61528
221	NDD**N#**VTQVRAF	P04040	1279.59245
222	GYY**N#**QSEAGSHT	P13747	1314.52373
223	NDV**N#**LTHIESRP	P00439	1395.68291
224	NGT**N#**VTNHSVDQL	Q00013	1399.64873
225	RLA**N#**LTQGEDQY	P10909	1408.66789
226	GYY**N#**QSEAGSHTL	P13747	1427.60869
227	SSG**N#**ATGPGPRSAGGSA	Q99835	1431.64641
228	RPS**N#**ATSAEPAGPLPA	A6NL88	1536.76604
229	GYY**N#**QSEAGSHTVQ	P01892	1541.64812
230	GYY**N#**QSEAGSHTLQ	P13747	1555.66606
231	YLG**N#**ATAIFFLPDEGK	P01009	1756.87773
232	VLS**N#**NSDANLELINTW	P05155	1803.87981
233	EK**N#**YTKAm	Q9BV57	1001.45970
234	SI**N#**TTNVmGTSLTVR	P01023	1610.80376
235	TL**N#**QSSDELQLSmGNAMFVK	P01011	2230.03727
236	SN**N#**GTVHL	Q96RN5	842.40099
237	AN**N#**GTVLR	Q5TFE4	845.44750
238	HV**N#**GSRPP	P07858	864.43224
239	RT**N#**GTIGR	P16233	875.46935
240	GQ**N#**KTQGF	O14832	880.41594
241	SG**N#**YTKGGP	Q8WVJ2	881.40032
242	TG**N#**GTRPPP	P46379	897.44194
243	TG**N#**NTFRV	Q8N8S7	909.44176
244	TG**N#**NTVRF	Q9H832	909.44316
245	AN**N#**GTVLRA	Q5TFE4	916.48454

246	TG**N**#ATVDHL	Q06587	928.43724
247	VI**N**#ETSQH	P08670	928.43755
248	AV**N**#ATRPTL	Q9HBL0	943.52068
249	RD**N**#STMGY	Q58FF7	944.37663
250	HT**N**#DTIGSV	O00507	944.43187
251	GN**N**#STVTRL	Q9NRX5	962.49089
252	EK**N**#YTKAM	Q9BV57	985.46575
253	AT**N**#TTLPHM	Q8WXI9	986.45970
254	SQ**N**#STLISH	P52736	987.47386
255	ED**N**#QTNRL	P63092	990.45049
256	TS**N**#DTIIRA	Q9BXC9	991.50530
257	GI**N**#GTVGGSKL	Q5T7W7	1003.54234
258	HA**N**#NTVSNF	Q92598	1004.44267
259	DG**N**#RTIGTGL	P49411	1004.50072
260	SA**N**#DTYSRP	Q460N5	1011.43785
261	ST**N**#DTNAKY	Q9NP61	1014.43761
262	DD**N**#VTQVRA	P04040	1018.47997
263	SK**N**#KTLVTQ	P14923	1019.57378
264	SD**N**#ATLTHY	Q5VWN6	1022.44298
265	TG**N**#NTVRFN	Q9H832	1023.48540
266	VG**N**#STRIDY	Q15257	1025.48906
267	VN**N**#VTSERL	P20929	1032.53179
268	YG**N**#SSDSRY	Q9Y6D0	1049.41545
269	AE**N**#QTVVKY	Q12769	1052.52568
270	NK**N**#KTITAY	Q96TA2	1053.55608
271	RE**N**#GTVSRY	P19652	1082.52202
272	GL**N**#VTLSSTGR	P0C0L5	1105.58525
273	YL**N**#QTSRSF	P01892	1116.53154
274	TG**N**#NTVRFNP	Q9H832	1120.53813
275	TV**N**#GTVLSSSGT	P30685	1123.54680
276	VD**N**#GSLANTPH	P07585	1125.51641
277	SN**N**#GTLVDRY	P43251	1139.52971
278	NI**N**#NTQTTTH	P35869	1144.52239
279	YY**N**#QSEAGSH	P13747	1156.45122
280	FN**N**#NTQHSSL	P01042	1162.51531
281	GT**N**#ESLERQM	P08670	1165.51421
282	GT**N**#TTGISEKY	Q8TCB0	1171.54741
283	ST**N**#ETDASNIE	P35555	1181.48100
284	GA**N**#RTETVTSF	P78527	1183.55864
285	AY**N**#ETMTEKL	Q9Y4C2	1200.54595
286	VG**N**#VTAKDPEGL	Q12864	1200.61016
287	RE**N**#QTEINKP	Q8IZT6	1229.61199
288	VD**N**#GSLANTPHL	P07585	1238.60063
289	NI**N**#NTQTTTHL	P35869	1257.60515
290	YK**N**#NSDISSTR	P01871	1285.60625
291	NT**N**#HTQVQSTLL	P51911	1356.67510
292	YY**N**#QSEAGSHTLQ	P13747	1498.64592
293	SI**N**#TTNVMGTSLTVR	P01023	1594.81120
294	TL**N**#QSSDELQLSMGN	P01011	1637.73528
295	LA**N**#LTQGEDQYYLR	P10909	1684.81841
296	TL**N**#QSSDELQLSMGNAM	P01011	1839.80974
297	AV**N**#ITSENLIDDVVSLIR	P02748	1972.05950
298	NP**N**#ATSSSSQDPESLQDRGEGK	P05155	2305.01804
299	ML**N**#TSSLLEQLNEQFNWVSR	P10909	2410.17441
300	KIVLDPSGSMNIYLVLDGSDSIGAS**N**#FTGAK	P00751	3170.60556
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302	NPPMGGNVVIFDTVITNQEEPYQ**N**#HSGR	P02745	3114.45957
303	GNEANYYSNATTDEHGLVQFSI **N**#TTnVMGTSLTVR	P01023	3806.76157
304	AVLQLNEEGVDTAGSTGVTL**N**#LTSKPIILR	P08185	3110.69345
305	E**N**#LTAPGSDSAVFFEqGTTR	P00450	2128.98808
306	GnEANYYS**N**#ATTDEHGLVqFSI **N**#TTNVMGTSLTVR	P01023	3808.73874
307	LnAEN**N**#ATFYFK	P01042	1433.66069
308	T**N**#TT**N**#ASHV	Q3LXA3	946.41130

309	I**N#**GT**N#**VTNH	Q00013	971.44328
310	Y**N#**ETmTEKL	Q9Y4C2	1145.50163
311	T**N#**ATFIGDHm	Q9Y4E6	1123.47222
312	A**N#**ITAIR	P49368	759.43645
313	S**N#**DTIIR	Q9BXC9	819.42211
314	S**N#**VSISRS	Q8WZ42	850.42534
315	H**N#**QTLVR	Q04727	868.46330
316	N**N#**VTSERL	P20929	933.46361
317	T**N#**DTIGSVR	O00507	963.47368
318	N**N#**ETEEIK	Q14314	977.44231
319	S**N#**DTIIRAV	Q9BXC9	989.52672
320	D**N#**FTSIVKA	Q16720	995.50432
321	V**N#**NTRVVGH	Q9Y5X9	996.52178
322	N**N#**VTLANKF	Q02108	1021.53179
323	T**N#**TTLPHML	Q8WXI9	1028.51067
324	D**N#**VTQVRAF	P04040	1050.52141
325	E**N#**VTLIHKP	P01892	1051.57817
326	N**N#**GTLVDRY	P43251	1052.50102
327	F**N#**DTFVHVT	P62263	1080.49968
328	T**N#**MTVTNHY	Q9P291	1081.46330
329	R**N#**DTNTQSF	Q8TCJ0	1083.47026
330	T**N#**DTKVLRH	P05783	1084.57585
331	N**N#**LTEAQRF	P45844	1093.52751
332	Y**N#**QSEAGSHT	P13747	1094.43889
333	N**N#**VTSERLY	P20929	1096.52751
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337	P**N#**STGAEIRSV	P35998	1131.56877
338	T**N#**STSVSSRKA	Q15004	1138.57109
339	D**N#**RTIVITSH	P31689	1156.59575
340	P**N#**STVHIQRL	Q96PG2	1165.63262
341	V**N#**GTDSEVRSL	Q6VN20	1177.57244
342	R**N#**STVVSSDTL	Q9HCM1	1179.58721
343	Y**N#**QSEAGSHTL	P13747	1207.52336
344	P**N#**STRDDSGKY	Q8WZ42	1240.54448
345	T**N#**HTQVQSTLL	P51911	1242.63164
346	I**N#**STTHPGADLQ	P00734	1254.59661
347	T**N#**STAASRPPVTL	Q15365	1315.68413
348	Y**N#**QSEAGSHTLQ	P13747	1335.57414
349	Y**N#**QSEAGSHIIQ	P30685	1347.61785
350	Q**N#**GSLGEGIHEPGGP	O15354	1449.65532
351	F**N#**SSYLQGTNQITGR	P04114	1686.81279
352	F**N#**LTETSEAEIHQSF	P01011	1753.79851
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354	E**N#**LTAPGSDSAVFFEQGTTR	P00450	2127.97832
355	F**N#**LTETSEAEIHQSFQHL	P01011	2131.99234
356	F**N#**LTETSEAEIHQSFQHLLR	P01011	2401.19487
357	A**N#**LSSQALQMSLDYGFVTPLTSMSIR	P19827	2831.39591
358	ALGISPFHEHAEVVFTA**N#**DSGPR	P02766	2452.20620
359	DVLEEMGIADLFTNQA**N#**FSR	P08185	2271.05815
360	ADGTVNQIEGEATPV**N#**LTEPAKLEVK	P05090	2724.39530
361	SISTALAFLSLGAH**N#**TTLTEILK	P01011	2402.31670
362	SVQEIQATFFYFTP**N#**KTEDTIFLR	P02763	2896.44266
363	KGSGPSGGSGGGA**N#**GTSF	P25685	1482.64226
364	TLYETEVFSTDFS**N#**ISAAK	P05543	2124.00322
365	ADTHDEILEGLNF**N#**LTEIPEAQIH	P01009	2720.30637
366	ADTHDEILEGLNF**N#**LTEIPEAQIHEGFQ	P01009	3181.50949
367	ADTHDEILEGLNF**N#**LTEIPEAQIHEGFQEL	P01009	3423.60422
368	LEDLEVTGSSFL**N#**LSTNIFS**N#**LTSLGK	P22792	2901.48516
369	LVLDGSDSIGAS**N#**FTGAK	P00751	1752.86492
370	VNQNLVYESGSL**N#**FSK	P04114	1799.88188
371	EPLSVTWSESGQ**N#**VTAR	P01877	1861.90007

372	KIFEPPAPGEG**N**#SSQNSRN	P19652	2029.96103
373	YQFNTNVVFSN**N**#GTLVDR	P43251	2088.99785
374	IQSPLFTLDAnADIG**N**#GTTSANEAGIAASITAK	P04114	3234.61960
375	DSLHGSTGAV**N**#AT	Q9HBL0	1230.56133
376	LDGSDSIGAS**N**#FTGAK	P00751	1540.71062
377	LDAPTNLQFV**N**#ETDSTVLVR	P02751	2233.13559
378	AALAAFNAQN**N**#GSNFQLEEISR	P02765	2366.13823
379	IVLDPSGSMnIYLVLDGSDSIGAS **N**#FTGAK	P00751	3043.49631
380	GGGLGVAGG **N**#STRE	Q9NPJ6	1232.58696
381	IDSEGGVSA **N**#HTS	P51659	1274.54875
382	DGASQLMGE **N**#RT	P02675	1279.55449
383	SVTWSESGQ **N**#VTAR	P01877	1522.71233
384	AQLLQGLGF **N**#LTER	P08185	1560.84697
385	EHEGAIYPD **N**#TTDFQR	P00450	1893.83122
386	VVTVAALGT **N**#ISIHKDEIGK	Q9Y6R7	2066.14139
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388	SQILEGLGF **N**#LTELSESDVHR	P29622	2345.16655
389	**N**#ATVHEqVGGPSLTSDLQAQSK	P04004	2269.11234
390	nLFL**N**#HSE **N**#ATAK	P00738	1461.68743
391	nGGQ**N**#GTVQEI	Q92945	1118.49565
392	nG**N**#MTQVQTTL	Q15417	1208.54631
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395	**N**#ETEEIK	Q14314	863.39928
396	**N**#RTIVITSH	P31689	1041.56865
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398	**N**#ATVHEQVGGPS	P04004	1196.55522
399	**N**#LTTSLTESVDR	P80108	1336.66411
400	**N**#GTTSANEAGIAASITAK	P04114	1677.82939
401	**N**#LTTGATLINEQWLLTTAK	P00738	2089.12041
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403	**N**#ATVHEQVGGPSLTSDLQAQSK	P04004	2268.11020
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405	YNVLDmK**N**#TTCQDLQIEVTVK	P0C0L5	2472.20011
406	mVSHH**N**#LTTGATLInEQWLLTTAK	P00738	2697.38066