Supporting Information

Maltose-Functionalized Hydrophilic Magnetic Nanoparticles with Polymer Brushes for Highly Selective Enrichment of N-linked Glycopeptides

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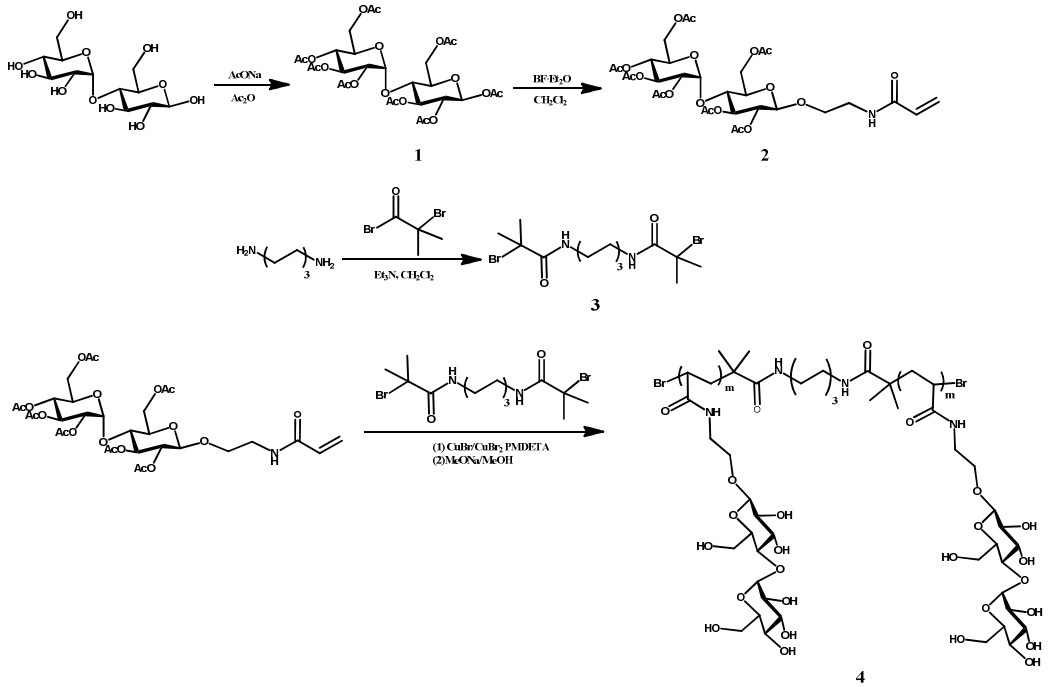

Scheme S1. Schematic illustration of maltose polymer brush with ATRP polymerization and off-protection group.

1. Synthesis of per-O-acetylated maltose (1)

Into a solution of D-(+)-maltose (10 g, 28.6 mmol) in acetic anhydride (140 mL) was added NaAc (10 g, 121.9 mmol). The resulting mixture was heated to 140 °C and stirred for 12 h. The reaction mixture was cooled to room temperature and water was added. The product was extracted with ethyl acetate, washed with water, brine and dried over anhydrous Na_2SO_4. The solvent were removed in vacuo and the residue was purified by recrystallization from methanol to give a white solid as product.^{1}H NMR (300 M Hz, $CDCl_3$) δ 5.73 (d, 1H), 5.40 (t, 1H), 5.33 (d, 1H), 5.27 (d, 1H), 5.05 (t, 1H), 4.87 (m, 1H), 4.85 (dd, 1H), 4.45 (dd, 1H), 4.25 (t, 1H), 4.21 (t, 1H), 4.07~4.01 (m, 2H), 3.94~3.92 (m, 1H), 3.86~3.82 (m, 1H), 2.14~2.01 (m, 24H). LR MS (ESI) m/z Calcd for $C_{28}H_{38}O_{19}$ $[M+Na]^+$:701.2, found 701.3.

2. Synthesis of (2-acrylamidoethoxy) 2,3,6-tri-O-(2,3,4,6-tetra-O-acetyl)-β-D-glucopyranosyl) -β- D-glucopyranoside (2)

This compound was prepared according to a literature[1]: Per-O-acetylated maltose[2] (3 g, 4.42 mmol) and N-(2-hydroxyethyl) acrylamide (0.76 g, 6.60 mmol) were dissolved in dry CH_2Cl_2 (40 mL). Boron trifluorideetherate (1 mL, 8.84 mmol) was added dropwise at 0 °C. Stirring was continued for 2 h at 0 °C and an additional 18 h at room temperature.The solution was poured on ice water and extracted twice with CH_2Cl_2. The combined organic phases were washed with water, brine and dried over anhydrous Na_2SO_4. The solvent were removed in vacuo and the residue was purified by column chromatography (SiO_2, 0-10 % MeOH:CH_2Cl_2) to give a white solid as product.^{1}H NMR (300 M Hz, $CDCl_3$) δ 6.29~6.23(m, 1H), 6.16~6.11 (m, 1H), 5.61 (dd, 1H), 5.42~5.19 (m, 3H), 5.06~4.99 (m, 1H), 4.86~4.75 (m, 2H), 4.55~4.47 (m, 2H), 4.25~3.45 (m, 11H), 2.11 (s, 3H), 2.08 (s, 3H), 2.01~1.97 (m, 15H). LR MS (ESI) m/z Calcd for $C_{31}H_{43}NO_{19}$ $[M+Na]^+$:756.2, found 756.4.

3. Synthesis of bis (2-bromoisobutyryl) hexanediamide (3)

Hexamethylenediamine (0.428 mg, 3.68 mmol) and Et_3N (1.22 mL, 8.82 mmol) were dissolved in dry CH_2Cl_2 (30 mL). 2-bromoisobutyryl bromide (1.69 g, 7.35 mmol) in CH_2Cl_2 (10 mL) was added slowly into the reaction mixture at 0 °C. After 2 h at 0 °C, the reaction was left to reach room temperature and stirred for 8 h. The reaction mixture was then filtered to remove all solids. After evaporation of the solvent, the residue was purified by column chromatography [SiO_2, 0-10 % ethyl acetate: petroleum (b.p. 60-90 °C)] to give a white solid as product. ^{1}H NMR (300 M Hz, $CDCl_3$) δ 6.76 (br, 2H), 3.29~3.23 (m, 4H), 1.96 (s, 12H),

1.56~1.52 (m, 4H), 1.40~1.35 (m, 4H).

4. Synthesis of maltose polymer brush (4) by atom transfer radical polymerization (ATRP)

(2-acrylamido) ethoxy-2,3,6-tri-*O*-(2,3,4,6-tetra-*O*-acetyl)-*β*-D-glucopyranosyl) -*β*-D-glucopyranoside (1.1 g, 20 eq), bis(2-bromoisobutyryl) hexanediamide (30 mg, 1 eq), PMDETA (39.2 μL) were added to a 50 mL Schlenk flask. The mixture was deoxygenated under vacuum and backfilled with argon three times. $CuBr/CuBr_2$ (20 mg) was added to the mixture and three vacuum-argon cycles were performed. The reaction system was stirred at 60 °C for 24 h. Low-resolution mass spectrometry revealed that raw material has reacted. The solvent was evaporated under reduced pressure, and the residue was dissolved in ethyl acetate (150 mL). The organic phase was washed with saturated brine (40 mL×3) and then dried over anhydrous Na_2SO_4. The crude mixture was filtered and concentrated. After the residue was dissolved in dry MeOH, 0.596 M NaOMe/MeOH was added at 0 °C. The resulting mixture was allowed to stir at room temperature 1 h. The reaction mixture was neutralized by addition of Amberlite IR 120 H^+ until pH 6 and filtered off the resin. The filtrate was concentrated under vacuum to give the product as a white solid. ^{1}H NMR (300 MHz, CD_3OH) δ 8.14 (s, 1H), 5.16~5.10 (m, 2H), 3.82~3.80 (m, 8H), 3.67~3.57 (m 10H), 3.46~3.35 (m, 6H), 3.28~3.26 (m, 2H), 1.96 (s, 1H), 1.90 (s, 1H).

5. Cell culture and protein extraction

Human renal mesangial cells (HRMC, kindly donated by Dr. Mingzhen Li (Metabolic Diseases Hospital, Tianjin Medical University, Tianjin, China)) were grown in Dulbeco's

modified eagle medium (Thermo Fisher) supplemented with 1 % penicillin/streptomycin and 10 % fetal bovine serum in a humidified atmosphere with 5% CO_2 in air. After collection, HRMC cells were washed twice with cold phosphate-buffer saline (PBS). The cell layers were further solubilized in RIPA buffer (0.1 % SDS, 1% Triton X-100 and 1 % deoxycholate) containing proteinase inhibitors (sodium butyrate and 1mmol/L phenylmethylsulfonyl fluoride (PMSF, Sigma-Aldrich)). Then total cell undissolved substance were ultrasound. The crude extract was finally clarified by centrifugation at 16,000×g at 4 °C for 10 min. The concentration of total proteins was determined by BCA protein assay kit (Pierce BCA protein assay kit, Thermo Scientific).

6. LC-MS/MS analysis

The deglycosylated peptides enriched from HRMC tryptic digest was desalted using a μ-C18 Ziptip and dissolved in 10 μL of HPLC buffer A (0.1 % (v/v) formic acid in water). 5μL sample was injected into a Nano-LC system (EASY-nLC 1000, Thermo Fisher Scientific, Waltham, MA). Chromatography was performed using an EASY-Spray Nano-LC source with a 15 cm × 50 μm inner diameter column packed with 2 μm C18 particles. The flow rate was 300 nl/min, a 45-min linear gradient from 2 to 35 % HPLC buffer B (0.1 % formic acid in CH_3CN) was developed, eventually the organic content was increased to 50 % over 10 min. The HPLC elute was electrosprayed directly into an Orbitrap Q-Exactive mass spectrometer (Thermo Fisher Scientific, Waltham, MA). The source was operated at 1.8 kV. For full MS survey scan, automatic gain control (AGC) target was 3e6, scan range was from 350 to 1750 with the resolution of 70,000. The 10 most intense peaks with charge state 2 and above were selected for fragmentation by higher-energy collision dissociation (HCD) with

normalized collision energy of 27 %. The MS2 spectra were acquired with 17.500 resolution.

7. MS/MS Data Analysis

Raw file was searched against the Uniport-Human protein sequence database using the PD search engine (version 2.1.0, Thermo Fisher Scientific) with an overall false discovery rate (FDR) for peptides of less than 1 %. Trypsin was specified as digesting enzyme. A maximum of 2 missing cleavages were allowed. Mass tolerances for precursor ions were set at ±10 ppm for precursor ions and ±0.02 Da for MS/MS. Oxidation of methionine, acetylation on protein N-terminal, and asparagines deamination were fixed as variable modifications. Carbamidomethylation on Cys was specified as fixed modification.

References

[1] Belardi B.; O'Donoghue G. P.; Smith A. W.; Groves J. T.; Bertozzi C. R. Investigating Cell Surface Galectin-Mediated Cross-Linking on Glycoengineered Cells. *J. Am. Chem. Soc*. **2012**, 134, 9549-9552.

[2] Virgil P.; Pawaret L.; Sun H. J.; Oleg K.; Christopher D. N.; Tam M. T.; Annabelle B.; Daniela A. W.; Mihai P.; Zhang S. D.; Neha P. K.; Kevin V.; Diana M.; Eric D. J.; Daniel A. H.; Darrin J. P.; Chen Y. C.; Yoann M. C.; Tze C. S.; Milan B.-B.; Sabine A.; René R.; Hans-J. G.; Paul A. H. Modular Synthesis of Amphiphilic Janus Glycodendrimers and Their Self-Assembly into Glycodendrimersomes and Other Complex Architectures with Bioactivity to Biomedically Relevant Lectins. *J. Am. Chem. Soc*. **2013**, 135, 9055-9077.

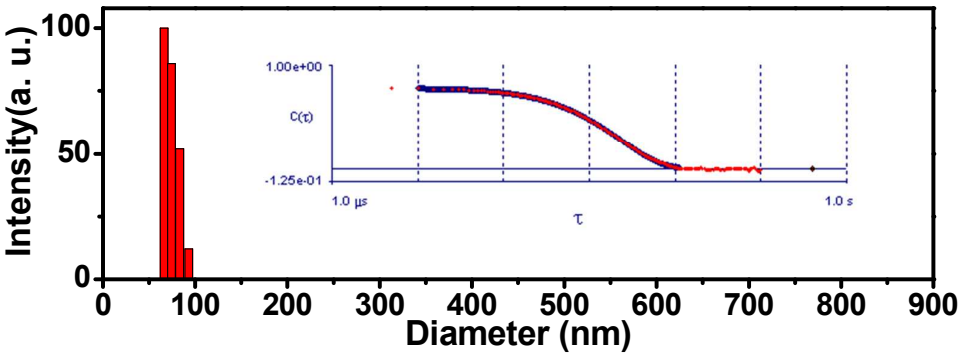

Figure S1 The hydrodynamic diameter histograms of Fe_3O_4-PEI-pMaltose NPs

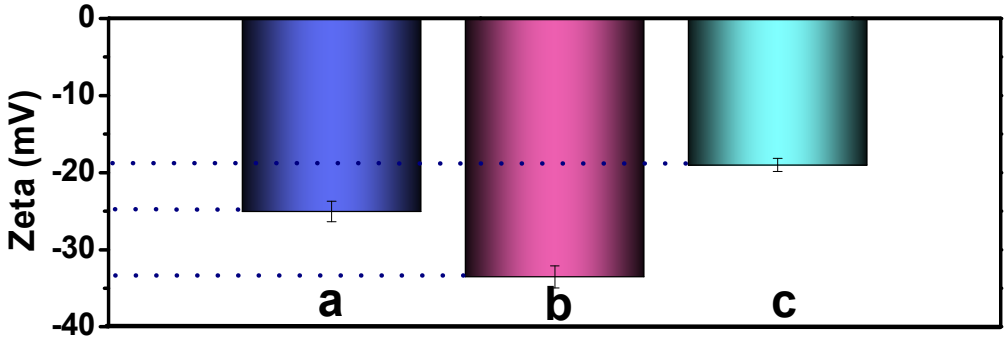

Figure S2 Zeta potential of Fe_3O_4-PEI (a), Fe_3O_4-PEI-COOH (b) and Fe_3O_4-PEI-pMaltose (c) NPs at pH 10.5.

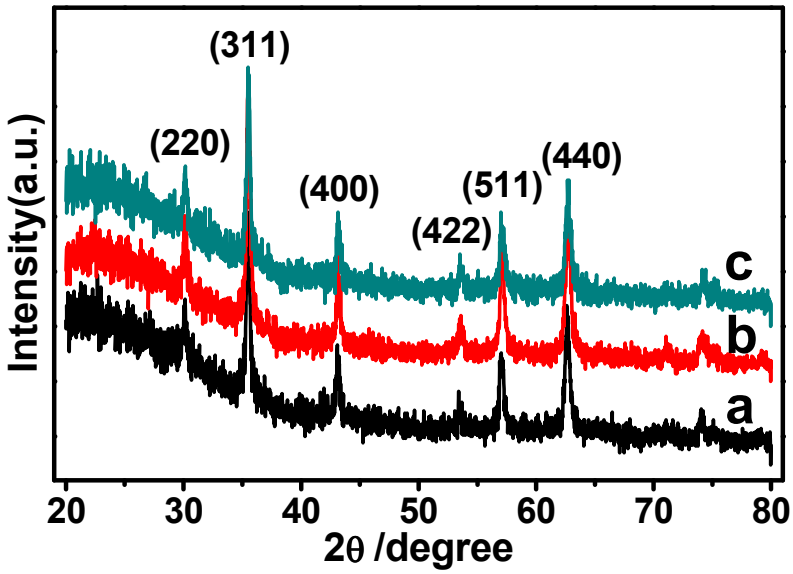

Figure S3 XRD patterns of Fe_3O_4-PEI (a), Fe_3O_4-PEI-COOH (b) and Fe_3O_4-PEI-pMaltose (c) NPs.

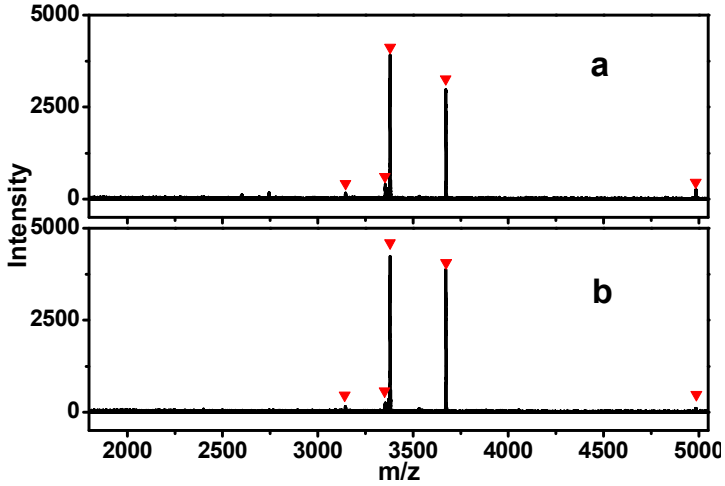

Figure S4 MALDI-TOF mass analysis of the glycopeptidesderived from HRP tryptic digest: (a) after treatment with Fe_3O_4-PEI-pMaltose NPs in the first time run, (b) after treatment with Fe_3O_4-PEI-pMaltose NPs in the sixth time run. The peaks of glycopeptides are marked with▼.

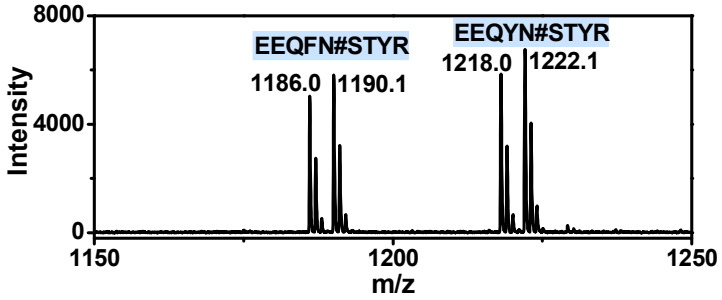

Figure S5 MALDI-TOF MS spectra of the isotope dimethylation labeled human IgG peptides after deglycosylation by PNGase F.

Table S1 Observed glycopeptides and glycan structures of human HRP digests enriched by Fe_3O_4-PEI-pMaltose NPs. The N-glycosylation sites are marked with N#.

Peak number	Observed m/z	Glycan composition	Amino acid sequence
1	2533.1	[HexNAc]1[Fuc]1	SFAN#STQTFFNAFVEAMDR
2	2612.2	[Hex]3[HexNAc]2[Xyl]1	MGN#ITPLTGTQGQIR
3	2851.6	[HexNAc]1[Fuc]1	GLIQSDQELFSSPN#ATDTIPLVR
4	3089.4	[Hex]3[HexNAc]2[Fuc]1[Xyl]1	GLCPLNGN#LSALVDFDLR
5	3146.4	[Hex]3[HexNAc]2[Fuc]1[Xyl]1	GLCPLNGN#LSALVDFDLR.Oxide
6	3189.2	[Hex]2[HexNAc]2[Fuc]1[Xyl]1	SFAN#STQTFFNAFVEAMDR
7	3209.6	[Hex]3[HexNAc]2[Xyl]1	SFAN#STQTFFNAFVEAMDR
8	3223.3	[Hex]3[HexNAc]2[Fuc]1[Xyl]1	QLTPTFYDNSCPN#VSNIVR
9	3323.2	[Hex]3[HexNAc]2[Fuc]1[Xyl]1	QLTPTFYDNSCPN#VSNIVR
10	3355.3	[Hex]2[HexNAc]2[Fuc]1[Xyl]1	SFAN#STQTFFNAFVEAMDR
11	3371.5	[Hex]3[HexNAc]2[Fuc]1[Xyl]1	SFAN#STQTFFNAFVEAM*DR
12	3380.3	[Hex]2[HexNAc]2[Fuc]1	GLIQSDQELFSSPN#ATDTIPLVR
13	3527.7	[Hex]3[HexNAc]2[Xyl]1	GLIQSDQELFSSPN#ATDTIPLVR
14	3541.4	[Hex]3[HexNAc]2[Fuc]1	GLIQSDQELFSSPN#ATDTIPLVR
15	3673.6	[Hex]3[HexNAc]2[Fuc]1[Xyl]1	GLIQSDQELFSSPN#ATDTIPLVR
16	3896.8	[Hex]3[HexNAc]2[Fuc]1[Xyl]1	LHFHDCFVNGCDASILLDN#TTSFR
17	4058.4	[Hex]3[HexNAc]2[Xyl]1	QLTPTFYDNSC(AAVESACPR)PN# VSNIVR-H_2O
18	4839.7	[Hex]3[HexNAc]2[Fuc]1[Xyl]1 [Hex]3[HexNAc]2[Xyl]1	LYN#FSNTGLPDPTLN#TTYLQTLR
19	4986.1	[Hex]3[HexNAc]2[Fuc]1[Xyl]1 [Hex]3[HexNAc]2[Fuc]1[Xyl]1	LYN#FSNTGLPDPTLN#TTYLQTLR

Hex=mannose, HexNAc= N-acetylglucosamine, Fuc= fucose, Xyl= xylose.

Table S2 Observed glycopeptides and glycan structures of human IgG digests enriched by Fe_3O_4-PEI-pMaltose NPs. The N-glycosylation sites are marked with N#.

Peak number	Observed m/z	Glycan composition	Amino acid sequence
1	2602.8	[Hex]3[HexNAc]4[Fuc]1	EEQFN#STFR
2	2634.7	[Hex]3[HexNAc]4[Fuc]1	EEQYN#STYR
3	2651.2	[Hex]4[HexNAc]4	EEQYN#STYR
4	2764.7	[Hex]4[HexNAc]4[Fuc]1	EEQFN#STFR
5	2796.7	[Hex]4[HexNAc]4[Fuc]1	EEQYN#STYR
6	2806.1	[Hex]3[HexNAc]5[Fuc]1	EEQYN#STFR
7	2819.8	[Hex]4[HexNAc]5	EEQFN#STFR
8	2837.7	[Hex]3[HexNAc]5[Fuc]1	EEQYN#STYR
9	2926.8	[Hex]5[HexNAc]4[Fuc]1	EEQFN#STFR
10	2958.7	[Hex]5[HexNAc]4[Fuc]1	EEQYN#STYR
11	2967.8	[Hex]4[HexNAc]5[Fuc]1	EEQFN#STFR
12	2982.2	[Hex]5[HexNAc]5	EEQFN#STFR
13	2999.8	[Hex]4[HexNAc]5[Fuc]1	EEQYN#STYR
14	3014.1	[Hex]5[HexNAc]5	EEQYN#STYR
15	3162.6	[Hex]5[HexNAc]5[Fuc]1	EEQYN#STYR
16	3217.8	[Hex]5[HexNAc]4[Fuc]1[NeuAc]1	EEQFN#STFR
17	3250.7	[Hex]5[HexNAc]4[Fuc]1[NeuAc]1	EEQYN#STYR

Hex= mannose, HexNAc= N-acetylhexosamine, Fuc= fucose, NeuAc= N-acetylneuraminic acid.

Table S3 The recovery yield of N-glycosylation motifs from tryptic digests of IgG enriched by Fe_3O_4-PEI-pMaltose NPs. L and H indicate the light- and heavy-tagged N-linked glycopeptide motifs, respectively.

Item	Peptide sequence	Recovery 1	Recovery 2	Recovery 3
L/H	EEQFN#STYR EEQYN#STYR	88.0%	92.8%	89.7%
H/L	EEQFN#STYR EEQYN#STYR	84.5%	89.0%	84.5%

Table S4 List of identified glycoproteins and peptides sequence from tryptic digest of proteins sample extracted from human renal mesangial cells after enrichment by Fe_3O_4-PEI-pMaltose NPs.

N# denotes the N-linked glycosylation site.

No	Protein Group Accessions	Peptide sequence
1	P22680	LSSASLN#IRTAKEDFTLHLEDGSYNIR
2	Q8NDV3-2	SVETLLN#QK
3	O60814	AMGIMN#SFVNDIFER
4		KEN#LSR
5	Q71DI3	FQSSAVMALQEASEAYLVGLFEDTN#LCAIHAK
6	Q9ULV0	N#PDILVGENDLTALSYLHEPAVLHN#LK
7	Q9UKT9-16	QN#HIYQQN#HMVLSR
8	Q8N6C5-2	GEDKPLQFLDATSIDDN#TSFFLNNVTYSDTGIYSCHYLLTWK
9	P68431	FQSSAVMALQEACEAYLVGLFEDTN#LCAIHAK
10	P82987-2	KPISWRHCLGPSCDSTYTSQTATN#K
11	H7C3P4	YPHNHHVVN#N#TLEGN#CSSK
12	E5RI99	TGVHHYSGN#NIELGTACGK
13	Q7L2E3-3	DKLVYVHTN#GPK
14	E9PEV0	LNMHMNVQN#GK
15	B4E241	VYVGNLGNN#GNK
16	F8VVM2	IQTQPGYAN#TLR
17	K7EM20	YLAEFATGN#DRK
18	V9GYN5	LGIYADVGN#K
19	G5E9G0	AHLMEIQVN#GGTVAEK
20	Q9Y5B9	GDKVDILYN#NIK
21	F5H4G7	KEAAWAITN#ATSGGTPEQIR
22	O60337-6	TVIEQVYAN#GIR
23	P13591-4	DGQLLPSSN#YSNIK
24	H0YEN5	AFVAIGDYN#GHVGLGVK
25	P11388	GFQQISFVN#SIATSK
26	Q09666	ISMPDIDLN#LK
27	Q96C36	IIASSPEMN#LPTVSALR
28	P06576	TVLIMELIN#NVAK
29	P13674-3	DMSDGFISN#LTIQR
30	P26599	AQAALQAVN#SVQSGNLALAASAAAVDAGMAMAGQSPVLR
31	Q9H9B4	SGDAPLTVN#ELGTAYVSATTGAVATALGLNALTK
32	P02751-2	HEEGHMLN#CTCFGQGR
33	P09382	FNAHGDAN#TIVCNSK
34	P34932	KFDEVLVN#HFCEEFGK
35	P00505	HFIEQGIN#VCLCQSYAK

36	H0YIM7	TTASTQMN#VQSSR
37	B4DWL3	ALQATVGN#SYK
38	K7EMG4	ASVDVFGN#R
39	P60709; P68032	IWHHTFYN#ELR
40	Q9NTI5-2	TLFSVINN#GHNQK
41	Q9H8M5-3	VYGQNINN#ETWSR
42	Q07954	LYWISSGN#HTINR
43	O75533	VPELNVQN#GVLK
44	Q07954	KLNLDGSN#YTLLK
45	Q02750-2	ISELGAGN#GGVVFK
46	B1ALC0	GFESPSDN#SSAMLLQWHEK
47	Q99536	VVTYGMAN#LLTGPK
48	P17480-2	FSQELLSN#GELNHLPLK
49	B4DJV2	DYIWNTLN#SGR
50	P30048-2	GLFIIDPN#GVIK
51	P07437	MAVTFIGN#STAIQELFK
52	P46977	TILVDNN#TWN#NTHISR
53	P02790	SWPAVGN#CSSALR
54	P16615	TGTLTTN#QMSVCR
55	O15230	VWQGHN#ASFCPHGYGCR
56	Q14974	VLANPGN#SQVAR
57	K7EP71	YHVLHIN#TTK
58	O60568	EQYIHEN#YSR
59	Q5VW52	IIEGHYN#GEQLGKPK
60	P43243	GNLGAGN#GNLQGPR
61	P29317	TASVSIN#QTEPPK
62	Q9HD45	KLEIGFN#GNR
63	P38646	QAVTNPN#NTFYATK
64	P62269	YSQVLAN#GLDNK
65	Q14697	SLLLSVN#AR
66	Q9H501	DVASEVN#LTAYKPK
67	P62158	VFDKDGN#GYISAAELR
68	P50542-2	LGATLAN#GNQSEEAVAAYR
69	P05023-3	IVEIPFN#STNK
70	P11166	VIEEFYN#QTWVHR
71	P22626	GFGDGYN#GYGGGPGGGNFGGSPGYGGGR
72	P62241	IIDVVYN#ASNNELVR
73	P11142	LLQDFFN#GK
74	Q09666	ISMPDVN#LNLK
75	Q99650-2	SVNILFN#LTHR
76	Q9Y5L4	VQIAVAN#AQELLQR
77	C9J931	ALAESWN#AAFLESSAK
78	P62316-2	REEEEFN#TGPLSVLTQSVK

79	P08133-2	SEIDLLN#IR
80	Q9Y6M1-1	TVNELQN#LTSAEVIVPR
81	O75165	FLATPPN#GNFADAVFR
82	O94874-3	TYDLPGN#FLTQALTQR
83	P05141; P12235	GLYQGFN#VSVQGIIIYR
84	P61006	FSEDAFN#STFISTIGIDFK
85	Q6DRA6	AMGIMN#SFLN#DIFER
86	B1AK13	LLEAGN#FICQALNR
87	P50395	NTNDAN#SCQIIIPQNQVNR
88	B4DEH8	SIYVGN#VDYGATAEELEAHFHGCGSVN#R
89	P08559	NFYGGN#GIVGAQVPLGAGIALACK
90	O75477	IYFGSN#IPNMFVDSSCALK
91	Q08945	ITVPGN#FQGHSGAQCITCSYK
92	P49746	LGFLGN#QSQGCLPAR
93	P49411	DKPHVN#VGTIGHVDHGK
94	P20700	LSSEMN#TSTVNSAR
95	P09874	KPPLLN#NADSVQAK
96	O60911	MIELHN#GEYSQGK
97	Q9H173	LINKFN#SSSSSLEEK
98	O94826	QAYTGN#NSSQIQAAMK
99	P67809	RPQYSN#PPVQGEVMEGADNQGAGEQGRPVR
100	O15173	ILLAVN#GK
101	P08238	KHLEIN#PDHPIVETLR
102	Q9UQ80	LVKPGN#QNTQVTEAWNK
103	Q07954	GVTHLN#ISGLK
104	E9PJ35	IAPASN#VSHTVVLRPLK
105		FASFIN#KVR
106	E9PL22	VFGSQN#LTTVK
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115	Q9BXT5	ISPIDN#YIVLHQEYK
116	P39656	YSQTGN#YELAVALSR
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128	P52907	DHYSN#GFCTVYAK
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130	P04040	LVNAN#GEAVYCK
131	Q07954	WTGHN#VTVVQR
132	J3KQE0	ALSPN#STISSAPK
133	P14625	DISTN#YYASQK
134	Q8N766-4	FINYN#QTVSR
135	P57105	ILSVN#GQDLK
136	O14773-2	LFGGN#FAHQASVAR
137	P13929-3	LAQSN#GWGVMVSHR
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139	P61106	KIYQN#IQDGSLDLNAAESGVQHKPSAPQGGR
140	Q9Y277	LSQNN#FALGYK
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142	Q8WVX9	IIAIN#SELTQPK
143	Q13586-2	LAVTN#TTMTGTVLK
144	Q9Y5B9	DLGFN#GAPYR
145	P08238; P07900	ADLIN#NLGTIAK
146		AVIDN#IR
147	P62805	VFLEN#VIR
148	Q13637	VHLPN#GSPIPAVLLANK
149	P04843	VHYEN#NSPFLTITSMTR
150	E9PMX3	GEFYN#EASNLQVAIR
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159	P16615	YETN#LTFVGCVGMLDPPR
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161	P11021	EFFN#GKEPSR
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164	Q9Y2C2	KLGN#MTVTVK

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166	Q07954	MHLN#GSNVQVLHR
167		ALLN#QLR
168	E9PKZ0	ASGN#YATVISHNPETK
169	P62424	AGVN#TVTTLVENK
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171	P14625	LIIN#SLYK
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173	Q9NS18	IFVN#GTFIGGATDTHR
174	Q09666	VDIN#APDVDVHGPDWHLK
175	F5H801	SSEN#GVDYVIMGMPHR
176	P11142	TVTN#AVVTVPAYFNDSQR
177	P68363; Q9BQE3	VGIN#YQPPTVVPGGDLAK
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179	P08574	AANN#GALPPDLSYIVR
180	Q96AY3	YHYN#GSLMDGTLFDSSYSR
181	Q6P2Q9	GPGN#PVPGPLAPLPDYMSEEK
182	O75976	GILN#ATISVAEINHPVTTYK
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188	P09382	DSN#NLCLHFNPR
189	P61224; F5GZG1	QWN#NCAFLESSAK
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201	P69849	LEN#ITTGTYTIHAQK
202	P14866-2	NPN#GPYPYTLK
203	P02545-6	NSN#LVGAAHEELQQSR
204	P62244	WQN#NLLPSR
205	Q8NBK3-2	FVN#STGYLTEAEK
206	Q07954	MTN#GAMNVEIGNPTYK
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208	P08559	MVN#SNLASVEELK
209	P45880-2	VNN#SSLIGVGYTQTLRPGVK
210	P54886-2	NLN#GTLHELLR
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213	P31943	SNN#VEMDWVLK
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215	P26006	VWN#STFIEDYR
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217	Q70UQ0-4	FQN#ITDFWK
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222	P63244	GHN#GWVTQIATTPQFPDMILSASR
223	P50897-2	FLN#DSIVDPVDSEWFGFYR
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226	P07437; P68371	SGPFGQIFRPDNFVFGQSGAGN#NWAK
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229	P10809	QSKPVTTPEEIAQVATISAN#GDK
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231	P78357	GLLTFVDHLPVTQVVIGDTN#R
232	H0YGE9	LN#ETHIFN#GSNWIMLIYK
233	Q92896	GN#ITEYQCHQYITK
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254	O75629	LN#ITNIWVLDYFGGPK
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258	K7EM56	DMIILPEMVGSMVGVYN#GK
259	E5RJU9	VLTDSGSLDSTIPGIEN#TITVTTEQLTTASFPVGSK
260	Q13148	FGGNPGGFGNQGGFGN#SR
261	P60709	VAPEEHPVLLTEAPLN#PK
262	Q15293	VVRPDSELGERPPEDN#QSFQYDHEAFLGK
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269	O95470	TPEIVAPQSAHAAFN#K
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274	Q9UBV2	LASEQQHSAQAMFN#LGYMHEK
275	P21796	KLETAVNLAWTAGN#SNTR
276	Q9Y5B9	APGEQTVPALNLQN#AFR
277	P60709; P68032	SYELPDGQVITIGN#ER
278	P38646	GVPQIEVTFDIDAN#GIVHVSAK
279	Q14974	LLETTDRPDGHQN#NLR
280	O14828-2	TAAANAAAGAAEN#AFR
281	P22626	GGGGNFGPGPGSN#FR
282	P11021	VTHAVVTVPAYFN#DAQR
283	P61106	IYQNIQDGSLDLN#AAESGVQHKPSAPQGGR
284	M0R116; P05023-3	QGAIVAVTGDGVN#DSPALK
285	Q9UBV2	MYSEGSDIVPQSN#ETALHYFK
286	Q00610-2	VGEQAQVVIIDMN#DPSNPIR
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288	P05387	YVASYLLAALGGN#SSPSAK
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291	P07437; P68371	SGPFGQIFRPDN#FVFGQSGAGN#NWAK
292	P38646	GAVVGIDLGTTN#SCVAVMEGK
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321	P55145	DVTFSPATIEN#ELIK
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443	Q969P0-3	IGPGEPLELLCN#VSGALPPAGR
444	P07437; P68371	EIVHIQAGQCGN#QIGAK
445	Q8WWI5-3	CAPVN#ISCYAK
446	P05556	CHEGN#GTFECGACR
447	P60709	CPEALFQPSFLGMESCGIHETTFN#SIMK (Oxidation)
448	P60709	CPEALFQPSFLGMESCGIHETTFN#SIMK
449	P18084	CHAGYIGDNCN#CSTDISTCR