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| STANDARD OPERATING PROCEDURE |
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| **Title: Reverse Response Curve Preparation and Analysis (Experiment 1) for a panel of Phosphopeptide Assays** |
|  |  |
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| **Date: August 1, 2016** | **BRD-002** |

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# Purpose

The purpose of this document is to describe the preparation of a reverse response curve for a panel of phosphopeptides.

# Scope

This procedure may be used to prepare a reverse curve of phosphopeptides in a digested background matrix (cells, tissues, plasma, etc) and analyze the mixture after IMAC enrichment by targeted mass spectrometry.

# Responsibilities

It is the responsibility of person(s) performing this procedure to be familiar with laboratory safety procedures. The interpretation of results must be done by a person trained in the procedure and familiar with such interpretation.

# Equipment

1. Microcentrifuge
2. Quantiva TSQ Mass spectrometer (Thermo)
3. Easy NanoLC 1000 liquid chromatograph (Thermo)

# Materials

1. HPLC grade water
2. formic acid (Fluka, 56302)
3. acetonitrile

# Reagents

**Standards: Refer to Appendix 1 for Phosphopeptide Sequences**

1. Heavy stable isotope standards (H-SIS), 2 pmol/uL, 30% acetonitrile/0.1% formic acid (New England Peptide)
2. Light stable isotope standards (L-SIS), 3.2 pmol/uL, 30% acetonitrile/0.1% formic acid (New England Peptide)
3. Michrom mix: 50 fmol/uL digest of 6 equimolar bovine proteins (Michrom Bioresources, #PTD/00001/63) in 3% acetonitrile/5% acetic acid [Note: this product is no longer commercially available]

**Matrix:**

MCF7 cell lysate, desalted and dried into a tube in 5 mg aliquots, as described in SOP\_Broad\_SamplePrep&PhosphoEnrich\_03, BRD-001 “Cell Lysis, Tryptic Digestion, and Phosphopeptide Enrichment by Automated Immobilized Metal Affinity Chromatography (IMAC)”

# Procedure

1. **Preparation of Reverse Curve (Refer to Table 1)**
	1. Spike 1.5 uL of L-SIS stock (3.2 pmol/uL) to 500 uL 80% acetonitrile/0.1% formic acid for final concentration of 10 fmol/uL in 500 uL of L-SIS working stock solution.
	2. Add 50 uL into 8 tubes for serial dilution. Cap one tube (labeled tube 1, pt 1) and set aside as a blank.
	3. Spike 17 uL H-SIS (2 pmol/uL) into tube 8 for final H-SIS concentration of 500 fmol/uL.
	4. Spike 1.7 uL L-SIS working stock solution (100 fmol/uL) into tube 8 to bring L-SIS concentration back to 10 fmol/uL after volume addition of H-SIS.
	5. Remove 17 uL from tube 8 and add to tube 7 (125 fmol/uL). Continue serial dilution, removing 17 uL from previous tube and adding to successive tube for a total of 7 tubes.

Table 1. Concentrations of L-SIS and H-SIS in reverse curve

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **pt** | **total L-SIS (fmol)** | **total H-SIS (fmol)** | **L-SIS conc (fmol/ug)** | **H-SIS conc (fmol/ug)** |
| **1** | **200** | **0** | **0.4** | **0** |
| **2** | **200** | **1.2** | **0.4** | **0.002** |
| **3** | **200** | **5** | **0.4** | **0.01** |
| **4** | **200** | **20** | **0.4** | **0.04** |
| **5** | **200** | **78** | **0.4** | **0.16** |
| **6** | **200** | **312** | **0.4** | **0.63** |
| **7** | **200** | **1250** | **0.4** | **2.5** |
| **8** | **200** | **5000** | **0.4** | **10** |

1. **Preparation of Sample Plate (Refer to Table 2)**
	1. Remove 3 tubes of dried MCF7 digested-desalted lysate (5 mg each) as prepared in SOP\_Broad\_SamplePrep&PhosphoEnrich\_03, BRD-001 “Cell Lysis, Tryptic Digestion, and Phosphopeptide Enrichment by Automated Immobilized Metal Affinity Chromatography (IMAC)” from the -80oC freezer.
	2. Add 1 mL 50% acetonitrile to each tube and vortex to resuspend peptides. Centrifuge briefly (20 s at 2000 x g) to bring the liquid to the bottom of the tube. Transfer to 15 mL Falcon tube.
	3. Add 1.5 uL 100% acetonitrile for a final acetonitrile concentration of 80%. Vortex to resuspend peptides and cCentrifuge briefly (20 s at 2000 x g) to bring the liquid to the bottom of the tube.
	4. Aliquot 250 uL to wells of a 96-well plate (Greiner) for final amount of 0.5 mg per well.
	5. Add 10 uL of the appropriate curve tube to each well, pipetting up and down each time.

*For example, dispense 10 uL of curve point 1 (0 fmol/uL H-SIS, 20 fmol/uL L-SIS) into wells A1 A2 A3, 10 uL each of curve point 2 (0.02 fmol/uL H-SIS, 20 fmol/uL L-SIS) into wells B1 B2 B3 and continue in a similar manner for each curve point.*

* 1. Follow SOP\_Broad\_SamplePrep&PhosphoEnrich\_03, BRD-001 “Cell Lysis, Tryptic Digestion, and Phosphopeptide Enrichment by Automated Immobilized Metal Affinity Chromatography (IMAC)” to enrich phosphopeptides.

Table 2. Curve platemap and concentrations

|  |  |  |  |
| --- | --- | --- | --- |
|  | **plate** | **map** |  |
|  |  |  |  |
|  | **1** | **2** | **3** |
| **A** | pt 1-1 | pt 1-2 | pt 1-3 |
| **B** | pt 2-1 | pt 2-2 | pt 2-3 |
| **C** | pt 3-1 | pt 3-2 | pt 3-3 |
| **D** | pt 4-1 | pt 4-2 | pt 4-3 |
| **E** | pt 5-1 | pt 5-2 | pt 5-3 |
| **F** | pt 6-1 | pt 6-2 | pt 6-3 |
| **G** | pt 7-1 | pt 7-2 | pt 7-3 |
| **H** | pt 8-1 | pt 8-2 | pt 8-3 |

|  |  |  |  |
| --- | --- | --- | --- |
|  | **curve** | **concentration**  | **(fmol/ug)** |
|  |  |  |  |
|  | **1** | **2** | **3** |
| **A** | 0 | 0 | 0 |
| **B** | 0.002 | 0.002 | 0.002 |
| **C** | 0.01 | 0.01 | 0.01 |
| **D** | 0.04 | 0.04 | 0.04 |
| **E** | 0.16 | 0.16 | 0.16 |
| **F** | 0.63 | 0.63 | 0.63 |
| **G** | 2.5 | 2.5 | 2.5 |
| **H** | 10 | 10 | 10 |

1. **Reconstitution of samples for LC-MRM-MS analysis**
	1. After IMAC enrichment, resuspend dried samples by adding 20 uL of 3% acetonitrile/5% formic acid to each autosampler vial.
	2. Sonicate and vortex to resuspend phosphopeptides; centrifuge briefly (20 s at 1000 x g) to bring all liquid to the bottom of autosampler vial.
2. **NanoLC-MRM-MS analysis**
	1. set up the TSQ-Quantiva MS with Easy NanoLC1000 and the following:
		1. Q1 resolution 0.2
		2. Q3 resolution 0.7
		3. 1.5 min cycle time
		4. CID gas 1.5
		5. 0.075 x 100 mm PicoFrit Reprosil C18, 3 um, 200 Å pore size, (Dr. Maisch GmBH) PicoFrit column
		6. mobile phase A: 3% acetonitrile/0.1% formic acid, mobile phase B: 90% acetonitrile/0.1% formic acid
		7. flowrate: 300 nL/min
		8. column temperature: 50 oC
		9. gradient: 0 – 35% B in 33 min, 35 – 90% B in 3 min, hold 90% B for 6 min. (42 min total time)
		10. injection volume: 2 uL
	2. Prior to analysis, LC-MS/MS of a mixture of H-SIS peptides was performed on a high resolution MS (QExactive) to generate spectral libraries. These were imported into Skyline and used to selected MRM transitions for each peptide. The best 5-10 transition m/z were selected and the H-SIS was analyzed by LC-MRM-MS to determine the optimal collision energy. The best 3-5 transition ions including those required to verify the specificity of the phosphosite were then selected for further sample analysis. See Appendix 2 for scheduled MRM method used to acquire the data.
3. **Run order**
	1. Samples are injected by order of increasing concentration, point 1 to point 8, one complete curve followed by the next replicate curve, with blank injections and carryover injections performed between each curve. Refer to Table 3 for the complete Run Order.

Table 3. Injection run order of replicate curves

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Curve 1 |  | Curve 2 |  | Curve 3 |
| inj # | Sample |  | inj # | Sample |  | inj # | Sample |
| 1 | michrom\_50fmol\_01 |  | 24 | michrom\_50fmol\_03 |  | 47 | michrom\_50fmol\_05 |
| 2 | blank\_01 |  | 25 | blank\_05 |  | 48 | blank\_09 |
| 3 | blank\_02 |  | 26 | blank\_06 |  | 49 | blank\_10 |
| 4 | blank\_03 |  | 27 | blank\_07 |  | 50 | blank\_11 |
| 5 | pt1\_0fmol\_01\_01 |  | 28 | pt1\_0fmol\_02\_01 |  | 51 | pt1\_0fmol\_03\_01 |
| 6 | pt1\_0fmol\_01\_02 |  | 29 | pt1\_0fmol\_02\_02 |  | 52 | pt1\_0fmol\_03\_02 |
| 7 | pt1\_0fmol\_01\_03 |  | 30 | pt1\_0fmol\_02\_03 |  | 53 | pt1\_0fmol\_03\_03 |
| 8 | pt1\_0fmol\_01\_04 |  | 31 | pt1\_0fmol\_02\_04 |  | 54 | pt1\_0fmol\_03\_04 |
| 9 | pt1\_0fmol\_01\_05 |  | 32 | pt1\_0fmol\_02\_05 |  | 55 | pt1\_0fmol\_03\_05 |
| 10 | pt2\_0002fmol\_01\_01 |  | 33 | pt2\_0002fmol\_02\_01 |  | 56 | pt2\_0002fmol\_03\_01 |
| 11 | pt3\_001fmol\_01\_01 |  | 34 | pt3\_001fmol\_02\_01 |  | 57 | pt3\_001fmol\_03\_01 |
| 12 | pt4\_004fmol\_01\_01 |  | 35 | pt4\_004fmol\_02\_01 |  | 58 | pt4\_004fmol\_03\_01 |
| 13 | pt5\_016fmol\_01\_01 |  | 36 | pt5\_016fmol\_02\_01 |  | 59 | pt5\_016fmol\_03\_01 |
| 14 | pt6\_063fmol\_01\_01 |  | 37 | pt6\_063fmol\_02\_01 |  | 60 | pt6\_063fmol\_03\_01 |
| 15 | pt7\_205fmol\_01\_01 |  | 38 | pt7\_205fmol\_02\_01 |  | 61 | pt7\_205fmol\_03\_01 |
| 16 | pt8\_10fmol\_01\_01 |  | 39 | pt8\_10fmol\_02\_01 |  | 62 | pt8\_10fmol\_03\_01 |
| 17 | carryover\_blank\_01 |  | 40 | carryover\_blank\_03 |  | 63 | carryover\_blank\_05 |
| 18 | carryover\_blank\_02 |  | 41 | carryover\_blank\_04 |  | 64 | carryover\_blank\_06 |
| 19 | wash\_01 |  | 42 | wash\_04 |  | 65 | wash\_07 |
| 20 | wash\_02 |  | 43 | wash\_05 |  | 66 | wash\_08 |
| 21 | wash\_03 |  | 44 | wash\_06 |  | 67 | wash\_09 |
| 22 | blank\_04 |  | 45 | blank\_08 |  | 68 | blank\_12 |
| 23 | michrom\_50fmol\_02 |  | 46 | michrom\_50fmol\_04 |  | 69 | michrom\_50fmol\_06 |

1. **Data Analysis**
	1. Raw files were imported into Skyline.
	2. Extracted Ion chromatograms (XIC) of all transition ions were integrated using a Skyline document (Skyline daily version 3.5. <https://brendanx-uw1.gs.washington.edu/labkey/project/home/software/Skyline/begin.view>).
	3. Integrated peaks were manually inspected to confirm proper integration and detection of the transitions for the corresponding light and heavy peptides.

# Referenced Documents

Protocol for automated IMAC enrichment:

Abelin et al Reduced-representation Phosphosignatures Measured by Quantitative Targeted MS Capture Cellular States and Enable Large-scale Comparison of Drug-induced Phenotypes.

[Mol Cell Proteomics.](http://www.ncbi.nlm.nih.gov/pubmed/26912667) 2016 May;15(5):1622-41. doi: 10.1074/mcp.M116.058354. Epub 2016 Feb 24. PMID:26912667

Discovery of phosphosite targets:

Mertins et al. Ischemia in tumors induces early and sustained phosphorylation changes in stress kinase pathways but does not affect global protein levels.

[Mol Cell Proteomics.](http://www.ncbi.nlm.nih.gov/pubmed/24719451) 2014 Jul;13(7):1690-704. doi: 10.1074/mcp.M113.036392. Epub 2014 Apr 9.

# Appendix 1. Proteins, Peptides and Pathways

|  |  |  |  |
| --- | --- | --- | --- |
| Protein | Peptide Sequence | phosphosite | Biological Pathway |
| ACIN1 | KIsVVSATK | S825  | Apoptosis, mRNA processing, mRNA splicing |
| ARAF | QHEAPSNRPLNELLtPQGPsPR | T181, S186 | apoptosis, protein regulation |
| ARAF | QHEAPSNRPLNELLtPQGPSPR | T181 | apoptosis, protein regulation |
| ARAF | QHEAPSNRPLNELLTPQGPsPR | S186 | apoptosis, protein regulation |
| CIC | AILGsYR | S1389  | Transcription, Transcription regulation |
| GLYR1 | KLsLSEGK | S130  | pentose-phosphate shunt |
| GTF2I | GREFsFEAWNAK | S722  | Transcription, Transcription regulation |
| HMGN1 | KVsSAEGAAKEEPK | S7  | chromatin organization, regulation of transcription, elongation |
| HSPB1 | GPsWDPFRDWYPHSR | S15  | Stress response |
| MAPK1 | VADPDHDHTGFLtEYVATR | T185 | Apoptosis, Cell cycle, Host-virus interaction, Transcription |
| MAPK1 | VADPDHDHTGFLTEyVATR | Y187 | Apoptosis, Cell cycle, Host-virus interaction, Transcription |
| MAPK1 | VADPDHDHTGFLtEyVATR | T185, Y187 | Apoptosis, Cell cycle, Host-virus interaction, Transcription |
| MAPK14 | HTDDEMtGYVATR | T180 | Apoptosis, Stress response, Transcription |
| MAPK14 | HTDDEMTGyVATR | Y182  | Apoptosis, Stress response, Transcription |
| MAPK14 | HTDDEMtGyVATR | T180, Y182 | Apoptosis, Stress response, Transcription |
| MAPK3 | IADPEHDHTGFLtEYVATR | T202 | Apoptosis, Cell cycle, Host-virus interaction |
| MAPK3 | IADPEHDHTGFLtEyVATR | T202, Y204 | Apoptosis, Cell cycle, Host-virus interaction |
| MAPK3 | IADPEHDHTGFLTEyVATR | Y204 | Apoptosis, Cell cycle, Host-virus interaction |
| MTOR | LHVsTINLQK | S1261 | cell growth and response, regulation of phosphorylation, signaling and expression |
| MTOR | KLHVsTINLQK | S1261 | cell growth and response, regulation of phosphorylation, signaling and expression |
| PBRM1 | TYsQDCSFK | S948  | Transcription, Transcription regulation |
| PHIP | AQsYDIQAWKK | S1315  | regulation of apoptosis, cell proliferation, phosphorylation, cytoskeleton organization |
| PRKD2 | LGTSEsLPCTAEELSR | S214 | Adaptive immunity, Angiogenesis, Cell adhesion, Immunity |
| RBM7 | SFsSPENFQR | S136  | Meiosis |
| SHC1 | ELFDDPSyVNVQNLDK | Y427 | Angiogenesis, Growth regulation, Host-virus interaction |
| SMARCA4 | EVDYSDsLTEKQWLK | S775  | Neurogenesis, Transcription, Transcription regulation |
| STMN1 | ASGQAFELILsPR | S66  | Differentiation, Neurogenesis |
| SYNPO2 | SLsLPGR | S25  | protein binding, actin binding, 14-3-3 binding |
| UBE2J1 | QIsFKAEVNSSGK | S184 | Ubl conjugation pathway |
| ZNF638 | NYQSQADIPIRsPFGIVK | S383 | Transcription, Transcription regulation |

# Appendix 2. Scheduled MRM Method

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Compound | Start Time (min) | End Time (min) | Polarity | Precursor (m/z) | Product (m/z) | Collision Energy (V) |
| KVS[+80.0]SAEGAAKEEPK(+3) | 22.81 | 30.81 | Positive | 504.24314 | 415.22434 | 16.4 |
| KVS[+80.0]SAEGAAKEEPK(+3) | 22.81 | 30.81 | Positive | 504.24314 | 558.78021 | 16.4 |
| KVS[+80.0]SAEGAAKEEPK(+3) | 22.81 | 30.81 | Positive | 504.24314 | 585.29348 | 16.4 |
| KVS[+80.0]SAEGAAKEEPK(+3) | 22.81 | 30.81 | Positive | 504.24314 | 642.82515 | 16.4 |
| KVS[+80.0]SAEGAAKEEPK (heavy)(+3) | 22.81 | 30.81 | Positive | 506.91454 | 419.23144 | 16.4 |
| KVS[+80.0]SAEGAAKEEPK (heavy)(+3) | 22.81 | 30.81 | Positive | 506.91454 | 562.78731 | 16.4 |
| KVS[+80.0]SAEGAAKEEPK (heavy)(+3) | 22.81 | 30.81 | Positive | 506.91454 | 585.29348 | 16.4 |
| KVS[+80.0]SAEGAAKEEPK (heavy)(+3) | 22.81 | 30.81 | Positive | 506.91454 | 646.83225 | 16.4 |
| KLS[+80.0]LSEGK(+2) | 26.8 | 34.8 | Positive | 471.23881 | 420.20889 | 18.3 |
| KLS[+80.0]LSEGK(+2) | 26.8 | 34.8 | Positive | 471.23881 | 533.29295 | 18.3 |
| KLS[+80.0]LSEGK(+2) | 26.8 | 34.8 | Positive | 471.23881 | 602.31442 | 18.3 |
| KLS[+80.0]LSEGK(+2) | 26.8 | 34.8 | Positive | 471.23881 | 715.39848 | 18.3 |
| KLS[+80.0]LSEGK (heavy)(+2) | 26.8 | 34.8 | Positive | 475.24591 | 428.22309 | 18.3 |
| KLS[+80.0]LSEGK (heavy)(+2) | 26.8 | 34.8 | Positive | 475.24591 | 541.30715 | 18.3 |
| KLS[+80.0]LSEGK (heavy)(+2) | 26.8 | 34.8 | Positive | 475.24591 | 610.32862 | 18.3 |
| KLS[+80.0]LSEGK (heavy)(+2) | 26.8 | 34.8 | Positive | 475.24591 | 723.41268 | 18.3 |
| KIS[+80.0]VVSATK(+2) | 27.05 | 35.05 | Positive | 506.77556 | 406.22962 | 19.5 |
| KIS[+80.0]VVSATK(+2) | 27.05 | 35.05 | Positive | 506.77556 | 505.29804 | 19.5 |
| KIS[+80.0]VVSATK(+2) | 27.05 | 35.05 | Positive | 506.77556 | 509.34459 | 19.5 |
| KIS[+80.0]VVSATK(+2) | 27.05 | 35.05 | Positive | 506.77556 | 673.38792 | 19.5 |
| KIS[+80.0]VVSATK(+2) | 27.05 | 35.05 | Positive | 506.77556 | 786.47198 | 19.5 |
| KIS[+80.0]VVSATK (heavy)(+2) | 27.05 | 35.05 | Positive | 510.78266 | 414.24382 | 19.5 |
| KIS[+80.0]VVSATK (heavy)(+2) | 27.05 | 35.05 | Positive | 510.78266 | 509.34459 | 19.5 |
| KIS[+80.0]VVSATK (heavy)(+2) | 27.05 | 35.05 | Positive | 510.78266 | 513.31224 | 19.5 |
| KIS[+80.0]VVSATK (heavy)(+2) | 27.05 | 35.05 | Positive | 510.78266 | 681.40212 | 19.5 |
| KIS[+80.0]VVSATK (heavy)(+2) | 27.05 | 35.05 | Positive | 510.78266 | 794.48618 | 19.5 |
| KIS[+80.0]VVSATK (heavy)(+2) | 27.05 | 35.05 | Positive | 514.29124 | 414.24382 | 19.5 |
| KIS[+80.0]VVSATK (heavy)(+2) | 27.05 | 35.05 | Positive | 514.29124 | 513.31224 | 19.5 |
| KIS[+80.0]VVSATK (heavy)(+2) | 27.05 | 35.05 | Positive | 514.29124 | 516.36176 | 19.5 |
| KIS[+80.0]VVSATK (heavy)(+2) | 27.05 | 35.05 | Positive | 514.29124 | 681.40212 | 19.5 |
| KIS[+80.0]VVSATK (heavy)(+2) | 27.05 | 35.05 | Positive | 514.29124 | 801.50334 | 19.5 |
| HTDDEMTGY[+80.0]VATR(+3) | 28.86 | 36.86 | Positive | 525.87636 | 689.30182 | 17 |
| HTDDEMTGY[+80.0]VATR(+3) | 28.86 | 36.86 | Positive | 525.87636 | 729.25083 | 17 |
| HTDDEMTGY[+80.0]VATR(+3) | 28.86 | 36.86 | Positive | 525.87636 | 746.32328 | 17 |
| HTDDEMTGY[+80.0]VATR (heavy)(+3) | 28.86 | 36.86 | Positive | 529.21245 | 699.31009 | 17 |
| HTDDEMTGY[+80.0]VATR (heavy)(+3) | 28.86 | 36.86 | Positive | 529.21245 | 729.25083 | 17 |
| HTDDEMTGY[+80.0]VATR (heavy)(+3) | 28.86 | 36.86 | Positive | 529.21245 | 756.33155 | 17 |
| HTDDEMTGY[+80.0]VATR (heavy)(+3) | 28.86 | 36.86 | Positive | 531.21705 | 705.3239 | 17 |
| HTDDEMTGY[+80.0]VATR (heavy)(+3) | 28.86 | 36.86 | Positive | 531.21705 | 729.25083 | 17 |
| HTDDEMTGY[+80.0]VATR (heavy)(+3) | 28.86 | 36.86 | Positive | 531.21705 | 762.34536 | 17 |
| HTDDEMT[+80.0]GY[+80.0]VATR(+3) | 29.97 | 37.97 | Positive | 552.5318 | 415.18384 | 17.8 |
| HTDDEMT[+80.0]GY[+80.0]VATR(+3) | 29.97 | 37.97 | Positive | 552.5318 | 446.27216 | 17.8 |
| HTDDEMT[+80.0]GY[+80.0]VATR(+3) | 29.97 | 37.97 | Positive | 552.5318 | 464.17228 | 17.8 |
| HTDDEMT[+80.0]GY[+80.0]VATR(+3) | 29.97 | 37.97 | Positive | 552.5318 | 598.21035 | 17.8 |
| HTDDEMT[+80.0]GY[+80.0]VATR (heavy)(+3) | 29.97 | 37.97 | Positive | 555.86789 | 420.18797 | 17.8 |
| HTDDEMT[+80.0]GY[+80.0]VATR (heavy)(+3) | 29.97 | 37.97 | Positive | 555.86789 | 456.28043 | 17.8 |
| HTDDEMT[+80.0]GY[+80.0]VATR (heavy)(+3) | 29.97 | 37.97 | Positive | 555.86789 | 469.17642 | 17.8 |
| HTDDEMT[+80.0]GY[+80.0]VATR (heavy)(+3) | 29.97 | 37.97 | Positive | 555.86789 | 598.21035 | 17.8 |
| TYS[+80.0]QDC[+57.0]SFK(+2) | 30.42 | 38.42 | Positive | 608.22303 | 508.71074 | 23 |
| TYS[+80.0]QDC[+57.0]SFK(+2) | 30.42 | 38.42 | Positive | 608.22303 | 656.27084 | 23 |
| TYS[+80.0]QDC[+57.0]SFK(+2) | 30.42 | 38.42 | Positive | 608.22303 | 853.35088 | 23 |
| TYS[+80.0]QDC[+57.0]SFK(+2) | 30.42 | 38.42 | Positive | 608.22303 | 951.32778 | 23 |
| TYS[+80.0]QDC[+57.0]SFK (heavy)(+2) | 30.42 | 38.42 | Positive | 612.23013 | 512.71784 | 23 |
| TYS[+80.0]QDC[+57.0]SFK (heavy)(+2) | 30.42 | 38.42 | Positive | 612.23013 | 664.28504 | 23 |
| TYS[+80.0]QDC[+57.0]SFK (heavy)(+2) | 30.42 | 38.42 | Positive | 612.23013 | 861.36508 | 23 |
| TYS[+80.0]QDC[+57.0]SFK (heavy)(+2) | 30.42 | 38.42 | Positive | 612.23013 | 959.34197 | 23 |
| HTDDEMT[+80.0]GYVATR(+3) | 32.47 | 40.47 | Positive | 525.87636 | 375.20067 | 17 |
| HTDDEMT[+80.0]GYVATR(+3) | 32.47 | 40.47 | Positive | 525.87636 | 446.27216 | 17 |
| HTDDEMT[+80.0]GYVATR(+3) | 32.47 | 40.47 | Positive | 525.87636 | 598.21035 | 17 |
| HTDDEMT[+80.0]GYVATR(+3) | 32.47 | 40.47 | Positive | 525.87636 | 609.33549 | 17 |
| HTDDEMT[+80.0]GYVATR(+3) | 32.47 | 40.47 | Positive | 525.87636 | 869.30941 | 17 |
| HTDDEMT[+80.0]GYVATR (heavy)(+3) | 32.47 | 40.47 | Positive | 529.21245 | 380.2048 | 17 |
| HTDDEMT[+80.0]GYVATR (heavy)(+3) | 32.47 | 40.47 | Positive | 529.21245 | 456.28043 | 17 |
| HTDDEMT[+80.0]GYVATR (heavy)(+3) | 32.47 | 40.47 | Positive | 529.21245 | 598.21035 | 17 |
| HTDDEMT[+80.0]GYVATR (heavy)(+3) | 32.47 | 40.47 | Positive | 529.21245 | 619.34376 | 17 |
| HTDDEMT[+80.0]GYVATR (heavy)(+3) | 32.47 | 40.47 | Positive | 529.21245 | 869.30941 | 17 |
| KLHVS[+80.0]TINLQK(+2) | 34.33 | 42.33 | Positive | 680.87105 | 511.29309 | 23.3 |
| KLHVS[+80.0]TINLQK(+2) | 34.33 | 42.33 | Positive | 680.87105 | 560.28154 | 23.3 |
| KLHVS[+80.0]TINLQK(+2) | 34.33 | 42.33 | Positive | 680.87105 | 645.31199 | 23.3 |
| KLHVS[+80.0]TINLQK(+2) | 34.33 | 42.33 | Positive | 680.87105 | 884.51999 | 23.3 |
| KLHVS[+80.0]TINLQK (heavy)(+2) | 34.33 | 42.33 | Positive | 684.87815 | 515.30019 | 25.4 |
| KLHVS[+80.0]TINLQK (heavy)(+2) | 34.33 | 42.33 | Positive | 684.87815 | 564.28864 | 23.3 |
| KLHVS[+80.0]TINLQK (heavy)(+2) | 34.33 | 42.33 | Positive | 684.87815 | 645.31199 | 25.4 |
| KLHVS[+80.0]TINLQK (heavy)(+2) | 34.33 | 42.33 | Positive | 684.87815 | 892.53419 | 23.3 |
| QIS[+80.0]FKAEVNSSGK(+2) | 35.36 | 43.36 | Positive | 737.85051 | 500.26654 | 27.4 |
| QIS[+80.0]FKAEVNSSGK(+2) | 35.36 | 43.36 | Positive | 737.85051 | 720.35226 | 27.4 |
| QIS[+80.0]FKAEVNSSGK(+2) | 35.36 | 43.36 | Positive | 737.85051 | 791.38937 | 27.4 |
| QIS[+80.0]FKAEVNSSGK (heavy)(+2) | 35.36 | 43.36 | Positive | 741.85761 | 500.26654 | 27.4 |
| QIS[+80.0]FKAEVNSSGK (heavy)(+2) | 35.36 | 43.36 | Positive | 741.85761 | 728.36646 | 27.4 |
| QIS[+80.0]FKAEVNSSGK (heavy)(+2) | 35.36 | 43.36 | Positive | 741.85761 | 799.40357 | 27.4 |
| SLS[+80.0]LPGR(+2) | 37.01 | 45.01 | Positive | 405.19949 | 442.27724 | 16.1 |
| SLS[+80.0]LPGR(+2) | 37.01 | 45.01 | Positive | 405.19949 | 511.29871 | 16.1 |
| SLS[+80.0]LPGR(+2) | 37.01 | 45.01 | Positive | 405.19949 | 609.2756 | 16.1 |
| SLS[+80.0]LPGR (heavy)(+2) | 37.01 | 45.01 | Positive | 410.20362 | 452.28551 | 16.1 |
| SLS[+80.0]LPGR (heavy)(+2) | 37.01 | 45.01 | Positive | 410.20362 | 521.30698 | 16.1 |
| SLS[+80.0]LPGR (heavy)(+2) | 37.01 | 45.01 | Positive | 410.20362 | 619.28387 | 16.1 |
| AILGS[+80.0]YR(+2) | 37.21 | 45.21 | Positive | 430.20731 | 577.30927 | 16.9 |
| AILGS[+80.0]YR(+2) | 37.21 | 45.21 | Positive | 430.20731 | 587.31877 | 16.9 |
| AILGS[+80.0]YR(+2) | 37.21 | 45.21 | Positive | 430.20731 | 675.28617 | 16.9 |
| AILGS[+80.0]YR (heavy)(+2) | 37.21 | 45.21 | Positive | 435.21145 | 587.31754 | 16.9 |
| AILGS[+80.0]YR (heavy)(+2) | 37.21 | 45.21 | Positive | 435.21145 | 587.31877 | 16.9 |
| AILGS[+80.0]YR (heavy)(+2) | 37.21 | 45.21 | Positive | 435.21145 | 685.29444 | 16.9 |
| AQS[+80.0]YDIQAWKK(+2) | 37.47 | 45.47 | Positive | 709.32922 | 560.79292 | 26.4 |
| AQS[+80.0]YDIQAWKK(+2) | 37.47 | 45.47 | Positive | 709.32922 | 773.46684 | 26.4 |
| AQS[+80.0]YDIQAWKK(+2) | 37.47 | 45.47 | Positive | 709.32922 | 888.49378 | 26.4 |
| AQS[+80.0]YDIQAWKK(+2) | 37.47 | 45.47 | Positive | 709.32922 | 1051.5571 | 26.4 |
| AQS[+80.0]YDIQAWKK (heavy)(+2) | 37.47 | 45.47 | Positive | 713.33632 | 564.80002 | 26.4 |
| AQS[+80.0]YDIQAWKK (heavy)(+2) | 37.47 | 45.47 | Positive | 713.33632 | 781.48103 | 26.4 |
| AQS[+80.0]YDIQAWKK (heavy)(+2) | 37.47 | 45.47 | Positive | 713.33632 | 896.50798 | 26.4 |
| AQS[+80.0]YDIQAWKK (heavy)(+2) | 37.47 | 45.47 | Positive | 713.33632 | 1059.5713 | 26.4 |
| SFS[+80.0]SPENFQR(+2) | 38.1 | 46.1 | Positive | 639.76117 | 391.16121 | 24 |
| SFS[+80.0]SPENFQR(+2) | 38.1 | 46.1 | Positive | 639.76117 | 473.7225 | 24 |
| SFS[+80.0]SPENFQR(+2) | 38.1 | 46.1 | Positive | 639.76117 | 790.38423 | 24 |
| SFS[+80.0]SPENFQR (heavy)(+2) | 38.1 | 46.1 | Positive | 644.7653 | 391.16121 | 24 |
| SFS[+80.0]SPENFQR (heavy)(+2) | 38.1 | 46.1 | Positive | 644.7653 | 478.72663 | 24 |
| SFS[+80.0]SPENFQR (heavy)(+2) | 38.1 | 46.1 | Positive | 644.7653 | 800.3925 | 24 |
| LHVS[+80.0]TINLQK(+2) | 38.63 | 46.63 | Positive | 616.82357 | 502.29837 | 25.4 |
| LHVS[+80.0]TINLQK(+2) | 38.63 | 46.63 | Positive | 616.82357 | 716.43012 | 25.4 |
| LHVS[+80.0]TINLQK(+2) | 38.63 | 46.63 | Positive | 616.82357 | 884.51999 | 25.4 |
| LHVS[+80.0]TINLQK (heavy)(+2) | 38.63 | 46.63 | Positive | 620.83067 | 510.31257 | 25.4 |
| LHVS[+80.0]TINLQK (heavy)(+2) | 38.63 | 46.63 | Positive | 620.83067 | 724.44431 | 25.4 |
| LHVS[+80.0]TINLQK (heavy)(+2) | 38.63 | 46.63 | Positive | 620.83067 | 892.53419 | 25.4 |
| QHEAPSNRPLNELLT[+80.0]PQGPSPR(+3) | 39.43 | 47.43 | Positive | 840.07813 | 738.38931 | 26.3 |
| QHEAPSNRPLNELLT[+80.0]PQGPSPR(+3) | 39.43 | 47.43 | Positive | 840.07813 | 821.42643 | 26.3 |
| QHEAPSNRPLNELLT[+80.0]PQGPSPR(+3) | 39.43 | 47.43 | Positive | 840.07813 | 1027.015 | 26.3 |
| QHEAPSNRPLNELLT[+80.0]PQGPSPR(+3) | 39.43 | 47.43 | Positive | 840.07813 | 1031.9889 | 26.3 |
| QHEAPSNRPLNELLT[+80.0]PQGPSPR (heavy)(+3) | 39.43 | 47.43 | Positive | 843.41422 | 748.39758 | 26.3 |
| QHEAPSNRPLNELLT[+80.0]PQGPSPR (heavy)(+3) | 39.43 | 47.43 | Positive | 843.41422 | 831.4347 | 26.3 |
| QHEAPSNRPLNELLT[+80.0]PQGPSPR (heavy)(+3) | 39.43 | 47.43 | Positive | 843.41422 | 1031.9889 | 26.3 |
| QHEAPSNRPLNELLT[+80.0]PQGPSPR (heavy)(+3) | 39.43 | 47.43 | Positive | 843.41422 | 1032.0191 | 26.3 |
| VADPDHDHTGFLTEY[+80.0]VATR(+3) | 40.74 | 48.74 | Positive | 741.99507 | 596.75453 | 23.4 |
| VADPDHDHTGFLTEY[+80.0]VATR(+3) | 40.74 | 48.74 | Positive | 741.99507 | 689.30182 | 23.4 |
| VADPDHDHTGFLTEY[+80.0]VATR(+3) | 40.74 | 48.74 | Positive | 741.99507 | 818.34441 | 23.4 |
| VADPDHDHTGFLTEY[+80.0]VATR(+3) | 40.74 | 48.74 | Positive | 741.99507 | 919.39209 | 23.4 |
| VADPDHDHTGFLTEY[+80.0]VATR(+3) | 40.74 | 48.74 | Positive | 741.99507 | 974.90929 | 23.4 |
| VADPDHDHTGFLTEY[+80.0]VATR (heavy)(+3) | 40.74 | 48.74 | Positive | 745.33116 | 596.75453 | 23.4 |
| VADPDHDHTGFLTEY[+80.0]VATR (heavy)(+3) | 40.74 | 48.74 | Positive | 745.33116 | 699.31009 | 23.4 |
| VADPDHDHTGFLTEY[+80.0]VATR (heavy)(+3) | 40.74 | 48.74 | Positive | 745.33116 | 828.35268 | 23.4 |
| VADPDHDHTGFLTEY[+80.0]VATR (heavy)(+3) | 40.74 | 48.74 | Positive | 745.33116 | 929.40036 | 23.4 |
| VADPDHDHTGFLTEY[+80.0]VATR (heavy)(+3) | 40.74 | 48.74 | Positive | 745.33116 | 974.90929 | 23.4 |
| QHEAPSNRPLNELLTPQGPS[+80.0]PR(+3) | 41.47 | 49.47 | Positive | 840.07813 | 720.37875 | 26.3 |
| QHEAPSNRPLNELLTPQGPS[+80.0]PR(+3) | 41.47 | 49.47 | Positive | 840.07813 | 799.90054 | 26.3 |
| QHEAPSNRPLNELLTPQGPS[+80.0]PR(+3) | 41.47 | 49.47 | Positive | 840.07813 | 818.35564 | 26.3 |
| QHEAPSNRPLNELLTPQGPS[+80.0]PR(+3) | 41.47 | 49.47 | Positive | 840.07813 | 821.42643 | 26.3 |
| QHEAPSNRPLNELLTPQGPS[+80.0]PR(+3) | 41.47 | 49.47 | Positive | 840.07813 | 978.02651 | 26.3 |
| QHEAPSNRPLNELLTPQGPS[+80.0]PR(+3) | 41.47 | 49.47 | Positive | 840.07813 | 1027.015 | 26.3 |
| QHEAPSNRPLNELLTPQGPS[+80.0]PR (heavy)(+3) | 41.47 | 49.47 | Positive | 843.41422 | 730.38702 | 26.3 |
| QHEAPSNRPLNELLTPQGPS[+80.0]PR (heavy)(+3) | 41.47 | 49.47 | Positive | 843.41422 | 804.90467 | 26.3 |
| QHEAPSNRPLNELLTPQGPS[+80.0]PR (heavy)(+3) | 41.47 | 49.47 | Positive | 843.41422 | 828.36391 | 26.3 |
| QHEAPSNRPLNELLTPQGPS[+80.0]PR (heavy)(+3) | 41.47 | 49.47 | Positive | 843.41422 | 831.4347 | 26.3 |
| QHEAPSNRPLNELLTPQGPS[+80.0]PR (heavy)(+3) | 41.47 | 49.47 | Positive | 843.41422 | 983.03064 | 26.3 |
| QHEAPSNRPLNELLTPQGPS[+80.0]PR (heavy)(+3) | 41.47 | 49.47 | Positive | 843.41422 | 1032.0191 | 26.3 |
| QHEAPSNRPLNELLT[+80.0]PQGPS[+80.0]PR(+3) | 41.68 | 49.68 | Positive | 866.73357 | 720.37875 | 27.1 |
| QHEAPSNRPLNELLT[+80.0]PQGPS[+80.0]PR(+3) | 41.68 | 49.68 | Positive | 866.73357 | 818.35564 | 27.1 |
| QHEAPSNRPLNELLT[+80.0]PQGPS[+80.0]PR(+3) | 41.68 | 49.68 | Positive | 866.73357 | 901.39276 | 27.1 |
| QHEAPSNRPLNELLT[+80.0]PQGPS[+80.0]PR(+3) | 41.68 | 49.68 | Positive | 866.73357 | 1018.0097 | 27.1 |
| QHEAPSNRPLNELLT[+80.0]PQGPS[+80.0]PR(+3) | 41.68 | 49.68 | Positive | 866.73357 | 1066.9981 | 27.1 |
| QHEAPSNRPLNELLT[+80.0]PQGPS[+80.0]PR(+3) | 41.68 | 49.68 | Positive | 866.73357 | 1115.026 | 27.1 |
| QHEAPSNRPLNELLT[+80.0]PQGPS[+80.0]PR (heavy)(+3) | 41.68 | 49.68 | Positive | 870.06966 | 730.38702 | 27.1 |
| QHEAPSNRPLNELLT[+80.0]PQGPS[+80.0]PR (heavy)(+3) | 41.68 | 49.68 | Positive | 870.06966 | 828.36391 | 27.1 |
| QHEAPSNRPLNELLT[+80.0]PQGPS[+80.0]PR (heavy)(+3) | 41.68 | 49.68 | Positive | 870.06966 | 911.40103 | 27.1 |
| QHEAPSNRPLNELLT[+80.0]PQGPS[+80.0]PR (heavy)(+3) | 41.68 | 49.68 | Positive | 870.06966 | 1023.0138 | 27.1 |
| QHEAPSNRPLNELLT[+80.0]PQGPS[+80.0]PR (heavy)(+3) | 41.68 | 49.68 | Positive | 870.06966 | 1072.0023 | 27.1 |
| QHEAPSNRPLNELLT[+80.0]PQGPS[+80.0]PR (heavy)(+3) | 41.68 | 49.68 | Positive | 870.06966 | 1115.026 | 27.1 |
| IADPEHDHTGFLTEY[+80.0]VATR(+3) | 42.05 | 50.05 | Positive | 751.33884 | 689.30182 | 23.7 |
| IADPEHDHTGFLTEY[+80.0]VATR(+3) | 42.05 | 50.05 | Positive | 751.33884 | 919.39209 | 23.7 |
| IADPEHDHTGFLTEY[+80.0]VATR(+3) | 42.05 | 50.05 | Positive | 751.33884 | 976.93056 | 23.7 |
| IADPEHDHTGFLTEY[+80.0]VATR(+3) | 42.05 | 50.05 | Positive | 751.33884 | 1034.444 | 23.7 |
| IADPEHDHTGFLTEY[+80.0]VATR(+3) | 42.05 | 50.05 | Positive | 751.33884 | 1039.4488 | 23.7 |
| IADPEHDHTGFLTEY[+80.0]VATR (heavy)(+3) | 42.05 | 50.05 | Positive | 754.67493 | 699.31009 | 23.7 |
| IADPEHDHTGFLTEY[+80.0]VATR (heavy)(+3) | 42.05 | 50.05 | Positive | 754.67493 | 929.40036 | 23.7 |
| IADPEHDHTGFLTEY[+80.0]VATR (heavy)(+3) | 42.05 | 50.05 | Positive | 754.67493 | 981.93469 | 23.7 |
| IADPEHDHTGFLTEY[+80.0]VATR (heavy)(+3) | 42.05 | 50.05 | Positive | 754.67493 | 1039.4482 | 23.7 |
| IADPEHDHTGFLTEY[+80.0]VATR (heavy)(+3) | 42.05 | 50.05 | Positive | 754.67493 | 1039.4488 | 23.7 |
| IADPEHDHTGFLTEY[+80.0]VATR (heavy)(+3) | 42.05 | 50.05 | Positive | 757.01398 | 699.31009 | 23.7 |
| IADPEHDHTGFLTEY[+80.0]VATR (heavy)(+3) | 42.05 | 50.05 | Positive | 757.01398 | 929.40036 | 23.7 |
| IADPEHDHTGFLTEY[+80.0]VATR (heavy)(+3) | 42.05 | 50.05 | Positive | 757.01398 | 985.44327 | 23.7 |
| IADPEHDHTGFLTEY[+80.0]VATR (heavy)(+3) | 42.05 | 50.05 | Positive | 757.01398 | 1042.9567 | 23.7 |
| IADPEHDHTGFLTEY[+80.0]VATR (heavy)(+3) | 42.05 | 50.05 | Positive | 757.01398 | 1042.9574 | 23.7 |
| VADPDHDHTGFLT[+80.0]EY[+80.0]VATR(+3) | 43.16 | 51.16 | Positive | 768.65051 | 689.30182 | 24.2 |
| VADPDHDHTGFLT[+80.0]EY[+80.0]VATR(+3) | 43.16 | 51.16 | Positive | 768.65051 | 901.38152 | 24.2 |
| VADPDHDHTGFLT[+80.0]EY[+80.0]VATR(+3) | 43.16 | 51.16 | Positive | 768.65051 | 960.91745 | 24.2 |
| VADPDHDHTGFLT[+80.0]EY[+80.0]VATR(+3) | 43.16 | 51.16 | Positive | 768.65051 | 1388.623 | 24.2 |
| VADPDHDHTGFLT[+80.0]EY[+80.0]VATR (heavy)(+3) | 43.16 | 51.16 | Positive | 771.9866 | 699.31009 | 24.2 |
| VADPDHDHTGFLT[+80.0]EY[+80.0]VATR (heavy)(+3) | 43.16 | 51.16 | Positive | 771.9866 | 911.38979 | 24.2 |
| VADPDHDHTGFLT[+80.0]EY[+80.0]VATR (heavy)(+3) | 43.16 | 51.16 | Positive | 771.9866 | 965.92158 | 24.2 |
| VADPDHDHTGFLT[+80.0]EY[+80.0]VATR (heavy)(+3) | 43.16 | 51.16 | Positive | 771.9866 | 1388.623 | 24.2 |
| IADPEHDHTGFLT[+80.0]EY[+80.0]VATR(+3) | 44.39 | 52.39 | Positive | 777.99428 | 610.77018 | 24.5 |
| IADPEHDHTGFLT[+80.0]EY[+80.0]VATR(+3) | 44.39 | 52.39 | Positive | 777.99428 | 689.30182 | 24.5 |
| IADPEHDHTGFLT[+80.0]EY[+80.0]VATR(+3) | 44.39 | 52.39 | Positive | 777.99428 | 818.34441 | 24.5 |
| IADPEHDHTGFLT[+80.0]EY[+80.0]VATR(+3) | 44.39 | 52.39 | Positive | 777.99428 | 901.38152 | 24.5 |
| IADPEHDHTGFLT[+80.0]EY[+80.0]VATR(+3) | 44.39 | 52.39 | Positive | 777.99428 | 967.92527 | 24.5 |
| IADPEHDHTGFLT[+80.0]EY[+80.0]VATR (heavy)(+3) | 44.39 | 52.39 | Positive | 781.33037 | 610.77018 | 24.5 |
| IADPEHDHTGFLT[+80.0]EY[+80.0]VATR (heavy)(+3) | 44.39 | 52.39 | Positive | 781.33037 | 699.31009 | 24.5 |
| IADPEHDHTGFLT[+80.0]EY[+80.0]VATR (heavy)(+3) | 44.39 | 52.39 | Positive | 781.33037 | 828.35268 | 24.5 |
| IADPEHDHTGFLT[+80.0]EY[+80.0]VATR (heavy)(+3) | 44.39 | 52.39 | Positive | 781.33037 | 911.38979 | 24.5 |
| IADPEHDHTGFLT[+80.0]EY[+80.0]VATR (heavy)(+3) | 44.39 | 52.39 | Positive | 781.33037 | 972.92941 | 24.5 |
| IADPEHDHTGFLT[+80.0]EY[+80.0]VATR (heavy)(+3) | 44.39 | 52.39 | Positive | 783.66942 | 610.77018 | 23.7 |
| IADPEHDHTGFLT[+80.0]EY[+80.0]VATR (heavy)(+3) | 44.39 | 52.39 | Positive | 783.66942 | 699.31009 | 23.7 |
| IADPEHDHTGFLT[+80.0]EY[+80.0]VATR (heavy)(+3) | 44.39 | 52.39 | Positive | 783.66942 | 828.35268 | 23.7 |
| IADPEHDHTGFLT[+80.0]EY[+80.0]VATR (heavy)(+3) | 44.39 | 52.39 | Positive | 783.66942 | 911.38979 | 23.7 |
| IADPEHDHTGFLT[+80.0]EY[+80.0]VATR (heavy)(+3) | 44.39 | 52.39 | Positive | 783.66942 | 976.43799 | 23.7 |
| LGTSES[+80.0]LPC[+57.0]TAEELSR(+2) | 45.09 | 53.09 | Positive | 915.40298 | 531.74786 | 33.4 |
| LGTSES[+80.0]LPC[+57.0]TAEELSR(+2) | 45.09 | 53.09 | Positive | 915.40298 | 670.34063 | 33.4 |
| LGTSES[+80.0]LPC[+57.0]TAEELSR(+2) | 45.09 | 53.09 | Positive | 915.40298 | 805.40502 | 33.4 |
| LGTSES[+80.0]LPC[+57.0]TAEELSR(+2) | 45.09 | 53.09 | Positive | 915.40298 | 1062.4884 | 33.4 |
| LGTSES[+80.0]LPC[+57.0]TAEELSR(+2) | 45.09 | 53.09 | Positive | 915.40298 | 1244.594 | 33.4 |
| LGTSES[+80.0]LPC[+57.0]TAEELSR (heavy)(+2) | 45.09 | 53.09 | Positive | 920.40712 | 536.75199 | 33.4 |
| LGTSES[+80.0]LPC[+57.0]TAEELSR (heavy)(+2) | 45.09 | 53.09 | Positive | 920.40712 | 670.34063 | 33.4 |
| LGTSES[+80.0]LPC[+57.0]TAEELSR (heavy)(+2) | 45.09 | 53.09 | Positive | 920.40712 | 815.41329 | 33.4 |
| LGTSES[+80.0]LPC[+57.0]TAEELSR (heavy)(+2) | 45.09 | 53.09 | Positive | 920.40712 | 1072.4967 | 33.4 |
| LGTSES[+80.0]LPC[+57.0]TAEELSR (heavy)(+2) | 45.09 | 53.09 | Positive | 920.40712 | 1254.6022 | 33.4 |
| EVDYSDS[+80.0]LTEKQWLK(+3) | 45.83 | 53.83 | Positive | 640.95907 | 615.32987 | 20.4 |
| EVDYSDS[+80.0]LTEKQWLK(+3) | 45.83 | 53.83 | Positive | 640.95907 | 658.84588 | 20.4 |
| EVDYSDS[+80.0]LTEKQWLK(+3) | 45.83 | 53.83 | Positive | 640.95907 | 707.83433 | 20.4 |
| EVDYSDS[+80.0]LTEKQWLK(+3) | 45.83 | 53.83 | Positive | 640.95907 | 846.87947 | 20.4 |
| EVDYSDS[+80.0]LTEKQWLK(+3) | 45.83 | 53.83 | Positive | 640.95907 | 932.51999 | 20.4 |
| EVDYSDS[+80.0]LTEKQWLK (heavy)(+3) | 45.83 | 53.83 | Positive | 643.63047 | 619.33697 | 20.4 |
| EVDYSDS[+80.0]LTEKQWLK (heavy)(+3) | 45.83 | 53.83 | Positive | 643.63047 | 662.85298 | 20.4 |
| EVDYSDS[+80.0]LTEKQWLK (heavy)(+3) | 45.83 | 53.83 | Positive | 643.63047 | 711.84143 | 20.4 |
| EVDYSDS[+80.0]LTEKQWLK (heavy)(+3) | 45.83 | 53.83 | Positive | 643.63047 | 850.88657 | 20.4 |
| EVDYSDS[+80.0]LTEKQWLK (heavy)(+3) | 45.83 | 53.83 | Positive | 643.63047 | 940.53419 | 20.4 |
| GREFS[+80.0]FEAWNAK(+3) | 46.19 | 54.19 | Positive | 507.88892 | 353.66901 | 16.5 |
| GREFS[+80.0]FEAWNAK(+3) | 46.19 | 54.19 | Positive | 507.88892 | 418.1903 | 16.5 |
| GREFS[+80.0]FEAWNAK(+3) | 46.19 | 54.19 | Positive | 507.88892 | 518.27216 | 16.5 |
| GREFS[+80.0]FEAWNAK(+3) | 46.19 | 54.19 | Positive | 507.88892 | 589.30927 | 16.5 |
| GREFS[+80.0]FEAWNAK (heavy)(+3) | 46.19 | 54.19 | Positive | 510.56032 | 353.66901 | 16.5 |
| GREFS[+80.0]FEAWNAK (heavy)(+3) | 46.19 | 54.19 | Positive | 510.56032 | 418.1903 | 16.5 |
| GREFS[+80.0]FEAWNAK (heavy)(+3) | 46.19 | 54.19 | Positive | 510.56032 | 526.28636 | 16.5 |
| GREFS[+80.0]FEAWNAK (heavy)(+3) | 46.19 | 54.19 | Positive | 510.56032 | 597.32347 | 16.5 |
| VADPDHDHTGFLT[+80.0]EYVATR(+3) | 46.5 | 54.5 | Positive | 741.99507 | 609.33549 | 23.4 |
| VADPDHDHTGFLT[+80.0]EYVATR(+3) | 46.5 | 54.5 | Positive | 741.99507 | 738.37808 | 23.4 |
| VADPDHDHTGFLT[+80.0]EYVATR(+3) | 46.5 | 54.5 | Positive | 741.99507 | 821.41519 | 23.4 |
| VADPDHDHTGFLT[+80.0]EYVATR(+3) | 46.5 | 54.5 | Positive | 741.99507 | 1192.5018 | 23.4 |
| VADPDHDHTGFLT[+80.0]EYVATR(+3) | 46.5 | 54.5 | Positive | 741.99507 | 1388.623 | 23.4 |
| VADPDHDHTGFLT[+80.0]EYVATR (heavy)(+3) | 46.5 | 54.5 | Positive | 745.33116 | 619.34376 | 23.4 |
| VADPDHDHTGFLT[+80.0]EYVATR (heavy)(+3) | 46.5 | 54.5 | Positive | 745.33116 | 748.38635 | 23.4 |
| VADPDHDHTGFLT[+80.0]EYVATR (heavy)(+3) | 46.5 | 54.5 | Positive | 745.33116 | 831.42346 | 23.4 |
| VADPDHDHTGFLT[+80.0]EYVATR (heavy)(+3) | 46.5 | 54.5 | Positive | 745.33116 | 1192.5018 | 23.4 |
| VADPDHDHTGFLT[+80.0]EYVATR (heavy)(+3) | 46.5 | 54.5 | Positive | 745.33116 | 1388.623 | 23.4 |
| IADPEHDHTGFLT[+80.0]EYVATR(+3) | 47.37 | 55.37 | Positive | 751.33884 | 610.77018 | 24.5 |
| IADPEHDHTGFLT[+80.0]EYVATR(+3) | 47.37 | 55.37 | Positive | 751.33884 | 738.37808 | 24.5 |
| IADPEHDHTGFLT[+80.0]EYVATR(+3) | 47.37 | 55.37 | Positive | 751.33884 | 821.41519 | 24.5 |
| IADPEHDHTGFLT[+80.0]EYVATR(+3) | 47.37 | 55.37 | Positive | 751.33884 | 927.94211 | 24.5 |
| IADPEHDHTGFLT[+80.0]EYVATR(+3) | 47.37 | 55.37 | Positive | 751.33884 | 976.93056 | 24.5 |
| IADPEHDHTGFLT[+80.0]EYVATR (heavy)(+3) | 47.37 | 55.37 | Positive | 754.67493 | 610.77018 | 23.7 |
| IADPEHDHTGFLT[+80.0]EYVATR (heavy)(+3) | 47.37 | 55.37 | Positive | 754.67493 | 748.38635 | 23.7 |
| IADPEHDHTGFLT[+80.0]EYVATR (heavy)(+3) | 47.37 | 55.37 | Positive | 754.67493 | 831.42346 | 23.7 |
| IADPEHDHTGFLT[+80.0]EYVATR (heavy)(+3) | 47.37 | 55.37 | Positive | 754.67493 | 932.94624 | 23.7 |
| IADPEHDHTGFLT[+80.0]EYVATR (heavy)(+3) | 47.37 | 55.37 | Positive | 754.67493 | 981.93469 | 23.7 |
| NYQSQADIPIRS[+80.0]PFGIVK(+3) | 51.07 | 59.07 | Positive | 705.02078 | 597.32575 | 22.3 |
| NYQSQADIPIRS[+80.0]PFGIVK(+3) | 51.07 | 59.07 | Positive | 705.02078 | 604.87933 | 22.3 |
| NYQSQADIPIRS[+80.0]PFGIVK(+3) | 51.07 | 59.07 | Positive | 705.02078 | 653.86778 | 22.3 |
| NYQSQADIPIRS[+80.0]PFGIVK(+3) | 51.07 | 59.07 | Positive | 705.02078 | 746.89981 | 22.3 |
| NYQSQADIPIRS[+80.0]PFGIVK(+3) | 51.07 | 59.07 | Positive | 705.02078 | 807.32677 | 22.3 |
| NYQSQADIPIRS[+80.0]PFGIVK (heavy)(+3) | 51.07 | 59.07 | Positive | 707.69218 | 601.33285 | 22.3 |
| NYQSQADIPIRS[+80.0]PFGIVK (heavy)(+3) | 51.07 | 59.07 | Positive | 707.69218 | 608.88643 | 22.3 |
| NYQSQADIPIRS[+80.0]PFGIVK (heavy)(+3) | 51.07 | 59.07 | Positive | 707.69218 | 657.87488 | 22.3 |
| NYQSQADIPIRS[+80.0]PFGIVK (heavy)(+3) | 51.07 | 59.07 | Positive | 707.69218 | 750.90691 | 22.3 |
| NYQSQADIPIRS[+80.0]PFGIVK (heavy)(+3) | 51.07 | 59.07 | Positive | 707.69218 | 807.32677 | 22.3 |
| ELFDDPSY[+80.0]VNVQNLDK(+2) | 52.52 | 60.52 | Positive | 988.43788 | 617.32532 | 35.9 |
| ELFDDPSY[+80.0]VNVQNLDK(+2) | 52.52 | 60.52 | Positive | 988.43788 | 678.8134 | 35.9 |
| ELFDDPSY[+80.0]VNVQNLDK(+2) | 52.52 | 60.52 | Positive | 988.43788 | 830.43666 | 35.9 |
| ELFDDPSY[+80.0]VNVQNLDK(+2) | 52.52 | 60.52 | Positive | 988.43788 | 1172.5347 | 35.9 |
| ELFDDPSY[+80.0]VNVQNLDK(+2) | 52.52 | 60.52 | Positive | 988.43788 | 1356.6195 | 35.9 |
| ELFDDPSY[+80.0]VNVQNLDK (heavy)(+2) | 52.52 | 60.52 | Positive | 992.44498 | 625.33952 | 35.9 |
| ELFDDPSY[+80.0]VNVQNLDK (heavy)(+2) | 52.52 | 60.52 | Positive | 992.44498 | 682.8205 | 35.9 |
| ELFDDPSY[+80.0]VNVQNLDK (heavy)(+2) | 52.52 | 60.52 | Positive | 992.44498 | 838.45086 | 35.9 |
| ELFDDPSY[+80.0]VNVQNLDK (heavy)(+2) | 52.52 | 60.52 | Positive | 992.44498 | 1180.5489 | 35.9 |
| ELFDDPSY[+80.0]VNVQNLDK (heavy)(+2) | 52.52 | 60.52 | Positive | 992.44498 | 1364.6337 | 35.9 |
| ASGQAFELILS[+80.0]PR(+2) | 55.34 | 63.34 | Positive | 734.86342 | 454.27724 | 27.3 |
| ASGQAFELILS[+80.0]PR(+2) | 55.34 | 63.34 | Positive | 734.86342 | 567.36131 | 27.3 |
| ASGQAFELILS[+80.0]PR(+2) | 55.34 | 63.34 | Positive | 734.86342 | 680.44537 | 27.3 |
| ASGQAFELILS[+80.0]PR (heavy)(+2) | 55.34 | 63.34 | Positive | 739.86756 | 464.28551 | 27.3 |
| ASGQAFELILS[+80.0]PR (heavy)(+2) | 55.34 | 63.34 | Positive | 739.86756 | 577.36958 | 27.3 |
| ASGQAFELILS[+80.0]PR (heavy)(+2) | 55.34 | 63.34 | Positive | 739.86756 | 690.45364 | 27.3 |
| ASGQAFELILS[+80.0]PR (heavy)(+2) | 55.34 | 63.34 | Positive | 743.37614 | 464.28551 | 27.3 |
| ASGQAFELILS[+80.0]PR (heavy)(+2) | 55.34 | 63.34 | Positive | 743.37614 | 577.36958 | 27.3 |
| ASGQAFELILS[+80.0]PR (heavy)(+2) | 55.34 | 63.34 | Positive | 743.37614 | 697.4708 | 27.3 |
| GPS[+80.0]WDPFRDWYPHSR(+3) | 55.37 | 63.37 | Positive | 661.61598 | 496.26266 | 21 |
| GPS[+80.0]WDPFRDWYPHSR(+3) | 55.37 | 63.37 | Positive | 661.61598 | 525.20922 | 21 |
| GPS[+80.0]WDPFRDWYPHSR(+3) | 55.37 | 63.37 | Positive | 661.61598 | 680.8309 | 21 |
| GPS[+80.0]WDPFRDWYPHSR(+3) | 55.37 | 63.37 | Positive | 661.61598 | 831.38403 | 21 |
| GPS[+80.0]WDPFRDWYPHSR (heavy)(+3) | 55.37 | 63.37 | Positive | 664.95207 | 506.27093 | 21 |
| GPS[+80.0]WDPFRDWYPHSR (heavy)(+3) | 55.37 | 63.37 | Positive | 664.95207 | 525.20922 | 21 |
| GPS[+80.0]WDPFRDWYPHSR (heavy)(+3) | 55.37 | 63.37 | Positive | 664.95207 | 685.83504 | 21 |
| GPS[+80.0]WDPFRDWYPHSR (heavy)(+3) | 55.37 | 63.37 | Positive | 664.95207 | 836.38817 | 21 |
| GPS[+80.0]WDPFRDWYPHSR (heavy)(+3) | 55.37 | 63.37 | Positive | 668.28815 | 506.27093 | 21 |
| GPS[+80.0]WDPFRDWYPHSR (heavy)(+3) | 55.37 | 63.37 | Positive | 668.28815 | 525.20922 | 21 |
| GPS[+80.0]WDPFRDWYPHSR (heavy)(+3) | 55.37 | 63.37 | Positive | 668.28815 | 690.83917 | 21 |
| GPS[+80.0]WDPFRDWYPHSR (heavy)(+3) | 55.37 | 63.37 | Positive | 668.28815 | 841.3923 | 21 |