

User Manual

SpikeTides Sets & SpikeTides Sets - heavy SpikeMix & SpikeMix - heavy

Peptide Sets for relative quantification of Proteins in Mass Spectrometry Based Assays

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Please read the entire Manual before starting your Experiments!

Carefully note the handling and storage conditions.

For research use only. Not intended for any animal or human therapeutic or diagnostic use.

1 Introduction

Quantitative proteomics plays an integral part in both discovery and targeted proteomic analyses. One common approach is to combine stable isotopically labeled peptides as internal standards with liquid chromatography mass spectrometry (LC-MS) to identify and quantitate complex proteins mixtures from cells, tissues or organisms. Utilizing stable isotope-labeled proteotypic peptides in conjunction with a targeted proteomic assay (SRM/MRM/PRM) can provide relative quantification analysis of many proteotypic peptides in a single LC-MS run. In addition, standards can be used for both retention time calibration and data normalization in label-free and data-independent assays.

JPT's unique high-throughput peptide synthesis platform yields small scale, unpurified light and heavy labeled peptides at a fraction of the costs of standard solid phase approaches. Based on this technology, JPT has developed a number of pre-manufactured SpikeMixes and SpikeTides Sets for rapid quantitative mass spectrometric assay development and relative protein quantification. The peptides of each set are selected to represent proteotypic peptides for a carefully chosen group of proteins. This enables answering complex questions at an unparalleled speed and cost effectiveness.

We offer SpikeTides Sets and SpikeMix pools as light or stable isotope-labeled (heavy) peptides:

SpikeTides: small scale, unpurified proteotypic peptides with C-terminal lysine or arginine.

SpikeTides L: labeled with stable isotopes (C-terminal Arg U-13C6;U-15N4 or Lys U-13C6;U-15N2).

Quantified SpikeTides_TQL: for absolute quantification of proteins are also available from JPT upon request.

The described kinds of **SpikeTides** can be prepared in two different formats:

- Individual peptides in microtiter plates or micronics tubes (**SpikeTides Sets**).
- Mixtures (pools) of peptides in polypropylene vials (**SpikeMix**).

1.1 List of Components

Product Information: Provided by Email or available as download from www.jpt.com

Depending on product specifications:

Product	Product Code	Quantity	Format
Tumor-associated antigens (TAAs)			
SpikeTides Set TAA SpikeTides Set TAA-heavy	SPT-TAA SPT-TAA-L	252 peptides (3 microtiter plates with 84 peptides each). Peptide amount: approx. 50-150 pm per peptide	96 well format (Greiner Bio-one, PP, #650201)
SpikeMix TAA SpikeMix TAA- heavy	SPT-TAA-POOL SPT-TAA-POOL-L	252 peptides (mixture in one polypropylene vial). Peptide amount: approx. 50-150 pm per peptide	Polypropylene vial (Sarstedt, #72.664.711)
Cytokines			
SpikeTides Set Cytokines (human) SpikeTides Set Cytokines (human) - heavy	SPT-CYT SPT-CYT-L	461 peptides (6 microtiter plates). Peptide amount: approx. 50-150 pm per peptide	96 well format (Greiner Bio-one, PP, #650201)
SpikeMix Cytokines (human) SpikeMix Cytokines (human) - heavy	SPT-CYT-POOL-hum SPT-CYT-POOL-L-hum	461 peptides (mixture in one polypropylene vial). Peptide amount: approx. 50-150 pm per peptide	Polypropylene vial (Sarstedt, #72.664.711)
SpikeMix Cytokines (mouse) - heavy	SPT-CYT-POOL-L-mou	383 peptides (mixture in one polypropylene vial). Peptide amount: approx. 50-150 pm per peptide	Polypropylene vial (Sarstedt, #72.664.711)
SpikeMix Cytokines (bovine) - heavy	SPT-CYT-POOL-L-bov	224 peptides (mixture in one polypropylene vial). Peptide amount: approx. 50-150 pm per peptide	Polypropylene vial (Sarstedt, #72.664.711)
SpikeMix Cytokines (Callitrix jacchus) - heavy	SPT-CYT-POOL-L-cal	119 peptides (mixture in one polypropylene vial). Peptide amount: approx. 50-150 pm per peptide	Polypropylene vial (Sarstedt, #72.664.711)
SpikeMix Cytokines (Canis) - heavy	SPT-CYT-POOL-L-can	145 peptides (mixture in one polypropylene vial). Peptide amount: approx. 50-150 pm per peptide	Polypropylene vial (Sarstedt, #72.664.711)
SpikeMix Cytokines (Cynomolgus) - heavy	SPT-CYT-POOL-L-cyn	140 peptides (mixture in one polypropylene vial). Peptide amount: approx. 50-150 pm per peptide	Polypropylene vial (Sarstedt, #72.664.711)
SpikeMix Cytokines (Guinea pig) - heavy	SPT-CYT-POOL-L-gui	134 peptides (mixture in one polypropylene vial). Peptide amount: approx. 50-150 pm per peptide	Polypropylene vial (Sarstedt, #72.664.711)

SpikeMix Cytokines (Ovis aries) - heavy	SPT-CYT-POOL-L-ovi	182 peptides (mixture in one polypropylene vial). Peptide amount: approx. 50-150 pm per peptide	Polypropylene vial (Sarstedt, #72.664.711)
SpikeMix Cytokines (Rabbit) - heavy	SPT-CYT-POOL-L-rab	123 peptides (mixture in one polypropylene vial). Peptide amount: approx. 50-150 pm per peptide	Polypropylene vial (Sarstedt, #72.664.711)
SpikeMix Cytokines (Rat) - heavy	SPT-CYT-POOL-L-rat	226 peptides (mixture in one polypropylene vial). Peptide amount: approx. 50-150 pm per peptide	Polypropylene vial (Sarstedt, #72.664.711)
SpikeMix Cytokines (Rhesus macaque) - heavy	SPT-CYT-POOL-L-rhe	156 peptides (mixture in one polypropylene vial). Peptide amount: approx. 50-150 pm per peptide	Polypropylene vial (Sarstedt, #72.664.711)
SpikeMix Cytokines (Xenopus laevis) - heavy	SPT-CYT-POOL-L-xen	54 peptides (mixture in one polypropylene vial). Peptide amount: approx. 50-150 pm per peptide	Polypropylene vial (Sarstedt, #72.664.711)
SpikeMix Cytokines (Zebrafish) - heavy	SPT-CYT-POOL-L-zeb	109 peptides (mixture in one polypropylene vial). Peptide amount: approx. 50-150 pm per peptide	Polypropylene vial (Sarstedt, #72.664.711)
Other Sets			
SpikeMix ABRF (Cross Species Standard) (*) special protocol, see section 5.2	SPT-ABRF-POOL-L	Approx. 1000 peptides (mixture in one polypropylene vial). SpikeMix aliquots provided in sizes of approx. 1 or 10 pmol per peptide	Polypropylene vial (Sarstedt, #72.664.711)
SpikeMix CEFT (*) special protocol, see section 5.3	SPT-CEFT-POOL-L	32 peptides (mixture in one polypropylene vial). Peptide amount: approx. 50-150 pm per peptide	Polypropylene vial (Sarstedt, #72.664.711)
SpikeMix Hormones (human)	SPT-PH-POOL-L-hum	552 peptides (mixture in one polypropylene vial). SpikeMix aliquots provided in sizes of approx. 10 or 100 pmol per peptide	Polypropylene vial (Sarstedt, #72.664.711)
Kinase Activation Loops			
SpikeTides Set Kinase Activation Loops	SPT-KAL-L	288 phospho- and 178 non-phospho peptides (3+2 microtiter plates). Peptide amount: approx. 10 pm per peptide	96 well format (Greiner Bio-one, PP, #650201)
SpikeMix Kinase Activation Loops	SPT-KAL-POOL-L	288 phospho- and 178 non-phospho peptides (mixture in two polypropylene vials). SpikeMix aliquots provided in sizes of approx. 10 or 100 pmol per peptide	Polypropylene vial (Sarstedt, #72.664.711)

The data CD-ROM provided contains all required information, esp. peptide sequences and their annotation to associated proteins.

For the SpikeTides Sets, the allocation of the peptide sequences to the microtiter plate wells is also included in the data CD-ROM. By default the numbering starts with well A1 in the upper left corner, counting the first 12 peptides up to well A12. Peptide 13 is deposited in well B1 and so on. Row H is left blank for optional controls etc.

The microtiter plate is delivered with a lid as well as an additional sealing mat, keeping environmental air and humidity out of the individual wells. Please see figure 2 for details:



Figure 2: Left: Microtiter-Plate delivery format, lidded and sealed; Right: individual components: Lid, seal and microtiter-Plate

Make sure to remove the sealing mat before adding solution to the microtiter plate wells!

Please note that all cysteines of the peptide set have been alkylated with iodoacetamide to maximize compatibility with typical proteomic workflows.

Please note that due to the nature of the targeted proteins, several peptides might be very hydrophilic. Please make sure to adapt your analysis workflow and instrument setup accordingly.

1.2 Storage and Handling

- All SpikeTides products should be stored at -20°C.

1.3 Additional Material Required

- 0.1M ammonium bicarbonate
- Acetonitrile
- Dithiotreitol (DTT)
- Iodoacetamide
- Formic acid

2 Experimental Protocols

Note: The following procedure is provided as a guideline only. The optimal experimental conditions will vary depending on your samples and instruments. The optimal experimental conditions must be established by the user. No warranty or guarantee of performance using this procedure can be made or is implied.

2.1 Standard Protocol

The SpikeTides peptides can be used directly as spike-in controls for your assay solution.

1. Solubilize the SpikeTides peptides in a solution consisting of 80% of 0.1M ammonium bicarbonate and 20% acetonitrile.
2. Add the SpikeTides peptides to your sample dissolved in 0.1M ammonium bicarbonate.
3. Add DTT to a final concentration of 12 mM in order to reduce all cysteine residues in your sample. Incubate sample for 30 minutes at 32°C.
4. Alkylate all Cys residues by adding iodoacetamide resulting in a final concentration of 40 mM. Incubate sample for 30 minutes at 25°C in the dark.
5. Add your protease (e.g. trypsin in a 1/100-1/15 enzyme/substrate ratio) and incubate at an appropriate temperature (e.g. RT, 16 hours).
6. Add formic acid to a final pH value of ≤ 3 to stop the enzymatic reaction.
7. Optionally dry down the sample and resolubilize in 0.1% formic acid (make sure that the pH value is acidic!).
8. Perform LC-MS analysis.

2.2 Protocol for SpikeMix ABRF (cross-species standard)

Following instructions from ABRF we recommend the following procedures for handling the SpikeMix – ABRF (cross-species standard):

If adding prior to enzymatic digestion

1. Dissolve and vortex the mixture of peptides in 70% formic acid.
2. Dilute with 0.1M ammonium bicarbonate to a final ratio of 1:6 of 70% formic acid/ 0.1 M ammonium bicarbonate.
3. Add the SpikeMix to your sample dissolved in 0.1M ammonium bicarbonate.
4. Proceed with reduction, alkylation, and enzymatic digestion as described above.

If adding the peptides prior to LC-MS analysis

1. Dissolve and vortex the mixture of peptides in 70% formic acid.
2. Dilute with 0.1% TFA in water to a final ratio of 1:6 of 70% formic acid/ 0.1% TFA in water.
3. Add the SpikeMix to your digestion mixture and proceed with a standard LC-MS protocol.

2.3 Protocol for SpikeMix CEFT

For characterization of T-cell stimulating peptides, the SpikeMix CEFT positive control pool can be applied. Since these peptides are not derived from proteotypic cleavage, no digestion step is necessary. We recommend the following protocol:

1. Dissolve and vortex the mixture of peptides in a solution consisting of 80% water and 20% acetonitrile.
2. Add the SpikeMix to your mixture of eluted epitope peptides and proceed with a standard LC-MS protocol.

3 Contact Us

Technical Support	Address
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4 Product Use & Liability

THE PRODUCTS ARE FOR EXPERIMENTAL LABORATORY USE ONLY AND NOT INTENDED FOR HUMAN OR HOUSEHOLD USE.

Only qualified personnel should handle these chemicals.

Note that missing hazard warnings do not indicate that a product is harmless. Products are for research use only (RUO). JPT Peptide Technologies declines responsibility for any damage arising from the inappropriate use of its products.

JPT Peptide Technologies makes no warranties of any kind, expressed or implied extending beyond the description of the product in this brochure, except that the material will meet our described specifications at the time of delivery.

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