Sample Preparation Kit
PROTOCOL - CHEMICAL LABELING

INTRODUCTION

Sample preparation is one of the essential steps of bottom-up proteomics. The PreOmics NHS-compatible sample preparation kit is designed to assist you achieving best results with few sample preparation steps and little hands-on time for multiplexing applications. For sample specific protocols and optimization contact us or visit our website at www.preomics.com.

KIT CONTENTS

The iST-NHS kit provides a streamlined solution for reliable sample preparation compatible with chemical labelling such as iTRAQ or TMT. It includes all chemicals to denature, reduce and alkylate proteins, as well as the enzymes to perform a tryptic digest and a final clean-up.

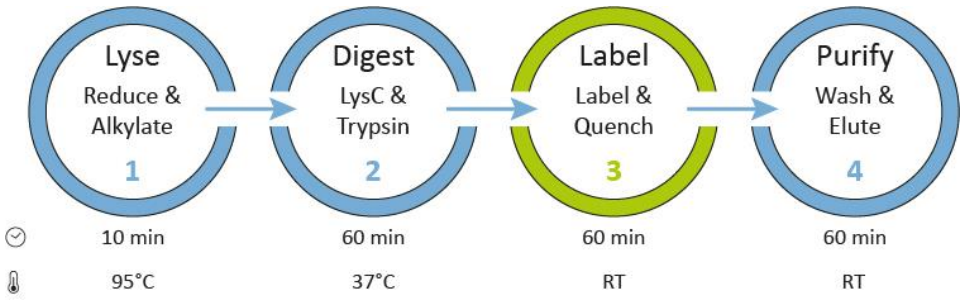
COMPONENT	CAP COLOR	QUANTITY	BUFFER PROPERTIES Organic	Acidic	Basic	Volatile	DESCRIPTION	STORAGE TEMP.
DIGEST	red	3x					Enzyme *Trypsin*-mix to digest proteins.	-20 °C
RESUSPEND	yellow	1x 2 mL				✓	Protease reconstitution buffer for enzymes.	RT
LYSE-NHS	orange	1x 2 mL			✓		Denature, reduce and alkylate proteins.	RT
STOP	black	1x 2 mL	✓	✓		✓	Stop the enzymatic activity.	RT
WASH 1	blue	2x 2 mL	✓	✓		✓	Clean up peptides from hydrophobic materials.	RT
WASH 2	green	2x 2 mL		✓		✓	Clean up peptides from hydrophilic materials.	RT
ELUTE	violet	2x 2 mL	✓		✓	✓	Elute the peptides from the cartridge.	RT
LC-LOAD	white	2x 1 mL		✓		✓	Load peptides on reversed-phase LC-MS column.	RT
CARTRIDGE		12x					Cartridge for max. 100 µg protein starting material (max. loading volume per cartridge is 300 µL)	RT
WASTE		12x					Tube for collecting waste after washing steps.	RT
COLLECTION		12x					Tube for collecting peptides after elution.	RT
ADAPTER		12x					Enables placing a cartridge into a tube.	RT
CAP		12x					Cap to optionally close the cartridge's bottom.	RT

PRE-REQUISITES

Common lab equipment is required for the sample preparation.

EQUIPMENT	QUANTITY AND DESCRIPTION
PIPETTE	Careful sample handling and pipetting reduces contaminations and improves quantification.
SAMPLE	Lyophilized protein or pelleted cells. For other materials ask us for adapted protocols.
HEATING BLOCK	2x heaters are recommended to help protein denaturation and during digestion.
CENTRIFUGE	Eppendorf tube centrifuges are necessary for loading, washing and elution.
SONICATOR	If you have DNA in your sample, shear it by sonication (e.g. Diagenode Bioruptor®)
SPEED-VAC	Vacuum manifolds evaporate volatile buffers from the eluate before LC-MS.
ULTRASONIC BATH	Optional: can be used to resuspend peptides.
LABELING REAGENT	Labelling reagent (e.g 400 µg labeling reagent in 41 µL dry acetonitrile for 100 µg peptides).
LABELING BUFFERS	Dry acetonitrile & quenching buffer (5% hydroxylamine) as recommended by the manufacturer.

PROCEDURE



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PROTOCOL

1. LYSE

1.1. Add 50 µL **LYSE-NHS** ● to 1-100 µg of protein sample, place it in a pre-heated HEATING BLOCK (95 °C; 1,000 rpm; 10 min).

1.2. Optional: Spin down droplets (RT; max. 300 rcf; 10 sec). *NOTE 1*

1.3. If you expect DNA, shear sample in a SONICATOR (10 cycles 30 sec ON/OFF).

1.4. Transfer sample to **CARTRIDGE** and cool down (RT). Be careful not to damage the bottom layer of **CARTRIDGE**.

1.5. Use **ADAPTER** to place **CARTRIDGE** in **WASTE** tube. Label all tubes.

2. DIGEST & LABEL

2.1. Add 210 µL **RESUSPEND** ○ to **DIGEST** ● (1 tube for 4 reactions), shake (RT; 500 rpm; 10 min), pipette up/down.

2.2. Add 50 µL **DIGEST** ● to **CARTRIDGE** and place it in a pre-heated HEATING BLOCK (37 °C; 500 rpm; 1-3 hours).

2.3. Resuspend LABELING REAGENT in dry acetonitrile (see page 1; 4:1 ratio of label:peptides). *NOTE 2*

2.4. Add resuspended LABELING REAGENT to **CARTRIDGE**, pipette up/down, incubate shaking (RT; 500 rpm; 1 hour).

2.5. Add 10 µL QUENCHING BUFFER (5% Hydroxylamine) to **CARTRIDGE** and mix.

2.6. Add 100 µL **STOP** ● to **CARTRIDGE** (precipitation may happen), shake (RT; 500 rpm; 1 min), pipette up/down. *SP*

3. PURIFY

3.1. Spin **CARTRIDGE** in a CENTRIFUGE (3,800 rcf; 1-3 min). If needed, adjust values to ensure complete flow-through.

3.2. Add 200 µL **WASH 1** ● to **CARTRIDGE**, repeat step 3.1., discard flow-through.

3.3. Add 200 µL **WASH 2** ● to **CARTRIDGE**, repeat step 3.1., discard flow-through. *SP*

3.4. Use **ADAPTER** to place **CARTRIDGE** in a fresh **COLLECTION** tube. Label all tubes.

3.5. Add 100 µL **ELUTE** ● to **CARTRIDGE**, repeat step 3.1., keep flow-through in **COLLECTION** tube.

3.6. Repeat step 3.5., keep flow-through in the same **COLLECTION** tube.

3.7. Remove **CARTRIDGE** and place **COLLECTION** tube in a SPEED-VAC (45 °C; until completely dry).

3.8. Add **LC-LOAD** ○ to **COLLECTION** tube. Aim for 1 g/L concentration (e.g. 100 µL to 100 µg protein starting material).

3.9. Sonicate **COLLECTION** tube in a SONICATOR (10 cycles 30 sec ON/OFF). *SP*

NOTE 1 Volumes of buffers can be adjusted according to protein starting amounts. Lysis temperature should be between 60-95 °C. Most classical protein quantification assays are compatible with our lysis buffer. We recommend the BCA assay or tryptophan quantification method. Some assays require dilution with water to achieve best results (Dilutions: BCA: none; Bradford: 1:4; Coomassie: 1:20; Lowry: 1:4; Tryptophan: none). Visit our FAQ website for more information.

NOTE 2 We recommend to use only fresh labeling reagents at a label to peptide ratio of 4:1, as well as a min. 30% (v/v) acetonitrile concentration during the labeling reaction to achieve best labeling and identification results. In case of reduced labeling efficiency, use LABELING REAGENT concentrations according to the manufacturer`s instructions and see the manufacturer`s troubleshooting information.

SP - Storage Point: At this point, close the peptide containing tube or **CARTRIDGE** (use a **CAP** for bottom). Peptides can be frozen at -20 °C. Storage of peptides should not exceed 2 weeks at -20 °C. For extended storage, finish the protocol and store at -80 °C.

DATA ANALYSIS

Consider the following as fixed modifications in your database search:

MODIFICATION	DESCRIPTION	COMPOSITION	SPECIFICITY	MASS
ALKYLATION	Specific cysteine modification	$C_6H_{11}NO$	[C]	+113.084 Da