



Ludger

Hexagen Biosciences

distributes Ludger Limited, UK products in India

Glycoprofiling Catalog

Glycoprofiling Catalog – Contents

- 1 Benefits of Ludger Glycoprofiling Technology
- 2 Glycan Release
- 3 Post-Release Purification - LudgerClean™ E
- 4 Glycan Labeling Overview
- 5 LudgerTag™ Glycan Labeling Kits
- 6 Post-Labeling Purification-LudgerCleanSCartridges
- 7 N-Glycan Standards for HPLC and MS
- 8 2-AB (2-Aminobenzamide) Labeled Glycan Standards
- 9 2-AA (2-Aminobenzoic Acid) Labeled Glycan Standards
- 10 Glycoprofiling HPLC Standards
- 11 LudgerSep™ Glycan HPLC Columns
- 12 LudgerMass™ Peptide Standards for MS
- 13 Glycosidases
- 14 References

1. Benefits of Ludger Glycoprofiling Technology

For Quantitative Glycoprofiling of Biopharmaceuticals

Ludger glycoanalysis technology is designed and manufactured for quantitative glycoprofiling of therapeutic glycoproteins for biopharmaceutical research and QC.

Regulatory Authority Approval

Ludger glycan labeling and purification kits have been validated and are used in FDA and EMEA-approved product lot-release QC procedures by biopharmaceutical companies throughout the world.

Accurate, Reliable and Reproducible

Ludger optimizes the chemistries, materials and manufacturing and storage procedures of their kits and reagents to maintain the highest performance standards for accuracy and reproducibility.

Ludger Tag kit reagents are purified to analytical grade and are dispensed and sealed under clean, inert atmospheres. The ampoules are pre-cleaned by pyrolysis at 500 °C then opened just before dispensing and sealing under oxygen-free dry nitrogen.

These controls ensure that your analyses work properly each and every time.

Convenient and Easy to Use

LudgerTag kits contain all the reagents needed for reductive amination labeling of released N- and O-glycans. The washing reagents required for the LudgerClean S cartridges are easy to prepare in your analytical labs.

All kits are designed for convenience, speed and ease of use and come with comprehensive instruction and troubleshooting guides together with full technical support by Ludger scientists.

Designed, Manufactured and Supported by Specialists

Ludger's expertise in glycoanalysis gives you peace of mind. Ludger scientists have many years experience in glycoprofiling of biopharmaceuticals.

Ludger is passionate about it and prides itself in producing and supporting the best tools for glycoprofiling in both pharmaceutical research and production environments.

If you wish, we can help you with the design and setting up your glycoprofiling operations. We guarantee that Ludger will listen to you, understand your needs and help you to perform your glycoanalyses efficiently and effectively.

2. Glycan Release

QA-Bio™ PNGase F

Peptide-N4-(acetyl- β -glucosaminyl)-asparagine amidase
N-Glycosidase F

Source: *Chryseobacterium meningosepticum* (Flavobacterium)

Description and Specificity

A stable, clean endoglycosidase formulated for glycoanalytical QC of biopharmaceuticals. The enzyme cleaves asparagine linked (N-linked) glycans from glycoproteins. PNGase F deamidates asparagine to aspartic acid leaving the oligosaccharide intact.

Denaturation of the substrate by reduction and alkylation typically increases the rate of cleavage up to 100 fold. Most native proteins can still be completely deglycosidated but incubation time must be increased.

Typically, QA-Bio PNGase F will remain active under incubation conditions for at least 72 hours.



Applications

- Release of N-linked oligosaccharides for glycoprofiling of therapeutic glycoproteins
- Deglycosidation for structure-function studies of biopharmaceuticals

Reference

Bayer et al 1995, Tarentino et al 1985

Purchasing Information

Catalog #	Description	Size
E-PNG01	PNGase F (Peptide N-Glycosidase F)	0.3 Units / 60 μ l
E-PNG05	PNGase F (Peptide N-Glycosidase F)	1 Unit / 200 μ l

3. Post-Release Glycan Purification

LudgerClean™ EB Cartridges

Description

Solid phase extraction (SPE) cartridges containing glycan binding resin.

Applications

- Purification of glycans after glycosidase (e.g PNGase F) treatment
- Removal of salts and detergent from glycan samples prior to fluorescent labeling or analysis by HPLC or mass spectrometry

Protocol

- Prime cartridges with a sequence of solvent washes
- Apply sample (typically up to 0.5 mg glycoprotein)
- Wash off unbound non-glycan contaminants (e.g. salts)
- Elute glycans with water / acetonitrile / trifluoroacetic acid mix



Tips for Use

- The new EB10 cartridges have been optimized for rapid glycan purification. They have faster flow than our original E cartridges and are more suitable for medium to high viscosity samples.

Purchasing Information

Catalog #	Description	Size
LC-EB10-A6	LudgerClean EB10 Cartridges	6 Cartridges

4. N – Glycan Analytical Standards

LudgerPure™ N-Glycan Standards

Description

N-linked oligosaccharides with free reducing termini. Typically released from glycoproteins by hydrazinolysis.

Applications

- Analytical standards for direct analysis by HPLC (e.g. HPAEPAD- high pH anion exchange with pulsed amperometric detection) or mass spectrometry
- Standards for fluorescent labeling prior to HPLC or MS analysis

Purity

Typically > 95% by a combination of HPLC and ¹H NMR.

Pack Sizes

- Ludger N-glycan standards were originally produced in 20 µg pack sizes (Cat. # CN-xx-20U).
- If you need a pack size that is not currently available in the catalog then please call us and we will do our best to find a size that is suitable for you.



Glycan Families

- Ludger N-glcans are grouped into structural 'families' based on the number of antennae and monosaccharide composition and configuration.
- The N-glycans currently available include members of the A4,A3, A2F, A2, oligomannose and hybrid families.

4. N-Glycan Analytical Standards *(cont)*

Purchasing Information			
Catalog #	Description	Glycan Family	Size
CN-NA4-20U	NA4 Glycan	A4 Family	20 µg
CN-NGA4-20U	NGA4 Glycan	A4 Family	20 µg
CN-A3-20U	A3 Glycan	A3 Family	20 µg
CN-A3-10U	A3 Glycan	A3 Family	10 µg
CN-NA3-20U	NA3 Glycan	A3 Family	20 µg
CN-NGA3-20U	NGA3 Glycan	A3 Family	20 µg
CN-A2F-20U	A2F Glycan	A2F Family	20 µg
CN-A2F-10U	A2F Glycan	A2F Family	10 µg
CN-A1F-20U	A1F Glycan	A2F Family	20 µg
CN-A1F-10U	A1F Glycan	A2F Family	10 µg
CN-NA2F-20U	NA2F Glycan	A2F Family	20 µg
CN-NA2F-10U	NA2F Glycan	A2F Family	10 µg
CN-NGA2F-20U	NGA2F Glycan	A2F Family	20 µg
CN-NGA2F-10U	NGA2F Glycan	A2F Family	10 µg
CN-A2-20U	A2 Glycan	A2 Family	20 µg
CN-A1-20U	A1 Glycan	A2 Family	20 µg
CN-NA2-20U	NA2 Glycan	A2 Family	20 µg
CN-NA2-10U	NA2 Glycan	A2 Family	10 µg
CN-NGA2-20U	NGA2 Glycan	A2 Family	20 µg
CN-NGA2-10U	NGA2 Glycan	A2 Family	10 µg

4. N-Glycan Analytical Standards *(cont)*

Purchasing Information			
Catalog #	Description	Glycan Family	Size
CN-M3N2-20U	M3N2 Glycan	A2 Family	20 µg
CN-MAN9-20U	Man-9 Glycan	Oligomannose Family	20 µg
CN-MAN9-10U	Man-9 Glycan	Oligomannose Family	10 µg
CN-MAN8-20U	Man-8 Glycan	Oligomannose Family	20 µg
CN-MAN7-20U	Man-7 Glycan	Oligomannose Family	20 µg
CN-MAN6-20U	Man-6 Glycan	Oligomannose Family	20 µg
CN-MAN5-20U	Man-5 Glycan	Oligomannose Family	20 µg
CN-MAN5-10U	Man-5 Glycan	Oligomannose Family	10 µg
CN-HYBRID-20U	Hybrid Glycan	Hybrid Family	20 µg

5. Glycan Labeling - Overview



Why Label Glycans?

In glycoproteomics studies free glycans, released from glycoproteins using either enzymatic or chemical methods, can be difficult to separate and detect on HPLC and often have poor running properties during mass spectrometric analyses.

These problems can be alleviated by labeling the free reducing termini with LudgerTag fluorophore or UV-active chromophore labels.

LudgerTag glycan labels are designed to:

- improve chromatographic properties on HPLC
- allow relative and absolute quantitation on HPLC
- improve sensitivity for electrospray and MALDI-TOF mass spectrometric analysis

- modify glycan fragmentation patterns during MS n analysis.

Steps for Glycan Labeling

Glycan labeling is normally done in two steps:

- 1 The **labeling reaction** - using a LudgerTag kit to conjugate the glycan and label.
- 2 **Post-labeling cleanup** - using a LudgerClean S glycans purification cartridge to remove excess labeling reagents that would interfere with subsequent HPLC or MS analyses.

Please see Section 6 for information on our range of LudgerTag labeling kits and Section 7 for details of LudgerClean S purification cartridges.

6. LudgerTag™ Glycan Labeling Kits

Acetic Acid

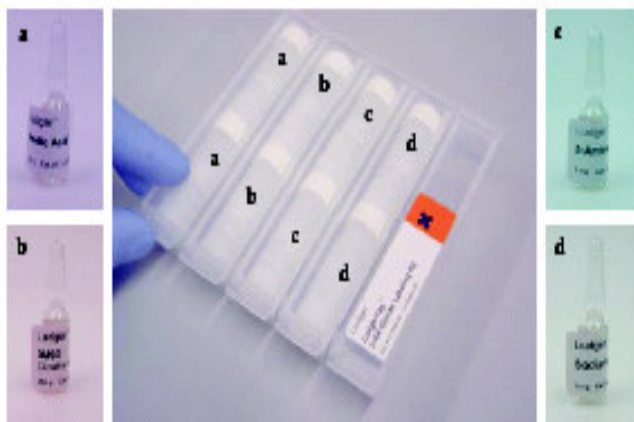
LT-ACETIC-01

This promotes acid catalyzed ring opening of the glycan reducing terminus prior to the formation of an imine intermediate between the sugars and the unprotonated form of the dye.

DMSO

LT-DMSO-01

This is the anhydrous solvent used to dissolve all the components of the reductive amination labeling reaction.



Dye

LT-xxx-01 (where xxx = dye type)
Analytical grade fluorescent dye.

The comprehensive range of LudgerTag dyes include 2-AB, 2-AA, 2-AP, and AA-Ac to cover different types of glycoanalyses by HPLC and MS.

Sodium Cyanoborohydride

LT-CYANO-01

This reductant stabilizes the imine produced by the reaction of the dye and glycans to produce stable fluorescently labeled glycans.

Description

A range of kits for fluorophore or chromophore labeling of glycans. Typical LudgerTag labels are aminoaryl compounds that conjugate to the free reducing termini of the glycans by reductive amination.

Applications

- Quantitative glycoprofiling of biopharmaceuticals
- Glycan characterization in glycoproteomics studies
- Detailed glycan structure analysis by HPLC and MS n

Kit Contents

LudgerTag kits contain purified, analytical grade reagents required for the glycan labeling reaction.

Post-Labeling Cleanup

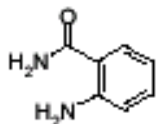
In biopharmaceutical QC applications the standard post-reaction cleanup of 2-AB or 2-AA labeled glycans is purification on LudgerClean S cartridges (see Section 7).

6. LudgerTag Glycan Labeling Kits (cont.)

LudgerTag 2AB Glycan Labeling Kit

Cat. #: LT-KAB-A2

Dye: 2-AB (2-Aminobenzamide)



$\lambda_{\text{ex}} = 320 - 360 \text{ nm}$ $\lambda_{\text{em}} = 420 \text{ nm}$

Applications

- Quantitative glycoprofiling of therapeutic glycoproteins by HPLC and MS
- Glycan characterization in proteomics studies

Notes

- LudgerTag 2-AB labeling technology is now widely used for quantitative glycoprofiling analyses as part of biopharmaceutical lot release QC.
- 2-AB labeling significantly enhances sensitivity for mass spectrometric analysis of glycans by MALDI-TOF (enhancements of S/N for oligosaccharides are typically in the range 5 - 40 fold).

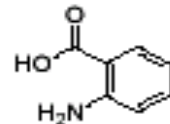
Refs

Bigge et al 1995, Guile et al 1996, Hardy 1997, Townsend et al 1996.

LudgerTag 2AA Glycan Labeling Kit

Cat. #: LT-KAA-A2

Dye: 2-AA (2-Aminobenzoic acid)



$\lambda_{\text{ex}} = 320 - 360 \text{ nm}$ $\lambda_{\text{em}} = 420 \text{ nm}$

Applications

- Quantitative glycoprofiling of therapeutic glycoproteins by HPLC, MS, CE and gel electrophoresis
- Glycan characterization in proteomics studies
- Monosaccharide analysis by HPLC

Notes

- LudgerTag 2-AA labeling technology is increasingly used for quantitative glycoprofiling analyses for biopharmaceutical lot release QC.
- For most applications 2-AA can replace 2-AB labeling with equivalent results.
- 2-AA labeling significantly enhances sensitivity for mass spectrometric analysis of glycans by MALDI-TOF by localizing the charge distribution during laser desorption.

Ref

Bigge et al 1995, Guile et al 1996, Hardy 1997, Townsend et al 1996.

6. LudgerTag Glycan Labeling Kits (cont.)

LudgerTag AA-Ac Glycan Labeling Kit

Cat. #: LT-KAAAC-A2

Dye: AA-Ac (3-(acetylamino)-6-aminoacridine)



$\lambda_{\text{ex}} = 382 \text{ or } 445 \text{ nm}$
 $\lambda_{\text{em}} = 525 \text{ nm}$

- Rapid glycoprofiling by HPLC and MS

Notes

- AA-Ac was developed as a hydrophobic tag to enhance analytical properties of glycans by HPLC and MS.
- AA-Ac labeled glycans are suitable for rapid fingerprinting by C18 HPLC.

Refs

Charlwood et al 2000.

LudgerTag 2-AP Glycan Labeling Kit

Cat. #: LT-KAP-A2

Dye: 2-AP (2-Aminopyridine)



$\lambda_{\text{ex}} = 295 \text{ nm}$ $\lambda_{\text{em}} = 352 \text{ nm}$

Applications

- Glycoprofiling of oligosaccharides by amide and C18 HPLC

Notes

- 2-AP is widely used as a label for oligosaccharide analysis in Japan.
- Typical analyses of 2-AP labeled glycans involve the use of 2-D plots of retention positions on amide and C18 HPLC and comparison to equivalent charts for standard glycans.

Refs

Fan et al 1995, Tokugawa 1996.

6. LudgerTag Glycan Labeling Kits (cont.)

Purchasing Information

<u>Catalog #</u>	<u>Description</u>	<u>Size</u>
LT-KAB-A2	LudgerTag 2-AB Glycan Labeling Kit	2 reaction sets
LT-KAA-A2	LudgerTag 2-AA Glycan Labeling Kit	2 reaction sets
LT-KAAAC-A2	LudgerTag AA-Ac Glycan Labeling Kit	2 reaction sets
LT-KAP-A2	LudgerTag 2-AP Glycan Labeling Kit	2 reaction sets

7. Post-Labeling Glycan Purification

LudgerClean™ S Cartridges

Description

Purification cartridges containing a hydrophilic glycan binding membrane.

Applications

- Purification of labeled glycans after LudgerTag labeling
- Purification of non-labeled glycans from peptides

Protocol

- Prime cartridge with a sequence of solvent washes
- Apply sample (typically 5 µl of LudgerTag labeling reaction mix)
- Wash off unbound non-glycan contaminants (e.g. unreacted dye) using high acetonitrile wash
- Elute glycans with water



Notes

- LudgerClean S cartridges are widely used for post-labeling purification of fluorescently tagged glycans as part of biopharmaceutical lot release QC.
- The cartridges are suitable for use in automated SPE (solid phase extraction) sample preparation systems. Please call us for details.

Purchasing Information

Catalog #	Description	Size
LC-S-A6	LudgerClean S Cartridges	6 Cartridges

8. 2-AB Labeled Glycans

LudgerPure™ 2-AB Labeled Glycans

Description

Glycans fluorescently tagged with 2-AB (2 aminobenzamide).

Applications

- Analytical standards for glycoprofiling analysis by HPLC with fluorescence detection. Typical HPLC methods include LudgerSep N1 amide HPLC for general glycoprofiling and HPAE-FD (high pH anion exchange with fluorescence detection)
- Analytical standards for mass spectrometry.

Purity

Typically > 90% by LudgerSep N1 HPLC and MALDI-MS.

Glycan Families

- Our labeled glycans are grouped into structural 'families' based on the number of antennae and monosaccharide composition and configuration.
- The 2-AB labeled N-glycans currently available include members of the A4, A3, A2F, A2, oligomannose and hybrid families as well as glucose homopolymer ladders.



Pack Sizes and Quantitation

- The standard pack size for the labeled glycans is 100 pmol.
- Quantitation has been done by comparison on LudgerSep N1 amide HPLC to a primary quantitative standard (LudgerPure maltopentose-2-AB cat # CABQ-G5-100P).

8. 2 AB Labeled Glycans (cont.)

Purchasing Information

Catalog #	Description	Size
CAB-NA4-01	NA4 Glycan, 2-AB Labeled	100 pmol
CAB-NGA4-01	NGA4 Glycan, 2-AB Labeled	100 pmol
CAB-A3-01	A3 Glycan, 2-AB Labeled	100 pmol
CAB-NA3-01	NA3 Glycan, 2-AB Labeled	100 pmol
CAB-NGA3-01	NGA3 Glycan, 2-AB Labeled	100 pmol
CAB-A2F-01	A2F Glycan, 2-AB Labeled	100 pmol
CAB-A1F-01	A1F Glycan, 2-AB Labeled	100 pmol
CAB-NA2F-01	NA2F Glycan, 2-AB Labeled	100 pmol
CAB-NGA2F-01	NGA2F Glycan, 2-AB Labeled	100 pmol
CAB-A2-01	A2 Glycan, 2-AB Labeled	100 pmol
CAB-A1-01	A1 Glycan, 2-AB Labeled	100 pmol
CAB-NA2-01	NA2 Glycan, 2-AB Labeled	100 pmol
CAB-NGA2-01	NGA2 Glycan, 2-AB Labeled	100 pmol
CAB-M3N2-01	M3N2 Glycan, 2-AB Labeled	100 pmol
CAB-MAN9-01	MAN-9 Glycan, 2-AB Labeled	100 pmol
CAB-MAN8-01	MAN-8 Glycan, 2-AB Labeled	100 pmol
CAB-MAN7-01	MAN-7 Glycan, 2-AB Labeled	100 pmol
CAB-MAN6-01	MAN-6 Glycan, 2-AB Labeled	100 pmol
CAB-MAN5-01	MAN-5 Glycan, 2-AB Labeled	100 pmol
CAB-HYBRID-01	Hybrid Glycan, 2-AB Labeled	100 pmol
CAB-GHP-30	2-AB Glucose Homopolymer Ladder	30 runs

9. 2-AA Labeled Glycans

LudgerPure™ 2-AA Labeled Glycans

Description

Glycans fluorescently tagged with 2-AA (2-aminobenzoic acid).

Applications

- Analytical standards for glycoprofiling analysis by HPLC with fluorescence detection. Typical HPLC methods include LudgerSep N1 amide HPLC for general glycoprofiling and HPAE-FD (high pH anion exchange with fluorescence detection)
- Analytical standards for mass spectrometry.

Purity

Typically > 90% by LudgerSep N1 HPLC and MALDI-MS.

Glycan Families

- Our 2-AA labeled glycans are grouped into structural 'families' based on the number of antennae and monosaccharide composition and configuration.
- The 2-AA labeled N-glycans currently available include members of the A4, A3, A2F, A2, oligomannose and hybrid families.



Pack Sizes and Quantitation

- The standard pack size for the 2-AA glycans is 100 pmol.
- Quantitation has been done by comparison on LudgerSep N1 amide HPLC to a primary quantitative standard (LudgerPure maltopentose-2-AB cat # CABQ-G5-100P).

9. 2-AA Labeled Glycan Standards (cont)

Purchasing Information

Catalog #	Description	Size
CAA-NA4-01	NA4 Glycan, 2-AA Labeled	100 pmol
CAA-NGA4-01	NGA4 Glycan, 2-AA Labeled	100 pmol
CAA-A3-01	A3 Glycan, 2-AA Labeled	100 pmol
CAA-NA3-01	NA3 Glycan, 2-AA Labeled	100 pmol
CAA-NGA3-01	NGA3 Glycan, 2-AA Labeled	100 pmol
CAA-A2F-01	A2F Glycan, 2-AA Labeled	100 pmol
CAA-A1F-01	A1F Glycan, 2-AA Labeled	100 pmol
CAA-NA2F-01	NA2F Glycan, 2-AA Labeled	100 pmol
CAA-NGA2F-01	NGA2F Glycan, 2-AA Labeled	100 pmol
CAA-A2-01	A2 Glycan, 2-AA Labeled	100 pmol
CAA-A1-01	A1 Glycan, 2-AA Labeled	100 pmol
CAA-NA2-01	NA2 Glycan, 2-AA Labeled	100 pmol
CAA-NGA2-01	NGA2 Glycan, 2-AA Labeled	100 pmol
CAA-M3N2-01	M3N2 Glycan, 2-AA Labeled	100 pmol
CAA-MAN9-01	MAN-9 Glycan, 2-AA Labeled	100 pmol
CAA-MAN8-01	MAN-8 Glycan, 2-AA Labeled	100 pmol
CAA-MAN7-01	MAN-7 Glycan, 2-AA Labeled	100 pmol
CAA-MAN6-01	MAN-6 Glycan, 2-AA Labeled	100 pmol
CAA-MAN5-01	MAN-5 Glycan, 2-AA Labeled	100 pmol
CAA-HYBRID-01	Hybrid Glycan, 2-AA Labeled	100 pmol
CAA-GHP-30	2-AA Glucose Homopolymer Ladder	30 runs

10. LudgerSep™ Glycan HPLC Columns

Description

A range of HPLC columns optimized for analytical chromatography of LudgerTag labeled glycans.

Applications

- Quantitative glycoprofiling of biopharmaceuticals

LudgerSep N1 Amide Columns

- Widely used for profiling of 2-AB and 2-AA labeled glycans as part of lot release QC for therapeutic glycoproteins. A standard column for glycoprofiling of monoclonal antibodies.
- The mode of action is hydrophilic interaction chromatography using an acetonitrile / ammonium formate (aq) gradient.

This gives a high resolution glycan profile related to a combination of glycan size and the topology of the constituent monosaccharide residues.



LudgerSep C2 Anion Exchange Columns

- A strong anion exchange column used for determining the charge profile of 2-AB and 2-AA labeled glycans as part of biopharmaceutical QC.
- A superior replacement to weak anion exchange columns giving reliable, reproducible separations.
- Samples are applied in water and are typically eluted with a sodium acetate or ammonium formate aqueous salt gradient.

Purchasing Information

Catalog #	Description	Size
LS-N1-4.6x250	LudgerSep N1 Amide Column	4.6 x 250 mm
LS-N1-4.6x10	LudgerSep N1 Amide Guard Column	4.6 x 10 mm
LS-C2-4.6x50	LudgerSep C2 Anion Exchange Column	4.6 x 250 mm

11. HPLC and MS Calibration Standards

LudgerPure™ HPLC & MS Calibration Standards

Description

2-AB and 2-AA fluorescently labeled glucose homopolymer (GHP) ladders.

Applications

- Retention time calibration of HPLC systems for glycoprofiling.
- Mass calibration of MS systems for glycoprofiling.

Purity

Typically > 95% by a combination of HPLC and MS.



Notes

- A GHP ladder should be run as an external standard with each batch of analysis samples.
- The glucose homopolymer ladders contain structures from the monosaccharide up to the 23-mer to allow calibration of all O- and N-linked glycans commonly found in biopharmaceuticals.

Purchasing Information

Catalog #	Description	Size
CAB-GHP-30	2-AB Glucose Homopolymer Ladder	30 runs
CAA-GHP-30	2-AA Glucose Homopolymer Ladder	30 runs

12. LudgerMass™ MS Calibration Standards

Description

A range of bioanalytical standards for mass spectrometry.

Applications

- Mass spec instrument calibration for proteomics and glycosylation analyses

LudgerMass Peptide Calibration Kit # 1

- Contains two sets of five different peptides (ACTH Peptide, Angiotensin II Peptide, Bradykinin Peptide, Fetuin Peptide 2, MUC2 Peptide) for mass spectrometry instrument calibration.
- Calibration standards should be measured with each set of samples to ensure reliable mass accuracy. This LudgerMass set provides good calibration in the range 500 to 3 000 Da.
- Typical conditions for MALDI work are the use of Alpha or DHB as matrix with the peptides prepared at a concentration of 5 pmol ml⁻¹.



Other LudgerMass Calibration Kits

- We will be introducing new ranges of MS calibration kits over the forthcoming months. These will include analytical protein standards, peptides, glycopeptides, protein digests and glycan derivatives.
- Please let us know if there are any standards that you are particularly interested in.

Purchasing Information

Catalog #	Description	Size
LM-PEP-CALK1-A2	Peptide MS Calibration Kit #1	2 sets of vials, 5 nmol per vial

13. QA-Bio™ Glycosidases

Description

A range of glycosequencing grade endo- and exo glycosidases.

Applications

- Endoglycosidases: Enzymatic release of glycans from glycoproteins
- Exoglycosidases: Controlled removal of specific monosaccharides from the non-reducing end of glycans

QA-Bio Enzymes for Glycoanalysis

- We are distributors for QA-Bio's range of enzymes for glycoanalysis.
- QA-Bio's glycosidases are purified to sequencing grade and formulated for glycoanalysis of therapeutic glycoproteins.

Endoglycosidases

- The range of endoglycosidases includes the following:

PNGase F
O-glycosidase
Endo F1, Endo F2,
Endo F3
Endo H



Exoglycosidases

- The range of exoglycosidases includes the following:

Sialidases [$\alpha(2-3,6,9)$, $\alpha(2-3,6)$, $\alpha(2-3)$]
Alpha Galactosidase [$\alpha(1-3,6)$]
Beta Galactosidases [$\beta(1-3,4,6)$, $\beta(1-3,6)$]
N-Acetyl-Glucosaminidase
Mannosidases [$\alpha(1-2,3,6)$, $\alpha(1-6)$]
Fucosidases [$\alpha(1-3,4)$, $\alpha(1-6)$]

14. References

- Bayer, E.A., F. De Meester, T. Kulik and M. Wilchek. 'Preparation of deglycosylated egg white avidin'. *Appl. Biochem Biotech* 53: 1-9 (1995)
- Bigge, J.C.; Patel, T.P; Bruce, J.A.; Goulding, P.N.; Charles, S.M; Parekh, R.B. (1995) 'Non-selective and efficient fluorescent labeling of glycans using 2-aminobenzamide and anthranilic acid'. *Analytical Biochemistry* 230: 229-238
- Charwood, J.; Birrell, H. Gribble, A.; Burdes, V.; Tolson, D.; Camilleri, P. (2000) 'A probe for the versatile analysis and characterization of N-linked oligosaccharides' *Analytical Chemistry* 72: 1453-1461
- Fan, J.Q.; Huynh, L.H.; Lee, Y.C. (1995). 'Purification of 2-aminopyridine derivatives of oligosaccharides and related compounds by cation-exchange chromatography. *Analytical Biochemistry* 232:65-68
- Guile, G.R.; Rudd, P.M.; Wing, D.R.; Prime, S.B.; Dwek, R.A. (1996) 'A rapid and high-resolution high-performance liquid chromatographic method for separating glycan mixtures and analyzing oligosaccharide profiles'. *Analytical Biochemistry* 240: 210-226
- Hardy, M.R. (1997) 'Glycan labeling with the fluorophores 2-aminobenzamide and anthranilic acid' in 'Techniques in Glycobiology', edited by Townsend, R.R and Hotchkiss, A.T.. Marcel Dekker Inc, New York
- Iwase, H.; Ishii-Karakasa, I.; Urata, T.; Saito, T.; Saito, T.; Ho, K. (1990) 'Extraction method for preparing pyridylamino sugar derivatives and application to porcine gastric mucus glycoprotein analysis'. *Analytical Biochemistry* 188: 200-202
- Tarentino, A.L., C.M. Gomez and T.H. Plummer, Jr. 'Deglycosylation of asparagine-linked glycans by peptide:N-glycosidase F'. *Biochemistry* 24: 4665-4671 (1985)
- Townsend, R.R.; Lipniunas, P.H.; Bigge, C.; Ventom, A.; Parekh, R. (1996) 'Multimode high-performance liquid chromatography of fluorescently labeled oligosaccharides from glycoproteins'. *Analytical Biochemistry* 239: 200-207

15. Contact Details

Worldwide Sales & Technical Support

company Ludger Ltd
address Li.lomore Park, Oxford OX4 4SS, UK
tel +44 870 085 7011
fax +44 870 163 4620
email info@ludger.com
web www.ludger.com

India Distributor

HEXAGEN BIOSCIENCES

135/37 Sonawala Bldg., 2nd floor
Zaveri Bazar, Mumbai 400002
India

Tel : 022-56372991
Fax: 022-56372990
Email : sales@hexagen.com

<http://www.hexagen.com>

Catalogue Courtesy Ludger Ltd.
Log on to www.ludger.com

