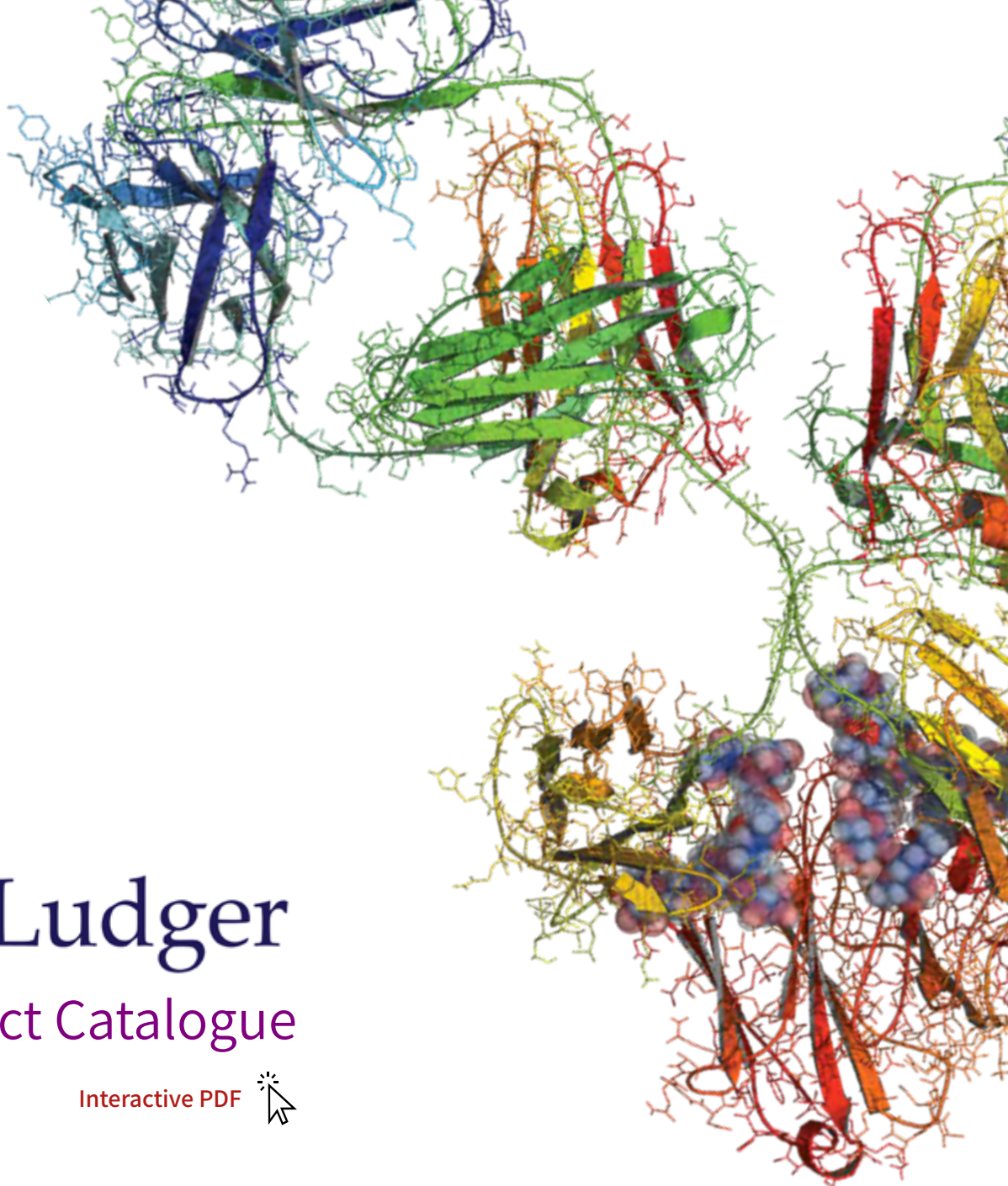


# Ludger

## Product Catalogue

Interactive PDF 

# 2025





## Industry leaders

Ludger's glycotecnology supports world-class medical research, drug developments, **IND** submissions, and the quality control of **FDA**- and **EMA**-approved biopharmaceuticals worldwide



## Products

We offer a comprehensive range of products and consumables for glycan analysis



## Glycan Analysis Services

We support world-class organizations in tackling the most complex glycobiology challenges

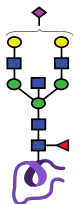
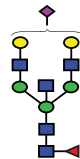
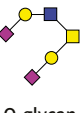
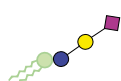


## Research & Development

Our R&D team is constantly publishing and establishing new research collaborations



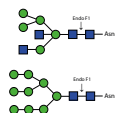
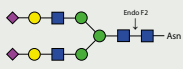
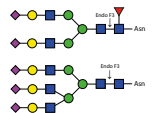
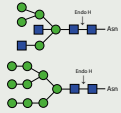
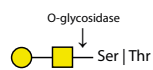
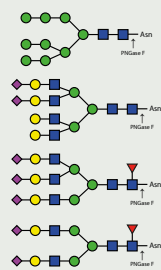
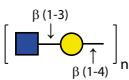
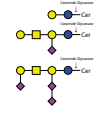
# LUDGER'S WORKFLOW

|                                                                                                        | Release                                                                                                                                                    | Post-release Clean up                                                                                               | Labeling                                                                                                                                                                                                                                           | Post-labeling clean up                                                            | Separations                                                                                                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <br>Glycopeptide      |                                                                                                                                                            |                                                                                                                     | <a href="#">LT-VTAG-24</a>                                                                                                                                                                                                                         | <a href="#">LC-A-24 (LT-VTAG-24)</a>                                              | <a href="#">LS-N1-4.6x10</a><br><a href="#">LS-N1-4.6x250</a><br><a href="#">LS-N2-2.0x150</a><br><a href="#">LS-N2-4.6x150</a><br><a href="#">LS-C2-4.6x150</a><br><a href="#">LS-C2-4.6x50</a><br><a href="#">LS-C3-7.5x75</a> |
| <br>N-glycan          | <a href="#">LT-VTAG-C30</a>                                                                                                                                |                                                                                                                     | <a href="#">LT-VTAG-C30</a>                                                                                                                                                                                                                        | <a href="#">LT-VTAG-C30</a>                                                       | <a href="#">LS-N1-4.6x10</a><br><a href="#">LS-N1-4.6x250</a><br><a href="#">LS-N2-2.0x150</a><br><a href="#">LS-N2-4.6x150</a><br><a href="#">LS-C2-4.6x150</a><br><a href="#">LS-C2-4.6x50</a><br><a href="#">LS-C3-7.5x75</a> |
|                                                                                                        | <a href="#">LZ-PNGaseL-50-KIT</a><br><a href="#">LZ-rPNGaseF-kit</a><br><a href="#">E-PNG01</a><br><a href="#">E-PNG01-200</a><br><a href="#">E-rPNG01</a> | <a href="#">LC-EB10-A6</a><br><a href="#">LC-EC50-24</a><br><a href="#">LC-EC50-96</a><br><a href="#">LC-PBM-96</a> | <a href="#">LT-KAA-A2</a><br><a href="#">LT-KAA-VP24</a><br><a href="#">LT-KAB-A2</a><br><a href="#">LT-KAB-VP24</a><br><a href="#">LT-KAB-VP96</a><br><a href="#">LT-KPROC-24</a><br><a href="#">LT-KPROC-96</a><br><a href="#">LT-KPROC-VP24</a> | <a href="#">LC-S-A6</a><br><a href="#">LC-T1-A6</a><br><a href="#">LC-PROC-96</a> |                                                                                                                                                                                                                                  |
| <br>O-glycan        | <a href="#">LL-HYDRAZ-A2<sup>1</sup></a><br><a href="#">LL-ORELA-A2</a>                                                                                    | <a href="#">LC-CEX-A6 (LL-HYDRAZ-A2 &amp; LL-ORELA-A2)</a>                                                          | <a href="#">LT-KAA-A2</a><br><a href="#">LT-KAA-VP24</a><br><a href="#">LT-KAB-A2</a><br><a href="#">LT-KAB-VP24</a><br><a href="#">LT-KAB-VP96</a><br><a href="#">LT-KPROC-24</a><br><a href="#">LT-KPROC-96</a><br><a href="#">LT-KPROC-VP24</a> | <a href="#">LC-S-A6</a><br><a href="#">LC-T1-A6</a><br><a href="#">LC-PROC-96</a> | <a href="#">LS-N1-4.6x10</a><br><a href="#">LS-N1-4.6x250</a><br><a href="#">LS-N2-2.0x150</a><br><a href="#">LS-N2-4.6x150</a><br><a href="#">LS-C2-4.6x150</a><br><a href="#">LS-C2-4.6x50</a><br><a href="#">LS-C3-7.5x75</a> |
|                                                                                                        |                                                                                                                                                            |                                                                                                                     | <a href="#">LT-PERMET-VP96</a>                                                                                                                                                                                                                     |                                                                                   |                                                                                                                                                                                                                                  |
| <br>Glycolipid      | <a href="#">LZ-CER-HM-KIT</a>                                                                                                                              |                                                                                                                     | <a href="#">LT-KAA-A2</a><br><a href="#">LT-KAA-VP24</a><br><a href="#">LT-KAB-A2</a><br><a href="#">LT-KAB-VP24</a><br><a href="#">LT-KAB-VP96</a><br><a href="#">LT-KPROC-24</a><br><a href="#">LT-KPROC-96</a><br><a href="#">LT-KPROC-VP24</a> | <a href="#">LC-S-A6</a><br><a href="#">LC-T1-A6</a><br><a href="#">LC-PROC-96</a> | <a href="#">LS-N1-4.6x10</a><br><a href="#">LS-N1-4.6x250</a><br><a href="#">LS-N2-2.0x150</a><br><a href="#">LS-N2-4.6x150</a><br><a href="#">LS-C2-4.6x150</a><br><a href="#">LS-C2-4.6x50</a><br><a href="#">LS-C3-7.5x75</a> |
| <br>Sialic acid     | <a href="#">LT-KDMB-A1</a><br><a href="#">LT-KDMB-96</a><br><a href="#">LT-KDMB-12</a>                                                                     |                                                                                                                     | <a href="#">LT-KDMB-A1</a><br><a href="#">LT-KDMB-96</a><br><a href="#">LT-KDMB-12</a>                                                                                                                                                             |                                                                                   | <a href="#">LS-R1-4.6x150</a><br><a href="#">LS-UR2-2.1x100</a>                                                                                                                                                                  |
| <br>Mono-saccharide | <a href="#">LT-MONO-96</a>                                                                                                                                 |                                                                                                                     | <a href="#">LT-MONO-96</a>                                                                                                                                                                                                                         |                                                                                   | <a href="#">LS-R2-4.6x150</a><br><a href="#">LS-UR2-2.1x50</a>                                                                                                                                                                   |

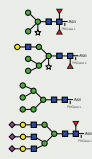
<sup>1</sup> This product is also suitable for N-glycan release. See [LL-HYDRAZ-A2](#) for more information.

## Endoglycosidases

- Cleave **intact glycans** from glycoproteins.
- **Highly stable** in clean preparations with no glycerol, NaCl, or other additives such as EDTA.
- Tested for the absence of proteolytic or unexpected glycosidic activity.

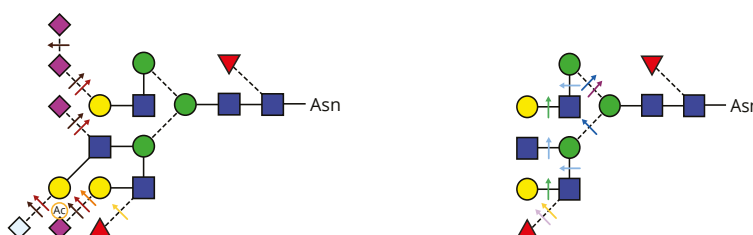
| Use example                                                                         | Name                       | Part number                     | Size         |
|-------------------------------------------------------------------------------------|----------------------------|---------------------------------|--------------|
|    | Endoglycosidase F1         | <a href="#">E-EF01</a>          | 1 U/60 µL    |
|    | Endoglycosidase F2         | <a href="#">E-EF02</a>          | 0.3 U/60 µL  |
|    | Endoglycosidase F3         | <a href="#">E-EF03</a>          | 0.33 U/60 µL |
|   | Endoglycosidase H          | <a href="#">E-EH02</a>          | 0.3 U/60 µL  |
|  | O-glycosidase              | <a href="#">E-G001</a>          | 75 mU/60 µL  |
|  | PNGase F                   | <a href="#">E-PNG01</a>         | 0.3 U/60 µL  |
|                                                                                     |                            | <a href="#">E-PNG01-200</a>     | 1 U/200 µL   |
|                                                                                     | Recombinant PNGase F       | <a href="#">E-rPNG01</a>        | 0.3 U/60 µL  |
|                                                                                     |                            | <a href="#">LZ-rPNGaseF-KIT</a> | 150 µL       |
|  | Endo-β-galactosidase       | <a href="#">E-XBG01</a>         | 0.9 U/60 µL  |
|  | Enzymatic CarboRelease kit | <a href="#">KE-DG01</a>         | 20 µL/enzyme |
|                                                                                     | Enzymatic DeGlycoMx kit    | <a href="#">KE-DGMX</a>         | 20 µL premix |
|  | Ceramide glycanase kit     | <a href="#">LZ-CER-HM-KIT</a>   | 55 µL        |



| Use example                                                                       | Name            | Part number                       | Size   |
|-----------------------------------------------------------------------------------|-----------------|-----------------------------------|--------|
|  | Ludger PNGase L | <a href="#">LZ-PNGaseL-50-KIT</a> | 100 µL |

## Exoglycosidases

- Cleave **specific terminal-monosaccharides** from glycans.
- **Characterize glycan structures** (monosaccharide type, linkage and sequence) in detail.
- Tested for the absence of proteolytic or unexpected glycosidic activity.



| Symbol                                                                              | Name                                       | Part number                          | Size         |
|-------------------------------------------------------------------------------------|--------------------------------------------|--------------------------------------|--------------|
|  | $\alpha$ -(1-2,3,6) mannosidase            | <a href="#">E-AM01</a>               | 0.6 U/60 µL  |
|  | $\alpha$ -(1,6) core mannosidase           | <a href="#">E-AM02</a>               | 0.6 U/60 µL  |
|  | $\beta$ -(1-4)-galactosidase               | <a href="#">E-BG07</a>               | 0.18 U/60 µL |
|  | $\alpha$ -(1-3,4) fucosidase               | <a href="#">E-F134</a>               | 30 mU/60 µL  |
|  | $\beta$ -N-acetylglucosaminidase           | <a href="#">E-GL01</a>               | 2.4 U/60 µL  |
|  | Sialidase Au $\alpha$ -(2-3,6,8,9)         | <a href="#">E-S001</a>               | 0.3 U/60 µL  |
|  | Sialidase Cp $\alpha$ -(2-3,6)             | <a href="#">E-S005</a>               | 0.9 U/60 µL  |
|  | Sialidase Sp $\alpha$ -(2-3)               | <a href="#">E-S007</a>               | 0.3 U/60 µL  |
|  | Sialate O-acetylsterase kit                | <a href="#">LZ-ACASE-KIT</a>         | 50 µL        |
|  | LudgerZyme $\alpha$ (1-3,4) fucosidase kit | <a href="#">LZ-FUCOSIDASE-01-KIT</a> | 50 µL        |

## Chemical release

- For **release of N- and O-glycans** from glycoprotein therapeutics.
- Orela allows the chemical **release of O-glycans** on your lab bench.

| Name                              | Part number                               | No. of samples |
|-----------------------------------|-------------------------------------------|----------------|
| LudgerLiberate hydrazinolysis kit | <a href="#">LL-HYDRAZ-A2</a> <sup>2</sup> | 12             |
| LudgerLiberate Orela kit          | <a href="#">LL-ORELA-A2</a>               | 12             |

<sup>2</sup> Classified as a Dangerous Good (DG). Additional shipping fees apply.

## Post-release clean up

Choose the appropriate LudgerClean tool to purify your released glycan sample after either chemical or enzymatic digestion.

| Release method         | Name                                                                             | Part number                  | Size/qty          |
|------------------------|----------------------------------------------------------------------------------|------------------------------|-------------------|
| Hydrazinolysis         | LudgerClean CEX cartridges for purification of O-glycans                         | <a href="#">LC-CEX-A6</a>    | 6 cartridges      |
| Exoglycosidase         | LudgerClean post-exoglycosidase clean-up spin columns                            | <a href="#">LC-EXO-A6</a>    | 6 cartridges      |
|                        | LudgerClean 96-well post-exoglycosidase clean-up plate                           | <a href="#">LC-EXO-96</a>    | 1 x 96 well plate |
| Endoglycosidase        | LudgerClean protein-binding membrane plate for unlabeled glycan enrichment       | <a href="#">LC-PBM-96</a>    | 1 x 96 well plate |
|                        | LudgerClean plate for pre-permethylation clean up                                | <a href="#">LC-PERMET-96</a> | 1 x 96 well plate |
| Chemical and Enzymatic | EB10 cartridges for purification of glycans from proteins, salts, and detergents | <a href="#">LC-EB10-A6</a>   | 6 cartridges      |
|                        | EC50 cartridges for purification of glycans from non-carbohydrate materials      | <a href="#">LC-EC50-24</a>   | 24 cartridges     |
|                        | EC50 96-well plate for purification of glycans from non-carbohydrate materials   | <a href="#">LC-EC50-96</a>   | 1 x 96 well plate |

## Post-labeling clean up

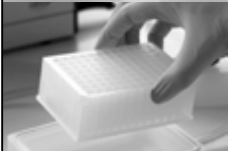
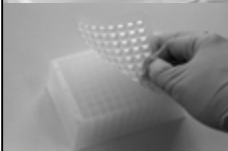
Remove any fluorescent molecule excess from your sample for accurate readings.

| Label                          | Sample type                   | Name                                                 | Part number                             | Size/qty                   |
|--------------------------------|-------------------------------|------------------------------------------------------|-----------------------------------------|----------------------------|
| VTAG                           | N-glycans                     | LudgerClean™ VSPE cartridges (VTAG)                  | <a href="#">LC-VSPE-30</a> <sup>3</sup> | 30 cartridges              |
|                                | Glycopeptides, N- & O-glycans | LudgerClean A cartridges for glycopeptide enrichment | <a href="#">LC-A-24</a>                 | 24 cartridges              |
| 2-AA & 2-AB                    | N- & O-glycans                | LudgerClean S cartridges                             | <a href="#">LC-S-A6</a>                 | 6 cartridges               |
| Procainamide                   |                               | LudgerClean S-plus (saver pack)                      | <a href="#">LC-S-A48</a>                | 48 cartridges              |
|                                |                               | N-glycans                                            | LudgerClean procainamide plate          | <a href="#">LC-PROC-96</a> |
| 2-AA, 2-AB & APTS <sup>4</sup> | N- & O-glycans                | LudgerClean T1 cartridges                            | <a href="#">LC-T1-A6</a>                | 6 cartridges               |

<sup>3</sup> Part of [LT-VTAG-C30](#) labeling kit. <sup>4</sup> T1 cartridges have not been tested with APTS-labeled O-glycans.

## LudgerVelocity™ SPE Vacuum Manifold System

96-well microplate format system which enables analysts using Ludger-Velocity solid phase clean-up systems to process up to 96 samples simultaneously. The system can be used with individual clean-up cartridges (such as LudgerClean™ T1 cartridges for purification of glycans post-fluorophore labeling) or 96 well plate clean-up devices (such as LudgerClean™ PBM plates for clean up following exoglycosidase or endoglycosidase digestion).

| Photo                                                                               | Name                               | Part number                         | Size/qty             |
|-------------------------------------------------------------------------------------|------------------------------------|-------------------------------------|----------------------|
|    | Vacuum manifold in 96-plate format | <a href="#">LC-VAC-MANIFOLD-KIT</a> | 1                    |
|    | Vacuum trap kit                    | <a href="#">LC-VAC-TRAP-KIT</a>     | 1                    |
|    | Collection plate pack              | <a href="#">LP-COLLPLATE-2ML-96</a> | 5 per pack           |
|   | Collection plate lid pack          | <a href="#">LP-COLLPLATE-LID-96</a> | 5 per pack           |
|  | Cartridge holder                   | <a href="#">LP-HOLDER-96</a>        | 1                    |
|  | Plug pack                          | <a href="#">LP-PLUG-96</a>          | 12 strips of 8 plugs |

## New releases

Our R&D is at the heart of our organization, and we actively work on adding new glycoanalytical tools to our product offer. We are scientists serving other scientists, and our focus is on developing new technologies that are practical, affordable and reliable.

Stay informed of new product launches (such as the one below) as well as scientific publications, and participation in events in the field by subscribing to our [Glycotechnology News Service](#).



### LudgerClean S plus - Saver pack

A cost-effective 48-cartridge version of the popular LC -S's

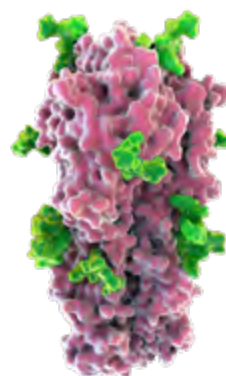




## LudgerTag labeling kits

Our labeling kits offer many **benefits over other “instant” labeling systems**:

1. Their **gold-standard** technology is well-established and **widely accepted by regulators** (e.g. FDA, EMA, and ICH).
2. The **efficiency** of the labeling remains the same even after prolonged incubation time with PNGase F (required for many **complex glycoproteins**)
3. Their chemistry **works with all glycans** containing aldehyde groups such as released N-glycans, O-glycans, glycosphingolipids (GSL), and glycosaminoglycans (GAG).
4. Well-characterized and purified glycans which can be used as **system suitability standards** and **reference panels** are **widely available**.



## Released N- and O-glycan labeling

Our **traditional labeling kits** for **N- and O-glycan** analysis are used for the quantitative and qualitative analysis of biopharmaceuticals as part of routine **quality controls** as well as **drug development** projects.

| Name                                       | Part number                                 | Reactions |
|--------------------------------------------|---------------------------------------------|-----------|
| 2-AA glycan labeling kit                   | <a href="#">LT-KAA-A2</a>                   | 30        |
| 2-AB glycan labeling kit                   | <a href="#">LT-KAB-A2</a>                   | 30        |
| Procainamide glycan labeling kit           | <a href="#">LT-KPROC-24</a>                 | 24        |
|                                            | <a href="#">LT-KPROC-96</a>                 | 96        |
| Permethylation kit (without methyl iodide) | <a href="#">LT-PERMET-VP96</a> <sup>5</sup> | 96        |
| VTAG glycan release and labeling kit       | <a href="#">LT-VTAG-C30</a> <sup>6</sup>    | 30        |

<sup>5</sup> Classified as a Dangerous Good (additional shipping fees will apply). Methyl iodide (CAS #:74-88-4) is not included due to shipping restrictions. We recommend purchasing this component from your local chemical provider. <sup>6</sup> LT-VTAG-C30 has not been validated for O- glycan analysis by Ludger.



## LudgerTag VP labeling kits

With **2PB safer reductant**

**Same quality results on your lab bench**

| Name                                             | Part number                   | Reactions |
|--------------------------------------------------|-------------------------------|-----------|
| 2-AA glycan labeling kit (2PB reductant)         | <a href="#">LT-KAA-VP24</a>   | 24        |
| 2-AB glycan labeling kit (2PB reductant)         | <a href="#">LT-KAB-VP24</a>   | 24        |
|                                                  | <a href="#">LT-KAB-VP96</a>   | 96        |
| Procainamide glycan labeling kit (2PB reductant) | <a href="#">LT-KPROC-VP24</a> | 24        |



## Glycopeptide labeling and enrichment

**Ludger V-Tag** glycoprofiling technology is a cost-effective, GMP-validated, and rapid tool for **mAb** developers and **biosimilar** manufacturers.

- Used for mAb **quality control** and biosimilarity **validation** throughout the drug lifecycle.
- Easy to integrate into your **peptide mapping**. it provides glycan **identity**, **quantitation**, **attachment site** and **site occupancy**.

| Photo                                                                             | Name                                     | Part number                | Reactions |
|-----------------------------------------------------------------------------------|------------------------------------------|----------------------------|-----------|
|  | Glycopeptide labeling and enrichment kit | <a href="#">LT-VTAG-24</a> | 24        |

## Sialic acid quantitation

Designed to satisfy the following **regulatory requirements**:

- The overall **degree of drug sialylation** - absolute quantitation of sialic acid residues per molecule (nmol/mg protein).
- Relative quantities of **Neu5Ac:Neu5Gc**.
- Identification and relative percentage of **O-acetylated sialic acids**.

| Photo                                                                               | Name                                     | Part number                | Reactions |
|-------------------------------------------------------------------------------------|------------------------------------------|----------------------------|-----------|
|  | DMB sialic acid release and labeling kit | <a href="#">LT-KDMB-12</a> | 12        |
|                                                                                     |                                          | <a href="#">LT-KDMB-A1</a> | 22        |
|                                                                                     |                                          | <a href="#">LT-KDMB-96</a> | 96        |

## Monosaccharide analysis

Our monosaccharide analysis kit is easy to use, reliable and can be used for **quantitative** routine **monosaccharide analysis** required by regulators, including:

- Determining the **type of glycosylation** (N-linked and/or O-linked) and the **extent** to which glycosylation has occurred.
- **Batch quality control** during the manufacturing process.

| Photo                                                                               | Name                                    | Part number                | Reactions |
|-------------------------------------------------------------------------------------|-----------------------------------------|----------------------------|-----------|
|  | Monosaccharide release and labeling kit | <a href="#">LT-MONO-96</a> | 96        |



## LudgerSep C anion exchange HPLC columns

For the **charge profile** analysis of **2-AA** and **2-AB** labeled glycans. A chemical property primarily determined by the number of **sialic acids per glycan**.

| Photo                                                                              | Name                                    | Part number                   | Size                      |
|------------------------------------------------------------------------------------|-----------------------------------------|-------------------------------|---------------------------|
|   | LudgerSep C2 anion exchange HPLC Column | <a href="#">LS-C2-4.6x150</a> | 4.6 x 150 mm              |
|   | LudgerSep C2 anion exchange HPLC Column | <a href="#">LS-C2-4.6x50</a>  | 4.6 x 50 mm               |
|   | LudgerSep C3 anion exchange HPLC Column | <a href="#">LS-C3-7.5x75</a>  | 7.5 x 75 mm               |
|  | LudgerSep C buffer x4 concentrate       | <a href="#">LS-C-BUFFX4</a>   | 50ml, makes 250 ml buffer |

## LudgerSep N amide HPLC columns

For analysis of **2-AA** and **2-AB** labeled **N- and O-glycans** based on **hydrophilicity** which is mainly determined by the size and to a lesser degree arm specificity, and linkage.

| Photo                                                                               | Name                            | Part number                   | Size               |
|-------------------------------------------------------------------------------------|---------------------------------|-------------------------------|--------------------|
|  | LudgerSep N1 amide Guard Column | <a href="#">LS-N1-4.6x10</a>  | 4.6 x 10 mm, 5 mm  |
|  | LudgerSep N1 amide HPLC Column  | <a href="#">LS-N1-4.6x250</a> | 4.6 x 250 mm, 5 mm |
|  | LudgerSep N2 amide HPLC Column  | <a href="#">LS-N2-2.0x150</a> | 2.0 x 150 mm, 3 mm |
|  |                                 | <a href="#">LS-N2-4.6x150</a> | 4.6 x 150mm, 3 mm  |

| Photo                                                                             | Name                               | Part number                  | Size                        |
|-----------------------------------------------------------------------------------|------------------------------------|------------------------------|-----------------------------|
|  | LudgerSep N buffer x40 concentrate | <a href="#">LS-N-BUFFX40</a> | 50ml, makes 2 litres buffer |

## LudgerSep R reverse phase (U)HPLC columns

For **monosaccharide** and **sialic acid analysis** based on **hydrophobicity**.

| Photo                                                                               | Name                                                                          | Part number                             | Size                      |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------|---------------------------|
|    | LudgerSep R reverse phase HPLC column for sialic acid profiling               | <a href="#">LS-R1-4.6x150</a>           | 4.6 x 150 mm              |
|                                                                                     |                                                                               | <a href="#">LS-UR2-2.1x100</a>          | 2.1 x 100 mm              |
|   | LudgerSep R reverse phase HPLC column for analysis of neutral monosaccharides | <a href="#">LS-R2-4.6x150</a>           | 4.6 x 150 mm              |
|                                                                                     |                                                                               | <a href="#">LS-UR2-2.1x50</a>           | 2.1 x 50 mm               |
|  | LudgerSep R BPT solvent x10 concentrate                                       | <a href="#">LS-R-BPTX10<sup>7</sup></a> | 50ml, makes 500ml solvent |

<sup>7</sup> LudgerSep R Buffer is formulated for monosaccharide analysis. For sialic acid analysis, follow the protocol in our [LT-KDMB-A1 guide](#).

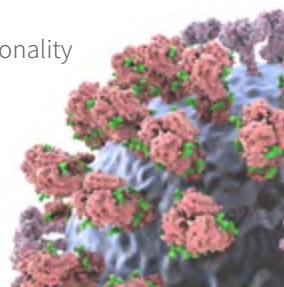
## Glucose homopolymer ladder

Use this **external calibration standard** during the analysis of glycans by (U)HPLC to assign **GU values** to peaks in your released glycan pool by comparison.

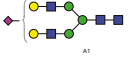
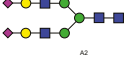
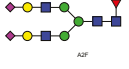
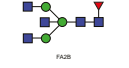
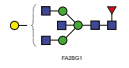
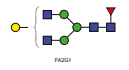
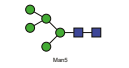
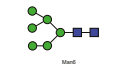
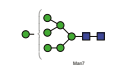
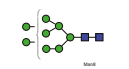
| Name                                             | Part number                  | Size    |
|--------------------------------------------------|------------------------------|---------|
| Glucose homopolymer ladder, 2-AA labeled         | <a href="#">CAA-GHP-30</a>   | 30 runs |
| Glucose homopolymer ladder, 2-AB labeled         | <a href="#">CAB-GHP-30</a>   |         |
| Glucose homopolymer ladder, procainamide labeled | <a href="#">CPROC-GHP-30</a> |         |

**Ludger Standards** have the following biopharmaceutical applications:

1. **System suitability standards** enable an analyst to test the holistic functionality of an analytical system.
2. **Process standards** or **controls** are used to verify that part of or an entire process has worked correctly.
3. **Reference standards** allow for characterization by comparison.
4. **Quantitative standards** are used to determine the absolute amount of an analyte in a sample as well as to quantify the efficiency of a process.



## N- glycan standards

| Structure                                                                           | Name   | Unlabeled                    | 2-AA                          | 2-AB                          | PROC                           | APTS                           |
|-------------------------------------------------------------------------------------|--------|------------------------------|-------------------------------|-------------------------------|--------------------------------|--------------------------------|
|    | A1     | <a href="#">CN-A1-10U</a>    | <a href="#">CAA-A1-01</a>     | <a href="#">CAB-A1-01</a>     |                                | <a href="#">CAPTS-A1-01</a>    |
|                                                                                     |        | <a href="#">CN-A1-20U</a>    |                               |                               |                                |                                |
|    | A1F    | <a href="#">CN-A1F-10U</a>   | <a href="#">CAA-A1F-01</a>    | <a href="#">CAB-A1F-01</a>    | <a href="#">CPROC-A1F-01</a>   | <a href="#">CAPTS-A1F-01</a>   |
|                                                                                     |        | <a href="#">CN-A1F-20U</a>   |                               |                               |                                |                                |
|    | A2     | <a href="#">CN-A2-10U</a>    | <a href="#">CAA-A2-01</a>     | <a href="#">CAB-A2-01</a>     |                                | <a href="#">CAPTS-A2-01</a>    |
|                                                                                     |        | <a href="#">CN-A2-20U</a>    |                               |                               |                                |                                |
|   | A2F    | <a href="#">CN-A2F-10U</a>   | <a href="#">CAA-A2F-01</a>    | <a href="#">CAB-A2F-01</a>    |                                | <a href="#">CAPTS-A2F-01</a>   |
|                                                                                     |        | <a href="#">CN-A2F-20U</a>   |                               |                               |                                |                                |
|  | A2G1   | <a href="#">CN-A2G1-10U</a>  | <a href="#">CAA-A2G1-01</a>   | <a href="#">CAB-A2G1-01</a>   |                                |                                |
|                                                                                     |        | <a href="#">CN-A2G1-20U</a>  |                               |                               |                                |                                |
|  | A3     | <a href="#">CN-A3-10U</a>    | <a href="#">CAA-A3-01</a>     | <a href="#">CAB-A3-01</a>     | <a href="#">CPROC-A3-01</a>    |                                |
|                                                                                     |        | <a href="#">CN-A3-20U</a>    |                               |                               |                                |                                |
|  | FA2B   |                              | <a href="#">CAA-FA2B-01</a>   | <a href="#">CAB-FA2B-01</a>   |                                |                                |
|  | FA2BG1 |                              | <a href="#">CAA-FA2BG1-01</a> | <a href="#">CAB-FA2BG1-01</a> |                                |                                |
|  | FA2G1  | <a href="#">CN-FA2G1-10U</a> | <a href="#">CAA-FA2G1-01</a>  | <a href="#">CAB-FA2G1-01</a>  | <a href="#">CPROC-FA2G1-01</a> | <a href="#">CAPTS-FA2G1-01</a> |
|                                                                                     |        | <a href="#">CN-FA2G1-20U</a> |                               |                               |                                |                                |
|  | M3N2   | <a href="#">CN-M3N2-10U</a>  | <a href="#">CAA-M3N2-01</a>   | <a href="#">CAB-M3N2-01</a>   |                                |                                |
|                                                                                     |        | <a href="#">CN-M3N2-20U</a>  |                               |                               |                                |                                |
|  | Man-5  | <a href="#">CN-MAN5-10U</a>  | <a href="#">CAA-MAN5-01</a>   | <a href="#">CAB-MAN5-01</a>   | <a href="#">CPROC-MAN5-01</a>  | <a href="#">CAPTS-MAN5-01</a>  |
|                                                                                     |        | <a href="#">CN-MAN5-20U</a>  |                               |                               |                                |                                |
|  | Man-6  | <a href="#">CN-MAN6-10U</a>  | <a href="#">CAA-MAN6-01</a>   | <a href="#">CAB-MAN6-01</a>   | <a href="#">CPROC-MAN6-01</a>  |                                |
|                                                                                     |        | <a href="#">CN-MAN6-20U</a>  |                               |                               |                                |                                |
|  | Man-7  | <a href="#">CN-MAN7-10U</a>  | <a href="#">CAA-MAN7-01</a>   | <a href="#">CAB-MAN7-01</a>   | <a href="#">CPROC-MAN7-01</a>  |                                |
|                                                                                     |        | <a href="#">CN-MAN7-20U</a>  |                               |                               |                                |                                |
|  | Man-8  | <a href="#">CN-MAN8-10U</a>  | <a href="#">CAA-MAN8-01</a>   | <a href="#">CAB-MAN8-01</a>   | <a href="#">CPROC-MAN8-01</a>  |                                |
|                                                                                     |        | <a href="#">CN-MAN8-20U</a>  |                               |                               |                                |                                |



| Structure                                                                          | Name  | Unlabeled                    | 2-AA                         | 2-AB                         | PROC                          | APTS                           |
|------------------------------------------------------------------------------------|-------|------------------------------|------------------------------|------------------------------|-------------------------------|--------------------------------|
|   | Man-9 | <a href="#">CN-MAN9-10U</a>  | <a href="#">CAA-MAN9-01</a>  | <a href="#">CAB-MAN9-01</a>  | <a href="#">CPROC-MAN9-01</a> |                                |
|                                                                                    |       | <a href="#">CN-MAN9-20U</a>  |                              |                              |                               |                                |
|   | NA2   | <a href="#">CN-NA2-10U</a>   | <a href="#">CAA-NA2-01</a>   | <a href="#">CAB-NA2-01</a>   | <a href="#">CPROC-NA2-01</a>  | <a href="#">CAPTS-NA2-01</a>   |
|                                                                                    |       | <a href="#">CN-NA2-20U</a>   |                              |                              |                               |                                |
|   | NA2F  | <a href="#">CN-NA2F-10U</a>  | <a href="#">CAA-NA2F-01</a>  | <a href="#">CAB-NA2F-01</a>  |                               | <a href="#">CAPTS-NA2F-01</a>  |
|                                                                                    |       | <a href="#">CN-NA2F-20U</a>  |                              |                              |                               |                                |
|   | NA3   | <a href="#">CN-NA3-10U</a>   | <a href="#">CAA-NA3-01</a>   | <a href="#">CAB-NA3-01</a>   | <a href="#">CPROC-NA3-01</a>  |                                |
|                                                                                    |       | <a href="#">CN-NA3-20U</a>   |                              |                              |                               |                                |
|   | NA4   | <a href="#">CN-NA4-10U</a>   | <a href="#">CAA-NA4-01</a>   | <a href="#">CAB-NA4-01</a>   |                               |                                |
|                                                                                    |       | <a href="#">CN-NA4-20U</a>   |                              |                              |                               |                                |
|   | NGA2  | <a href="#">CN-NGA2-10U</a>  | <a href="#">CAA-NGA2-01</a>  | <a href="#">CAB-NGA2-01</a>  | <a href="#">CPROC-NGA2-01</a> | <a href="#">CAPTS-NGA2-01</a>  |
|                                                                                    |       | <a href="#">CN-NGA2-20U</a>  |                              |                              |                               |                                |
|   | NGA2F | <a href="#">CN-NGA2F-10U</a> | <a href="#">CAA-NGA2F-01</a> | <a href="#">CAB-NGA2F-01</a> |                               | <a href="#">CAPTS-NGA2F-01</a> |
|                                                                                    |       | <a href="#">CN-NGA2F-20U</a> |                              |                              |                               |                                |
|   | NGA3  | <a href="#">CN-NGA3-10U</a>  | <a href="#">CAA-NGA3-01</a>  | <a href="#">CAB-NGA3-01</a>  | <a href="#">CPROC-NGA3-01</a> |                                |
|                                                                                    |       | <a href="#">CN-NGA3-20U</a>  |                              |                              |                               |                                |
|  | NGA4  | <a href="#">CN-NGA4-10U</a>  | <a href="#">CAA-NGA4-01</a>  | <a href="#">CAB-NGA4-01</a>  | <a href="#">CPROC-NGA4-01</a> |                                |
|                                                                                    |       | <a href="#">CN-NGA4-20U</a>  |                              |                              |                               |                                |

**Important considerations:**

The content of CAB and CAA standards is 100 pmol. The size of CPROC and CAPTS items is 20 pmol. CN-XXX-20U standards are dispatched in two 10-µg vials.

## Glycan libraries

A glycoprotein-specific **mixture of glycan species** and **panels** with common characteristics.

| Name                                       | Part number                      | Size                       |
|--------------------------------------------|----------------------------------|----------------------------|
| Fetuin N-glycan library                    | <a href="#">CLIBN-FETUIN-01</a>  | ≈ 7.5 µg                   |
| Fetuin O-glycan library                    | <a href="#">CLIBO-FETUIN-01</a>  | Released from 30 µg fetuin |
| Monoclonal antibody reference standards    | <a href="#">CLIBN-MABMIX-10U</a> | 10 µg                      |
|                                            | <a href="#">CLIBN-MABMIX-20U</a> | 20 µg                      |
| High mannose glycan standard library       | <a href="#">CLIBN-MANMIX-10U</a> | 10 µg                      |
|                                            | <a href="#">CLIBN-MANMIX-20U</a> | 20 µg                      |
| IgG N-glycan library, 2-AB labeled         | <a href="#">CAB-IGG-01</a>       | 200 pmol                   |
| IgG N-glycan library, APTS labeled         | <a href="#">CAPTS-IGG-01</a>     | 10 pmol                    |
| IgG N-glycan library, unlabeled            | <a href="#">CLIBN-IGG-01</a>     | 25 µg                      |
| IgG N-glycan library, permethylated        | <a href="#">CPM-IGG-01</a>       | 20 MS runs                 |
| IgG N-glycan library, C13 permethylated    | <a href="#">CPM-C13-IGG-01</a>   |                            |
| IgG N-glycan library, procainamide labeled | <a href="#">CPROC-IGG-02</a>     | 50 pmol                    |



## Quantitative glycan standards

**Process control** standards are designed to fit simply into your glycan analysis workflow and be treated as one more of your samples.

| Name                                             | Part number                       | Size            |
|--------------------------------------------------|-----------------------------------|-----------------|
| Chitotriose quantitative standard (2-AA labeled) | <a href="#">BQ-CAA-CHI-01</a>     | 100 pmol        |
| Chitotriose quantitative standard (2-AB labeled) | <a href="#">BQ-CAB-CHI-01</a>     | 100 pmol        |
| Chitotriose quantitative standard (unlabeled)    | <a href="#">BQ-CHITOTRIOSE-01</a> | 5 nmol          |
| Mannose 8 quantitative standard                  | <a href="#">BQ-CN-MAN8-10U</a>    | 10 µg           |
| Mannose 6 phosphate quantitative standard        | <a href="#">CM-MAN6P-10</a>       | 10 nmol         |
| Mix of 6 quantitative monosaccharide standards   | <a href="#">CM-MONOMIX-10</a>     | 10 nmol of each |
|                                                  | <a href="#">CM-MONOMIX-10X3</a>   | Pack of 3       |
| Xylose quantitative standard                     | <a href="#">CM-XYLOSE-100</a>     | 100 nmol        |

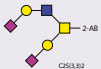
## Glycoprotein and glycopeptide standards

**Process control** standards used during the chemical and enzymatic **release** of all types of glycans.

| Name                                      | Part number                        | Size      |
|-------------------------------------------|------------------------------------|-----------|
| A2G2S2 quantitative glycopeptide standard | <a href="#">BQ-GPEP-A2G2S2-10U</a> | 3.49 nmol |
| Fetuin glycoprotein standard              | <a href="#">GCP-FET-05</a>         | 500 µg    |
|                                           | <a href="#">GCP-FET-250U</a>       | 250 µg    |
|                                           | <a href="#">GCP-FET-50U-X4</a>     | 4 x 50 µg |
| Human IgG glycoprotein standard           | <a href="#">GCP-IGG-100U</a>       | 100 µg    |
|                                           | <a href="#">GCP-IGG-50U</a>        | 50 µg     |
| GPEP FA2 glycopeptide standard            | <a href="#">GPEP-FA2-01</a>        | ≈ 6 µg    |
| <b>NEW</b> GPEP IGG glycopeptide standard | <a href="#">GPEP-IGG-01</a>        | ≈ 1 nmol  |

## O-glycan standards

Mucin O-glycans or O-GalNAc glycans impact the structure, functional recognition, modulation of activity, and expression of proteins. Their malfunctioning lead to diseases such as HEMPAS and cancer.

| Structure                                                                           | Name                    | Part number                      | Size     |
|-------------------------------------------------------------------------------------|-------------------------|----------------------------------|----------|
|  | C1, unlabeled           | <a href="#">CO-C1-10U</a>        | 10 µg    |
|                                                                                     |                         | <a href="#">CO-C1-20U</a>        | 20 µg    |
|                                                                                     | C1, 2-AB labeled        | <a href="#">CAB-C1-01</a>        | 100 pmol |
|  | C1S(3)1, 2-AB labeled   | <a href="#">CO-C1(S3)1-10U</a>   | 10 µg    |
|                                                                                     |                         | <a href="#">CO-C1(S3)1-20U</a>   | 20 µg    |
|                                                                                     |                         | <a href="#">CAB-C1S(3)1-01</a>   | 100 pmol |
|                                                                                     |                         | <a href="#">CAB-C1S(3)1-02</a>   | 50 pmol  |
|  | C1S(3,6)2, 2-AB labeled | <a href="#">CAB-C1S(3,6)2-01</a> | 100 pmol |
|  | C2S(3,3)2, 2-AB labeled | <a href="#">CAB-C2S(3,3)2-01</a> | 100 pmol |

## Sialic acid standards

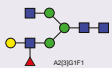
Sialic acids play a key role in determining the 3D conformation and stability of glycoproteins. Due to their location at the terminal position, they are the point of contact for many glycoprotein interactions including:

1. Sialylation of IgG **reduces ADCC** and **increases anti-inflammatory activity**.
2. Sialic acids **increase the serum half-life of glycoproteins** by preventing uptake by the liver's asialoglycoprotein receptor.
3. **NGNA(Neu5Gc)**, a glycan not found in humans, can **elicit an immune response** and lead to increased **neutralization of biopharmaceuticals**.

| Name                                                       | Part number                        | Size        |
|------------------------------------------------------------|------------------------------------|-------------|
| 5-N-acetyl-9-O-acetyl neuraminic acid qualitative standard | <a href="#">CM-NEU5,9AC2-01</a>    | >800 pmol   |
| N-acetylneuraminic acid quantitative standard              | <a href="#">CM-NEU-AC-01</a>       | 1 nmol      |
|                                                            | <a href="#">CM-NEUAC-100</a>       | 100 nmol    |
| N-glycolyneuraminic acid quantitative standards            | <a href="#">CM-NEU-GC-01</a>       | 1 nmol      |
|                                                            | <a href="#">CM-NEUGC-100</a>       | 100 nmol    |
| Sialic acid reference panel                                | <a href="#">CM-SRP-01-C</a>        | ≈ 1.25 nmol |
| Sialidase testing panel, 2-AB labeled                      | <a href="#">CAB-STP-NEUAC-01</a>   | 100 pmol    |
| Sialidase testing panel, procainamide labeled              | <a href="#">CPROC-STP-NEUAC-01</a> | 20 pmol     |

## Lewis X standards

Lewis X (Lex) is a fucosylated trisaccharide glycan epitope which is up-regulated in various cancers (pancreas, breast, colon, and lung tumors), plays an important role in cell-to-cell interaction, and has been found in an infectious bacterium (e.g. *Helicobacter pylori*).

| Structure                                                                           | Name                                                              | Part number                      | Size  |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------------|-------|
|  | A2G2F2(a1-3) – symmetric N-glycan containing two Lewis X epitopes | <a href="#">CN-A2[3]G1-10U</a>   | 10 µg |
|                                                                                     |                                                                   | <a href="#">CN-A2[3]G1-20U</a>   | 20 µg |
|  | A2[3]G1F1(a1-3) - asymmetric Lewis X containing N-glycan          | <a href="#">CN-A2[3]G1F1-10U</a> | 10 µg |
|                                                                                     |                                                                   | <a href="#">CN-A2[3]G1F1-20U</a> | 20 µg |
|  | A2[3]G1 – asymmetric N-glycan precursor to A2[3]G1F1(a1-3)        | <a href="#">CN-A2G2F2-10U</a>    | 10 µg |
|                                                                                     |                                                                   | <a href="#">CN-A2G2F2-20U</a>    | 20 µg |

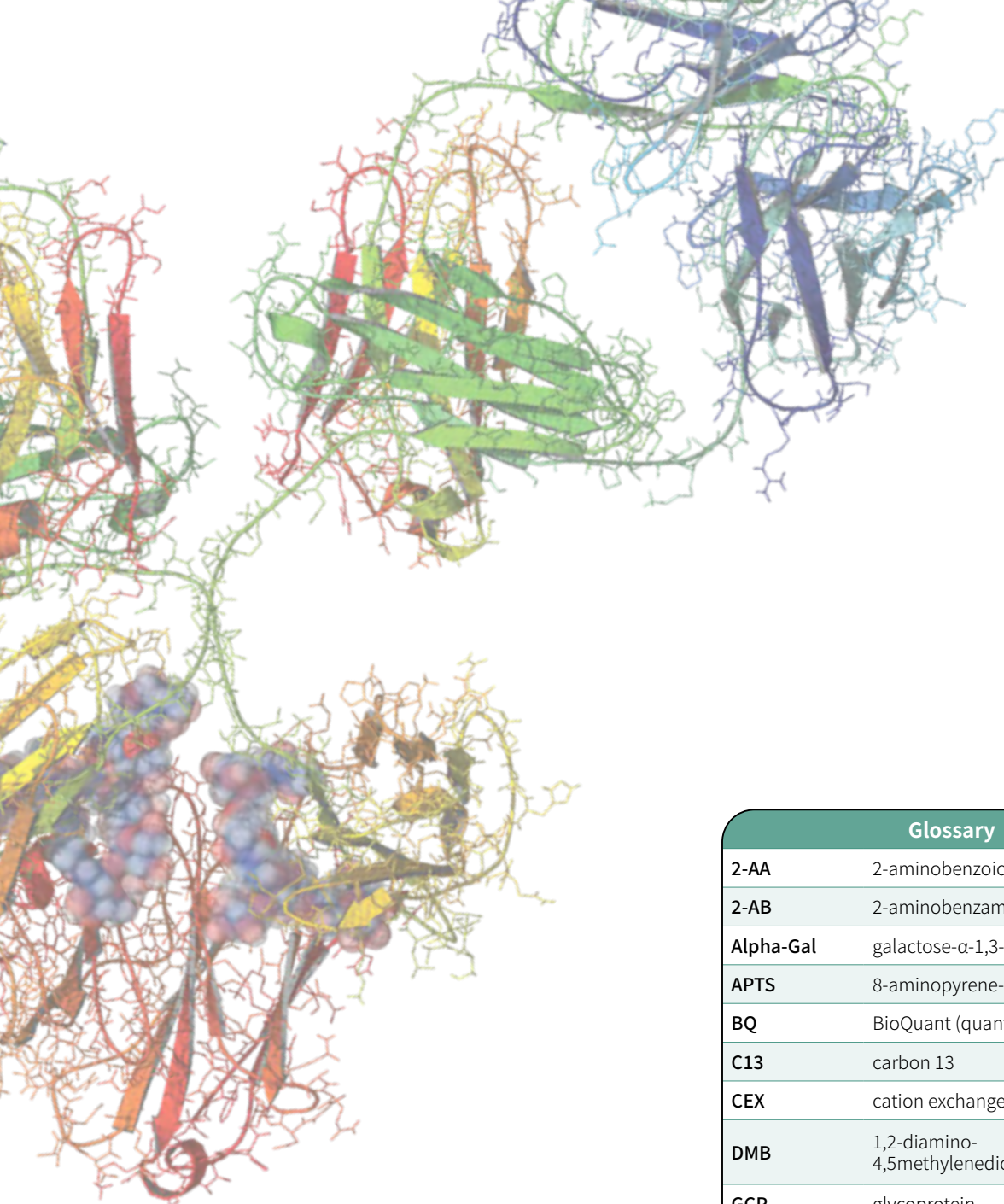
## Alpha-Gal standards

Essential **process controls** when using an  $\alpha$ -galactosidase to identify an  **$\alpha$ -linked galactose** from a  **$\beta$ -linked galactose** in a glycan structure which has major implications for the safety of therapeutic glycoproteins.

| Structure                                                                           | Name                             | Part number                      | Size     |
|-------------------------------------------------------------------------------------|----------------------------------|----------------------------------|----------|
|  | Alpha-Gal standard, unlabeled    | <a href="#">CN-ALPHA-GAL-10U</a> | 10 µg    |
|                                                                                     |                                  | <a href="#">CN-ALPHA-GAL-20U</a> | 20 µg    |
|                                                                                     | Alpha-Gal standard, 2-AA labeled | <a href="#">CAA-ALPHAGAL-01</a>  | 100 pmol |
|                                                                                     | Alpha-Gal standard, 2-AB labeled | <a href="#">CAB-ALPHA-GAL-01</a> |          |







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### Glossary

|           |                                                |
|-----------|------------------------------------------------|
| 2-AA      | 2-aminobenzoic acid                            |
| 2-AB      | 2-aminobenzamide                               |
| Alpha-Gal | galactose- $\alpha$ -1,3-galactose             |
| APTS      | 8-aminopyrene-1,3,6-trisulfonic acid           |
| BQ        | BioQuant (quantitative standards)              |
| C13       | carbon 13                                      |
| CEX       | cation exchange                                |
| DMB       | 1,2-diamino-4,5-methylenedioxybenzene.2HCl     |
| GCP       | glycoprotein                                   |
| GPEP      | glycopeptide                                   |
| IgG       | immunoglobulin G                               |
| MAB       | monoclonal antibody                            |
| MS        | mass spectrometry                              |
| PROC      | procainamide                                   |
| SPE       | solid phase extraction                         |
| (u)HPLC   | (ultra) high-performance liquid chromatography |