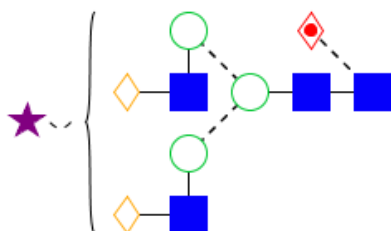


CERTIFICATE OF ANALYSIS

PRODUCT NAME:	GLYKO [®] MONOSIALYLATED, GALACTOSYLATED BIAN TENNARY COMPLEX N-GLYCAN, CORE SUBSTITUTED WITH FUCOSE (A1F)
PRODUCT CODE:	GKC-124301
LOT NUMBER:	DP11K0902c
PACK SIZE:	10 µg (qualitative standard for glycan identification)
PURITY:	≥90% of glycan by UPLC [®]
FORM:	Dry solid
STORAGE:	Store at -20°C before and after reconstitution
EXPIRATION:	May 2019, may be used for 1 year after reconstitution

STRUCTURE^{1,2,3} :



Structure Key:

Monosaccharide symbol:	Linkage position:	Linkage type:
□ Glucose		— β-linkage
◇ Galactose		- - - α-linkage
○ Mannose		~ Unspecified β-linkage
◊ Fucose		- · - Unspecified α-linkage
△ Xylose		
■ N-Acetylglucosamine (GlcNAc)		
◆ N-Acetylgalactosamine (GalNAc)		
★ N-Acetylneuraminic acid (Neu5Ac or NANA)		
☆ N-Glycolyneuraminic acid (Neu5Gc or NGNA)		

Quality Control:

Sample Preparation: A1F was labeled with 2-aminobenzamide (2-AB) by reductive amination⁴ using the Signal[™] 2-AB Labeling Kit (product code GKK-404).

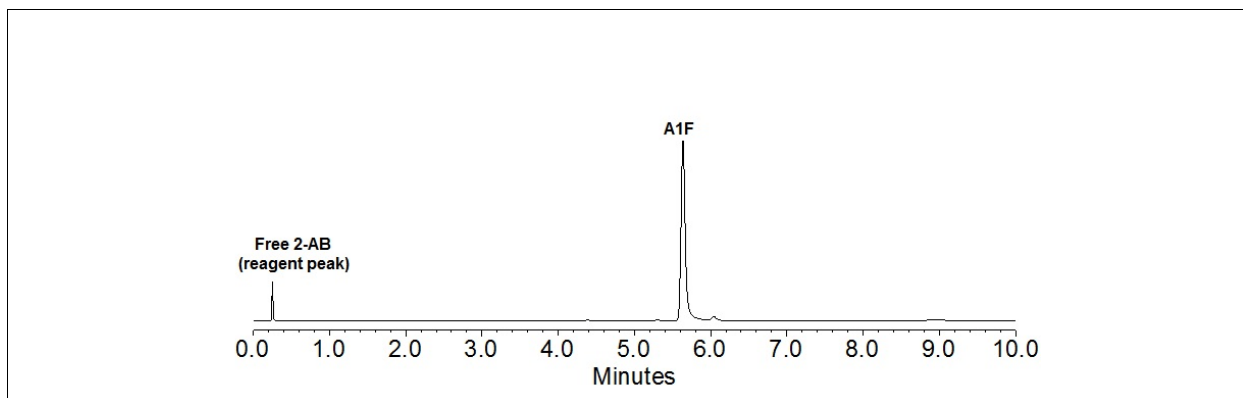


Figure 1 - UPLC® Results: 3 - 6 pmol (1 μ l, aqueous) of the 2-AB-labeled glycan was injected on a Waters ACQUITY UPLC® H Class System utilizing a 10-minute method under the conditions below:

Time (min)	Flow (ml/min)	% ACN	% Buffer
0	1.0	75	25
8.0	1.0	60	40
8.1	0.5	40	60
8.5	0.5	40	60
8.6	1.0	40	60
8.8	1.0	75	25
10.0	1.0	75	25

Column: Waters ACQUITY UPLC BEH Glycan Column (1.7 μ m, 2.1 x 100 mm)

ACN: Acetonitrile

Buffer: 100 mM ammonium formate, pH 4.4

Flow rate: As stated in table, in ml/min

Temperature: 60°C

Max Pressure: 15,000 psi

Fluorescence Detection: λ_{ex} = 330 nm

λ_{em} = 420 nm

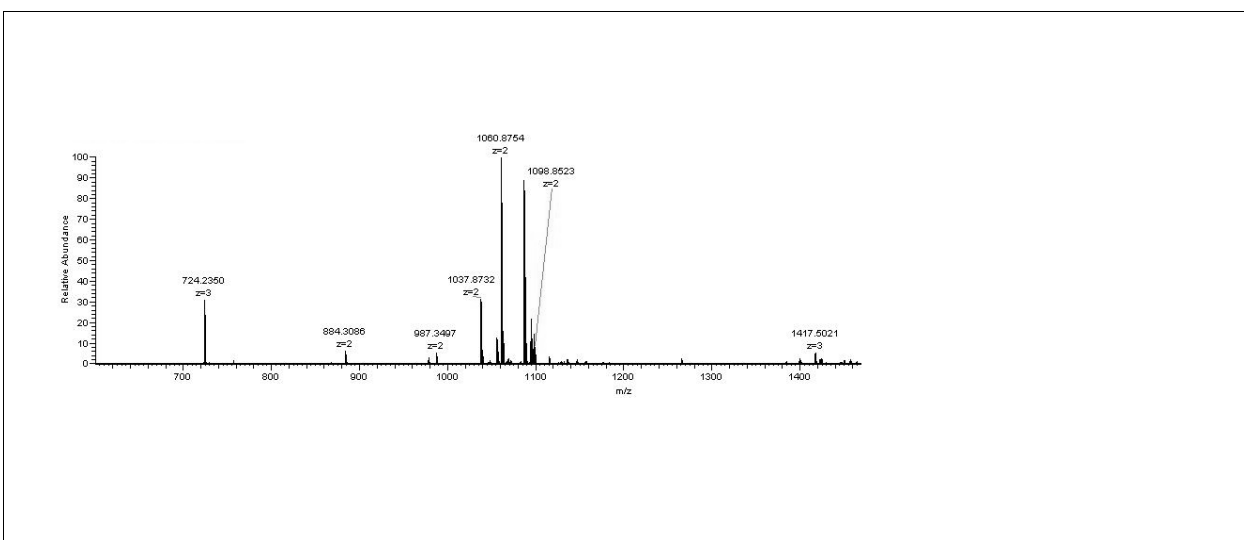


Figure 2 - Mass Spectrum of A1F

Average Mass⁵: 2078.9

Monoisotopic Mass⁵: 2077.7455

Structural Analysis: The purity and structural integrity of the glycan was assessed by UPLC⁶ (as described above) and MALDI-TOF^{7,8}, ESI-MS or LC-MS. Agreement was found between the results from mass spectrometry and UPLC.

Applications:

- Qualitative standard for various analytical procedures
- Fluorescent-labeling or formation of a variety of oligosaccharide derivatives
- Substrate for glycosidase and glycosyl transferase assays

Handling & Reconstitution: The labeled oligosaccharide is shipped as a dried solid. Use ultra-pure water or an aqueous buffer to dissolve the glycan.

Allow the unopened vial to reach ambient temperature and tap on a solid surface to ensure that most of the material is at the bottom of the vial. Gently remove the cap, add the desired volume of ultra-pure water or aqueous buffer, re-cap and mix thoroughly to redissolve all the oligosaccharide. For maximal recovery, ensure that the cap lining is also rinsed. Centrifuge the reconstituted vial briefly before use.

Make sure that any glassware, plasticware, solvents or reagents used are free of glycosidases and carbohydrate contaminants.

Minimize exposure to elevated temperatures or extremes of pH.

Store the reconstituted glycan at -20°C. Allow the vial to equilibrate to ambient temperature before use.

REFERENCES

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<http://web.expasy.org/glycanmass/>
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Authorized Signature