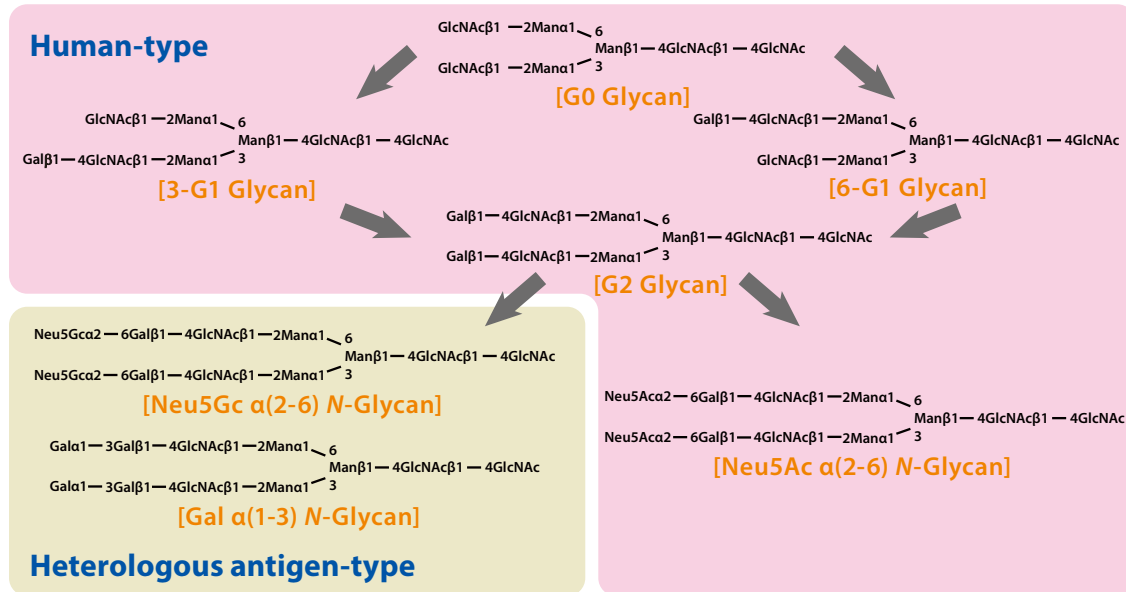


# N-Glycan / Labeled N-Glycan based on Chemical Synthesis

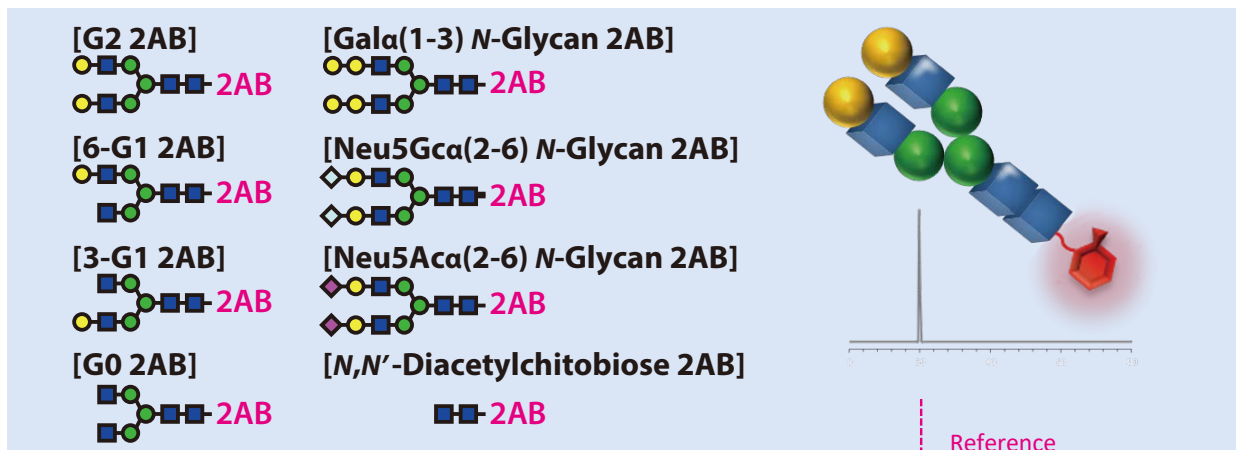
## N-Glycan

Our chemical synthesis of oligosaccharide using various sugar building blocks provides various structure-defined N-glycans such as human type glycans (G0, G2 and SG), uniform isomer (each G1 and G1') and heterogenic antigen (including αGal or NeuGc).

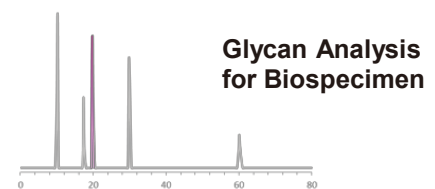
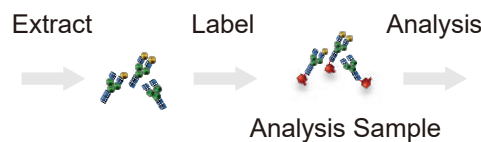


## Labeled N-Glycan

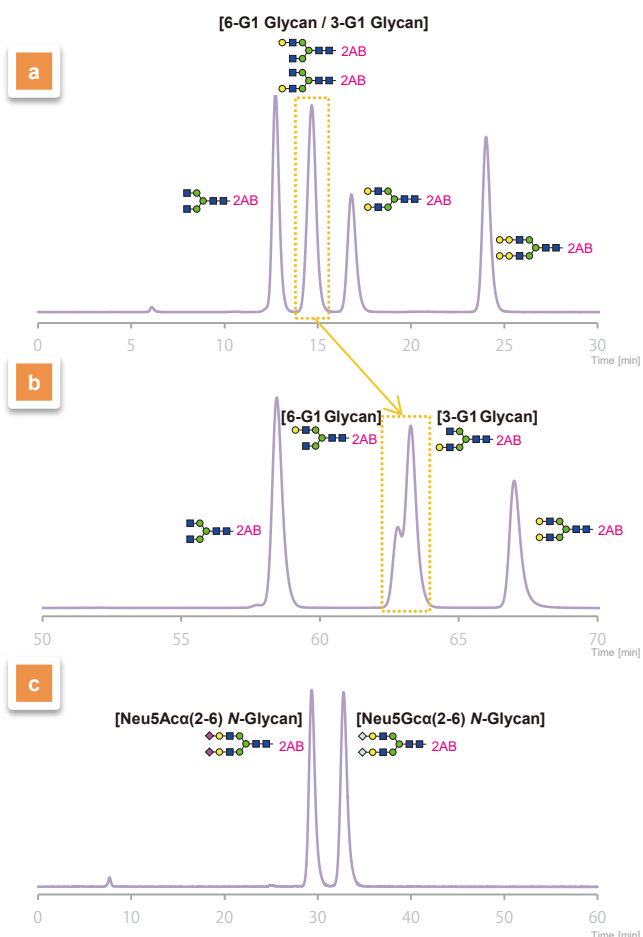
We produce high grade 2-AB labeled N-glycans. Please take advantage of our fluorescent-labeled product portfolio as a test sample for MS, CE and HPLC analyses.



Cell, Biopharmaceutical, etc.



# Application of 2AB-labeled Glycans



[Column] Asahipak NH2P-50 4E (Φ4.6×250 mm)

[Detection] FL (Ex: 330 nm, Em: 420 nm)

[Inject] 5 μL (10 μg/mL except for 5 μg/mL of 6-G1 2AB)

[Flow rate] 0.5 mL/min

[Temp.] 40°C

[Solvent] A : Acetonitrile

B : 50 mM Ammonium formate (pH4.4)

[Condition]

- |              |                       |
|--------------|-----------------------|
| (A) 0-10 min | B: 40%                |
| 10-30 min    | B: 40% (gradient)→50% |
| (B) 0-20 min | B: 20%                |
| 20-60 min    | B: 20% (gradient)→40% |
| 60-80 min    | B: 20%                |
| (C) 0-60 min | B: 100%               |

(A) The labeled neutral *N*-glycan mixture was individually separated based on the distinctive features of glycan structure. (However, each G1 isomer was not separated.)

(B) Each G1 isomer; 6-G1 and 3-G1, is modestly detached in this condition.

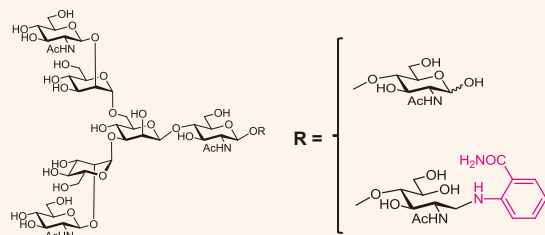
(C) The acidic *N*-glycan; Heterologous antigen-type Neu5Gc α(2-6) *N*-Glycan was completely separated from Neu5Acα(2-6) *N*-Glycan due to the minimal difference of sialic acid.

## *N*-Glycan / Labeled *N*-Glycan based on Chemical Synthesis

<b>G0 Glycan</b>	<b>[G0484]</b>	<b>G0 2AB</b>	<b>[G0490]</b>
<b>3-G1 Glycan</b>	<b>[G0485]</b>	<b>3-G1 2AB</b>	<b>[G0491]</b>
<b>6-G1 Glycan</b>	<b>[G0486]</b>	<b>6-G1 2AB</b>	<b>[G0492]</b>
<b>G2 Glycan</b>	<b>[G0487]</b>	<b>G2 2AB</b>	<b>[G0493]</b>
<b>Neu5Acα(2-6) <i>N</i>-Glycan</b>	<b>[N1065]</b>	<b>Neu5Acα(2-6) <i>N</i>-Glycan 2AB</b>	<b>[N1073]</b>
<b>Neu5Gcα(2-6) <i>N</i>-Glycan</b>	<b>[N1064]</b>	<b>Neu5Gcα(2-6) <i>N</i>-Glycan 2AB</b>	<b>[N1075]</b>
<b>Galα(1-3) <i>N</i>-Glycan</b>	<b>[G0488]</b>	<b>Galα(1-3) <i>N</i>-Glycan 2AB</b>	<b>[G0494]</b>
		<b><i>N,N'</i>-Diacetylchitobiose 2AB</b>	<b>[D5327]</b>

A part of the products was commercialized by support from the projects of New Energy and Industrial Technology Development Organization (NEDO) and the Japan Agency for Medical Research and Development (AMED) implementation of manufacturing technology association of biologics.

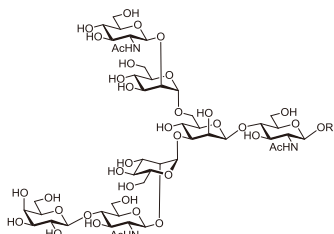
# N-Glycan / Labeled N-Glycan



**G0 Glycan [G0484]**



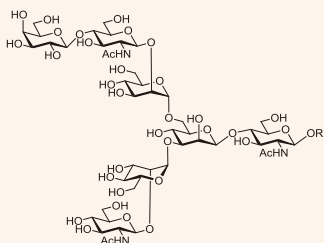
**G0 2AB [G0490]**



**3-G1 Glycan [G0485]**



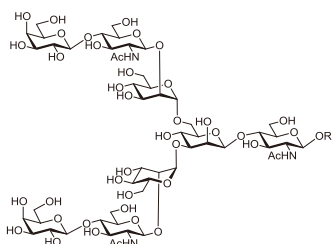
**3-G1 2AB [G0491]**



**6-G1 Glycan [G0486]**



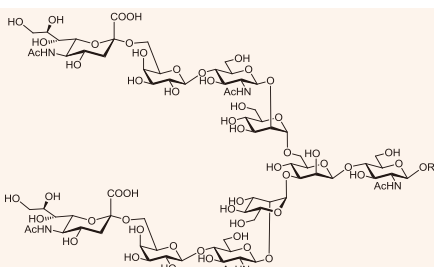
**6-G1 2AB [G0492]**



**G2 Glycan [G0487]**



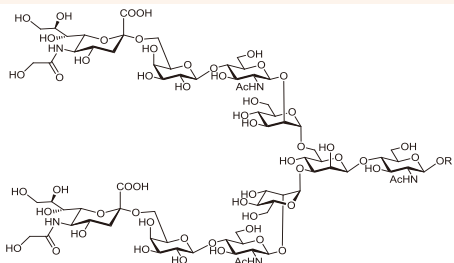
**G2 2AB [G0493]**



**Neu5Aca(2-6) N-Glycan [N1065]**



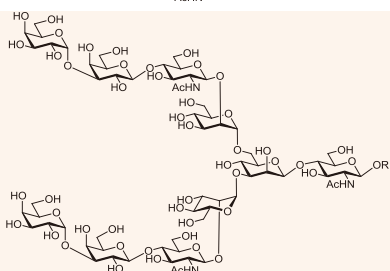
**Neu5Aca(2-6) N-Glycan 2AB [N1073]**



**Neu5Gca(2-6) N-Glycan [N1064]**



**Neu5Gca(2-6) N-Glycan 2AB [N1075]**



**Gala(1-3) N-Glycan [G0488]**



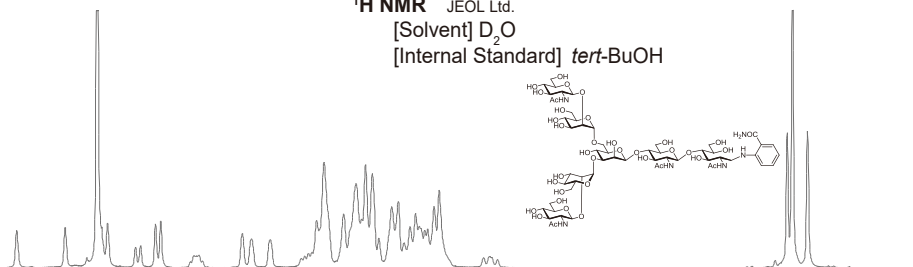
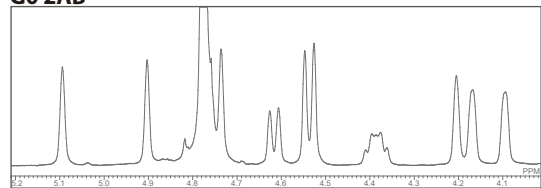
**Gala(1-3) N-Glycan 2AB [G0494]**



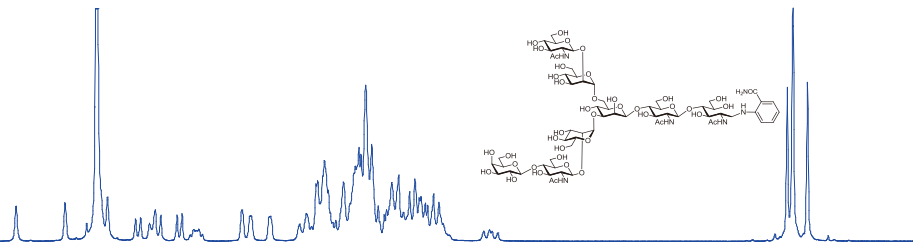
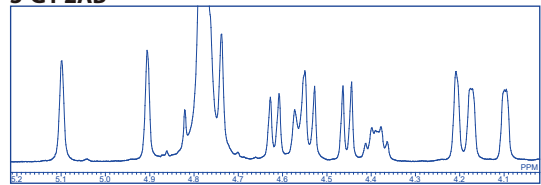
# NMR Data of Labeled *N*-Glycan

<sup>1</sup>H NMR JEOL Ltd.  
[Solvent] D<sub>2</sub>O  
[Internal Standard] *tert*-BuOH

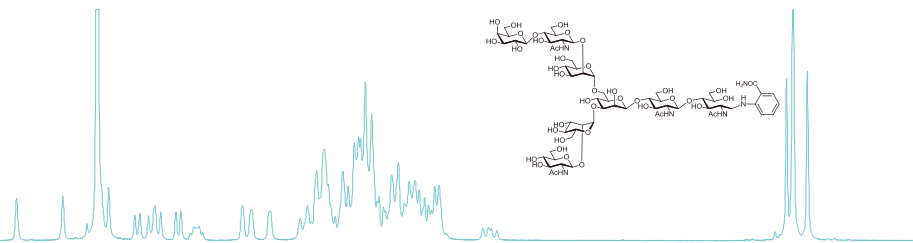
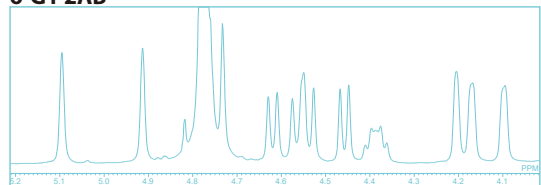
G0 2AB



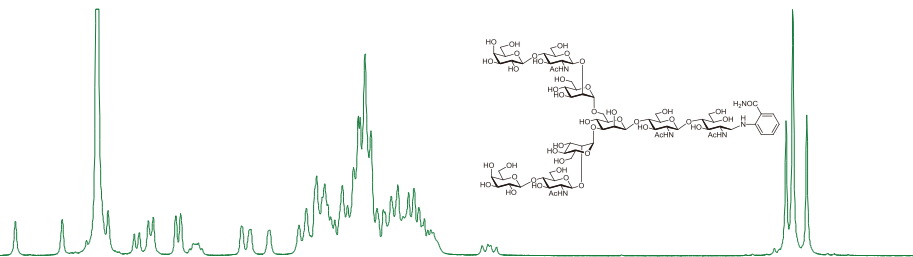
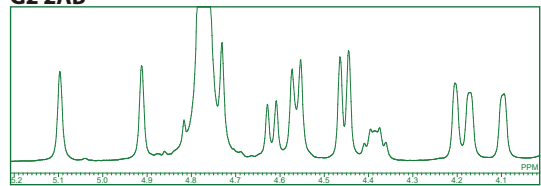
3-G1 2AB



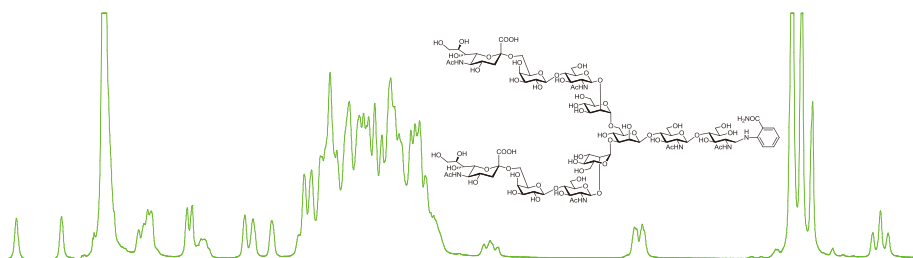
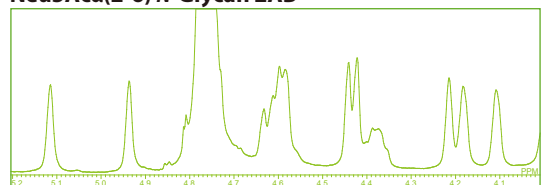
6-G1 2AB



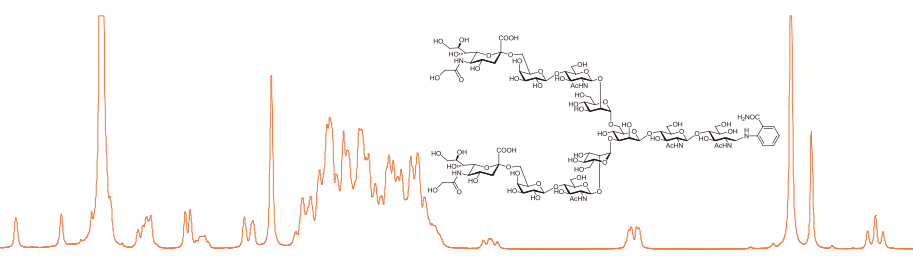
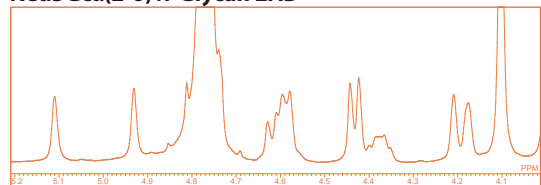
G2 2AB



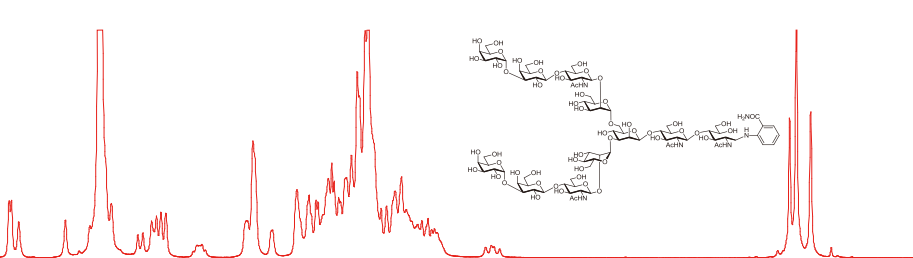
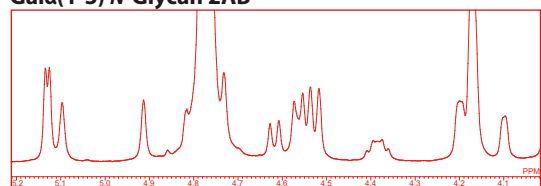
Neu5Acα(2-6) *N*-Glycan 2AB



Neu5Gcα(2-6) *N*-Glycan 2AB



Galα(1-3) *N*-Glycan 2AB



PPM

# MS / HPLC Data of Labeled N-Glycan

**MALDI-TOF** Bruker Daltonics

[Mode] Positive mode

(Neu5Ac(2-6) N-Glycan 2AB, Neu5Gc(2-6) N-Glycan 2AB were analyzed by Negative mode)

**HPLC** Hitachi Hightech

[Detection] FL (Ex: 330 nm, Em: 420 nm)

[Column] Asahipak NH2P-50 4E (4.6×250 mm)

HPLC purity >95%

[M+Na]<sup>+</sup> 1459.322



[M+Na]<sup>+</sup> 1621.411



[M+Na]<sup>+</sup> 1621.405



[M+Na]<sup>+</sup> 1783.473



[M-H]<sup>-</sup> 2341.445



[M+Na-2H]<sup>-</sup> 2363.412

[M-H]<sup>-</sup> 2373.718

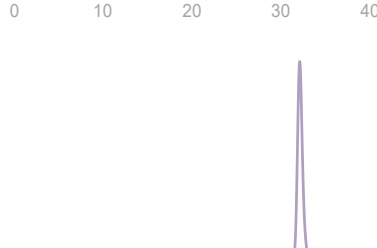
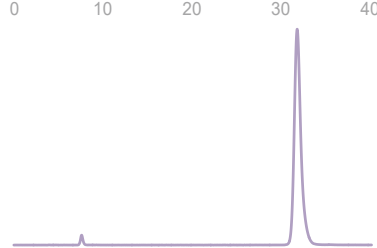
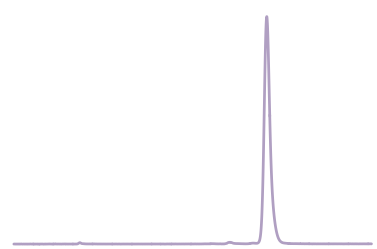
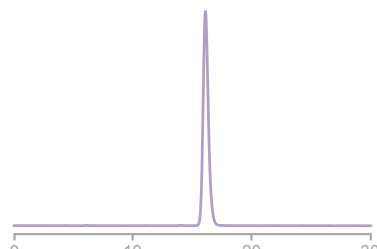
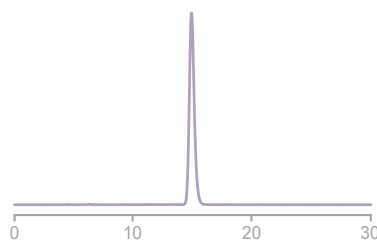
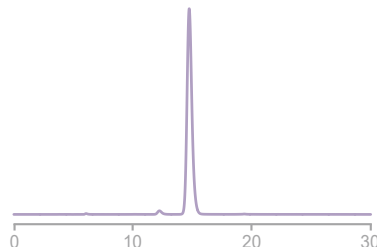
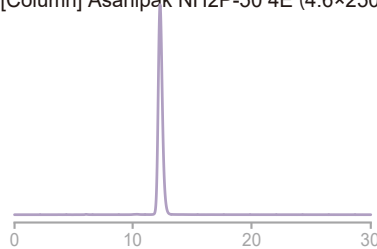


[M+Na-2H]<sup>-</sup> 2395.677

[M+Na]<sup>+</sup> 2107.691



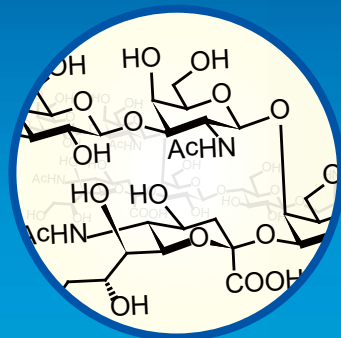
Int.



Human-type

Heterologous antigen-type

# Glycoscience



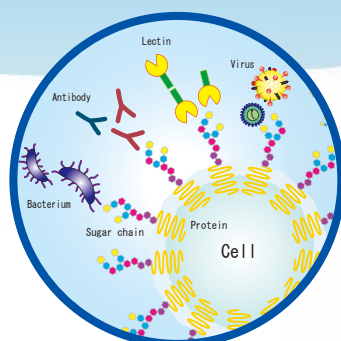
## Sugar chains

- Functional oligosaccharides
- Various sugar blocks at 10-100kg
- Synthetic technology with high-quality
- Application of sugar-conjugates



## Enzymes

- Endo type enzymes for glycoconjugate synthesis
- Glycohydrolase and their substrates



## Antibodies & Lectins

- Antibodies for glycolipids and glycosaminoglycans
- Fucose specific lectin
- Modification of antibodies and lectins

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