LIFE SCIENCE

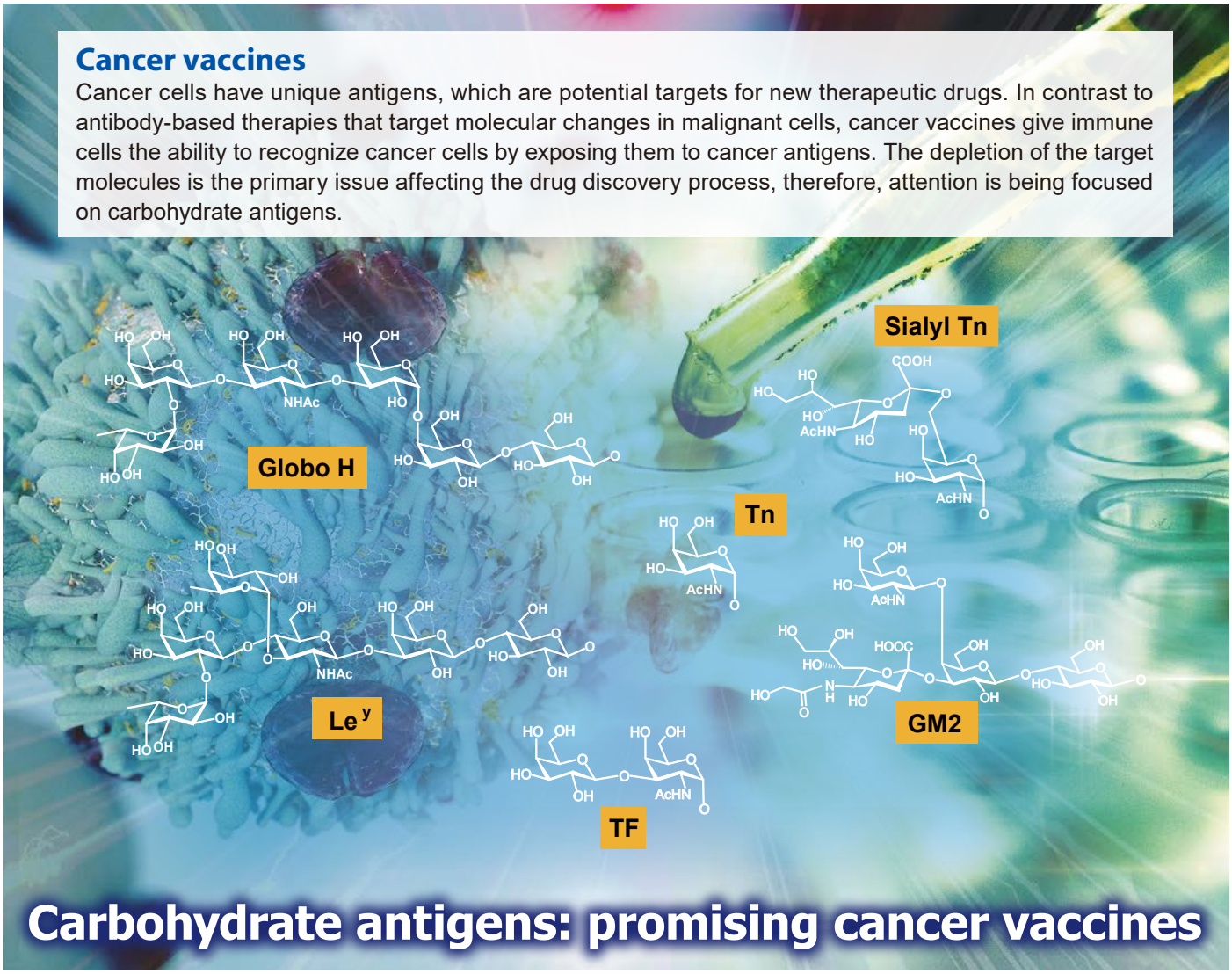
Synthetic Carbohydrate Antigens for Immunotherapy Research

TCI offers cancer biomarkers and synthetic antigens

Surgery, radiation, and chemotherapy have been the most common cancer treatments. Recently, antibody-based therapies, antibody stimulating cancer vaccines, immunotherapy, and CAR T-cell therapy has attracted attention. Tumor-associated carbohydrate antigens play an important role in these treatments, which are becoming increasingly mainstream. Here, we introduce oligosaccharide reagents, which represent a new avenue of research and may lead to new therapeutic methods.

Cancer vaccines

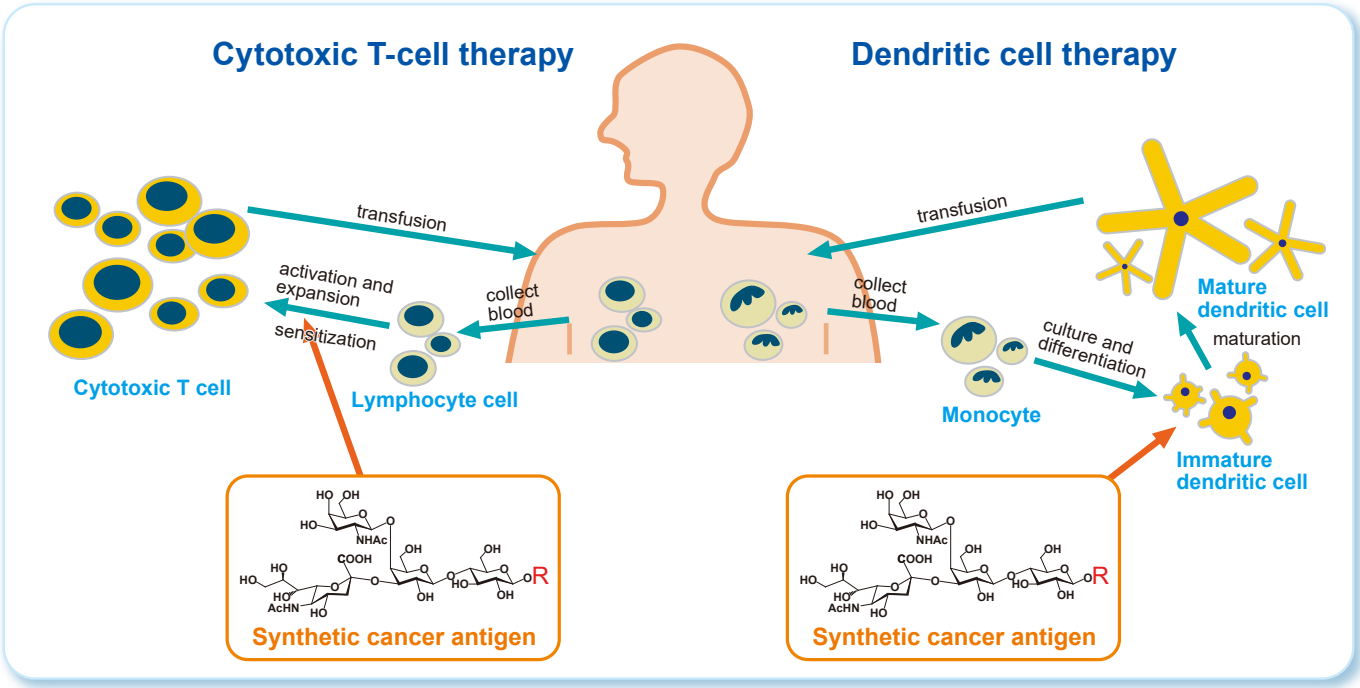
Cancer cells have unique antigens, which are potential targets for new therapeutic drugs. In contrast to antibody-based therapies that target molecular changes in malignant cells, cancer vaccines give immune cells the ability to recognize cancer cells by exposing them to cancer antigens. The depletion of the target molecules is the primary issue affecting the drug discovery process, therefore, attention is being focused on carbohydrate antigens.



Easily modified oligosaccharides and oligosaccharide-linked artificial compounds are useful in carbohydrate vaccine research. TCI strongly supports research involving synthetic carbohydrates, which can be easily modified to meet the needs of the researcher.

Immunotherapy (cell transfer therapy)

Therapeutic antibodies and cancer vaccines are based on cancer cell recognition by immune cells, eventually collaborating to destroy cancer cells. In cell transfer therapy, immune cells are removed from the patient's body, engineered to attack cancer cells, and then returned to the body. Research into the application of carbohydrate reagents is also increasing.



Cytotoxic T Lymphocyte (CTL)

Cellular immune responses resulting from cytotoxic T cells, also known as cytotoxic T lymphocytes (CTL), generate effector cells and attack cancer cells. Stimulating lymphocytes with "cancer antigens", which only exist on cancer cells, will increase the number of CTLs specifically targeting cancer cells. Therapeutic response is also affected if specific CTLs are increased or administered. Currently, there is a global research effort to develop methods to increase specific cell types.

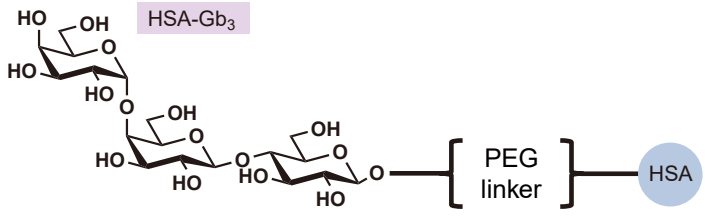
Dendritic cell therapy

Dendritic cells are branched antigen-presenting cells known for their "tree-like" shapes, which have the ability to present antigens to lymphocytes. Cytotoxic T lymphocytes can be induced if cancer antigens are presented to major histocompatibility complex (MHC) molecules on cell surfaces using the antigen-presenting ability of these cells, and this is a promising approach to cancer treatment.

TCI offers a large selection of reagents that can be used for the preparation of carbohydrate compound combinations and carbohydrate-protein combinations in addition to tools for the evaluation of oligosaccharides conjugated to human serum albumin (HSA).

HSA-Oligosaccaride Conjugates : useful tools for evaluating carbohydrate-binding molecules

These are useful tools for evaluating carbohydrate-binding molecules, including antibodies. The recombinant HSA produced in plants does not contain animal-derived components and cannot be contaminated with virus. Additionally, it has the same structure, characteristics, and biological activity as natural HSA. Several sugar-conjugates are available, and it is also possible to manufacture the sugar-conjugates according to customer specifications. For more details on the products and contracts, please contact us.

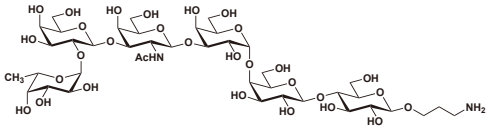


HSA-Gb_3	[H1718]
HSA-Gb_5	[H1777]
HSA-Lewis	[H1719]
HSA-Sialyl Lewis X	[H1730]
HSA-GM_1 Pentasaccharide	[H1767]
HSA-Globo-H	[H1794]
HSA-L1-L1	[H1782]

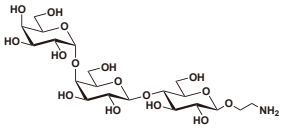
Synthetic Carbohydrate Antigens for Immunotherapy Research

Tumor-associated carbohydrate antigens

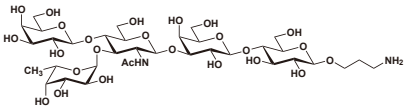
Aminoethyl Glycosides, Aminopropyl Glycosides



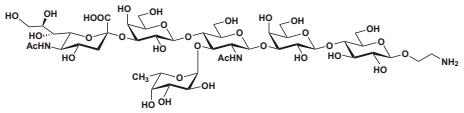
Globo-H-PrNH$_2$ [G0447]



Gb$_3$-β-ethylamine [G0402]

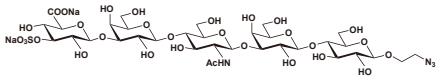


SSEA-1-PrNH$_2$ [S0946]

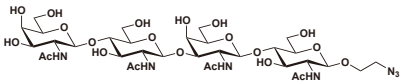


Sialyl Lewis X-Lactose Ethylamine [S0923]

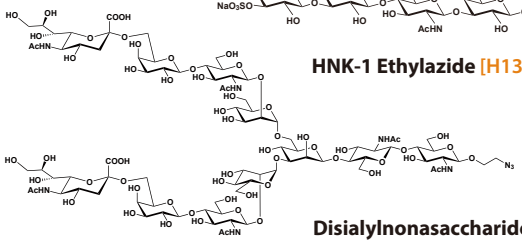
Glycosyl Azides



HNK-1 Ethylazide [H1333]

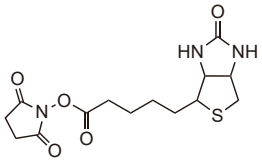


LacDiNAc Dimer Ethylazide [L0237]

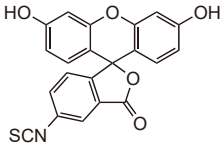


DisialylnonasaccharideEthylazide [D4217]

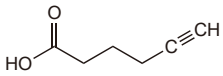
Conjugation reagents



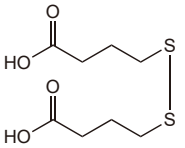
N-Succinimidyl D-Biotinate [S0491]



Fluorescein 5-Isothiocyanate (isomer I) [F0026]

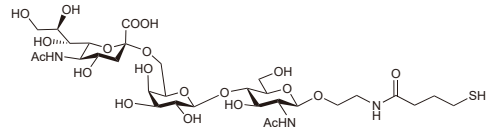


5-Hexynoic Acid [H0882]

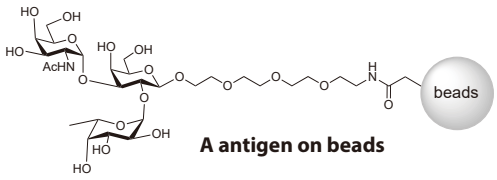


4,4'-Dithiodibutyric Acid [D1757]

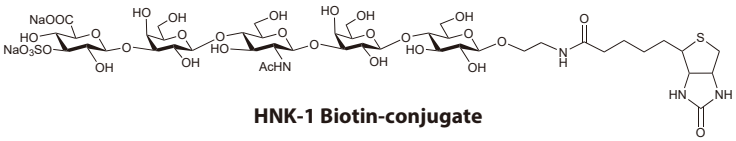
Glyco-conjugates



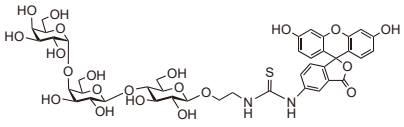
Neu5Acα(2-6)Galβ(1-4)GlcNAc having a thiol group



A antigen on beads



HNK-1 Biotin-conjugate



Gb$_3$ FITC-conjugate

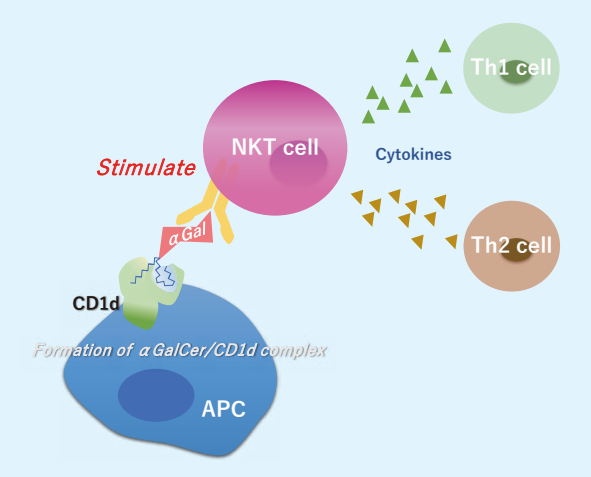
Bioconjugation reagents ▶▶▶ https://bit.ly/2A9V5IN

Tumor-associated antigens ▶▶▶ https://bit.ly/35G0H8Y

Anti-oligosaccharide antibodies ▶▶▶ https://bit.ly/3b6zRbf

Synthetic Carbohydrate Antigens for Immunotherapy Research

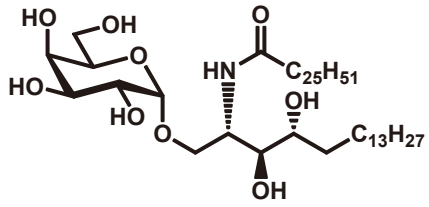
α-Galactosyl Ceramide (α-GalCer)



α-Galactosyl Ceramide (α-GalCer) is an artificial glycolipid which has been developed based on the sphingolipid extracted from the sea sponge, *Agelas mauritianus*.[1-3] Work conducted by Prof. Taniguchi demonstrated that α-GalCer forms a complex with the CD1d antigen present on cell surfaces.[4,5] This complexing results in strong NKT (Natural Killer T) cell activation causing high levels of cytokine production.[6,7] The NKT cells bare features of both of NK cells and T cells.[8] Since α-GalCer is related to immune functions, it is used in disease research on cancer, atopic dermatitis and asthma and also is used as an adjuvant for experiment and research. Moreover, a synthetic intermediate of α-GalCer is required in synthetic research of analogs containing different functional groups such as unsaturation and aromatic groups on the ceramide moiety which can increase biological activity of α-GalCer.[9] TCI can provide large amount of α-GalCer and its intermediates synthesized in our facilities. Additionally, we can offer highly pure α-GalCer for use as a standard and other applications.

References

1) M. Morita *et al.*, *J.Med. Chem.* **1995**, *38*, 2176. 2) T. Natori *et al.*, *Tetrahedron Lett.* **1993**, *34*, 5591. 3) T. Natori *et al.*, *Tetrahedron* **1994**, *50*, 2771.
4) T. Kawano *et al.*, *Science* **1997**, *278*, 1626. 5) N. Kamada *et al.*, *Int. Immunol.* **2001**, *13*, 853.
6) M. Taniguchi, Hyoujun menekigaku (Standard Immunology), Igaku-shoin, **2013**, 226. 7) M. Taniguchi, M. Harada, *et al.*, *Annu. Rev. Immunol.* **2003**, *21*, 48.
8) Y. Makino *et al.*, *Int. Immunol.* **1995**, *7*, 1157.
9) T. Tashiro, K. Mori, *Trends Glycosci. Glycotechnol.* **2010**, *22*, 280.



α-Galactosylceramide
[G0509]

Advantages

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- **We can accept your request of GMP production.**

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For further information please refer to our website at www.TCIchemicals.com. ▶▶▶ TCI sugar antigen

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