GlykoGen

Revolutionising Anti-Glycan Antibody Development

GlykoGen offer engineered monoclonal antibodies, which are produced using our novel immunisation process and antibody platform. The resulting recombinant rabbit antibodies target carbohydrates found on the surface of cancerous cells as well as on cells during early development, including key subsets of stem cells. We offer our antibodies against glycans to both the research and therapeutic markets.

The biological importance of glycans

Glycans are as-yet unexploited drug targets. They play a role in almost every biological process and are involved in every major disease, but their role in cancer is not well explored, predominantly due to the difficulties of producing antibodies to glycans which do not generally produce a strong immune response.

Glycans are molecules made up of combinations of different sugar units, such as glucose. These units can link together to form complex, three-dimensional structures. Unlike DNA and proteins, glycans are not created by following a template. Instead, the reactions that link individual sugar units together are influenced by factors including cellular metabolism, cell type, developmental stage, and nutrient availability. These factors provide substantial diversity and allow for glycans with a wide array of properties, but they also make glycans much more difficult to study and manipulate in the laboratory.

We have developed a novel immunisation process that produces recombinant monoclonal rabbit IgG antibodies that are specific to glycan antigens.

Our Technology

Glycans have traditionally proven a difficult target for antibody production, with their ubiquitous presence on all animal and plant cells and small size leading to a lack of immunogenicity. Our proprietary immunisation process is GlykoGen's key difference from other antibody producers. In addition to our novel immunisation strategy, the use of rabbits as host animal confers certain advantages. In evolutionary terms, rabbits are relatively distant from humans and so their glycans are more likely to stimulate a response, and less likely to harm the animal by creating auto antibodies. Rabbits are also adept at making antibodies to small targets, so they are the ideal host for anti-glycan antibody production. We utilise antibody phage display technology to generate optimised, high-affinity and specific antibodies from RNA isolated from these immunised rabbits.

Why use GlykoGen antibodies?

One of the key problems that GlykoGen products solve for researchers is a lack of available reagent options. Currently, there are very few antibodies available; most are of the IgM or IgG3 class and are therefore of low affinity, can be difficult to handle and have restricted applications. Alternatively, mass spectrometry techniques which can be used to assay patient tumour tissue sections are highly specialist, time-consuming and expensive. Consequently, they are beyond the reach of most labs. Good quality IgG antibodies, especially ones that can be used in multiple applications, will be key to advancing the study of these targets both in cancer and stem cell biology.

Our advantages:

- **Our novel immunisation strategy is able to stimulate an immune response to otherwise non-immunogenic glycans**

- **Our recombinant rabbit IgG antibodies include reagents against targets for which there are no other antibodies currently available**

- **Rabbit IgG antibodies offer a more user-friendly and high-quality solution than any mouse monoclonal antibodies currently available against glycans than the current options**

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3-SLeX

The 3'sulfo-βGal linkage found on the tetrasaccharide carbohydrate Sialyl LewisX (sLeX) is usually found attached to O-glycans on the surface of cells. 3′-sulfo-Lex (3-SLeX) structures have essential roles in cell-to-cell recognition, acting as a ligand for the adhesion molecules E- and L-selectin.

The biosynthetic enzymes of 3-SLeX are expressed in cell lines with high metastatic potential. Therefore, the expression of 3-SLeX is important for identifying tumours with poor prognosis and a higher likelihood of progression and metastasis. 3-SLeX has been found to be expressed at high levels in the mucins from the lungs of cystic fibrosis (CF) patients. *Pseudomonas aeruginosa*, the most important pathogen for infection in CF patients, preferentially binds to the 3'sulfo form of LeX. High levels of expression may be related to more serious infections and chronic colonisation of airway mucins in CF.

In the past, studies of 3-SLeX expression and function have been hampered by the lack of specific antibodies. Glykogen's anti-3'Sulfo Lewis X antibody (clone B4) will facilitate studies into 3-SLeX expression and function, both in normal tissues and in cancer studies.

Antibody	SKU	Quantity
Rabbit anti-3'Sulfo Lewis X	GKGB4RBIGG50	50 µg
	GKGB4RBIGG100	100 µg
	GKGB4RBIGG500	500 µg

Figure 1. Rabbit anti-3'Sulfo Lewis X antibody (a, b) Total lipid immunostaining for immunofluorescence with rabbit anti-3'Sulfo Lewis X. (c) Immunohistochemistry (IHC) staining of frozen tissue sections of colon carcinoma using B4 antibody specific for 3-SLeX
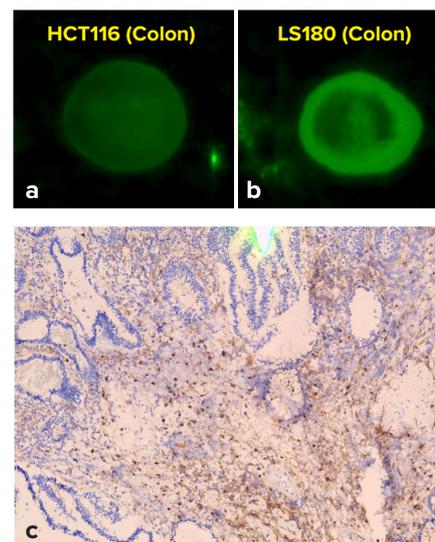
Anti-SSEA-4 antibody

Stage-specific embryonic antigen-4 (SSEA-4) is a ganglioside which consists of a glycosphingolipid (GSL) containing a terminal sialic acid residue (N-acetylneuraminic acid). SSEA-4 expression changes qualitatively and quantitatively during development, differentiation and tumorigenesis.

During human development, SSEA-4 is first observed on pluripotent cells of the inner cell mass and subsequently lost upon differentiation[1]. In addition, human germ stem cells in the testis and ovary express SSEA-4[2-3]. Also, stage-Specific Embryonic Antigen-4 (SSEA-4) is over-expressed in cancers. SSEA-4 expression is associated with increased metastatic potential and poor prognosis of several cancers[4].
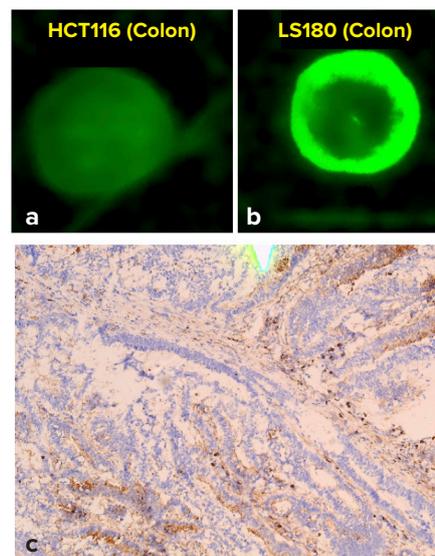
The lack of high-quality reagents has often inhibited SSEA-4 expression and function studies. Due to the glycan nature of the antigen, almost all developed antibodies to date have been IgM or IgG3 antibodies, which tend to be of low affinity and can be difficult to handle. Glykogen's anti-SSEA-4 antibody is a recombinant monoclonal rabbit IgG (Clone F8) antibody that will facilitate studies into SSEA-4 expression and function, both in stem cell biology and cancer studies.

Antibody	SKU	Quantity
Rabbit anti-human SSEA-4	GKGF8RBIGG50	50 µg
	GKGF8RBIGG100	100 µg
	GKGF8RBIGG500	500 µg

Figure 2. Rabbit anti-human SSEA-4 antibody (a, b) Total lipid immunostaining for immunofluorescence with rabbit anti-human SSEA-4. (c) IHC staining of frozen tissue sections of colon carcinoma using SSEA-4 F8 antibody

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