Therapeutic Antibodies Targeting MUC1

For Treatment of Solid Tumors

Overview

Drug Name	Anti-MUC1-Ab
Description	High expression level of MUC1 in tumor cells in combination with low expression levels in healthy cells, membrane localization, as well as the presence of tumor specific antigen epitopes emerging due to aberrant glycosylation of the molecule are characteristics. Moreover, high expression level of MUC1 was detected in cells of various cancer types. Hence, MUC1 was considered as a nearly ideal target for cancer immunotherapy. Anti-MUC1-Ab has been generated against these altered MUC1, which have shown potential in therapeutics development in multiple cancers.
Target	MUC1
Drug Modality	Monoclonal antibody
Indication	Solid tumor
Product Category	Immunotherapy
Mechanism of Action	Targeting MUC1 to inhibit tumor growth, metastasis and immune escape
Status	Preclinical
Patent	Granted

Collaboration Opportunity

Protheragen Inc. is actively seeking partnership to further develop Anti-MUC1-Ab. Potential collaboration can be strategic alliance, licensing, or marketing agreement.
We look forward to hearing from you.

Target

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MUC1

Introduction	Mucins are heavily glycosylated proteins thought to function in the protection of epithelial surfaces. Secreted and transmembrane mucins form a protective mucous barrier, and transmembrane mucins may also function in signaling the presence of adverse conditions in the extracellular environment. MUC1 is a transmembrane mucin normally expressed on the apical borders of secretory epithelial cells.
Approved Name	Mucin 1, cell surface associated
Official Symbol	MUC1
Gene Type	Protein coding
Synonyms	EMA; MCD; PEM; PUM; KL-6; MAM6; MCKD1; MUC-1
Ensembl	ENSG00000185499
Gene ID	4582
mRNA Refseq	NM_002456
Protein Refseq	NP_002447
OMIM	158340
Protein Refseq	P15941
Chromosome Location	1q22

Clinical Resources

Gene Function	This gene encodes a membrane-bound protein that is a member of the mucin family. Mucins are O-glycosylated proteins that play an essential role in forming protective mucous barriers on epithelial surfaces. These proteins also play a role in intracellular signaling. This protein is expressed on the apical surface of epithelial cells that line the mucosal surfaces of many different tissues including lung, breast stomach and pancreas. This protein is proteolytically cleaved into alpha and beta subunits that form a heterodimeric complex. The N-terminal alpha subunit functions in cell-adhesion and the C-terminal beta subunit is involved in cell signaling. Overexpression, aberrant intracellular localization, and changes in glycosylation of this protein have been associated with carcinomas. This gene is known to contain a highly polymorphic variable number of tandem repeats (VNTR) domain. Alternate splicing results in multiple transcript variants.
Pathway	The mitogen-activated protein kinase (MAPK), phosphatidylinositol 3-kinase (P13K/Akt), wingless type (Wnt) pathways, *etc*.

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Major Conditions Cancer

Drug Modality

Monoclonal Antibody

Anti-MUC1-Ab is a novel, proprietary, highly specific antibody designed to bind MUC1 on the cell surface to inhibit tumor growth, metastasis and immune escape.

Indication

Solid Tumors

Solid tumors are abnormal mass of tissue that usually does not contain cysts or liquid areas. Solid tumors may be benign or malignant. Different types of solid tumors are named for the type of cells that form them, such as breast cancer. Based on projections, cancer deaths will continue to rise with an estimated 11.4 million people dying from cancer in 2030.

The best strategy for fighting cancer is prevention to reduce cancer risk. Nevertheless, even if we were to apply all that we know about preventing cancer, one out of four cancers would still occur. Because of this, therapies that target malignancies after they have developed will continue to be important for some time to come. The most commonly used treatment modalities for cancer include some combination of surgery, radiation therapy, and chemotherapy. The best approach to treating cancer provides a balance between therapeutic effectiveness and minimization of treatment-associated side effects.

The global market for solid tumor cancer treatment was estimated at $121.3 billion in 2018 and is expected to reach $424.6 billion by 2027, increasing to CAGR by 15.0 per cent from 2019 to 2027.

Breast cancer is dominant in the indication market for the treatment of solid tumor cancer. Breast cancer is the second most common cancer in women after lung cancer. In 2018, there will be about 2.1 million newly diagnosed cases over the world. Incidence rates of breast cancer have been rising for most countries over the last decades, with some of the most rapid increases occurring in South America, Africa, and Asia.

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Mechanism of Action

Targeting MUC1 to Inhibit Tumor Growth, Metastasis and Immune Escape

The aberrant glycosylation of MUC1 is overexpressed by various types of carcinomas, and was considered as a very promising target for both passive and active immunotherapy. Discovery of cytotoxic T-lymphocytes in the blood of oncologic patients that recognize tumor associated human mucin MUC1 was the main driver for using MUC1 as a target in cancer therapy. This allowed the development of Anti-MUC1-Ab for cancer therapy that involved the immune system, as an alternative to traditional radio- and chemotherapy.

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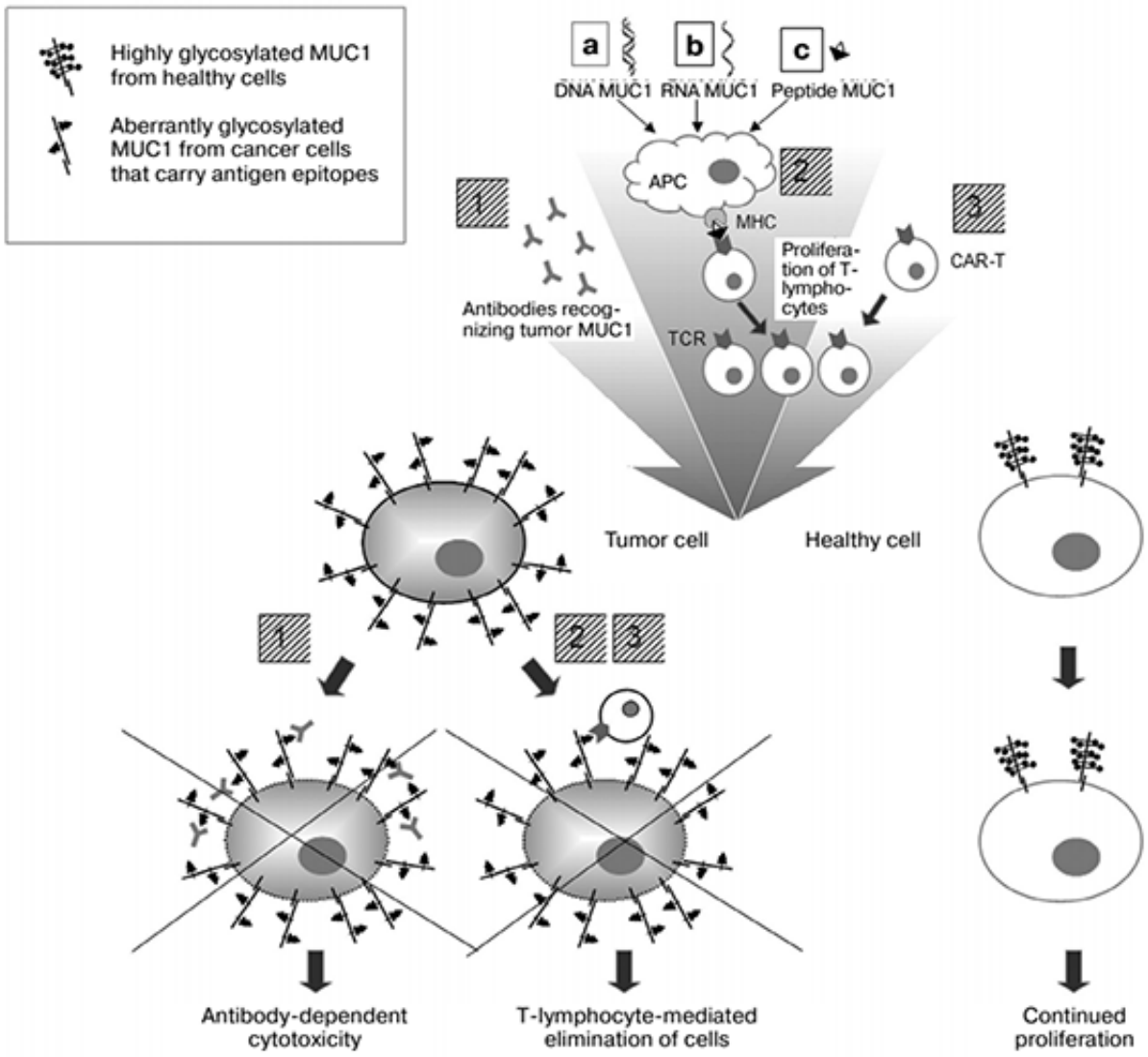


Figure. The application of human MUC1 in cancer immunotherapy.

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Status

The Status of Anti-MUC1-Ab

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Proprietary antibodies construct and methods of use are developed with clean IP. The development of Anti-MUC1-Ab is at the stage of preclinical trials, and other pipelines targeting MUC1 such as CAR-T cell, bispecific antibodies and antibody drug conjugates are being developed at the same time.



Data

Please feel free to contact us for non-confidential data.

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