

Significance of Glycobiology in Advancing Cancer Research by Using TN Antigens

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DESCRIPTION

Tumor-Associated Antigens (TAAs) are molecules or proteins that are expressed on the surface of cancer cells and can be recognized by the immune system. They are often used as targets for cancer immunotherapy and diagnostic purposes. Tumor-Specific Antigens (TSAs) are unique to cancer cells and are not found on normal, healthy cells. They result from mutations or genetic changes in the cancer cell's DNA. TSAs are ideal targets for cancer immunotherapy because they offer a specific target for the immune system to attack without harming healthy tissues. Examples of TSAs include neoantigens, which are antigens derived from tumor-specific mutations.

Various treatment of TAAs

Tumor-Associated Antigens (TAAs) that are present on both cancer cells and some normal cells but are overexpressed or aberrantly expressed in cancer cells. These antigens are not as specific as TSAs and may lead to some level of collateral damage to healthy tissues when targeted by the immune system. However, they are still valuable targets for cancer immunotherapy and can be used in various treatment approaches. Examples of TAAs includes

HER2 (Human Epidermal Growth Factor Receptor 2): Overexpressed in breast and other cancers.

PSA (Prostate-Specific Antigen): Elevated in prostate cancer.

CEA (Carcinoembryonic Antigen): Associated with colorectal and other cancers.

MUC1 (Mucin 1): Found in various epithelial cancers.

NY-ESO-1: A cancer-testis antigen expressed in several cancer types.

Tumor-associated Tn antigens

These are the type of tumor-associated antigen that is characterized by the exposure of an abnormal carbohydrate structure on the surface of cancer cells. Tn antigens are a subset

of glycans or glycoproteins that can be found on the cell surface or secreted by cancer cells. They are associated with certain types of cancers and are not typically present on healthy cells. The Tn antigen is characterized by the presence of an exposed N-acetylgalactosamine (GalNAc) sugar residue attached to serine or threonine residues of glycoproteins. The Tn antigen is a truncated or incomplete version of a larger carbohydrate structure called the O-linked glycans, which are common components of glycoproteins on the surface of cells. In cancer cells, the machinery responsible for adding additional sugar residues to these glycoproteins may become dysfunctional, resulting in the exposure of the Tn antigen. This abnormal glycosylation pattern is associated with the development of certain types of cancer.

Applications of TAAs

Immunotherapy: TAAs serve as targets for various immunotherapies, such as monoclonal antibodies, cancer vaccines, and adoptive T-cell therapies (e.g., CAR-T cells). These treatments aim to enhance the immune system's ability to recognize and attack cancer cells.

Diagnostic and prognostic tools: Detection of TAAs can be used in diagnostic tests, such as blood tests or imaging techniques, to identify cancer or monitor disease progression. The presence or level of certain TAAs can also be used to predict the prognosis of cancer patients.

Biomarkers: Some TAAs can be used as biomarkers to classify and subtype different types of cancer, which can guide treatment decisions and predict a patient's response to specific therapies.

CONCLUSION

It's important to note that Tn antigens are just one of many tumor-associated antigens, and their clinical application in cancer diagnosis and treatment is an on-going area of research. Their presence can be detected in certain types of cancers, including breast, colon, and ovarian cancers, and they have the

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potential to be used in the development of targeted therapies and diagnostic tools for these malignancies. Monoclonal antibodies

targeting Tn antigens have been developed for experimental cancer treatments.