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Journal of Clinical Chemistry and Laboratory Medicine

Short Communication

# Antibodies Specific for Glycan as Cancer Biomarkers: A Spotlight on Microarray Applications

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## ABOUT THE STUDY

Glycosylation is a complicated and widespread posttranslational modification that involves the enzymatic binding of carbohydrate chains, known as glycan's, to a protein or lipid. Glycan play many different roles in the body, including cell-cell adhesion, signaling, protein folding, receptor activation, and endocytosis. Because of its necessity and the lack of a common glycosylation pattern, one of the fundamental concerns of molecular biology is to study glycosylation. Since glycan are implicated in tumor invasion, angiogenesis, progression, and metastasis, studying glycan and their derivatives in the context of personalized medicine is a potential method for finding new cancer biomarkers, both prognostic and predictive. Aside from that, glycan are potential immunotherapy targets, and research in this area could be a viable strategy to diagnose and treat cancer [1].

CA 15-3, CA 125, and CA 19-9 (also known as sialyl-Lewis A [SiaLeA]) are carbohydrate antigens that are commonly applied as tumour markers. The most commonly used plasma marker for pancreatic cancer is CA 19-9. CA 19-9 and thrombospondin-2, a protein involved in the stimulation of TGF-, one of the key mechanisms in the start of pancreatic cancer, have both shown encouraging results in the early detection of pancreatic ductal adenocarcinoma. Prostate-Specific Antigen (PSA), Carcinoembryonic Antigen (CEA), and different mucins are other glycosylated serological tumour indicators used in clinical practise. Analysis of changes in the profiles of N or O-glycans, which are found during tumour transformation and could provide enough information about the patient's pathological status, is one of the available diagnostic techniques. The development of these glycans is a reflection of changes in the regulation and activity of the related glycosyltransferases and glycosidases, and the pattern of these enzymes is also diagnostic and predictive. Additionally, cancer cells are stimulated to multiply because glycoproteins and glycosphingolipids may be able to activate tyrosine kinases of growth factor receptors [2]. Aberrant glycosylation of proteins and lipids occurs during tumor transformation, resulting in the production of tumor-associated glycans that promote tumor invasion. Antiglycan antibody competences in the samples of healthy donors and cancer patients have been studied, and three types of anti-glycan antibodies have been identified. Glycan microarrays, which are immobilised on a substrate and contain hundreds of thousands of unique saccharides, are used to explore glycan specific interactions with antibodies and lectins. Furthermore, when detecting antiglycan antibodies in serum stored in various conditions, the levels of antiglycan antibodies did not differ considerably depending on the dates and conditions of storage of the sample; this should make analysis easier in the case of glycan use in the clinic. The first group consists of conservative antibodies found in all (or almost all) healthy donors, with little variation in content, affinity, or epitope specificity [3]. Antiglycan antibody repertoires vary widely depending on the isotype of immunoglobulins G, A, or M. These variances could be due to the population's features and physiological state, as well as the stage and location of the disease in cancer patients. Antibody levels can rise by more than ten times in response to vaccination or pathogenic infection [4]. Antiglycan antibodies have been examined for the diagnosis of high grade serous ovarian cancer. Glycan microarrays are currently the most common and promising technique for evaluating glycans and antiglycan antibodies. Additionally, competition for antigen binding between antibodies of different isotypes may arise, with the outcome depending on the specificity, affinity, concentration, and isotype itself. IgG and IgA appear to have a stronger affinity than IgM during the formation of an immune response when created by lymphocyte immunoglobulin type alterations. The capacity to adequately cover the glycosylation spectrum of proteins and the application of trace amounts of glycans and small volumes of a sample for analysis are advantages of this technology. Glycan microarray analysis provides for the clarification or suggestion of the involvement of structures, including glycans, in the formation of diverse biomarkers for cancer, infectious and autoimmune diseases [5].

## CONCLUSION

Antibodies to tumor-associated glycans are a new and promising class of oncological disease biomarkers Changes in the levels of

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**Received:** 18-Feb -2022, Manuscript No. JCCLM-22-16222; **Editor assigned:** 21-Feb-2022, PreQC No. JCCLM-22-16222 (PQ); **Reviewed:** 08-Mar-2022, QC No. JCCLM-22-16222; **Revised:** 11-Mar-2022, Manuscript No. JCCLM-22-16222 (R); **Published:** 18-Mar-2022, DOI: 10.35248/ JCCLM.22.05.210.
**Citation:** Wang C (2022) Antibodies Specific for Glycan as Cancer Biomarkers: A Spotlight on Microarray Applications. J Clin Chem Lab Med. 5:210

tumor associated with glycans are reflected in the levels of corresponding antibodies to them, allowing the glycosylation pattern to be analyzed without the need for time-consuming glycan studies. The wide range of glycans and antibodies that go with them makes it impossible to say that the research done so far is exhaustive. As a result, study in this area remains an attractive task.

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