

Cancer Biomarkers-A Short Note

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Cancer Biomarkers

A cancer biomarker refers to a substance or to a process that indicate the presence of cancer in the body. A biomarker may be a molecule secreted by a tumor or a specific response of the body to the presence of cancer. Genetic, epigenetic, glycomic, proteomic, and imaging biomarkers used for diagnosis, prognosis, and epidemiology of cancer. Biomarkers can be assayed in non-invasively collected biofluids like blood or serum.

Numerous challenges exist in translating biomarker research into the clinical space; a number of gene and protein based biomarkers have already been used at some point in patient care; including, Liver Cancer, Chronic Myeloid Leukemia, Breast/Ovarian Cancer, Melanoma/Colorectal Cancer, Ovarian Cancer, Pancreatic Cancer, Colorectal Cancer, Non-small-cell lung carcinoma, Breast Cancer, Gastrointestinal stromal tumor, Prostate Specific Antigen (Prostate Cancer), Melanoma, and many others.

Mutant Proteins themselves detected by SRM (Selected Reaction Monitoring) have been reported to be the most specific biomarkers for cancers because they can only come from an existing tumor. About 40% of cancers can be cured if detected early through examinations.

In cancer research and medicine, biomarkers are used in three primary ways

- To help and diagnose in the case of identifying in early stage cancers
- To forecast the aggressive condition in case of determining a patient's ability to fare in the absence of treatment
- To predict a patient will respond to treatment

Uses of biomarkers in cancer

- Risk assessment
- Diagnosis
- Prognosis and treatment predictions
- Pharmacodynamics and pharmacokinetics

- Monitoring treatment response
- Recurrence
- Developing drug targets
- Surrogate endpoints

Examples of Biomarkers

Tumor Suppressors Lost in Cancer. Examples: BRCA1, BRCA2

RNA. Examples: mRNA, microRNA.

Proteins found in body fluids or tissue. Examples: Prostate-specific antigen, and CA-125.

Antibodies to cancer antigens. Examples: Merkel cell polyomavirus

DNA. Examples: Circulating Tumor DNA (ctDNA)

Cancer biomarkers without specificity

Not all cancer biomarkers are specific to types of cancer. Some biomarkers are found in the circulatory system which can be used to determine an abnormal growth of cells present in the body. All these types of biomarkers can be identified through blood tests, which are main reasons to get regularly health tested. By getting regularly tested, many health issues like cancer can be discovered at an early stage, preventing many deaths. Unfortunately, it has been shown that in the presence of tumors it is highly active which has led to the conclusion that it may help malignant cells reproduce at faster rates. It is possible that it is involved in inhibiting the apoptosis, programmed cell death due to some defect.

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