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Commentary

Biomarker Testing for Cancer Therapy and its Significance

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DESCRIPTION

Biomarkers are characteristics of cancer cells that different from normal cells. They are detectable in your blood, tissue, or body fluids. Biomarkers are frequently used in cancer treatment to assist you choose the best treatment for you. These biomarkers can be proteins, genes, or mutations in genes. Biomarkers are frequently referred to by a three- or four-letter acronym. Biomarkers include HER-2 in breast cancer and EGFR in lung cancer.

Biomarkers in cancer are substances produced by the body or a tumour in response to cancer cells that serve to characterise the features of a cancer and influence the cancer's response to treatment. Biomarkers, also known as tumour markers, can aid in determining the characteristics of a tumour, the severity or grade of the malignancy, and the possible benefits of various cancer treatments.

The use of biomarkers in cancer treatment has changed the treatment of many types of cancer and promoted the adoption of a personalised approach to cancer treatment. Cancer biomarkers are discovered through gene or molecular testing and can be used to give a detailed image of a tumour.

TUMOR TESTING FOR BIOMARKERS

To identify the molecular properties of a cancer, tumour biomarkers are tested using body tissue samples, blood samples, or other physiological fluids. Molecular or genetic testing is the examination of genes or DNA in our cells to determine whether a specific biomarker is involved in cancer. If molecular testing identifies a biomarker in cancer cells, it can help to describe the tumours unique characteristics.

Biomarker testing can be done before, during, or after a cancer diagnosis and can save money on extra testing. A recent study, for example, found that checking for two biomarkers in urine may assist some men avoid having to undergo needless biopsy to diagnose a suspected prostate cancer.

SIGNIFICANCE

Cancer biomarkers function in a variety of ways in the body and in response to various treatments. One sort of biomarker stimulates cells, leading them to proliferate abnormally. The HER-2 protein has been shown to control aberrant cell development in breast cancer and other malignancies. When proteins or cells are overexpressed, i.e. there is more target protein growth than is necessary; the cells are considered HER-2 positive. This could lead the cells to spread swiftly or possibly metastasis to other parts of the body. Here, therapies can be developed to disrupt the HER 2 protein's signalling pathway, halting cancer spread.

Biomarkers that aid in treatment at the cellular or molecular level, such as the *SPARC* gene, are an excellent illustration of this application. It is an acronym for secreted protein, acidic, cysteine-rich gene, and it aids in the transport of albumin into cells. Certain chemotherapy medicines bind to albumin and prevent them from reaching their target cells. As a result, the biomarker can be employed to aid in the delivery of albumin-attached therapies to their target cells.

There are various biomarkers that can halt the treatment's cell or molecular function. Platinum-containing chemotherapy medicines have the potential to alter tumour DNA. *ERCC1* is in charge of fixing this, and if it is detected at levels higher than those seen in platinum-based medications, the treatment will be ineffective.

Certain genes found in people's DNA can also indicate an elevated risk of cancer. Those who have *BRCA1* or *BRCA2* gene mutations may be at an increased risk of developing prostate, breast, or ovarian cancer. No inherited gene effects are detected using genetic biomarkers. Cancer cells' DNA differs from that of healthy cells. These include tumor-specific genes and their molecular structure, where cancer biomarkers have been used to treat patients.

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