Brief Report
Volume 13:2, 2022

Journal of Molecular Biomarkers & Diagnosis

ISSN: 2155-9929 Open Access

Effect of Biomarkers in Molecular Medicine

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About the Study

Current cancer diagnostic imaging methods are time-consuming and costly, particularly when screening large asymptomatic populations. Noninvasive screening methods that detect cancers in their early stages are essential for effective screening strategies. The use of molecular markers as tools for cancer detection and prognosis is gaining popularity. Newly discovered cancer biomarkers and advances in high-throughput technologies are expected to revolutionise cancer therapies by improving cancer risk assessment, early detection, diagnosis, prognosis, and therapeutic response monitoring [1-3]. These biomarkers will be used as stand-alone tests or in conjunction with existing imaging methods.

There has been significant progress in both the understanding and treatment of cancer over the last three decades. Cancer remains the second leading cause of death in the United States, and the Director of the National Cancer Institute (NCI) has challenged the cancer community to eliminate cancer-related suffering and death by 2015. Achieving this goal will necessitate not only improved therapies, but also improved methods for assessing an individual's risk of developing cancer, detecting cancers at an early stage when they can be treated more effectively, distinguishing aggressive from nonaggressive cancers, and monitoring recurrence and response to therapy. Improving methods for screening asymptomatic populations for early stage cancers is a particularly difficult problem.

Future Prospective

Achieving this goal will necessitate not only improved therapies, but also improved methods for assessing an individual's risk of developing cancer, detecting cancers at an early stage when they can be more effectively treated, distinguishing aggressive from nonaggressive cancers, and monitoring recurrence and response to therapy. Improving methods for screening asymptomatic populations for the presence of early stage cancers is a particularly difficult problem. The American Cancer Society recently recommended a variety of diagnostic tests to screen populations for the early detection of many cancers with a high incidence, including breast, colon, and prostate cancer [4]. However, there are no viable screening methods for other common cancers, such as lung cancer.

While diagnostic imaging methods can be used to identify cancer patients, many are too time-consuming and costly for screening large asymptomatic populations. Furthermore, some have encountered resistance from the general public because they can be embarrassing or inconvenient, limiting their utility for screening this group. Furthermore, diagnostic imaging methods frequently miss smaller lesions, resulting in the disease not being diagnosed until it is advanced, when therapeutic intervention is usually less effective. In recent years, there has been a surge in interest and enthusiasm for molecular markers as cancer detection and prognosis tools, both as stand-alone diagnostic tools and to supplement existing imaging methods and technologies [5].

Cancers develop as a result of a series of genetic and/or epigenetic changes that alter the proteins expressed in the affected cells. Posttranslational modifications can change the levels of specific proteins, as well as their functions and distributions. These protein changes can have an impact on cell metabolism and physiology, cell growth and death, and the secretion of molecules that communicate with other cells and tissues. In the field of cancer research, molecular biomarkers are substances that indicate the presence of cancer in the body. Genes and genetic variations, differences in messenger RNA (mRNA) and/or protein expression, posttranslational protein modifications, and metabolite levels are all examples of biomarkers.

Conflict of Interest

None.

Acknowledgement

None.

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How to cite this article: Faria, Marcella. "Effect of Biomarkers in Molecular Medicine." J Mol Biomark Diagn 13 (2022): 513.

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Received 02-Feb-2022, Manuscript No. Jmbd-22-58195; **Editor assigned:** 04-Feb-2022, Pre QC No. P-58195; **Reviewed:** 16-Feb-2022, QC No.Q-58195; **Revised:** 21-Feb-2022, Manuscript No.R-58195; **Published:** 28-Feb-2022, DOI: 10.37421/ jmbd.2022.13.513.