Opinion
Volume 14:2, 2023

Journal of Molecular Biomarkers & Diagnosis

ISSN: 2155-9929 Open Access

Determination of Cancer Biomarkers using Molecularly Imprinting Polymers

Arunas Ramanaviciuse*

Department of Medical Sciences, Sumy State University, 40018 Sumy, Ukraine

Introduction

Biomarkers can provide critical information about cancer and many other diseases, so developing analytical systems for detecting biomarkers is an important direction in bioanalytical chemistry. Recently, molecularly imprinted polymers have been used in biomarker detection systems. Prostate cancer, breast cancer, epithelial ovarian cancer, hepatocellular carcinoma, and small molecule cancer biomarkers are all examples of cancer biomarkers. Cancer biomarkers can be found in tumors, blood, urine, feces, and other bodily fluids or tissues. It is technically difficult to determine low concentrations of biomarkers in these complex matrices. MIP-based biosensors were used in the studies reviewed to assess natural or artificial samples such as blood, serum, plasma, or urine. The principles of MIP-based sensor creation and molecular imprinting technology are described.

Description

Sensor and biosensor development is one of the most recent directions of analytical chemistry, so sensor development technologies are evolving quickly. The majority of sensor challenges are related to the sensitivity and selectivity of the recognition system. Polymers are frequently used to improve sensor analytical performance, particularly selectivity towards targeted analytes. Some polymer-based structures have unique electrical conductivity and can be used to modify various signal transducers. The most common methods for forming unique polymeric structures are chemical, electrochemical, enzymatic, and/or microorganism-assisted conducting polymer formation. To increase the selectivity of developed biosensors, various biomaterials, antigens, antibodies, and receptors are immobilised within and/or over polymers during the design of the biological recognition system [1].

However, these materials are not very stable and are usually quite expensive; thus, there is a need to develop less expensive and more stable biorecognition systems suitable for sensor designs. The most appealing approach to replacing natural biological recognition systems is to use molecularly imprinted polymers. Electrostatic and hydrophobic interactions between monomers and template molecules are important in the template molecules' specific binding to the MIP. The removal of template molecules is an important step in the preparation of the majority of MIPs. The term "gate effect" is used to describe the electrochemical readout of MIP sensors. Electrically conducting polymer-based structures are used among the various MIP-based structures. The population's great potential and interest gained diagnostics from point-of-care devices, which enable self-health monitoring and management [2-5].

***Address for Correspondence:** Arunas Ramanaviciuse, Department of Medical Sciences, Sumy State University, 40018 Sumy, Ukraine; E-mail: arunasraman@gmail.com*

***Copyright:** © 2023 Ramanaviciuse A. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.*

Received: 02 February, 2023, Manuscript No. jmbd-23-93662; **Editor Assigned:** 03 February, 2023, PreQC No. P-93662; **Reviewed:** 16 February, 2023, QC No. Q-93662; **Revised:** 21 February, 2023, Manuscript No. R-93662; **Published:** 28 February, 2023, DOI: 10.37421/2155-9929.2023.14.569

Conclusion

Finally, MIP-based electrochemical biosensors were used to detect various cancer biomarkers such as proteins or small molecules. As a result, it may be a viable alternative to costly and time-consuming laboratory tests. In the reviewed articles, gold was primarily used for electrodes. Other electrodes, such as GCE and LSG electrodes, were combined with gold nanoparticles. Because of its ease of use in clinical settings, SPE has recently become a popular option. Because determining multiple biomarkers is usually required for cancer detection, developing biosensors capable of detecting multiple biomarkers at the same time would be advantageous. In comparison to routine laboratory tests, these biosensors provide a simple, sensitive, and low-cost analysis required for early cancer detection.

Acknowledgement

None.

Conflict of Interest

There are no conflicts of interest by author.

References

1. Canaud, Guillaume and Joseph V. Bonventre. "Cell cycle arrest and the evolution of chronic kidney disease from acute kidney injury." *Nephrol Dial Transplan* 30 (2015): 575-583.
2. Schnaper, H. William, Sara Jandeska, Constance E. Runyan and Susan C. Hubchak, et al. "TGF-beta signal transduction in chronic kidney disease." *Front Biosci* 14 (2009): 2448.
3. Guo, Li-Juan and Qing-Yun Zhang. "Decreased serum miR-181a is a potential new tool for breast cancer screening." *Int J Mol Med* 30 (2012): 680-686.
4. Zeng, Rui-chao, Wei Zhang, Xing-qiang Yan and Zhi-qiang Ye, et al. "Down-regulation of miRNA-30a in human plasma is a novel marker for breast cancer." *Med Oncol* 30 (2013): 1-8.
5. Zhao, Fu-long, Yue-chao Dou, Xue-fei Wang and Da-cheng Han, et al. "Serum microRNA-195 is down-regulated in breast cancer: A potential marker for the diagnosis of breast cancer." *Mol Biol Rep* 41 (2014): 5913-5922.

How to cite this article: Ramanaviciuse, Arunas. "Determination of Cancer Biomarkers using Molecularly Imprinting Polymers." *J Mol Biomark Diagn* 14 (2023): 569.