Mini Review

Recent Development of the Electrochemical Sensors for miRNA Detection

Xianjin Xie, Jinyao Liu, Mengkui Ding, Xiaoyu Yang, Yaru Peng, Yuefeng Zhao,
Ruizhuo Ouyang*, Yuqing Miao

Institute of Bismuth Science, University of Shanghai for Science and Technology, Shanghai 200093,
P. R. China

*E-mail: ouyangrz@usst.edu.cn

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MicroRNAs (miRNAs) are a family of non-protein-coding, endogenous, small RNAs that play a significant role in gene expression and biological processes. The expression level and types of miRNAs are strictly related to the early diagnosis, targeted therapy, and prognosis of diseases. miRNAs are therefore considered as ideal biomarkers of some diseases, especially cancers. It is thus important and necessary to detect miRNAs using a sensitive, accurate, specific, simple and fast method. Electrochemical sensors have attracted wide attention for sensing biomolecules because of the unique properties, such as simple operation, low cost, fast response, good stability and high sensitivity. In this review, we mainly summarize recent developments in electrochemical miRNA biosensors. We cover a diverse range of electrochemical miRNA sensors, including early electrochemical miRNA sensors, as well as the improvement of electrochemical miRNA sensors and the detection of two miRNAs. While electrochemical miRNA sensors still suffer from the inability to achieve high-throughput detection and cumbersome construction of the entire sensor, their shortcomings will reorient the development of electrochemical detection of miRNA that will make its application possible in the field of biomedical research and clinical analysis.

Keywords: miRNAs, electrochemical sensors, signal amplification, probe immobilization, detection of two miRNAs

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