Exploring Long Noncoding RNA Dysregulation in Cancer Using Electrochemical Sensing Platforms

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One of the keys to reduce cancer mortality is its early diagnosis. Investigations on early detection of cancer should address in parallel two important issues: the identification of selective tumour biomarkers and the development of effective tests to clinically validate them. Long noncoding RNAs (lncRNAs) are part of the transcriptome that does not code for proteins but have important functions in different mechanism of gene regulation. They are deregulated in a number of cancers, with both oncogenic and tumour suppressive roles [1]. In consequence, lncRNAs have become new an important players in the clinical diagnosis of cancer and its treatment. But to effectively translate them to the clinical practice, it would be necessary to develop new and robust methods to detect the expression levels of lncRNAs in biological fluids and tissues.

The use of hybridization-based electrochemical biosensors results particularly appealing for the detection of lncRNA in clinical samples, with potential to meet the demands of selectivity, sensitivity, simple use, portability, and multiplexed detection, although their application to cancer-related lncRNAs monitoring is scarce [2]. Using this approach, we have developed bioelectrochemical platforms for the detection of different circulating lncRNAs overexpressed in prostate and colorectal cancer. These platforms have been combined with Molecular Biology tools to analyze total RNA extracts from tumour-derived cell lines, as well as accessible body fluids from cancer patients and healthy individuals, urine for prostate cancer and blood plasma in the case of colorectal cancer [3,4]. Our results, compared with those provided by real-time reverse transcription polymerase chain reaction (RT-qPCR) as a reference, demonstrated that these new tools would be useful as liquid biopsy test for cancer diagnostic.

References

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