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Rapid and Sensitive MiRNA Detection in Biofluids Using Ultra Microelectrode Sensors.

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Summary:

MiRNA are short nucleic acids sequences that are correlated to many important genetic cascades response, immune response being among one of the most important. Our previous sensors, able to detect DNA, is now used not only to detect miRNA sequences in plasma but it's also adapted to work with a portable potentiostat, making the aim of an electrochemical sensor on field more realistic.

Keywords: #miRNA #Bovinehealth #electrochemestry #microelectrode #IDE

Headlines

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Background, Motivation an Objective

MiRNA, despite their limited dimension once matured compared to the average mRNA, are oligonucleotide sequences that help to regulated different genetic signals cascades and some of them are considered potential new biomarker for different pathologies, miRNA21 being among them one of the most studied [1]

As proved by our comparison with the gold standard for miRNA study, qPCR, we noticed the difficulties in using this techniques to discriminate between miRNA21 different threshold of concentration related to immunoresponse [2], consequentially we used a previous work done on our chip sensor [3] to be readapted to a microarray-like structure mediated by chitosan and glutaraldeide on the working electrode, we tested spiked solution of plasma both using commercial potentiostat and our prototype developed from the schematics of Dr. Aidan Murphy thesis [4]

Description of the New Method or System

The comparison with qPCR using the same spiked plasma samples has let focused on the large range possible, this is related to the limits of both techniques since qPCR has shown a still superior quality, it' unable to detect the metabolic threshold related to immune-response, this is even more improved by the use of portable prototype (Fig.2)

Results

We have been able to cover a large range of Molarity specific for miRNA21, resulting in a R^2 of 0.98, with a portable system that have the potential to be cheaper

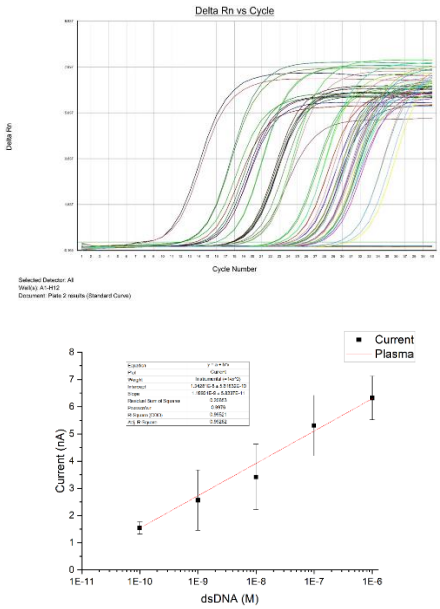

Fig. 1. Comparison between qPCR and our methods.

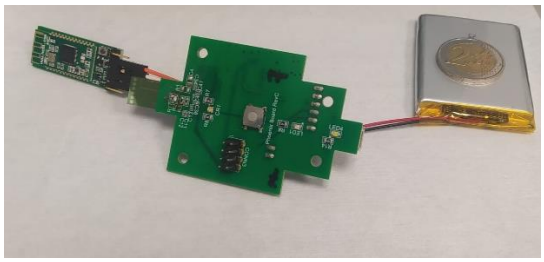

Fig. 2. Architecture of prototype and sensor chip

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