HP-49: A Simple Fluorescent Aptasensor Based on MXene for Amoxicillin detection

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Subject description: In this study, our focus was on the development of a sensitive and a selective biosensor based on FAM labelled aptemer and FRET process using 2D nanosheet MXene as a quencher of fluorescence for amoxicillin detection.

Objectives: The use of amoxicillin in human and veterinary medicine can result in the appearance of residues in food and the aquatic environment, which poses undesirable health risks for consumers. To help overcome this problem, it may be advantageous to detect and measure the levels of amoxicillin residues. Therefore, we propose a simple, sensitive and selective aptasensor for amoxicillin detection.

Methods: to realize the fluorescent aptasensor, MXene was used as agent of fluorescence quenching. Firstly, the MXene concentration and quenching time were optimized. Than the detection of amoxicillin was realized in a 96-well black microplate, for which an appropriate volume of FAM-Apt was incubated with different concentrations of AMOX, then MXene solution was added to the mixture and stirred. Finally, the fluorescence intensity was measured.

Results and discussion: Fluorescence measurements showed a wide linear range from 100 to 2400 ng/ml and a low detection limit of 1.53 ng/ml witch was lower than those reported amoxicillin detection assays. The selectivity of this detection system was tested and the result confirms that the developed aptasensor has excellent specificity for the detection of AMOX, indicating its potential application in complex matrices.

Conclusion: The developed aptasensor is excellent for the detection of AMOX, this detection system based on two-dimensional MXene nanosheets, has the potential to be expanded in order to target other antibiotics. Thus widening the method's scope and offering potential for more comprehensive monitoring of various antibiotics.

Keywords: Amoxicillin, Aptamer, Aptasensor, Fluorescence, MXene