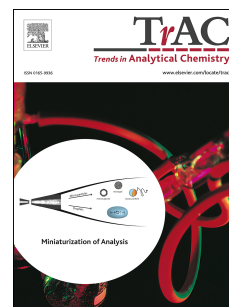


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ADVANCES IN APTAMERS-BASED LATERAL FLOW ASSAYS

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Abstract

The use of lateral flow assays exploiting antibodies is well established in different fields due to their advantages, which include low cost, ease of production and rapid response, with the only required end-user intervention being sample addition. In recent years, aptamer-based lateral flow assays are garnering increasing interest offering a highly cost-effective and more flexible alternative to antibodies. In this review, an overview of the aptamer-based lateral flow assays developed to date is provided, highlighting the advantages of using aptamers and their ability to be incorporated into formats not possible with antibodies.

Keywords

Aptamers; Lateral flow aptamer assays; Point-of-care; Point-of-need; Sandwich aptamer assay; Competitive aptamer assay

1. Introduction

Aptamers are nucleic acids that can bind to a wide range of diverse targets, from small molecules to proteins and even cells [1–7]. Aptamers offer several advantages over their antibody counterparts, including their flexibility to adapt to different assay formats. Once aptamers are selected they can be synthesised with high reproducibility and purity and are chemically stable, being able to recover their native conformation following denaturation. Furthermore, aptamers can be selected against specific regions of targets [8,9], which is sometimes difficult for antibodies, since the animal-immune system is inherently generated towards specific epitopes on target molecules. Aptamers possess excellent selectivity and affinity toward their targets, binding with dissociation constants (K_D) ranging from picomolar to nanomolar [10,11]. Small variations in the target molecule can disrupt aptamer binding, as exemplified by the

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