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Lateral Flow Assay Nano-Aptasensors for Mycotoxins Detection

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Aptamers are short, single-stranded oligonucleotides that have high affinity, and specificity toward their targets. [1] Aptamers often undergo significant conformational changes upon target binding, and many sensing strategies have been proposed to detect targets based on these conformational changes. Aptamers have been proposed as alternatives to antibodies in many different applications. Aptamer based biosensors have received considerable interest from numerous scientific communities. Mycotoxins are a class of contaminants that require regulation in foods and feeds to maintain good quality, and to reduce negative impacts on human health. The development of biosensors for various mycotoxins has been an expanding field of research in recent years. A wide range of devices have been developed and reported in scientific literature. [2] In this study, we used BioT-aptamer functionalized nanonanomaterials (aptamer-assembled nanoparticle (NP) aggregates) which show target (mycotoxin) - induced disassembly of the aggregates, resulting in a change of optical properties (colour and the SPR) [3]. Lateral flow assays were developed and their performance was tested with various mycotoxins spiked into real samples. The approach is rapid, simple, inexpensive, and time efficient and could be applied to the construction of efficient biosensor devices.