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Colocalization recognition-activated cascade signal amplification strategy for ultrasensitive detection of transcription factors

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Abstract

Transcription factors (TFs) bind to specific double-stranded DNA (dsDNA) sequences in the regulatory regions of genes to regulate the process of gene transcription. Their expression levels sensitively reflect cell developmental situation and disease state. TFs have become potential diagnostic markers and therapeutic targets of cancers and some other diseases. Hence, high sensitive detection of TFs is of vital importance for early diagnosis of diseases and drugs development. The traditional exonucleases-assisted signal amplification methods suffered from the false positives caused by incomplete digestion of excess recognition probes. Herein, based on a new recognition way-colocalization recognition (CR)-activated dual signal amplification, an ultrasensitive fluorescent detection strategy for TFs was developed. TFs-induced the colocalization of three split recognition components resulted in noticeable increases of local effective concentrations and hybridization of three split components, which activated the subsequent cascade signal amplification including strand displacement amplification (SDA) and exponential rolling circle amplification

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