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Short Communication

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BRCA1 gene ultrasensitive spectrophotometric detection on endonuclease assisted target circle and hybridization chain reaction

Wenbin Tan

Jining Medical University, Chinax

Abstract:

In this work, we demonstrated a ultrasensitive approach for DNA assay base on endonuclease assisted target circle and the hybridization chain reaction (HCR). The dual signal amplification process consists target DNA recognition, nicking enzyme triggered target circle, and hybridization chain reaction. In the presnece of target DNA, the hairpin probe DNA (HP1) was recoginized and partially hybridized with the target to form double-stranded strutures contianing the full recognition sequences for nicking endonuclease. Under the reaction of nicking endonuclease, HP1 was cleavaged into two fragments (trigger DNA and DNA S1) and the target DNA was dissociated from the DNA duplexes. The releasing DNA S1 was able to initiate another endonuclease assisted target circle with the assistance of hairpin probe DNA (HP2). The dissociated target DNA and DNA S1 from the two endonuclease assisted reaction can recognize with other HP1 and HP2 and repeat the hybridiation and cleavage process. Through the ndonuclease assisted cyclical process, a large number of trigger DNA was produced. The resulting trigger DNA can bind to the microplate immobilized capture DNA and the trigger the hybridization chain reaction, resulting in the production of numerous duoble strands DNA with biotin lablling. In the presence of streptavidin conjugated horseradish peroxidase (HRP), the amplified signal can be detected by spectrophotometer via HRP catalyzed substrate 3, 3' 5, 5'-tetramethylbenzidine (TMB). This proposed signal amplification method provides a detection limit of 0.4 aM, which also exhibits a good linearity ranging from 1 aM to 10 nM.

Biography:

I was born on December 5, 1960 in an area now known as region Dalmatia, currently Split Croatia. I graduated from Split Gymnasium in 1969 with an Associate of Arts Degree in Humanities and Science.