DNA-templated fluorescent silver nanoclusters for screening of homo-adenine binding molecules

박기수, 박현규*
KAIST
(hgpark@kaist.ac.kr*)

A novel, label-free, fluorescent turn-on detection system for screening of homo-adenine binding molecules, which employs DNA-templated silver nanoclusters (DNA-AgNCs) as a key detection component, has been developed. The new strategy relies on the formation of Non-Watson-Crick homo-adenine DNA duplex through the high affinity interaction between adenine-rich DNA sequence and its binding molecule, which brings guanine-rich sequence in proximity to DNA-AgNCs. This phenomenon transforms the weakly fluorescent AgNCs into the highly emissive species, which results in the emission of bright red fluorescence. By utilizing this turn-on assay, we have successfully identified a coralyne molecule, which is known to selectively bind to homo-adenine and subsequently trigger the formation of non-Watson-Crick homo-adenine DNA duplex. Importantly, this new method is well suited to high-throughput screening system for the identification of candidate molecules binding to homo-adenine because it is simply operated without the complicated modifications and technical expertise.