

Mismatched pyrrolo-dC-modified duplex DNA as a novel probe for sensitive detection of silver ions

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We have developed a new technology that enables the reliable detection of silver ions. The method takes advantage of the unique fluorescence property of a mismatched pyrrolo-dC(PdC)-modified duplex DNA, which serves as the key detection component, and the specific interaction of this duplex with silver ions. The new sensing strategy exhibits high selectivity and sensitivity and it does not require the use of procedures to pre-incorporate fluorophore or quencher labels. The latter feature is one of the greatest merits of the new fluorescence-based method. In addition, the novel concept has been successfully extended to the detection of biological thiols that is based on their specific and tight binding to silver ions. To the best of our knowledge, this is the first study showing that a specific interaction of a metal ion (e.g., Ag⁺ ions) with a fluorescent mismatched nucleobase pair can be employed as the basis for a new type of metal ion sensing system. As a result, the observations made in this study could serve as the basis of new sensing strategies that utilize optical and binding properties of nucleobases and/or their analogs.