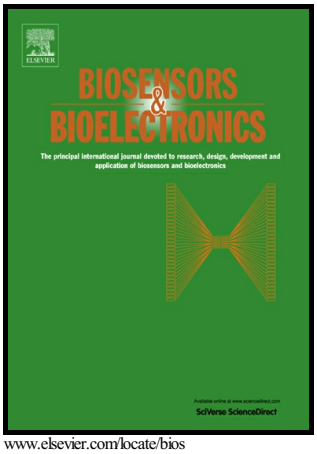

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Ruoyu Wang, Xiaohong Zhou, Hanchang Shi, Yi Luo

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T-T mismatch-driven biosensor using triple functional DNA-protein conjugates for facile detection of Hg^{2+}

Ruoyu Wang [a], Xiaohong Zhou [a*], Hanchang Shi [a] and Yi Luo[a]

[a] State Key Joint Laboratory of ESPC, Center for Sensor Technology of Environment and Health, School of environment, Tsinghua University, Beijing 100084, China;

Corresponding author: xhzhou@mail.tsinghua.edu.cn.

Abstract: We report herein a T-T mismatch-driven biosensor using triple functional DNA-protein conjugates for facile detection of mercury ions (Hg^{2+}) based on evanescent wave fluorescence excitation. Fluorescein-labeled DNA strands and streptavidin molecules were conjugated using heterobifunctional crosslinkers，and the obtained conjugates were named as "Hg^{2+} dependent conjugates, HDCs". Initially hybridized with quencher-labeled DNA (Q-DNA) strands, HDCs showed low evanescent wave-induced fluorescence emission signals; However, in the presence of Hg^{2+}, the DNA moieties of HDCs tended to form hairpin structures stabilized by T-T mismatches, releasing Q-DNA strands, which was accompanied by increases in the fluorescent signals. The novel detection strategy enables the fluorescent detection of mercury ions with high specificity and a low detection limit of 1.06 nM in a facile way.

Keywords: DNA-protein conjugates; Mercury; T-T mismatch; Evanescent wave; Optical fiber biosensor