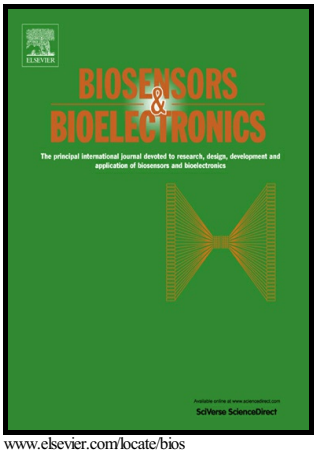

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DNAzyme-integrated plasmonic nanosensor for bacterial sample-to-answer detection

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PII: S0956-5663(16)30989-7
DOI: http://dx.doi.org/10.1016/j.bios.2016.09.103
Reference: BIOS9215

To appear in: *Biosensors and Bioelectronic*

Received date: 2 August 2016
Revised date: 18 September 2016
Accepted date: 28 September 2016

Cite this article as: Fang Yu, Yun Li, Mingyu Li, Longhua Tang and Jian-Jun He, DNAzyme-integrated plasmonic nanosensor for bacterial sample-to-answe detection, *Biosensors and Bioelectronic* http://dx.doi.org/10.1016/j.bios.2016.09.103

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ABSTRACT

Pathogenic bacteria pose a serious threat to public safety and health, and cause significant losses in the global economy and in lives. The current golden standard, culture-based method, for bacterial detection is often costly, laborious, and time-consuming (even weeks). Thus, there is an urgent need to develop rapid, reliable and easy-to-use approaches for bacterial detection. Herein, we present a new detection strategy termed as 'DNAzyme-Integrated Plasmonic Nanosensor' (DIPNs) that can selectively detect target bacteria in a simple, inexpensive and culture-free process, which combines real-time DNAzyme-based sensor and enzyme-responsive nanoplasmonic biosensor system. The DIPNs platform takes advantage of a bacteria-specific RNA-cleaving DNAzyme probe as the molecular recognition element and enzyme-responsive plasmonic nanoparticles' localized surface plasmon resonance (LSPR) as the signal readout. Using *Escherichia coli* (*E. coli*) as a model analyte, we demonstrated that the DIPNs system can