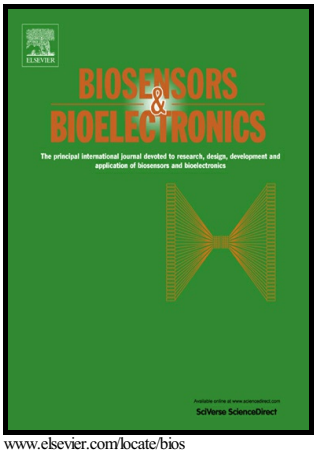

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Electrochemical Latent Redox Ratiometric Probes for Real-Time Tracking and Quantification of Endogenous Hydrogen Sulfide Production in Living Cells

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Abstract

Hydrogen sulfide (H_2S) was discovered as a third gasotransmitter in biological systems and recent years have seen a growing interest to understand its physiological and pathological functions. However, one major limiting factor is the lack of robust sensors to quantitatively track its production in real-time. We described a facile electrochemical assay based on latent redox probe approach for highly specific and sensitive quantification in living cells. Two chemical probes, Azido Benzyl ferrocene carbamate (ABFC) and N-alkyl Azido Benzyl ferrocene carbamate (NABFC) composed of azide trigger group were designed. H_2S molecules specifically triggered the release of reporters from probes and the current response was monitored using graphene oxide film modified electrode as transducer. The detection limits are 0.32 µM (ABFC) and 0.076 µM (NABFC) which are comparable to those of current sensitive methods. The probes are successful in the determination of H_2S spiked in whole human blood, fetal bovine serum, and *E. coli*. The continuous monitoring and quantification of endogenous H_2S production in *E. coli* were successfully accomplished. This work lays first step stone towards real-time electrochemical quantification of endogenous H_2S in living cells, thus hold great promise in the analytical aspects of H_2S.