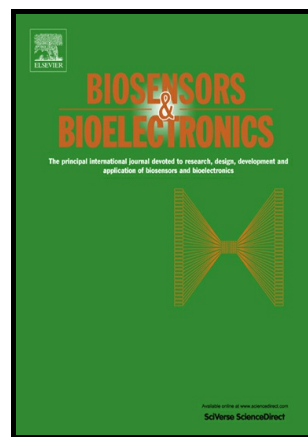


## Author's Accepted Manuscript

*In situ* grown DNA nanotail-templated silver nanoclusters enabling label-free electrochemical sensing of terminal deoxynucleotidyl transferase activity

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***In situ* grown DNA nanotail-templated silver nanoclusters  
enabling label-free electrochemical sensing of terminal  
deoxynucleotidyl transferase activity**

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**Abstract**

A novel label-free electrochemical strategy was established based on the unique electro-catalytic activity of graphene oxide (GO)-supported terminal deoxynucleotidyl transferase (TdT)-generated C-rich DNA nanotail-templated silver nanoclusters (DNA-AgNCs). TdT can catalyze the deoxycytidine triphosphate (dCTP) to the 3'-OH terminus of single-stranded DNA (ssDNA) with no template; then, in the presence of Ag(I), TdT-generated C-rich DNA sequence was employed for the synthetic template of AgNCs because of the formed complexes of nitrogen atoms of cytosine based with silver atoms. We proved that *in situ* grown DNA nanotail-templated AgNCs can be adsorbed on GO-modified electrode and possess high electro-catalytic activity to H<sub>2</sub>O<sub>2</sub> reduction, presenting a good electrochemical indicator for signal readout. Under optimal conditions, the proposed biosensor could be employed for quantitatively monitoring TdT activity and within a dynamic range from 0.4 to 90 U/mL and a low limit of detection is 0.08 U/mL. With high sensitivity

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