Electronic Supplementary Material (ESI) for Analyst.


# Cascade toehold-mediated strand displacement strategy for label-free and sensitivity non-enzymatic recycling amplification detection of the *HIV-1* gene

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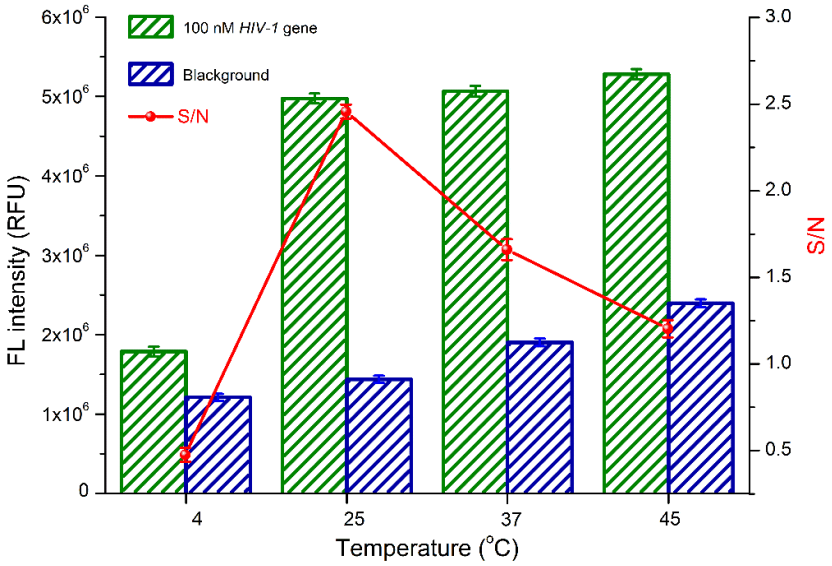


Fig. S1 Effect of the reaction temperature on the response of the sensing system. The histograms represent the fluorescence intensity of the solution in the presence of 100 nM *HIV-1* gene (green) and in the absence of the *HIV-1* gene (blue), respectively. The red line represents the S/N ratio. The corresponding error bars represent the standard deviation of three independent measurements obtained at each reaction temperature.

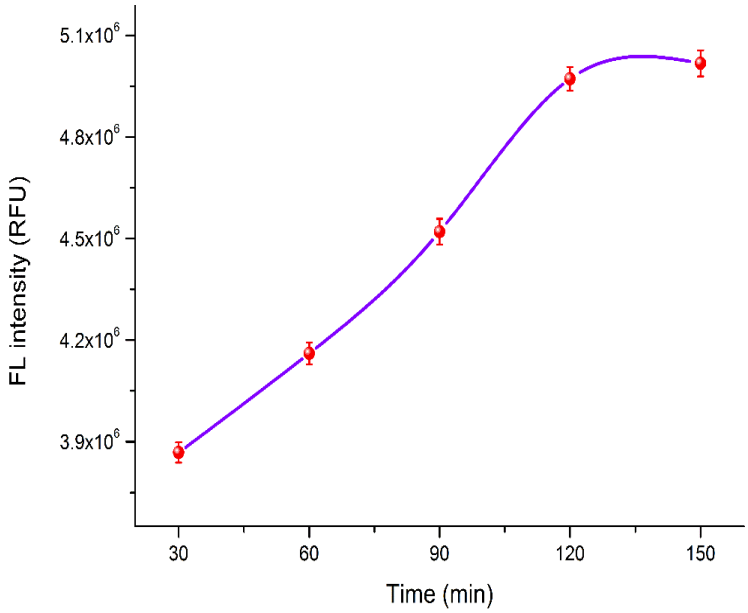


Fig. S2 Effect of the reaction time of the signal amplification on the fluorescence intensity of the proposed method for the detection of the *HIV-1* gene (100 nM). Reactions were performed at room temperature.

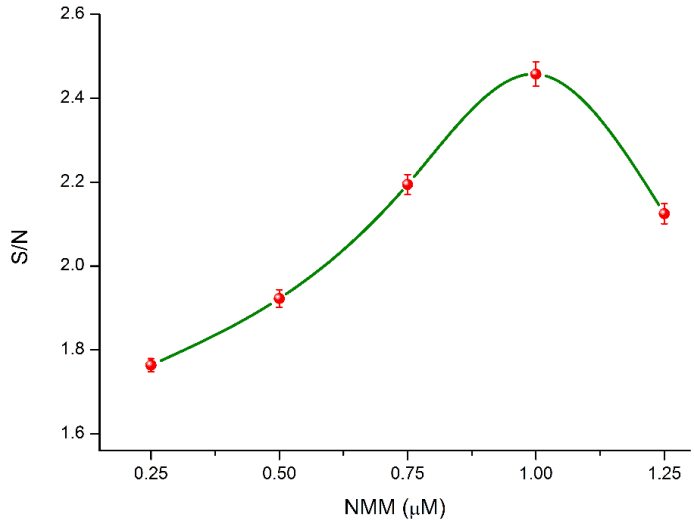


Fig. S3 Effect of the NMM concentration on the performance of the sensing system. The *HIV-1* gene concentration is 100 nM. Incubation temperature and reaction time were 25 °C and 120 min, respectively.

Table. S1 Comparison of the analytical methods capable of sensing the*HIV-1*gene

| Method | Linear range | Detection Limit | References |
|---|---|---|---|
| Electrochemical biosensor based on amperometry | 10 pM–50 nM | 18 pM | 1 |
| Electrochemical biosensor based on a nafion-graphene composite | 40 nM–2.56 μM | 5 nM | 2 |
| Electrochemical biosensor based on a Closed Bipolar | 100 pM–300 nM | 30 pM | 3 |
| Electrochemical biosensor based on a triplex-oligonucleotide probe | 0.1-10 nM | 54 pM | 4 |
| Colorimetry biosensor base on a multi-amplification Nanoplatform | 10 pM-120 nM | 4.8 pM | 5 |
| Fluorescence biosensor base on grapheme oxide | 7–80 nM | 3 nM | 6 |
| Fluorescence biosensor base on fluorescence polarization | 50 pM-8 nM | 9.12 pM | 7 |
| Fluorescence biosensor base onTMSDRs | 10 pM-1 μM | 1.9 pM | This work |

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