**Supplementary Information**

**Diagnosing viruses by the rolling circle amplified synthesis of DNAzymes**

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**Experimental Section**

**Materials:** Oligonucleotides 1, 2 and 4 (Genosys, Sigma), the deoxynucleotide solution mixture, dNTPs; T4 polynucleotide kinase, and Quick Ligation™ Kit (New England BioLabs, Inc.), M13mp18(+) STRAND DNA and polymerase Klenow fragment exo- (Amersham Biosciences Corp), hemin (Frontier Scientific, Inc.) were used without any further purification. A hemin stock solution was prepared in DMSO and stored in the dark at -20°C. The single-stranded calf thymus DNA, luminol, and H₂O₂ were purchased from Sigma.

**Circular DNA template preparation:** The circular DNA template was prepared as follows: First, the linear DNA (5’-GATCCTAACCCAACCGCCCTACCCAAACCCACAC-3’), 6×10⁻⁶ M, was phosphorylated using T4 polynucleotide kinase, 0.4 units/µl, the ligation template (5’-TTAGGATCGTGTT-3’), 3.6×10⁻⁵ M, in the Quick Ligation™ Kit buffer, at 37°C for 30 min. The synthesis was completed by the Quick Ligation™ Kit, using the manufacturer-supplied protocol. The enzymes were denatured by heating at 90°C for 10 min. The ligated circular DNA was then purified and separated from the ligation template by urea, 8 M, using a centricon filtration device (10,000 cutoff, Millipore Inc.).
**RCA assay:** In all systems fixed concentrations of the hairpin 4, $2 \times 10^{-7}$ M and the circular DNA 2, $2 \times 10^{-8}$ M were employed. Polymerase Klenow exo-, 0.4 units/µl and dNTPs, 0.2 mM were included. The RCA process was performed in a buffer solution consisting of 50 mM Tris-HCl, pH 7.5, 10 mM MgCl$_2$, 1 mM DTT and 50 µg/ml BSA.

**The conditions for the absorbance/chemiluminescence studies are as follows:**

Colorimetric measurement: The experiment was performed in a solution consisting of the products; hemin, $4 \times 10^{-7}$ M; H$_2$O$_2$, $4.4 \times 10^{-5}$ M; ABTS$^{2-}$, $1.82 \times 10^{-4}$ M in a buffer solution consisting of 25 mM HEPES, 20 mM KCl and 200 mM NaCl, pH 7.4, 25°C. Absorbance changes were followed at 415 nm to characterize the rate of the oxidation of ABTS$^{2-}$. Chemiluminescence measurements: Light emission experiments were performed using a photon counting spectrometer (Edinburgh Instruments, FLS 920) equipped with a cooled photomultiplier detection system, connected to a computer (F900 v.6.3 software). Measurements were made in a cuvette that included a buffer solution consisting of 25 mM HEPES, 20 mM KCl and 200 mM NaCl, pH 9.0, which included the product; hemin, $1 \times 10^{-9}$ M; 0.5 mM luminol and 30 mM H$_2$O$_2$. The light emission was monitored at $\lambda_{em}=420$ nm.