

## Smartphone-Based Device for Colorimetric Detection of microRNA Biomarkers Using Nanoparticle-Based Assay

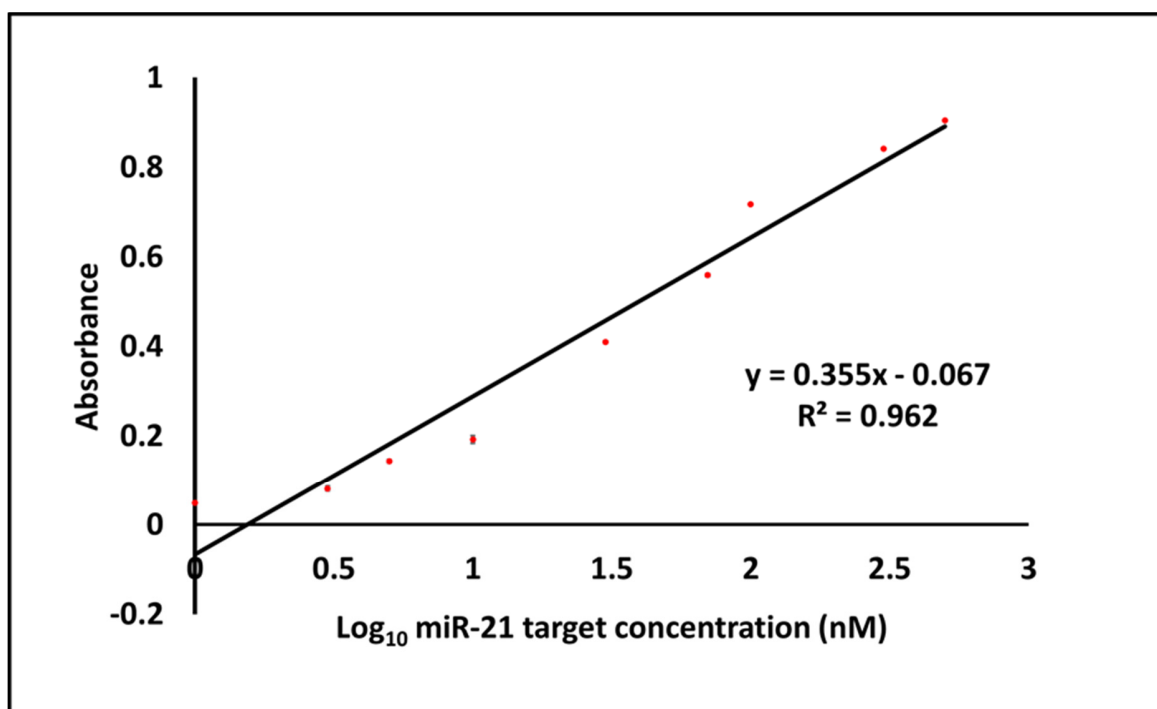
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**Figure S1.** Plot showing the absorbance difference ( $A_{412} - A_{650}$ ) of the calibration samples with the  $\log_{10}$  of their miR-21 target concentration on the x axis. Each measurement was performed thrice. The error bars show one standard deviation of variation in the measurements. The linear fit of the data ( $R^2 = 0.962$ ) was used as the calibration curve for calculating the concentration of the test samples.

### Sample Preparation

Sample preparation was adapted from the methods described in previous works [40, 41].

### **Preparation of silver nanoparticles**

Silver nanoparticles were prepared by swiftly adding 1 mL of a solution containing 15 mM hydroxylamine hydrochloride and 30 mM sodium hydroxide to 9 mL of 1.1 mM silver nitrate solution under vigorous stirring conditions for 1 hr. The colloidal solution was kept at 4°C and used within a few weeks.

### **Conjugation of oligonucleotide to silver nanoparticles**

Silver nanoparticles were incubated with 0.4  $\mu$ M thiolated DNA oligonucleotides (oligoA having the sequence 5'-SH- TCAACATCAGTCTGATAAGCTA-3' and oligoB having the sequence 5'-SH-TAGCTTATCAGAC-Cy3-3') in 0.25 mM magnesium chloride solution (total volume: 1mL) overnight at room temperature. To stabilize the solution, a mixture of 100 $\mu$ M mPEG-SH and 0.5 $\mu$ M mPEG-SH (MW 5000) was added for 10 min followed by the addition of 0.01% Tween 20. The functionalized nanoparticles were washed thrice with 10 mM Tris-HCl buffer (pH 8.0) containing 0.01% Tween 20 using repeated centrifugation at 12,000 rpm for 10 min. The purified nanoprobees were suspended in 1 mL of 10 mM Tris-HCl buffer (pH 8.0) containing 0.01% Tween 20 and kept at 4°C.

### **Materials**

Silver nitrate (99.995%) was procured from Alfa Aesar (Ward Hill, MA). Hydroxylamine hydrochloride and sodium hydroxide (pellet) were purchased from Avantor Performace Materials (Phillipsburg, NJ). SH-PEG-COOH (O-(2-Carboxyethyl)-O'-(2 mercaptoethyl)-heptaethylene glycol), Tris-HCl buffer (1 M, pH 8.0), magnesium chloride (1M) and sodium chloride (5M) were purchased from Sigma-Aldrich. mPEG-SH (MW 5000) was purchased from Nanocs, Inc. (Boston, MA) and Tween 20 (10%) was purchased from G-Biosciences (St. Louis, MO). All DNA oligonucleotides were purchased from Integrated DNA Technologies, Inc. (Coralville, IA).