Visual Detection of miRNA-122

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MicroRNAs (miRNAs) are involved with gene regulation by obstructing translation or by helping with the deterioration of mRNAs therefore suppressing the gene. A lack or surplus of miRNAs is related to various diseases including cancer. Specifically, miRNA-122 is prevalent in the liver and is believed to be important in tumor suppression. As a result, it is believed that decreased levels of miRNA-122 in the liver correlate with hepatocellular carcinoma (HCC), cancer of the liver. This experiment was designed to measure concentrations of synthetic miRNA-122 by a new assay that provides color change thus providing a means for the instrument-free point-of-care detection of HCC. It is hypothesized that a decrease in the concentration of synthetic miRNA-122 should lead to a reduced sample absorbance and color. Different concentrations of synthetic miRNA-122 were placed in separate samples and combined with two DNA probes, which can together cleave a reporter, IPDz, and release a guanine-rich DNA sequence. The sequence of guanines spontaneously folds into a G quadruplex structure, which is stained and used for the measurement of fluorescence by a uv/vis spectrophotometer. The average of each sample containing a different concentration of miRNA-122 shows that an increase in the concentration of miRNA-122 has an increase in the measure of absorbance at 500 nm and more intensive brown color. Therefore, the hypothesis that a decrease in the concentration of synthetic miRNA-122 should lead to a decrease in the level of absorbance when measured was supported.

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