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# Micotoroid Resonators for microRNA Quantitation

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# Microtoroid Resonators for microRNA Quantitation

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Increasing the rapidity, reliability, sensitivity, and cost-effective nature of biological assays for medically relevant molecules holds great potential to improve medical practice and make it more widely available. Many researchers have tapped into the potential of microresonators for ultra-sensitive detection and assays of proteins, oligonucleotides, pH, temperature, and chemicals. Microresonators provide highly sensitive detection on the order of picomolar concentrations, cheap and fast fabrication, recyclability, label-free detection, rapid detection time, accuracy in complex media, and multiplexing. Examples of microresonators include microrings, microspheres, and microtoroids.

To detect particles using microresonators, targets bind to the chemically altered surface and change the path of light traveling through the microresonators. This change is measured and used to detect individual particles or small concentrations of particles. The surface chemistries can be altered to optimize binding of a specific target biomolecule by attaching the appropriate functionalization, blocking, and probe chemistries. My research seeks to optimize surface chemistry and microfluidics while using a toroidal microresonator to detect specific miRNA's. Since miRNA's have recently been found to regulate multiple cancers and diseases, a cheaper, faster, and more accurate assay to analyze miRNA's would be beneficial.