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Label-Free Detection Platform for CircRNAs

Circular RNAs (circRNAs) hold great potential as novel biological and clinical biomarkers for diagnosis and prognosis of cancer and other diseases. Conventional detection techniques such as northern blotting, microarray, qRT-PCR and RNA-seq suffer from many issues including low sensitivity and background noise, which limit the use of circRNA in clinical applications. To realize the full potential of circRNA, better bioanalytical platforms are needed for sensitive and precise quantification of low abundance detection in complex biological samples.

Researchers at the Biodesign Institute of Arizona State University have developed a novel label-free, SPR-based detection platform for the rapid, simple, sensitive and specific detection of circRNA directly in various biological samples. This platform can utilize a microfluidic chip to decrease sample volume and reagent consumption. DNA nanostructures have been designed to act as transducers to enhance the SPR signal and increase specificity and sensitivity from the signal. Multiple target exon sites of circRNA can be detected simultaneously in a single sample, allowing for a more comprehensive analysis of the circRNA.

This platform represents a total analytical system to enable direct circRNA analysis with various biological samples for biological studies and clinical applications.

Potential Applications

- Label-free SPR-based circRNA detection
 - Cancer and other disease (AD, cardiovascular disease, etc.) diagnostics and prognostics

Benefits and Advantages

- Able to distinguish between linear and circular RNA
- Decreased sample volume and reagent consumption with use of microfluidic chip
- Label-free SPR biosensors can be integrated onto the microfluidic chip to enable real-time detection and identification of circRNA

- Improves both the sensitivity and specificity of label-free SPR detection of circRNA
- Rapid, simple, sensitive and specific detection of circRNA directly in various biological samples

For more information about the inventor(s) and their research, please see

[Dr. Yan's departmental webpage](#)

[Dr. Wang's departmental webpage](#)