Skysong Innovations
Advancing the Arizona State University Knowledge Enterprise

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Case ID:M06-076L^
Published: 4/14/2023

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High Speed, High Fidelity, High Sensitivity, Nucleic Acid Detection

Technologies capable of rapid and sensitive detection of single biomolecules is continuously evolving, and is now beginning to emerge as a very promising new tool for precision detection and identification. Application areas span analytical chemical and biochemical fields, with high potential economic impact in the genomic analysis, drug discovery, pathogen identification and diagnostics fields. Some of the most sensitive DNA detection technologies, such as surface-enhanced Raman scattering of DNA molecules bound to metal nanoparticles still require high concentrations of DNA-reporter aggregates, and suffer from non-specific binding and long incubation times.

Researchers at Arizona State University have developed a highly sensitive technique to detect target molecules. The technique utilizes a plurality of target-specific nucleic acid probes that are each complementary to a target nucleic acid, and ligation methods in combination with a molecular post and probe to detect specific targets without the need for amplification steps. Detection is accomplished using conventional methods such as fluorescence microscopy, surface plasmon resonance, gel electrophoresis etc. The technology is capable of detecting minute amounts of target molecules with high specificity very quickly.

Potential Applications

- Single-molecule DNA detection/sequencing
- Genomic analysis/gene expression analysis
- Diagnostics/drug discovery
- Proteomics
- Biophysical/biochemical basic research

Benefits and Advantages

- High speed - does not require lengthy sample incubation times
- High sensitivity - demonstrated detection of 1800 molecules of target DNA without the use of amplification
- High fidelity - able to distinguish between bound target and non-specific binding

For more information about the inventor(s) and their research, please see Dr. Frasch's departmental webpage