Enhanced Fluorescence Readout And Reduced Inhibition For Nucleic Acid Amplification Tests

Tech ID: 27060 / UC Case 2016-809-0

SUMMARY

UCLA researchers in the Department of Bioengineering have developed an enhanced fluorescent detection method for nucleic acid amplification tests.

BACKGROUND

Nucleic acid amplification tests are crucial elements in point-of-care diagnostics. The use of fluorescent dyes and probes is a common component of many nucleic acid amplification tests as they can provide a readout for a variety of methods including PCR, NASBA, RCA, MDA, LAMP, Immuno-PCR, etc. Real-time fluorescence monitoring of amplification often requires costly custom probes, or fluorescent intercalating dyes, such as EvaGreen, Sybr Green, Pico green, and others. However, these dyes can often hinder the amplification process, making their use more challenging and time-consuming. The development of a novel method or formulation preventing interference from the dye would allow for improved real-time fluorescence monitoring, reduced cost optical readout systems, and lower the limit of detection benefiting the nucleic acid amplification testing field.

INNOVATION

Prof. Dino Di Carlo and colleagues at UCLA have developed a novel enhanced fluorescent readout formulation containing a dye quenching reagent that not only allows for >50-fold enhanced signal in real-time fluorescent monitoring of amplification leading to lower limits of detection, but also decreased time to readout. Their formulation containing EvaGreen and a dye sequestering reagent reduced readout time to 25-40-mins for loop mediated isothermal amplification, roughly twice as fast as compared to using the dye alone. The technique has also been demonstrated in a single-molecule digital nucleic acid readout approach. This method allows for easy of integration of these dyes into amplification techniques without the need for costly custom probes.

APPLICATIONS

- Early and rapid nucleic acid detection of bacterial or viral infection
- Point-of-care diagnostics device

ADVANTAGES

- Formulation is easily incorporated into many nucleic acid amplification techniques
- Significantly improved signal generation allowing for lower limits of detection
- Real-time fluorescent readout for amplification analysis without costly reagents or readers
- Yields rapid results in 25-40 mins

STATE OF DEVELOPMENT

Researchers have validated their novel formulation using LAMP (Loop Mediated Isothermal Amplification) nucleic acid amplification techniques.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20190119737	04/25/2019	2016-809

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INVENTORS

- Di Carlo, Dino

OTHER INFORMATION

KEYWORDS

nucleic acid amplification, NAAT, nucleic acid amplification test, PCR, LAMP, Loop Mediated Isothermal Amplification, RCA, NASBA, point-of-care, EvaGreen, fluorescent test, fluorescent point-of-care

CATEGORIZED AS

- **Biotechnology**
  - Health
- **Medical**
  - Diagnostics
  - Disease: Infectious Diseases
  - Research Tools
- **Nanotechnology**
  - NanoBio

RELATED CASES

2016-809-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Integrated Isolation, Emulsification, And Single-Cell Assay
- Robust, Ultra-Flexible, Micro-Encoded Ferromagnetic Tape for Bioseparation and Assembly
- Controllable Emulsification and Point-Of-Care Assays Driven by Magnetic Induced Movement of the Fluid

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