

Fluorescent and Electrochemical DNA-Based Switches for Antibody Detection

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BRIEF DESCRIPTION

A novel DNA-based switch that enables the one-step quantitative detection of antibodies in complex samples (such as whole blood) and effectively reduces analysis time from a few hours to less than 5 minutes.

BACKGROUND

Despite the great importance of antibodies in biotechnology and as molecular markers for the diagnosis of many disease states, current methods for their quantitative detection in complex samples are cumbersome and protracted procedures. While the use of biomolecular switches for rapid detection of disease markers (DNA, RNA, proteins, etc.) in complex samples has been successful in simplifying clinical diagnostic procedures for many diseases, similar methods for the one-step quantitative detection of antibodies do not currently exist. Thus, more efficient methods for quantitative antibody detection could drastically speed up the clinical diagnosis process.

DESCRIPTION

Researchers at the University of California, Santa Barbara have developed a novel DNA-based switch, called “antibody beacon”, that enables the one-step quantitative detection of antibodies in complex samples (such as whole blood) and effectively reduces analysis time from a few hours to less than 5 minutes. The switches support a multitude of readout mechanisms such as optical, electrochemical, and catalytical outputs via a binding-induced structural change. As such, the antibody beacons are extremely versatile, and can be engineered to recognize virtually any antibody against small molecules (e.g. DNP or Dig), peptides (HIV epitope), and proteins. Finally, the switches are exceptionally cheap to produce, making them an ideal solution for the fast and quantitative detection of antibodies.

ADVANTAGES

- ▶ Effectively reduce antibody detection time to less than 5 minutes
- ▶ Can be easily and cheaply synthesized through a well established protocol
- ▶ Binding-specific switching mechanism is insensitive to the presence of other molecules in complex environments
- ▶ Switching can be coupled to any signaling mechanism based on donor-acceptor distance changes (fluorescence, electrochemistry, nanoparticles, quantum dots, etc.)

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INVENTORS

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OTHER INFORMATION

KEYWORDS

antibody detection, DNA-based switch, indpharma

CATEGORIZED AS

- ▶ **Biotechnology**
 - ▶ Genomics
- ▶ **Research Tools**
 - ▶ Antibodies
 - ▶ Nucleic Acids/DNA/RNA
 - ▶ Screening Assays

RELATED CASES

2011-023-0

- ▶ Switching is rapid and reversible, allowing continuous, real-time detection of antibodies

APPLICATIONS

- ▶ Antibody detection kits

This technology is available for licensing. Patent Pending.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	9,828,628	11/28/2017	2011-023

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ Drift-Free and Calibration-Free Measurement of Analytes
- ▶ Drift-Free, Self-Calibrated Interrogation Method For Electrochemical Sensors Based On Electron Transfer Kinetics
- ▶ Electronic Detection Of Molecular Targets, Including Proteins, Oligonucleotides And Other Small Molecules
- ▶ Electronic Detection Of Molecular Targets, Including Proteins, Oligonucleotides And Other Small Molecules
- ▶ Dual-Labeled E-AB Platform for Continuous, Real-Time Monitoring of Small Molecules

