

Detects, Differentiates and Identifies:
Anthrax, Small Pox, Plague and Tularemia

Rapid Detection, Differentiation and Identification of Selected Category A Biological Agents

Bioterrorism involves the deliberate release of harmful biological agents, such as anthrax and tularemia, ranging from hoaxes and use of non-mass casualty agents by individuals or small groups in small scale targeted attacks to state-sponsored terrorism that employs biological weapons of mass destruction. Biological weapons include any pathogen (bacterium, virus or other disease-causing organism) or biotoxin that can be used to kill, seriously injure or incapacitate. They are characterized by low visibility, high lethality, broad accessibility and relatively easy delivery.

Current advancements in biotechnology and availability of knowledge have also been accompanied with increasing cases of misuse of biotechnology, such as the ability to develop powerful biological weapons easily, thus rendering the threats posed by bioterrorism more imminent now than at any point in history. In the event of a biological attack, the early detection and identification of the bioagent(s) used is critical to allow the authorities to take the necessary actions and appropriate measures, such as containment and decontamination, to prevent further damage and protect public health.

This highlights the need for reliable bioagent detection systems, to be able to rapidly detect targets with high sensitivity and specificity. Bioagent detection systems need to be able to differentiate between biological threats and strains that pose no biological threat. The ideal system also needs to be able to detect low concentrations of multiple targets without interference from an often complex mix of background materials.

To meet this need, the VereThreat™ assay, together with the VerePLEX™ Lab-on-Chip platform, has been developed to ensure that critical test results are obtained quickly and accurately so that rapid and appropriate countermeasures can be implemented. With the successful validation by an independent testing and evaluation laboratory¹, VereThreat™ is well-suited to be deployed at point-of-need such as ports, borders, postal offices, train stations, airports and military sites.

¹ Validation performed by Battelle Memorial Institute, OH, USA. Data available upon request.



Specifications

Detects four selected Category A biological agents

Multiple probes (with duplicates) for:

- *Bacillus anthracis*
- *Francisella tularensis*
- *Yersinia pestis*
- *Variola virus*

Each chip has the following controls to ensure the reliability of results:

PCR Process Controls	Microarray Process Controls
Positive	Orientation Probes
Negative	Hybridization Probes

Performance characteristics based on an independent evaluation by Battelle Memorial Institute:

Target (Analyte)	Sensitivity	Specificity
<i>B. anthracis</i>	125 copies/rxn	100%
<i>F. tularensis</i>	125 copies/rxn	100%
<i>Y. pestis</i>	125 copies/rxn	100%
<i>Variola virus</i>	125 copies/rxn	100%

Sample Types: Air, water, soil and food

Every chip is bar-coded and measures 2.54cm x 7.62cm.

Robust and Time-tested Technologies:

Polymerase Chain Reaction (PCR) and microarray gives the VereThreat™ chip the accuracy and sensitivity needed to provide answers in the shortest possible time.

Breakthrough Innovation:

The integration of two powerful molecular biological technologies enables the development of the VereThreat™ chip into a fast PCR-microarray based diagnostic test using the VerePLEX™ Biosystem to simultaneously detect, differentiate and identify selected biological agents all in a single test. With the flexibility afforded by our customizable updates in our VereChip™ target panels, we are able to provide diagnostic and surveillance tools needed today and be ready for the next threat tomorrow.

Veredus Laboratories, the future of diagnostics and surveillance, today.

Features

- Multiplex amplification reactions
- Multiple probes per target ensures reliable detection of subtypes in every test
- Small sample volume requirement
- Fast and programmable temperature ramp rate
- Scalable for high throughput
- PCR yield is comparable to standard thermal cyclers
- 40% faster than conventional thermal cyclers
- Functional validation of PCR is provided by an internal positive control
- Functional validation of hybridization for each assay is provided by an internal positive hybridization control
- Short time required for fluidic operations

Advantages

Speed

- Fast turnaround time – multiple results in less than 3 hours versus 2 days or more for culture-based testing
- Rapid detection for first responders to implement appropriate measures quickly

Comprehensive

- Tests for four major Category A bioagents in a single assay

Mobile

- The VerePLEX™ Biosystem is designed to be portable so that first responders can test at the point of need for biothreat investigations

Easy to use

- The simple workflow allows for minimally trained or non-scientific personnel to run tests



VerePLEX™ Biosystem

VerePLEX™ Biosystem combines molecular biology, microfluidics and microelectronics to bring the future of diagnostics and surveillance to you today. The VerePLEX™ Biosystem, along with the VereChip™, is a breakthrough in innovation, integrating two powerful molecular biological technologies: PCR and Microarray.

VerePLEX™ Biosystem includes the following components:

- Temperature Control System (5 random access modules)
- Optical Reader
- Biosystem Software
- Barcode Reader