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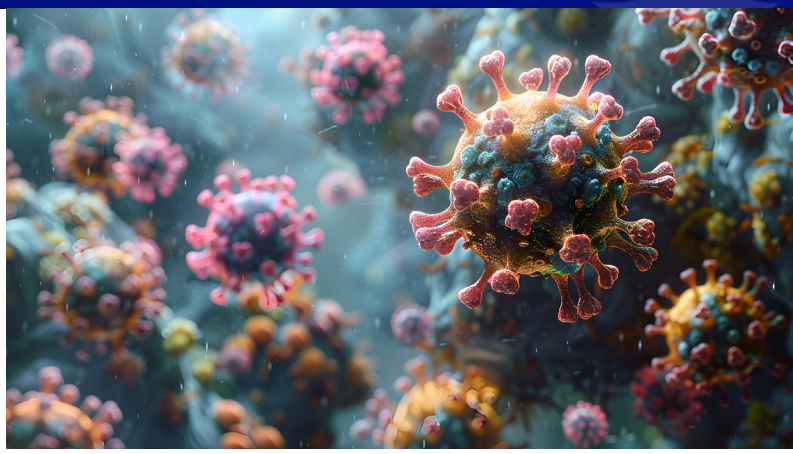
Technology Snapshot

Los Alamos NATIONAL LABORATORY

PlagueGuard Antibodies

Plague, caused by the bacterium Y*ersinia pestis*, remains a rare but serious threat



Applications

PlagueGuard enables rapid detection and effective treatment of antibiotic-resistant plague, with applications in public health, biodefense, and infectious disease therapeutics.

Partnership Opportunities

LANL is seeking a partner to commercialize PlagueGuard Antibodies through a technical collaboration under a CRADA or a license agreement to develop a commercial prototype and leverage LANL's intellectual property.

Technology Readiness Level 5

IP Information

U.S. Patent No. 11,702,465

Contact Information

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Overview

Los Alamos National Laboratory scientists have developed high-affinity human antibodies that can quickly detect and potentially treat deadly, antibiotic-resistant plague infections, helping protect against both natural outbreaks and bioterror threats.

Advantages

- **High Affinity and Specificity:** The affinity-matured antibodies exhibit picomolar binding affinities to the F1 antigen of *Yersinia pestis*, each recognizing a distinct epitope on the antigen. This enhances diagnostic precision and reduces the likelihood of false positives.
- **Dual Application (Therapeutic and Diagnostic):** The antibodies can be conjugated to metal chelators for radioimmunotherapy, offering an alternative to traditional antibiotics, which is crucial given the risk of antibiotic resistance. Also, the antibodies can be chemically conjugated to enzymes for use in rapid diagnostics like lateral flow assays (LFAs).
- **Potential to Combat Antibiotic Resistance:** Unlike traditional antibiotics, these antibodies could remain effective even against engineered, antibiotic-resistant strains of *Y. pestis*, which is a critical advantage in the context of biothreats.

Technology Description

The Challenge:

Plague, caused by the bacterium Y*ersinia pestis*, remains a serious threat—not just as a rare but deadly natural infection, but also as a potential bioweapon. Modern medicine relies heavily on antibiotics, but these can fail if the bacteria become resistant, which is a growing

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NNSA National Nuclear Security Administration

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global concern. Rapid, accurate detection is also difficult, and existing diagnostic tools can produce false results or aren't practical for field use.

Problems Solved:

Scientists at Los Alamos National Laboratory developed high-affinity antibodies that are specifically designed to detect a key component (the F1 antigen) found in the most dangerous strains of *Y. pestis*. These antibodies are:

- Extremely sensitive and specific, detecting even tiny amounts of the plague bacterium.
- Designed to target two different parts of the F1 antigen, minimizing the risk of false positives.
- Resilient when chemically modified, allowing them to be used in both fast diagnostic tests and innovative treatments, including options that may work even if traditional antibiotics fail.

This innovation enables more accurate diagnosis and opens the door to new treatments for plague, even in the face of antibiotic resistance or biological warfare scenarios.

Market Applications

- Public Health & Infectious Disease Diagnostics
- Biodefense & National Security
- Pharmaceutical & Biotech
- Radiopharmaceuticals & Targeted Therapeutics
- Veterinary & Agricultural Biosafety

Next Steps

PlagueGuard is advancing toward deployment in high-impact health and biodefense settings, with continued testing and validation of its antibody-based detection and therapeutic capabilities. Future development efforts will focus on translating this platform into practical tools for public health, pharmaceutical and national security markets, where speed, specificity and resistance-proof treatment are critical. LANL is actively seeking industry partners—including biotech firms, diagnostic developers and biodefense contractors—to support the next phase of development. Key objectives include:

- adapting PlagueGuard antibodies for use in field-deployable diagnostic assays and therapeutic formulations;
- conducting targeted preclinical testing to refine efficacy, safety and manufacturability; and
- licensing intellectual property and co-developing commercial products to address emerging infectious disease and biothreat challenges.

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