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SUCCESS STORY

Rapid Far-Forward Infection Diagnostic Improves Mission Readiness and Warfighter Health

RAPID FAR-FORWARD INFECTION DIAGNOSTIC

TOPIC NUMBER: **CBD15C-001**

CONTRACT NUMBER: **W91CRB-18-C-0060**

SBIR COMPANY NAME: **GENECAPTURE, INC.**

TECHNICAL PROJECT OFFICE: **OFFICE FOR CHEMICAL AND BIOLOGICAL DEFENSE**

SPONSORING ORGANIZATION: **AFWERX**

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THE BASICS

- Drastically reduces the time for diagnosis
- Equal accuracy to current culture testing
- Simplifies the process and available for use in more austere environments
- Portable, lightweight, does not depend on strict temperature and environment regulation
- Air Force Small Business Innovation Research funding was essential

Photo by Joseph Mather.

GENECAPTURE HAS CREATED A PORTABLE DIAGNOSTIC THAT SCREENS FOR OVER 200 PATHOGENS IN UNDER AN HOUR, FOR LESS THAN TWENTY DOLLARS.

With the support of the Small Business Innovation Research/Small Business Technology Transfer Program, Alabama-based GeneCapture, Inc. has developed a lightweight diagnostic tool designed for easy carry in austere environments. It can identify drastically more pathogens than the current diagnostic in use, and in 75% less time.

Scientists with GeneCapture have also collaborated with faculty from the University of Alabama in Huntsville to test the new antibiotic sensitivity testing diagnostic with real patient samples. It was found that the system drastically reduced the time for diagnosis, with equal accuracy to the current culture testing.

GeneCapture is currently under a Phase II contract that is intended to increase the durability of the diagnostic system for use in austere environments. With this development, the company hopes to accelerate commercialization of their product.

Along with this research, GeneCapture is currently researching expanding their array to include COVID-19, which could aid in limiting the spread of the virus, both in the military and civilian spheres.

BEHIND THE TECHNOLOGY

With current technology, pathogens can take several days to identify, and to identify their antibiotic resistances. Furthermore, such technology requires strict temperature control, and complicated instructions for use. It is too delicate to be transported in rugged environments, which makes it less accessible to the warfighter.

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GeneCapture uses direct RNA probes to bind to the pathogen's RNA, by use of plastic cartridges that both simplify the process and are available for use in more austere environments. With an additional five to seventy-five minutes, the technology is also able to identify the pathogen's antibiotic resistances. This saves valuable time in determining treatment and the next course of action.

"Antibiotic overuse is a threat to all of us because of growing antibiotic resistance, so unless it's the right antibiotic, we're just leaving the door open for more resistant bugs to infect us in the future. We've found a novel technology solution, and now we are designing the product to be efficient and cost-effective for the clinic," says Paula Koelle, chief scientist at GeneCapture. "The feedback we received from our clinic collaborators matches with our plan to seamlessly fit our tests into standard clinic protocol, reducing the time, suffering and cost for the patient."

The infection diagnostic tool is portable and lightweight and does not depend on strict temperature and environment regulation, which allows it to be used in less controlled environments.

Because of this rugged capability, the technology has been slated for use by both military and civilian agencies, for the battlefield, disaster sites, refugee camps, and many other settings.

GeneCapture is now putting their resources into adding COVID-19 to their screening array. If they are successful, diagnosis could occur in as little as forty-five minutes, which would prove invaluable in limiting the spread of the virus.

SBIR FUNDING AND AFWERX EXPERTISE WERE CRITICAL

SBIR's funding and research contribution were essential in developing the technology for use on the battlefield.

"Being at the Tech Warrior Ops has given me a chance to meet actual day-to-day medics who are in the hospitals, several who have been deployed, so I'm able to hear what it was like for them to be in a field environment and needing to get a rapid infection detection done," says Peggy Sammon, co-founder and CEO of GeneCapture.

The Phase I and II contracts awarded GeneCapture, Inc. just over $1 million and allowed the company to further develop the diagnostic capability of the product, as well as the portability and durability in the field.

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Paula Koelle, Chief Scientist
GeneCapture, Inc.