

TOPIC NUMBER:
OSD11-H05

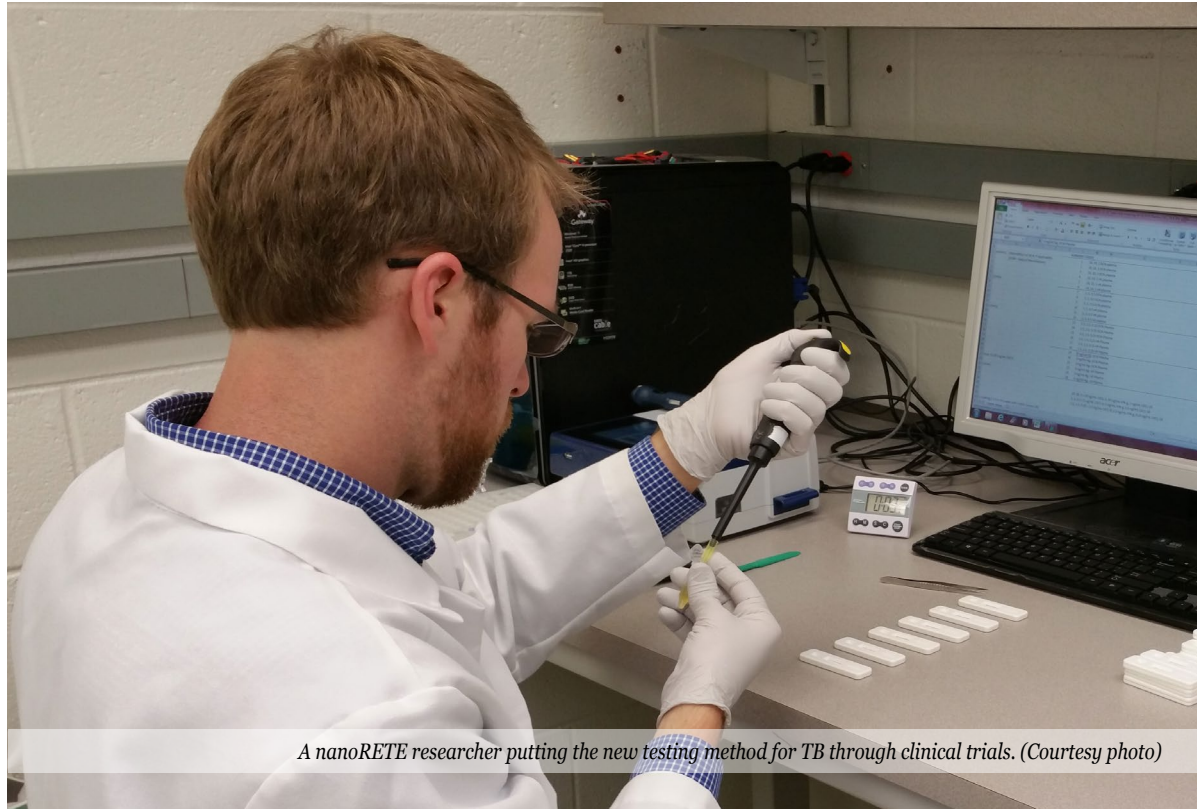
TOPIC TITLE:
Development of a
Field-Appropriate
Biosensor
for Detecting
Mycobacterium
Tuberculosis Infection

**CONTRACT
NUMBER:**
FA8650-13-C-6392

**SBIR
COMPANY
NAME:**
nanoRETE, Inc.
Lansing, MI

**TECHNICAL
PROJECT
OFFICE:**
AFRL Human
Effectiveness
Directorate,
Wright-Patterson
AFB, OH

PUBLISHED:
May 2016



A nanoRETE researcher putting the new testing method for TB through clinical trials. (Courtesy photo)

MICHIGAN SMALL BUSINESS DRIVES GLOBAL HEALTH SOLUTION

Tuberculosis is a leading cause of infectious disease death worldwide, particularly in some of the countries where U.S. troops often deploy. Commonly known as TB, it can be difficult to detect among service members returning from high-risk locations.

Current TB tests have their limitations. Some tests take days or weeks to get results, some have poor sensitivity, and still others are expensive and require a sophisticated lab facility.

That prompted the Air Force to seek a practical and reliable alternative.

With the backing of an Air Force Small Business Innovation Research (SBIR) contract, Michigan-based nanoRETE Inc. worked to develop an improved diagnostic platform for TB testing. The company's concept follows the same principle as the latest commercial methods—a hypersensitivity based on prior exposure—but is designed to employ multiple biomarkers to determine a person's infection status.

BEHIND THE TECHNOLOGY

The test uses blood-based biomarkers indicating the immune response to the bacteria that causes TB on a lateral flow platform. The platform—similar to how a blood glucose strip works—is designed as an integrated system from sample collection through diagnosis, providing results in hours instead of days, and requiring only a single patient visit. Even better, the platform holds promise to become an affordable method for field-based testing outside the traditional laboratory.

To further mature the technology, nanoRETE has received a combined \$1.7 million equity investment from the Michigan Accelerator Fund, the state of Michigan and Michigan State University.



A rendering of nanoRETE's TB testing product. (Courtesy photo)

TB'S GLOBAL IMPACT

The World Health Organization reports that overall detection of the disease is still less than 70 percent globally. Put another way, of the estimated 9.6 million people who became ill with TB in 2014, about 2.9 million with active disease were not diagnosed.

MILITARY APPLICATIONS

Developments by nanoRETE are expected to have direct military applications, particularly to ensure incoming recruits and personnel returning from overseas tours are quickly tested and treated, if necessary, to prevent further transmission of the disease.

"It was a pleasure to work with such an innovative company that is moving TB diagnostics forward, particularly at a time when accurately diagnosing tuberculosis is critically important for global health," said Capt. Jameson Voss, MD, MPH, of the U.S. Air Force School of Aerospace Medicine, who served as the SBIR program manager.

The company was founded to commercialize a technology that was deemed suitable for detection of mycobacterium tuberculosis—or Mtb, the bacterium that causes most TB cases—in populations with both high and low incidence rates for the disease. The Air Force SBIR Program helped nanoRETE by providing critical funding needed to translate an academic endeavor into a product that is positioned for widespread evaluation in the field.



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