Natick plays key role in helping to fight spread of Ebola

By NSRDEC Public Affairs  October 21, 2014
NATICK, Mass. (Oct. 21, 2014) -- Researchers at the U.S. Army Natick Soldier Research, Development and Engineering Center here, invented a next-generation disinfectant system that kills the Ebola virus on surfaces.

The scientists developed and patented a novel chemical system, which is being used to sterilize medical equipment and electronic items used in the treatment of patients on the front lines of the war on Ebola in West Africa.

This came about through the transfer of the technology from the Army lab to a privately held company, ClorDiSys Solutions, which is manufacturing the portable "no power required" chemical compound, and supplying it worldwide.

One of the key research thrusts at the U.S. Army Natick Soldier Research, Development and Engineering Center is the discovery and development of decontamination technologies to keep the warfighter healthy and safe from bioterror attack. Natick's invention is a portable "no power required" method of generating chlorine dioxide, known as ClO2, gas, one of the best biocides available for combating contaminants, which range from benign microbes and food pathogens to Category A Bioterror agents.

The starting ingredients used to generate ClO2 are now produced and marketed by Lebanon, New Jersey-based ClorDiSys Solutions, and they can be quickly mobilized and applied as a gas to decontaminate or sterilize equipment and surfaces.

Dr. Christopher Doona, the lead inventor of this field-portable method for generating ClO2, is a senior research chemist at the center, known locally as Natick Labs, with extensive experience in ClO2 reaction chemistry. Doona and his team are credited with inventing and perfecting this process of converting dry powder chemicals into ClO2.

Doona says an important exponent of ClO2 is its versatility as a disinfectant suitable for any industry, ranging from textiles, medicine, wastewater treatment and public health, to food safety, personal hygiene, and household uses. ClO2 can be activated in small or large quantities and in varying strength levels from potent enough to sterilize medical instruments to mild enough to use in toothpaste to fight off germs in the mouth.

This technology could have ended up like many military technologies, in a warfighter-only product. However, the Army patented it and the technology transfer specialists at TechLink in Bozeman, Montana, collaborated with Natick's Technology Transfer Office, to transfer the technology to
ClorDiSys, so it could be commercialized and made widely available. Technology transfer such as this, from a government lab to private enterprise, is mandated by Congress and ensures that useful technologies don't just gather dust on a shelf, but find application in U.S. industry.

Jeff DiTullio, business development lead at Natick, is always searching for opportunities where military innovation can be licensed for commercial application. Natick is one of dozens of DOD laboratories actively involved in research and technology aimed at benefiting the U.S. warfighter, and giving the military unrivaled operational capability. Working as a conduit between the DOD and the private sector, TechLink assisted ClorDiSys in navigating the Army's licensing process.

"It was a perfect scenario. We needed something and the Army had it. TechLink helped us get to the finish line," said Paul Lorcheim, ClorDiSys Solutions' director of operations.

"This transfer would not have happened without TechLink," added DiTullio.

ClorDiSys Solutions is a spinout of Johnson & Johnson. The company focuses on generating and using ClO2, providing both powered and unpowered solutions for a variety of applications, and in particular for decontamination and sterilization of pharmaceutical, medical, veterinary, and food facilities. When the opportunity came along to provide ClO2 on the Ebola front, ClorDiSys was willing and ready.

"ClorDiSys is proud to be helping to fight the spread of Ebola in Africa," said Mark Czarneski, ClorDiSys Solutions' director of technology. "Various world health organizations, including the U.S. government, are using ClorDiSys's gaseous chlorine dioxide to sterilize medical equipment contaminated with Ebola. It has been tested and is being utilized by these organizations for a number of applications."

The company's ultraviolet light disinfection system, called TORCH, was also utilized by the University of Nebraska Medical Center to perform the terminal disinfection after the release of their first Ebola patient.

Chlorine dioxide is a yellow-green gas with a faint odor similar to chlorine bleach, but otherwise it is very different. It has been recognized as a disinfectant since the early 1900s, and has been approved by the U.S. EPA for many applications.

In the modern age, the effectiveness of ClO2 was confirmed at the dawn of the new millennium. In the weeks after the 9/11 attacks when terrorists sent anthrax in letters to public officials, hazardous
materials teams used ClO2 to decontaminate the Hart Senate Office Building, and the Brentwood Postal Facility.

Unlike other methods of preparing chlorine dioxide, no electricity or caustic acids are needed to activate the powdered ClO2, nor is clean water required, making it ideal for use in remote field locations. Packets of ClorDiSys's ClO2 product, which until recently did not exist, are portable enough to be carried in backpacks.

Chlorine dioxide is a broad-based biocide that kills spores, bacteria, viruses, and fungi. To date no organism tested against ClO2 has proved resistant. It has effectively been used to kill bacterial spores, which are much more difficult to kill than viruses, such as Ebola, according to Doona.

"Americans hear in the news about outbreaks of E. coli, Listeria, and Salmonella from fresh fruits and vegetables. ClO2 holds promise for the food industry but also, on a smaller scale as a home sanitizer for rinsing fresh produce or appliances," Doona said.

The success of ClO2 in combating Ebola and other pathogens follows collaboration between the DoD and a biotech company that yielded a potential treatment for victims sickened by Ebola. The Ebola antibody that is a key component of the experimental drug called ZMapp was developed in the Army Medical Research Institute of Infectious Diseases, and transferred with assistance from TechLink to Mapp Biopharmaceutical of San Diego. ZMapp is credited with having saved the lives of two American medical missionaries who contracted Ebola last July, and is regarded as one of the most promising treatments for Ebola currently under development.

-----

The Natick Soldier Research, Development and Engineering Center is part of the U.S. Army Research, Development and Engineering Command, which has the mission to develop technology and engineering solutions for America's Soldiers.

RDECOM is a major subordinate command of the U.S. Army Materiel Command. AMC is the Army's premier provider of materiel readiness -- technology, acquisition support, materiel development, logistics power projection, and sustainment -- to the total force, across the spectrum of joint military operations. If a Soldier shoots it, drives it, flies it, wears it, eats it or communicates with it, AMC provides it.
MARCH 28, 2017
NSSC observes Women's History Month

APRIL 11, 2017
TF Raptor uncases colors at Bagram Airfield

MARCH 13, 2017
Transfer of Authority In Kuwait

MARCH 21, 2017
Bedtime snack to optimize bone health, give trainees a fighting chance

MARCH 15, 2017
New York guardsman says deployments make him a better doctor

FEBRUARY 24, 2017
Army chief of staff visits Natick

MARCH 9, 2017
Deployments make New York Guard doctor better hometown physician

FEBRUARY 28, 2017
NSRDEC: helping the Soldier, helping the economy

FEBRUARY 16, 2017
SMDC History: DSCS Transfers to ARSPACE

FEBRUARY 15, 2017
Town of Natick police chief speaks at NSSC

FEBRUARY 28, 2017
Do you qualify for the Post 9/11 GI Bill?

FEBRUARY 21, 2017
Washington Guard engineers wraps up deployment
FEBRUARY 11, 2017

Transfer of Authority ceremony held for 1st Squadron, 3d Cavalry Regiment