Portable Anthrax Detector Sought

Kansas State University Researchers Among Those Working on Project to Develop Portable Anthrax Detector

The Associated Press

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MANHATTAN, Kan. Nov. 11 — As Americans faced the anthrax scare a year ago, spilled sugar, salt, baby powder, even Sheetrock dust became suspect.

If only there could have been some way to easily detect anthrax and other bioagents, something along the lines of a smoke detector small, reliable and capable of giving ample warning.

Two Kansas State University physicists are among scores of researchers around the country working to help develop just such a device.

Hongxing Jiang and Jingyu Lin have been at Kansas State more than a decade and are experts in designing light-emitting diodes, or LEDs, and laser diodes, both of which are sources of light that can be as small as a human hair.

"That's our expertise. We make things very small too small to see with the naked eye without a light source," Lin said.

Kansas State last summer received a $1.4 million government grant over four years to develop semiconductor ultraviolet light sources which Jiang said is a key part of a detector.

It's part of a four-year, $40 million program by the Defense Advanced Research Projects Agency, the central research and development organization for the Pentagon.

DARPA said the research is in its early stages, and the aim is to develop a prototype. That could be several years away.

"The last thing any of us should do is give people false hope like we are going to be putting this out where people can buy it at a store anytime soon," said Lt. Col. John Carrano, who oversees the research program for DARPA.

Lin also cautioned against early expectations.

"This is very difficult research. There are a lot of technical issues to be resolved," she said.

Any bioagent excited by ultraviolet light creates a unique color spectrum, or fluorescence, making it visible.

Jiang said there are bioagent detectors on the market but they use biological or chemical means.

For instance, one such device can detect a bioagent in about 20 minutes by immersing the DNA of a suspicious substance in a chemical bath designed to identify it.

Jiang said a UV light source would make it possible to detect anthrax from a distance, without exposing someone to it.

No single machine can detect all known biological weapons, which can be lethal in extremely tiny amounts. Nor is there a device like the scanners used on mail and luggage that can uncover spores or bacteria hidden inside a sealed package.

Jiang and Lin are trying to come up with a device small enough to be portable and bright enough to be effective.

"It is a critical component," Lin said. "Without it, you have nothing to see. You need to use an ultraviolet source for this."

They already have the ultraviolet LEDs, but there's a hitch they aren't bright enough.

"If the light source is brighter, the detection of anthrax particles will be easier," Lin said. "Otherwise it will not work."

Once the ultraviolet LEDs become bright enough and small enough, the actual testing of anthrax detection will be done elsewhere, since Kansas State labs aren't allowed to have anthrax.

Kansas State isn't the only university involved. Other researchers, including those at Brown University, are working on similar ultraviolet light sources. But Jiang said he doesn't view it as some sort of race.

"We are not competing (for) who comes up with it first. We are working together," he said. "The goal is to come up with something that can detect anthrax."

At Brown, Arto Nurmikko, professor of engineering and physics, said the research presents scientific and technical challenges.

"In principle, we think we can create a grain of sand-size UV source of light that operates at a high level of efficiency and brightness," Nurmikko said.

Similar research is under way at University of California-Santa Barbara. "It's an outgrowth of eight years of research in the related fields of gallium nitride, the semiconductor that makes it all happen," said Jim Speck, professor of engineering and one of the researchers.

DARPA said Yale University also is trying to come up with a way to demonstrate a prototype real-time miniaturized biosensor using ultraviolet LEDs and laser diodes.

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