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Scientists work to build better flu trap

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Winn L. Rosch

Special to The Plain Dealer

Chicken pluckers who don't wash their hands are a bigger threat than terrorists with anthrax spores.

Already more people in the world have died from avian flu than anthrax terrorism, and the world faces a possible epidemic should the avian flu mutate and become more infectious. A single gene mutation (which may have already happened) could make the disease transmissible between people and let it spread beyond the Far East.

Thankfully, a new kind of disinfectant developed by researchers at Sandia National Laboratories in Albuquerque, N.M., and Kansas State University in Manhattan, Kan., may have the power to prevent an epidemic.

Even before October 2001, when anthrax-laden letters started appearing in mailrooms, the Department of Energy had charged Sandia to find a better way to fight chemical and biological agents. The lab

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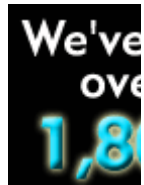
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developed a foam that proved its effectiveness against anthrax spores in New York City and Washington, D.C.

With concerns growing about the SARS virus - both its threat to health and the economies of areas where it had appeared - the researchers adapted the decontaminating agent to that virus. Now, they have hope it will prove effective against avian flu virus and help prevent its spread.

Dirty work

The challenge they faced with SARS was not the virus itself but where it was found. By itself, the SARS virus is not particularly resistant to disinfectants.

"The SARS virus is an enveloped corona virus, which means it has a lipid envelope that protects a protein envelope that protects its genetic information. Although people assume that makes it more hardy in the environment, non-enveloped viruses are typically more resistant," explained Jill Bieker, a graduate student researcher at Kansas State. "But soils and fecal materials on surfaces can actually protect the enveloped virus."

In addition, the soils degrade the effectiveness of conventional disinfectants.

"Disinfectants like bleach are inactivated by the soils. You may think you have disinfected a surface, but viruses surviving the crippled disinfectant can infect people," said Mark Tucker, a chemical engineer at Sandia.

Worse, with traditional disinfectants, the cure is often more damaging than the disease literally.

"All decontamination agents used earlier were toxic or corrosive," said Tucker. "They would neutralize the biologic or chemical agent but also destroy the material the agent was on."

Consequently, Sandia worked hard to develop a decontaminating agent that was relatively benign. Instead of strong oxidizers (like bleach) or alcohols, they found that a combination of safer chemicals could do the trick.

"It's basically a combination of common household ingredients," said Tucker. "It's kind of a combination of ingredients found in hair conditioner and toothpaste."

Cleansing foam

But just glopping Clairol and Crest all over the place won't kill viruses.

"It requires a very specific mixture of these ingredients to neutralize all the agents we're concerned about," said Tucker.

As typically applied, the Sandia decontaminating agent is a foam, which is more economical and less likely to cause damage. "One gallon of liquid may expand to 20 gallons of foam," said Tucker. "The foam gives you coverage of a large surface area with little liquid."

Foam is also more tenacious.

"When you deploy a foam on a vertical surface, it can hang onto the surface for a long time to maintain the contact time we need," said Tucker.

Anthrax spores require 15 to 30 minutes of contact before they succumb. The SARS virus, however, is so much more vulnerable than anthrax spores that the solution can be diluted to 10% strength and still effectively inactivate the virus with just one minute of contact.

Even so, the solution likely poses few dangers to people.

"Right now, it is not approved for the intentional application to human skin, so you have to use protective equipment," said Tucker. "But all the ingredients are so common, I don't believe there is any danger from it."

Fighting flu

Two companies have licensed the formula and have applied to the EPA to register it as a disinfectant.

Although the solution hasn't been checked against avian flu virus, it will likely be effective against it.

"Avian flu is a virus similar to the corona viruses like SARS," said Bieker. "Studies indicate that the viruses will typically behave similarly in response to agents that inactivate them."

Bieker believes that the effectiveness of the solution against avian flu will be proved within three months. Testing has already begun. The scientists also think the solution would work against the toxin of the week, ricin, but it has not been tested. They said the standard decontaminant for ricin is bleach.

Once proven, the foam can help stop the spread of avian flu by eliminating it from places where people have caught the disease.

That may be able to interrupt its spread before it mutates - without the need to slaughter whole flocks of chickens and ducks.

"The faster we can contain the virus, the more we can lower the risk of mutation," said Bieker. "If we can contain the virus before it evolves and becomes more infectious, then we win."

Rosch is a Shaker Heights free-lance writer.

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