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DNA Tests Tie New York and Florida Anthrax Strains, a Vital Clue

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The government's finding that preliminary genetic testing indicates the strains of anthrax found in New York and Florida are the same provides a vital clue to investigators searching for the origins of the bacteria and the bioterrorists.

The Centers for Disease Control and Prevention said information about the strain of the anthrax found in Washington wasn't available. He said more information about the strain of the anthrax was important for the criminal investigation and wouldn't be revealed.

Anthrax experts say, however, that as the investigation into the source of the anthrax has progressed, three leading candidate strains have emerged. They are known as Ames, the Vollum and the New Hampshire strains, according to David Kelly, chief bioweapons adviser to the United Kingdom's Ministry of Defense.

Ames Strain

That notion is consistent with widespread speculation that the variety of anthrax used in the Florida attacks is the "Ames" strain, a virulent form that was first isolated from a sick cow in Iowa several decades ago. Ames is commonly used among scientists involved in drug and vaccine research.

It may have been weaponized by the U.S. government's Cold War biological weapons program before it was halted by President Nixon in 1969, according to Kimothy Smith, a scientist at Northern Arizona University in Flagstaff, where researchers are said to be helping authorities identify the strains. The scientists declined to confirm their participation in the investigation.

The CDC says it has typed the anthrax strain found in Florida, but hasn't released the results. Ron Atlas, a professor at the University of Louisville in Kentucky and president-elect of the American Society for Microbiology says his best information is that the Florida anthrax is "Ames-like."

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He says that might mean it is a version of the Ames strain that has been cultured for many years in a laboratory, leaving time for genetic changes to accumulate. Even if the strain being used is related to Ames, that may not make it easier for authorities to link the attacks to a particular source.

The spread of anthrax strains continues to be poorly monitored, Dr. Raymond Cypess said.

"This strain has been around the world in many different labs, so I have no clue where whoever is doing this has obtained this strain from," Dr. Atlas said.

The Vollum strain, first isolated in Great Britain, is at least as virulent and deadly as the Ames strain. Iraq obtained this strain from the American Type Culture Collection, Manassas, Va., before the Gulf War and before current laws controlling shipment of deadly pathogens were passed by Congress. Iraq used that strain and turned it into weapons, according to UNSCOM inspectors.

Monitoring Distribution

A variety of anthrax strains have been widely available from cell culture depositories and scientific laboratories, although under a 1996 law the CDC began restricting and monitoring its distribution within the U.S. After the terror attacks of Sept. 11, those rules may become even tighter.

Under the proposed Uniting and Strengthening America Act, Congress plans to make possession of anthrax or other "selected agents" by nonresident aliens from nations that support terrorism a crime. The bill also would criminalize possession that isn't justified by peaceful purposes. The proposed legislation was passed recently by the House and Senate, and legislators are negotiating final changes.

Raymond Cypess, president of the American Type Culture Collection, said his repository still stores 21 strains of anthrax in freezers at negative 270 degrees Farenheit, although not the Ames strain. He says ATCC hasn't distributed any anthrax to scientific laboratories since 1997.

The spread of anthrax strains continues to be poorly monitored world-wide, Dr. Cypess said. "This stuff has been widely distributed for many years. There is no international harmonization or regulation. It goes on and on, and it's a tough problem," Dr. Cypess said.

Seeking Clues

Anthrax is a fixture in nature as well as in the scientific community. The bacterium exists in the soil in many parts of the world, and supplies for researchers and bioweapons makers generally have been isolated from afflicted animals. According to Eric Croddy, a senior research associate at the Monterey Institute of International Studies, a Monterey, Calif., graduate school, the Soviets derived a particularly virulent strain from a sewer rat. Virulence is a measure of how effective the bacteria is in sickening and killing animals.

Scientists at Los Alamos have a database containing DNA-typing information from 1,200 varieties of anthrax from all over the globe. The soil-dwelling bacteria can form protective spores that allow it to survive in unfriendly conditions for decades. Only about a dozen of these varieties are widely used by scientists.

If the strains used in the attacks are among those used in scientific or vaccine research the results might "provide a clue to how many and which laboratories may have had" it said Richard Spertzel, a consultant who studied Iraq's biological-weapons program between 1994 and 1998 for the United Nations Special Commission.

Iraq has previously tested spent Iraqi munitions for anthrax and also investigated unsuccessful anthrax attacks by the Aum Shinrikyo, a Japanese cult that released the bacteria in Tokyo. In that case, genetic fingerprinting conducted by Dr. Smith and Northern Arizona University project leader Paul Keim indicated that the anthrax used was the Sterne strain, a nonvirulent strain used for vaccinating animals that was probably purchased at a veterinary supply house.

Experts called the fingerprinting methods highly accurate. Like DNA tests used in criminal trials, the method depends on identifying patterns of DNA that are unique to a particular strain.

"We have a pistol that uniquely marks its bullets," said Martin Hugh-Jones, an anthrax specialist at Louisiana State University in Baton Rouge. "If this is found in anyone's basement, they are going to have some explaining to do."

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