



NEWSLETTER---

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ANTHRAX FACTS

The major bioterrorism news has been about one organism: *Bacillus anthracis*. Through all the reports ran the topic of testing and identification. It seemed like a simple matter: test the powder or a wipe sample from an object and get a result, positive or negative. It isn't simple after all.

Some of the complications are as follows: there is no available instant test comparable to litmus paper; the simplest reliable test requires a bacteriology lab and at least 24 hours for a result; a conclusive test is more complex and takes many days; anthrax comes in many "strains", with slightly different DNA and with differing hazard to humans; and the available laboratory capacity has been inadequate to process the many samples being taken. The US Military has been concerned about anthrax being used against troops for some time. An effective immunization was developed and administered to Gulf War troops. The basic science is widely known but still no "instant test" has emerged to be useful for forensic investigators. Some promising candidates have been reported and even patented.

The first level of testing is microscope identification. This was first done in 1876 by German bacteriologist Robert Koch. His photomicrographs first showed the distinctive appearance of this organism, described by some as "a string of box cars." An enlarged view shows that within these rectangles is an oval that is the spore. When the outer capsule of the cell is broken these spores multiply and generate the disease. A raw sample will not usually show the box-car image within the other matter collected. This takes incubation of the sample in a nutrient environment to multiply the anthrax cells. That is not done quickly.

The next complication is that there are variations in the disease-causing potential of different strains of anthrax. Sorting this out has been done, first by liberating the spore from the capsule and then by DNA analysis, consuming an additional delay and expense and the relative shortage of available laboratory facilities. These facts compelled many investigators to work on developing more direct test methods. Promising among these are those in the class of "testing on a chip". Submicroscopic traces of some chemical component of the virulent anthrax bacillus is allowed to react with another chemical substance, for instance a protein that is an antibody to a definitive part of the anthrax DNA. This can be done on a semiconductor chip where the reaction gives an electronic signal.

Another approach is based on color change in a paper strip that contains the antibody protein to anthrax. A color change is said by one company, Tetracore, to identify anthrax in the environment within a time period of 15 minutes at a certain detection level. This is not yet commercially

available. Researchers at Northwestern University have developed a different method that they claim to be much more sensitive than others. They use minute gold particles on a microscope slide to form tiny probes that can detect specific DNA with more accuracy and less expense than conventional methods. They call this scanometric DNA array detection. Strands of synthesized DNA containing sequences that will bind with complementary target DNA (that of anthrax) are combined with the test sample, the gold particles are added, then combined with silver solution in a clever way to produce gray dots large enough to show up on an inexpensive computer scanner.

There are more such hopeful announcements, but no sign that any of them have gained commercial application. One company, Vital Living Products, of Matthews, NC tried to enter the market with their Anthrax At-Home test kit. This company had claimed that an independent test laboratory had verified the effectiveness of this test kit. They announced they had signed up several hardware and mall store chains to sell it. The whole thing fell through when the stock of the company soared on the NASDAQ exchange and the FBI and Security and Exchange Commission investigated and shot the whole thing down. The company withdrew the product when the independent lab withdrew its report. A simple and sensitive test kit will probably sometime be introduced so that post offices, television news rooms and government offices can be economically monitored but it obviously is not so easy to do.

CONSULTING AND NATIONAL EMERGENCY

All our lives and some of our businesses have been affected by the attacks of September 11. The perspective of what is most important has shifted for many. On top of an already-underway recession, travel and investment of time and money have been rethought and plans we made were cancelled or changed. This newsletter undertook to ask some of the members of ACC&CE for their stories. Not surprisingly, the replies were very individual, reflecting the marvelous diversity of the membership.

One member saw an actual upturn in his consulting business after a slump in August. He didn't see any connection to September 11 and called it "luck of the draw" but observed that the world has changed.

Another said that on top of the recession the terrorist situation motivated a shift of corporate budgets to security projects and away from technical programs and projects and he sees a decrease in the "success rate" of proposals made to clients for work. He also thinks that those who survive will be those who manage to adjust the fastest to the new realities and use the internet more, lowering costs quite dramatically.

A third member has seen that people are not willing to fly to his training sessions so enrollment is down. He sees a positive effect in that as companies lay off people they need to rely more on outside consultants and legal work continues to thrive

One successful consultant is an optimist. He advises us to get on with life and living: travel, dine out, shop, work your game plan, attend meetings, mentor those in need, be a leader not a follower. He throws in the quote from Helen Keller: "Life is a daring adventure or nothing." We wish that more members had something to say on the subject. These conditions will be with us for some time, so if you have thoughts of your own, please forward them to the editor and he will use them in a

future issue.

MEMBER USES THE MEDIA

David Manuta (# 882) had a letter printed in Chemical and Engineering News in October responding to an editorial by managing Rudy Baum on the subject of the media's distorted idea of what constitutes science and technology. In this case it was an article in Time magazine titled "America's Best Science & Medicine," listing cellular biology, human origins, child psychology, pediatrics, genomics, cardiology, oncology, climatology, ecology, AIDS research, astrophysics, paleontology, biomedical engineering, neurobiology, cell death, spinal-cord repair, molecular mechanics, and lifetime achievement. Baum stated: "I always thought the two main branches [of science], were chemistry and physics. Neither makes Time's list."

Manuta's reply is one we frequently try to make, evidently with little impact on the reporters and editors of the popular press. His letter says: "Education, as always, is the key to fixing the problem. And I believe that ACS has a role to play, along with other professional societies, to ensure that science is presented to the public in as well balanced a manner as is possible."

"Individuals can play a role. In recent months, I have convinced the editorial staff at the twice-a-week news publication in my location (Pike County, Ohio) to have me read their 'science stories' prior to publication. I have read faxes of drafts, I have made the necessary changes, and I have then faxed back a document that is "technically accurate." Admittedly, my local paper is not the New York Times or the Washington Post, but the relationship I have cultivated is an example of what we can do in our communities. The by-line is still the reporter's, but, at the end of the day, I have the satisfaction of knowing that I am educating the "media-types" in this community."

As one of the stated obligations of the Association of Consulting Chemists and Chemical Engineers: "Aid and support efforts to advance knowledge of chemistry, chemical engineering, bioengineering and related fields and the application of this knowledge to practical purposes." We applaud Dave.

To your Health: RED WINE FOR YOUR HEART

It has often been reported that the French, who drink more wine than the British, have lower heart problems, even though they both eat diets that ought to promote them equally. There have been suggestions that there is a causal connection. Now researchers at University of Leeds in the UK report experiments that point to components of red wines (but not white or rose) as the explanation. Their conclusion is different from another well-reported supposition that it is the tannins in red wine, which are polyphenols, acting as antioxidants, reducing the formation of fatty plaques that explain the paradox. The explanation of these Leeds researchers points to an 18-amino acid peptide endothelin-1, the most potent vasoconstrictor known, and therefore a culprit in heart attacks. This endothelin is synthesized by the body and is a specific cause of excessively high blood pressure. Experiments showed that non-alcoholic extracts from red wine inhibit the formation of endothelin.

Cabernet Sauvignon, Merlot, Zinfandel, Chianti and other wines made by fermentation of red grape skins therefore should be on the list of things that are good for you.

Do you need a refractometer to check the sugar in that batch of wine you have been tending? Or add to your laboratory's capabilities? Member B. Donald Halpern, number 600, has one for sale. If new, it would cost \$1250. He will take \$275. Phone him at 215-886-7896, FAX 215-885-4205.

INTERNET SITES OF INTEREST

Pictures of Lecture Demonstrations

Delights of Chemistry: Stop Action Color Photos of spectacular chemical demonstrations. Chemical Demonstrations from the School of Chemistry, University of Leeds. <http://www.chem.leeds.ac.uk/delights/>

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