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CBRNE Terrorism Newsletter

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BIO NEWS

www.cbrne-terrorism-newsletter.com

Special delivery May 6 in Twin Cities will test terror attack plan

By Amanda Bankston

Source: http://www.startribune.com/lifestyle/health/148607855.html

Nearly **40,000 Twin Cities residents** will go to their mailboxes on Sunday, May 6, to find an unusual delivery: An empty pill bottle representing a powerful antibiotic that would be delivered in the event of a bioterrorism attack in Minnesota.

The exercise, dubbed "Operation Medicine Delivery," has united the Minnesota Department of Health with the U.S. Postal Service to answer questions that have plagued public health officials since the terror attacks of 9/11. What if an airborne anthrax attack struck the Twin Cities? How would millions of Minnesotans get the medicine to survive?

More than 300 mail carriers will participate in the test, fanning out across four neighborhoods in Minneapolis, St. Paul, Robbinsdale and Golden Valley. They plan to reach 37,000 households in four ZIP codes: 55101, 55102, 55411 and 55422.

The overall goal of the exercise would be to deliver preventive doses of medication to most people **within the first 48 hours** of a bioterror attack, though much of that would happen through local medicine dispensing sites run by area public health organizations. During an actual bioterror crisis, the couriers would be alerted through an automated phone message.

The exercise, funded through the U.S. Department of Health and Human Services and the Postal Service, will spark an intense period of evaluation, when health officials will finally see if the idea could work under the most catastrophic public health conditions.

The tactic has been tested on a smaller scale in Boston, Philadelphia and Seattle, but the Twin Cities experiment will be its first full-scale test.

Minnesota health officials have been developing the idea since 2004 and expect it to be closely watched by other states.

"We made it a priority," said Health Department spokesman Buddy Ferguson. "We really felt it was important to take the lead on this."

The average mail carrier reaches 400 households in a day, said Postal Service spokesman Pete Nowacki, so delivery "is the easy part."

But, he added, Postal Service volunteers had to go through hours of safety training and preparation --including being fitted with protective masks. Local law enforcement officials will be on hand to escort the postal workers, as they would be in a true emergency.

Mail carriers are enthusiastic about the experiment because they often "get to know people as more than just an address," Nowacki said. Many are deeply committed to the neighborhoods they serve, and at 6 a.m. on what would normally be a day off, their trucks will roll out.

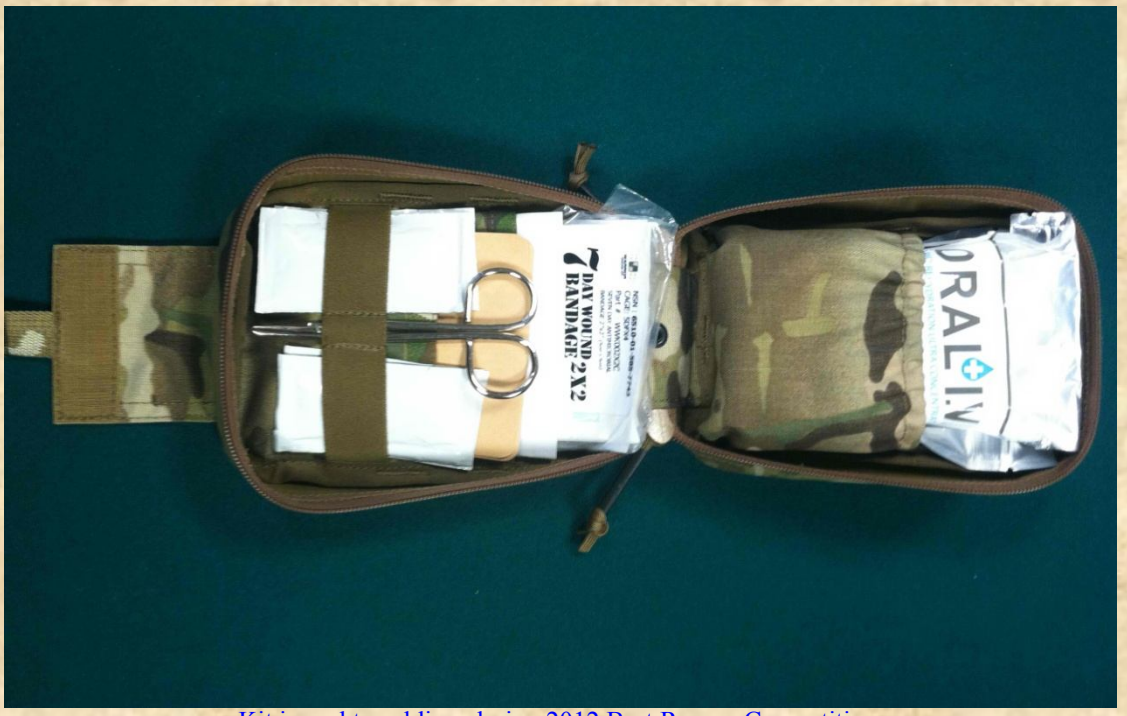
The **biggest logistical concern** for the Health Department and the Postal Service has been informing the communities that will be part of the simulation. They're working through local public health organizations to notify residents in the affected ZIP codes to expect the delivery -- and to recycle the empty bottles.

__Amanda Bankston__ is a University of Minnesota student on assignment for the Star Tribune.

Warrior Wound Care Keeps Warfighters in the Fight

By Will Grant

Source:http://blackwaterusa.com/2012/05/warrior-wound-care-keeps-warfighters-in-the-fight/?utm_source=Copy+of+April+28++BTW&utm_campaign=BTW+MAY+5&utm_medium=email



Kit issued to soldiers during 2012 Best Ranger Competition

Two innovative products—Oral IV and the 7-Day Bandage—from Warrior Wound Care have found fertile ground in the military and are receiving the backing of the medical industry. Both products employ cutting-edge technologies to keep a body functioning to its highest potential, and both products were part of a first-aid kit issued to soldiers at this year's Best Ranger Competition.

Oral IV is a 15-milliliter vial of essential minerals and electrolytes. It's colorless, tasteless, and enables the body to rehydrate quicker and more effectively using crystalloid electrolytes. The 7-Day Bandage is a bioelectric wound covering, infused with silver and zinc, that works with the body's natural electrolytes to form an electrical current that promotes healing, decreases pain, and kills bacteria, viruses and fungi.

"People ask me how this stuff works," says Kino Davis, Operations Director at WWC, "and I tell them magic. It's magic, that's how it works."

But it's not magic, it's science. And neither technology is new. The body's ability to more easily absorb crystalloid electrolytes than colloid electrolytes has been known for years, and the healing and anti-bacterial properties of silver, as well as an electric current associated with healing, is nothing new.

What's new is that these technologies are finally making their ways into the rucksacks of frontline soldiers. Change comes slow to the military, but when something finally makes it through the ranks of the screening process it's tried and true.

Oral IV is different than nearly every other hydration formula available. Unlike Gatorade and so many other products out there, Oral IV contains no high fructose corn syrup, no sugars, no artificial colors, nothing but straight electrolytes.

But Oral IV's secret weapon is that the electrolytes are in crystalloid form, which means they're easier for the body to absorb and metabolize than colloid electrolytes. The body absorbs these smaller electrolytes on a cellular level through any mucosal membrane.

As soon as Oral IV gets into your mouth, you're replenishing your body. During the recent cholera epidemic in Haiti, patients were treated with Oral IV to curb their dehydration. The patients—mainly children—were unable to digest nearly anything. Everything that went into their bodies, passed right through. So medical personnel started administering Oral IV through patients' eyes, noses, and ears, and the results were increased hydration.

Speaking of diarrhea, that's what drove the World Health Organization's recommendations for rehydration. The leading cause of dehydration is diarrhea, and the WHO drafted its recommendations to confront that. But losing electrolytes and water through aerobic activity is different.

Oral IV approached dehydration from an aerobic perspective. The solution is geared toward replenishing essential vitamins and minerals lost through exercise, workload, and environmental conditions.

Tim Hardy is an endurance athlete who may be using Oral IV at a higher level than any one. Most recently, he ran an ultra-marathon while taking Oral IV every four to six hours and drank only two gallons of water over the course of 135 miles and 55 hours of nearly continuous work.

"I don't know a lot about cellular metabolism and all that," he says, "but what I do know is that this stuff works."

Hardy's recent race, the Arrowhead 135, is no easy jog on city sidewalks. The race is run on a snowmobile track from International Falls, Minnesota, to Tower, Minnesota, and this year was held January 30 to February 2.

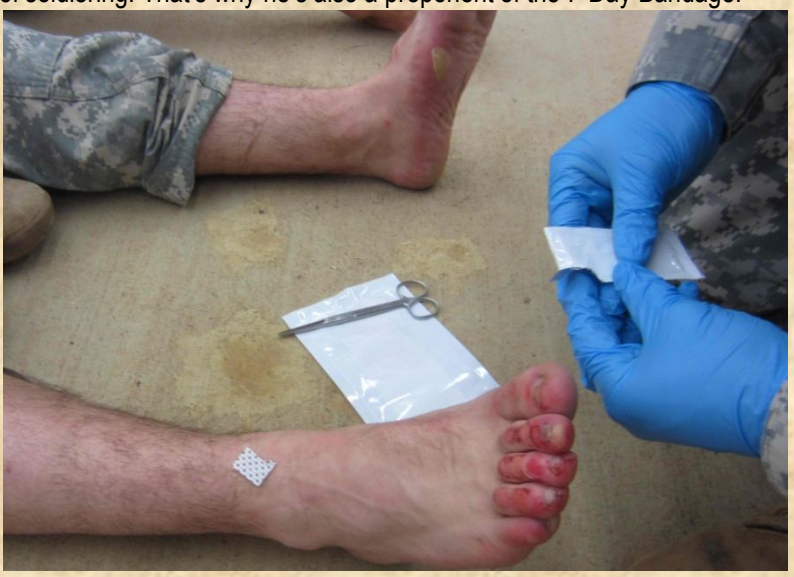
Like all contestants, Hardy carried his essential gear, most it required by race regulations, on a sled behind him. He packed a sleeping bag rated to 20 degrees Fahrenheit, bottles of water, at least 3,000 calories, and a way to melt snow to make more water. His kit weighed between 35 and 38 pounds.

"It's not a survival race," Hardy says, "but it's close. It's a very, very difficult race. I tried it in 2010 and didn't finish."

Throughout the race, Hardy took Oral IV as he felt his energy waning. Twenty minutes or so after taking the solution, he could feel his body rejuvenate.

"A big part of ultra-running," he says, "is recovering during the race."

Hardy is glad to see Oral IV showing up in soldiers' kits. He retired from the Army as a Major after 20 years of service, including time with a Ranger battalion, the 82nd Airborne, and the 10th Mountain Division. No stranger to dehydration through hard work, he's also well acquainted with the wear and tear of soldiering. That's why he's also a proponent of the 7-Day Bandage.



The 7-Day bandage is manufactured by Vomaris, which also developed the product. The technology of the silver and zinc dots impregnated on dressing is called Prosit, and the bandage is called Procellera. Warrior Wound Care distributes the bandages and is the means by which the dressing finds its way to soldiers. Warrior Wound Care has had a

National Stock Number for the 7-Day Bandage for about two years, and the bandage is currently in use with the military. The Federal Drug Administration also endorses the infection-fighting properties of the bio-electric dressing.

Mike Puente is the Sniper Team Leader for the Maricopa County Sheriff's Office Tactical Operations Unit. During a training exercise, a Belgian Malinois bit him and severely injured his left hand, tearing through the flesh to the bone and exposing tendons.

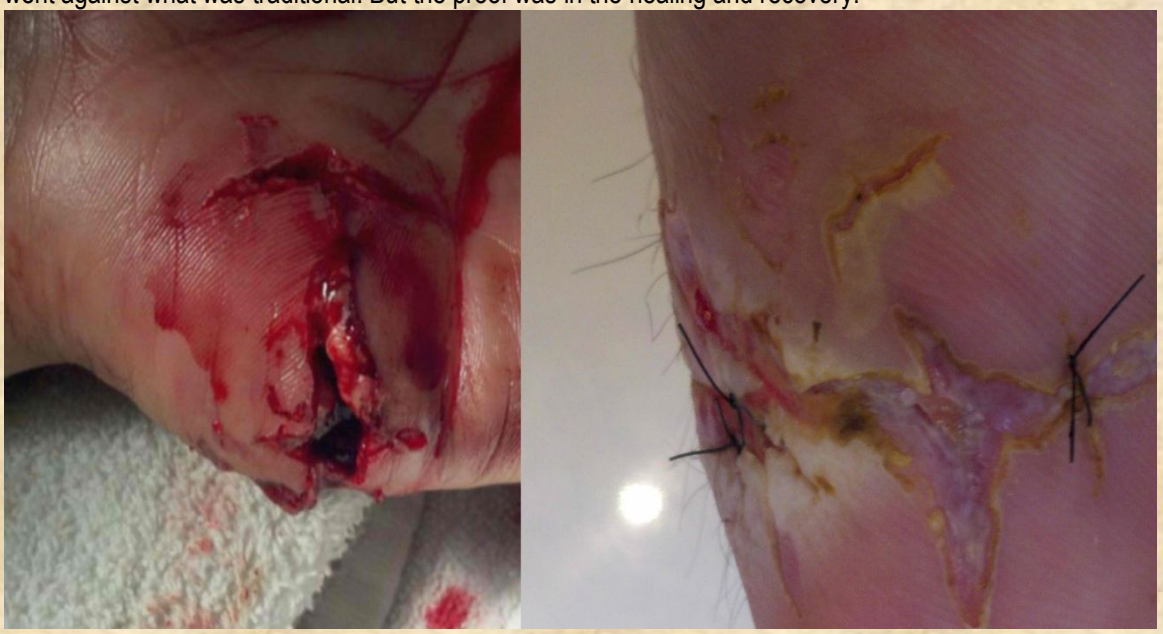
It's no secret that hand injuries can be career-ending for law enforcement. So four days after getting sewn up in the emergency room, Peunte put the 7-Day Bandage on his wounds. Three days later, inflammation had significantly decreased. Ten days later, his hand started looking normal again.

The bandage accelerated the healing and lessened the pain.

"The bandage had an immediate effect on pain," he says. "It was almost instantaneous after I put it on. In fact, after my hand injury and applying the bandage, I stopped taking the narcotics prescribed by the doctor."

Two and a half weeks after his initial hospital visit, Puente went in to have the sutures removed. That was a week and a half earlier than the doctors anticipated.

"I was able to return to full duty almost two months ahead of he doctor's original schedule," Puente says. "The hand surgeon actually had a hard time believing the science behind the bandage because it went against what was traditional. But the proof was in the healing and recovery."



Puente's hand the day of the injury and two weeks later.

Neither the 7-Day Bandage nor Oral IV are traditional forms of recovery. You almost need a college degree in biology to understand the science behind the technologies, but it's there, and it's getting thicker all the time.

The anecdotal evidence supporting these two products is extensive. The scientific evidence is slower to roll in, but supportive nonetheless.

On a personal level, we tested a few samples of Oral IV at Blackwater this past week. Project Manager Monica Wright, who runs four to six miles three or four days a week, took a vial of Oral IV before her lunchtime run.

Upon her return, she said her stride felt freer, her muscles less tight, and that she was hardly tired. She said her posture was better, that she found herself running with her body in a good, upright position more easily.

"I feel great," she said, "I would have kept going except that I had to be back here."

We know. We don't pay Wright to run, so we felt further testing (more miles) was unnecessary.

GEORGE MASON UNIVERSITY

Pandemics, Bioterrorism, and International Security [HSEC 0300]

About the Course

This three-day, non-credit course is designed to introduce participants to the challenges facing the world at the intersection of biodefense and public health. A bioterrorist attack is both a public health emergency and a criminal act whose perpetrators need to be apprehended. Pandemics affect not only public health, but also public safety and national security. Further complicating this domain is the dual-use dilemma: the knowledge and skills developed for legitimate scientific and commercial purposes can be misused by actors with hostile intent.

To meet these biosecurity challenges, public health, law enforcement and national security agencies, pharmaceutical and biotech companies, and the academic life sciences community need to establish new priorities, develop new types of expertise, adopt new types of risk assessment and risk management strategies, and learn to collaborate with each other.

The course will present case studies of how elite organizations have struggled to address novel biological threats, make high-impact decisions with limited information, and work effectively with new partners. The lessons from these cases are broadly applicable to public and private organizations seeking to address current and emerging biosecurity risks.

Date: July 23–25, 2012
Time: 9:00 AM–5:00 PM
Location: Fairfax, VA
Fee: $1500.00

Early Bird Rate (by June 1): $1200.00
2.1 Continuing Ed Units
Contact Hours Onsite

Who Should Attend

Professionals and academics in public health, the life sciences, law enforcement, and national security who have responsibilities for preventing, preparing for, or responding to pandemics or bioterrorism.

Faculty

David R. Franz, DVM, PhD (SBDGlobal and National Science Advisory Board for Biosecurity)

Kendall Hoyt, PhD (Dartmouth Medical School)

Gregory D. Koblentz, MPP, PhD (George Mason University)

Jens H. Kuhn, MD, PhD (Tunnell Consulting and Integrated Research Facility at Fort Detrick)

Sanford L. Weiner (Massachusetts Institute of Technology)

Edward H. You, MS (Federal Bureau of Investigation)

For more information and to register, visit ocpe.gmu.edu/PBIS.html

Discounts available for academics, NGOs, GMU alum, and groups of 3 or more.

Bird flu paper that raised bioterrorism fears published

Source:http://www.foxnews.com/health/2012/05/03/bird-flu-paper-that-raised-bioterrorism-fears-published/

The journal *Nature* has published the first of two controversial papers about laboratory-enhanced versions of the deadly bird flu virus that initially sparked fears among U.S. biosecurity experts that it could be used as a recipe for a bioterrorism weapon.

The publication of the paper by Yoshihiro Kawaoka of the University of Wisconsin, Madison, on Wednesday follows months of acrimonious debate that pitted the need for science to be free of censorship against the obligation to protect the public from a potentially devastating flu pandemic.

Bird flu is lethal in people and spreads among those who are in close contact with infected birds, but so far, the virus known as H5N1 has not had the ability to pass easily among humans through sneezing and coughing, and some scientists had begun to doubt that that was possible.

The studies by Kawaoka and Dr. Ron Fouchier of Erasmus Medical College in the Netherlands changed that view by proving that with a few genetic mutations, the virus could pass easily among ferrets, which are used as a close approximation of how a virus might behave in people.

"There are people who say that bird flu has been around for 16, 17 years and never attained human transmissibility and never will," said Malik Peiris, virology professor at the University of Hong Kong.

"What this paper shows is that it certainly can. That is an important public health message, we have to take H5N1 seriously. It doesn't mean it will become a pandemic, but it can," said Peiris, who wrote a commentary accompanying Kawaoka's paper in Nature.

The impending publication of the two papers last December prompted the National Science Advisory Board for Biosecurity to recommend that sensitive information be redacted, a first for the group which was formed after a series of anthrax attacks in the United States in 2001.

The group advises the Department of Health and Human Services and other agencies about "dual use" research that could serve public health but also be a potential bioterrorism threat.

Weighing the risks

The National Institutes of Health, which funded some of the research, agreed with the panel's assessment and made non-binding recommendations to Nature and Science, the journal that planned to publish Fouchier's study, to withhold key elements of the work.

But after a series of meetings involving flu experts and officials at the World Health Organization and the National Institutes of Health in the United States, the NSABB reversed its decision.

The group voted unanimously to support publication of the paper by Kawaoka, considered the least controversial of the two.

And it voted 12-6 in favor of publishing a study from Erasmus Medical Center in the Netherlands, but did not explain the concerns among some panel members about that research. Science has not given a specific date for its publication.

Kawaoka said in an email he believed that in face-to-face meetings with members of the NSABB in March, he was able to explain in greater detail the full implications of his experiments and win the panel's support.

Kawaoka's team developed a hybrid virus by taking the hemagglutinin

gene from the H5N1 virus and combining it with the pandemic strain of the 2009 H1N1 swine flu virus.

Then, by adding four other gene mutations, plus some spontaneous changes that occurred in the ferrets, the virus became transmissible among ferrets - the best model scientists have for predicting whether a flu virus can be transmitted among humans, Peiris said.

"But it doesn't necessarily mean that just because this virus transmitted in ferrets, it will 100 percent transmit in humans, but it's as close as we can get. It lost a lot of its virulence in ferrets, maybe because of the H1N1 backbone," Peiris said.

Kawaoka said his manuscript has been updated to provide more information about the benefits of these findings, particularly the risk posed by currently circulating viruses that already have one of these mutations.

"In addition, we provided more details about the biosafety and biosecurity measures in place to conduct these experiments," Kawaoka said.

Arturo Casadevall, a microbiologist from Albert Einstein College of Medicine in New York and a member of NSABB, said from his own perspective, he still believes there is risk in publishing information on how to increase the transmissibility of the bird flu virus, but publishing the study also gives scientists around the world a better idea of what to watch for in viruses already circulating.

Knowing that bird flu has the potential to jump more easily from human to human may now encourage governments to do a better job of tracking this potential threat.

"We feel the risk is still there, but the benefits now outweigh the risks," he said.

FDA approves Levaquin to combat pneumonic plague bioterrorist attack

Source:http://medcitynews.com/2012/04/fda-approves-levaquin-to-combat-pneumonic-plague-bioterrorism-attack/

The U.S. Food and Drug Administration has approved the expanded use of **Johnson & Johnson's antibiotic Levaquin against pneumonic plague in the event of a bioterrorist attack** through its rarely invoked animal rule, according to a statement from the U.S. regulator.

The animal efficacy rule allows evidence to support a drug's approval to be based entirely on animal studies to provide a regulatory pathway in instances where it is not feasible or ethical to conduct trials in humans. Because plague is such a rare disease, it would not be possible to conduct adequate efficacy trials in humans, the FDA statement said.

Levaquin's approval was based on an efficacy study conducted in African green monkeys that were infected with the plague bacterium in a laboratory setting.

The expanded use allows Leviquin to be used to treat people with the pneumonic plague and to reduce the risk of people exposed to the bacterium that causes the disease. Pneumonic plague is an infection of the lungs likened to a malignant form of pneumonia that has a high death rate unless those infected with the bacteria get immediate treatment.

The National Institute of Allergy and Infectious Disease approached New Brunswick, New Jersey-based Johnson & Johnson's pharmaceutical arm Janssen Pharmaceuticals about getting approval for the drug to treat pneumonic plague nine years ago.

The FDA's Anti-Infective Drugs Advisory Committee recommended the accelerated approval at the start of April.

The U.S. government has pushed for the use of Levaquin against the pneumonic plague, despite a black box warning that accompanies it and other strong antibiotics of its potential to cause spontaneous tendon ruptures, with adults over 60 years old particularly at risk. Although there are other drugs available to treat the pneumonic plague, evidence for the efficacy of

tetracyclines is limited and there are limited supplies of streptomycin because it is is infrequently used in the U.S., according to committee documents.

Remotely Piloted Aircraft Could Disperse Bioweapon at Olympics

Source:http://www.nti.org/gsn/article/remotely-piloted-aircraft-could-disperse-bioweapon-olympics/?goback=.gsm_3711808_1_*2_*2_*2_lna_PENDING_*2.gmp_3711808.gde_3711808_member_113745327

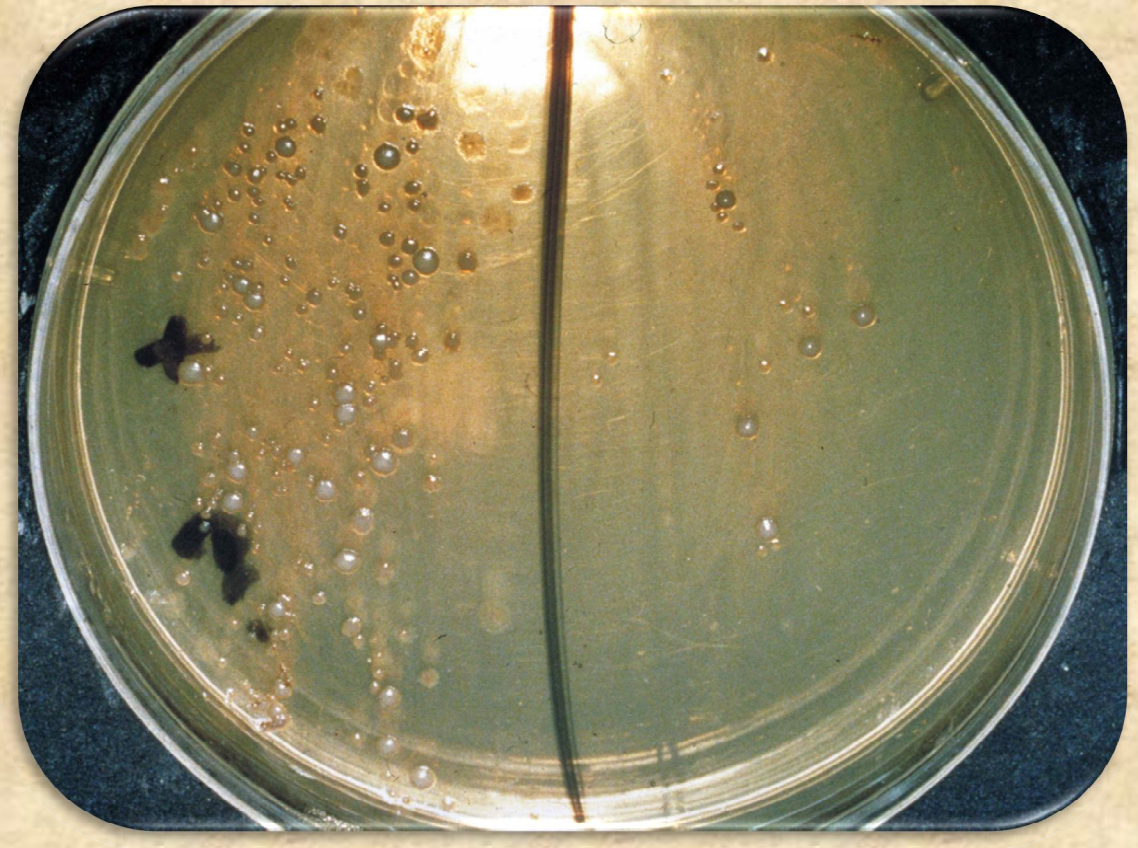
A high-level British army official has said it would be "feasible" for an extremist to employ a miniature, remotely piloted airplane to disperse a dangerous biological agent over London as the Summer Olympics take place, the *Daily Mail* reported on Saturday (May 6).

"An unmanned aerial vehicle (UAV) can be put in a backpack. They come in all sorts of sizes and it's feasible they could be filled with something noxious and flown by remote control," Lt. Col. Brian Fahy told the newspaper.

Fahy refused to speculate on what bioagent such a strike might incorporate.

Separately, the United Kingdom's Porton Down military research facility in recent months has hosted Special Air Services drills in preparation for a potential anthrax release.

QUIZ: Can you identify this?



► Read answer at the end of this section

Biosafety Labs

Source: http://www.niaid.nih.gov/topics/biodefenserelated/biodefense/publicmedia/Pages/BioLabs.aspx

In the past century, medical research has led to improved health and increased life expectancy largely because of success in preventing and treating infectious diseases. This success has come about through the use of antibiotics and vaccines, improved hygiene, and increased public awareness. New threats to health continually emerge naturally, however, as bacteria and viruses evolve, are transported to new environments, or develop resistance to drugs and vaccines. Some familiar examples of these so-called emerging or re-emerging infections include HIV/AIDS, West Nile virus, severe acute respiratory syndrome (SARS), and annual outbreaks of influenza.

To control epidemics and protect the public health, medical researchers must quickly identify naturally occurring microbes and then develop diagnostic tests, treatments, and vaccines for them. Preparing for bioterrorism-the deliberate release of a microbe into a community in which it is not a current health concern-calls for the identical scientific skills and strategies.

For more than 50 years, the National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health (NIH), has led the nation's medical research effort to understand, treat, and prevent the myriad infectious diseases that threaten hundreds of millions of people worldwide. NIAID's portion of the NIH budget-received each year from Congress-supports medical research conducted on the NIH campus in Maryland, at the Rocky Mountain Laboratories in Montana, and at universities and research centers, primarily nationwide but also overseas. The benefits of this research reach people of all ages worldwide.

Because NIAID has broad experience, expertise, and success in developing medical tools to fight infectious diseases, it now also plays a leading role in the nation's fight against bioterrorism. The Institute has greatly expanded its research programs to accelerate the

development of new and improved diagnostics, treatments, and vaccines to protect civilians from deadly infectious diseases, whether they emerge naturally or are deliberately released.

Scientists use biosafety labs to study contagious materials safely and effectively. These state-of-the-art labs are designed not only to protect researchers from contamination, but also to prevent microorganisms from entering the environment.

There are four biosafety levels (BSLs) that define proper laboratory techniques, safety equipment, and design, depending on the types of agents being studied:

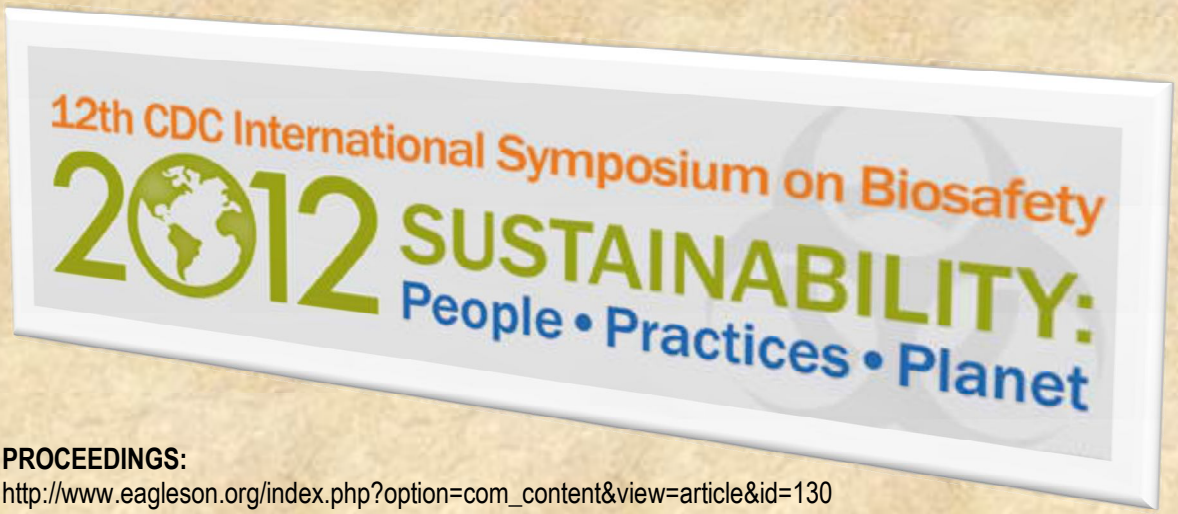
- **BSL-1** labs are used to study agents not known to consistently cause disease in healthy adults. They follow basic safety procedures and require no special equipment or design features.
- **BSL-2** labs are used to study moderate-risk agents that pose a danger if accidentally inhaled, swallowed, or exposed to the skin. Safety measures include the use of gloves and eyewear as well as handwashing sinks and waste decontamination facilities.
- **BSL-3** labs are used to study agents that can be transmitted through the air and cause potentially lethal infection. Researchers perform lab manipulations in a gas-tight enclosure. Other safety features include clothing decontamination, sealed windows, and specialized ventilation systems.
- **BSL-4** labs are used to study agents that pose a high risk of life-threatening disease for which no vaccine or therapy is available. Lab personnel are required to wear full-body, air-supplied suits and to shower when exiting the facility. The labs incorporate all BSL 3 features and occupy safe, isolated zones within a larger building.

Biosafety Levels

Biosafety Level	Agents	Practices	Safety Equipment	Facilities
BSL-1	These agents are not generally associated with disease in healthy people	• Good micro- biological practice • Hand washing • No eating, drinking, or gum chewing in the laboratory	• Pipeting devices- mouth pipeting is prohibited	
BSL-2	These agents are associated with human disease	• Limited lab access • Most work may be performed on a bench top • Biohazard warning signs • "Sharps" precautions • Biosafety manual defining any needed waste decontamination or medical surveillance policies	• Class I or II Biological Safety Cabinets (BSCs) or other physical containment devices • Lab coats, gloves, face protection, as needed	• Open bench-top • sink for hand washing is required • Autoclave available
BSL-3	These agents: • Are associated with human disease and cause illness by spreading through the air (aerosol) • Cause diseases that may have serious or lethal consequences	BSL-2 practice plus • Controlled access • Decontamination of all waste • Decontamination of lab clothing before laundering	• Class I or II Biological Safety Cabinets (BSCs) or other physical containment devices • Protective lab clothing, gloves, respiratory protection as needed	BSL-2 plus • Physical separation from access corridors • Self-closing, double-door access • Exhaust air is not recirculated • Negative airflow into laboratory • Design includes back up/redundant systems

BSL-4	These agents: • Are associated with human disease and cause illness by spreading through the air (aerosol) or have an unknown cause of transmission • Cause diseases that are usually life-threatening	BSL-3 practices plus • Clothing change before entering • Shower on exit • All material decontaminated on exit from facility	Class II procedures conducted in Class III BSCs or Class I or II BSCs in combination with full-body, air-supplied, positive- pressure personnel suit	BSL-3 plus • Separate building or isolated zone • Dedicated supply and exhaust, vacuum, and decontamination systems • Design includes back-up/redundant systems • Other requirements outlined in NIH/CDC publication Biosafety in Microbiological and Biomedical Laboratories



PROCEEDINGS:
http://www.eagleson.org/index.php?option=com_content&view=article&id=130

Trace detection of meglumine and diatrizoate from _Bacillus_ spore samples using liquid chromatography/mass spectrometry

Source: http://www.promedmail.org

In the weeks following the 11 Sep 2001 terrorist attacks on the World Trade Center and the Pentagon, 4 letters containing _Bacillus anthracis_ spores were collected. These letters were addressed to 2 media outlets in New York City and to 2 members of the United States Senate in Washington, DC. As a result of the distribution of these letters through the United States Postal System, 5 victims died and at least 17 victims demonstrated symptoms of inhalational or cutaneous anthrax.

The investigation to determine the individual(s) responsible for the most disruptive terrorist attack on the United States involving the use of a biological agent was conducted by the Federal Bureau of Investigation (FBI) and the United States Postal Inspection Service (USPIS). Because of unprecedented challenges, this was among the most complex investigations the FBI or the USPIS had ever conducted. The investigation team, known as the Amerithrax Task Force, worked with subject matter experts and the scientific community to develop novel analytical/forensic assays to leverage all possible information from the evidentiary _B. anthracis_ spore materials.

The _B. anthracis_ spores recovered from the letters were determined to be of the Ames strain and were of a high degree of purity. While the spores recovered from the mailings to media outlets in New York City were characteristically different (for example, off-white in color, more granular, some cellular debris, and growth media components present) from the spores sent to Washington, DC., both had

high colony-forming units (CFU) per gram of material, on the order of 1011 CFU/g, indicating that both were high-quality spore preparations. Spores of such purity are often used in conducting aerosol challenges to minimize the incidence of nebulizer obstruction by cellular debris or growth media components during an experiment.

The investigation determined that some laboratories conducting _B. anthracis_ research with the Ames strain were purifying spores using a density gradient of RenoCal-76(R) or similar products. Meglumine diatrizoate and sodium diatrizoate are the primary constituents in RenoCal-76(R), Hypaque-76(R), and Renografin-60(R), which are commercially available radiographic imaging products. In addition, meglumine diatrizoate, meglumine, and sodium diatrizoate are readily available from commercial chemical suppliers. The literature reports, as early as 1966, the use of products containing meglumine diatrizoate in spore purification.

The Ames _B. anthracis_ used in the New York City and Washington, DC mailings had a number of identified morphological variants, which were isolated and their complete genomes sequenced. The sequences of these variants were compared to the wild-type Ames _B. anthracis_, and a number of genetic differences were identified. Assays were used to screen over 1000 samples of Ames _B. anthracis_ collected from research institutions within the United States and internationally. Of the samples screened, all samples positive for all of the genetic markers were determined to originate from a common source of spores, known as RMR-1029. The RMR-1029 spores were known, from laboratory records, to have been purified using a density gradient of RenoCal-76(R). Some investigative questions became: "Were the evidentiary spores from the mailings directly diverted from RMR-1029? Could an analytical method identify residual RenoCal-76速 in a spore preparation known to be purified using RenoCal-76(R)?"

This paper describes the development, validation, and application of a novel, highly sensitive protocol using liquid chromatography/mass spectrometry (LC/MS) with electrospray ionization (ESI) to detect trace amounts of meglumine and/or diatrizoate, components of RenoCal-76(R), in a single spore sample preparation. This analytical capability was applied to limited evidentiary spore material and RMR-1029 to provide probative information about a possible production method of the evidentiary samples. During the investigation, it was determined that the number of researchers who used gradients of RenoCal-76(R), or similar products, to purify spores and who had access to the Ames strain of _B.

anthracis_ was limited. Therefore, if meglumine and diatrizoate were identified in the _B. anthracis_ spores used in the mailings, the number of potential sources for the spore material could be significantly reduced.

Conclusions

A sensitive and selective analytical protocol has been developed for the detection of meglumine and diatrizoate in samples of _Bacillus_ spores. A tiered approach of capturing chromatographic separation, full-scan MS, MS2, and MS4 data was developed for both meglumine and diatrizoate. System carryover concerns with meglumine were resolved by changing the stationary and mobile phases. The method validation demonstrated both sensitivity and selectivity by obtaining detection limits of meglumine and diatrizoate at concentrations ranging from 1.00 to 10.0 ng/mL. Maximizing the data that could be derived from the analysis of a few milligrams of evidentiary material was paramount to the FBI. The application of this novel method proved to be a valuable tool during the investigation. As the genetic data that linked the _B. anthracis_ spore material from the mailings to RMR-1029 was being compiled, investigators were uncertain whether an aliquot of RMR-1029 was used directly. The absence of meglumine and diatrizoate on the evidentiary material, using the protocol described herein and when taken together with other forensic examinations, was supportive to the investigation in indicating that the evidentiary spore material was not diverted directly from RMR-1029.

Swider C, Maguire K, Rickenbach M, et al: Trace detection of meglumine and diatrizoate from _Bacillus_ spore samples using liquid chromatography/mass spectrometry. J Forensic Sci. 2012 Apr 26. [E-pub ahead of print]

Embassies receive black powder, threats

Source: http://www.dailytimes.com.pk/default.asp?page=2012\05\17\story_17-5-2012_pg1_5

Several Western embassies in Islamabad received letters on Wednesday containing suspicious powder and threats to poison supplies for NATO soldiers in Afghanistan, officials said.

Islamabad police chief Bani Amin told AFP that at least three embassies had received small packets containing black powder, which had been sent for laboratory analysis.

The letters said the powder was a sample of "poison" that would be hidden in NATO supplies if Pakistan lifts a nearly six-month blockade on convoys carrying supplies for troops fighting Taliban in neighbouring Afghanistan.

Senior Pakistani security officials told AFP that the French embassy and the Australian and British high commissions had received suspicious packages for certain, and other diplomatic missions had probably also been targeted. "Embassies have received one sachet each. The problem is that it is in a meagre quantity and difficult even to test. It seems somebody has committed some mischief. We are sending it to a laboratory," Amin told AFP.

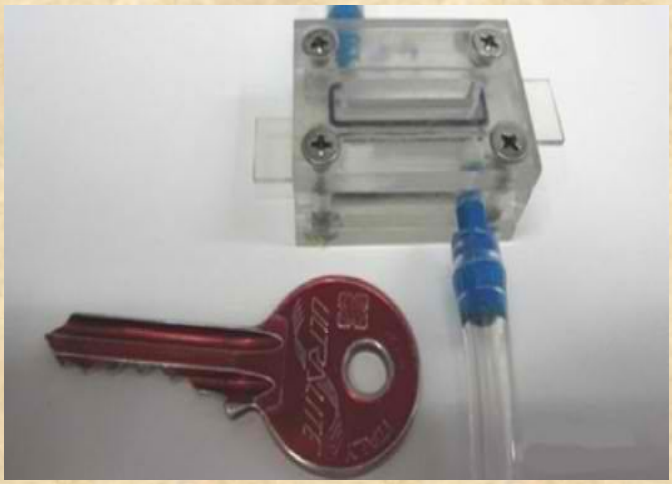
A diplomat at one of the embassies said the accompanying handwritten letter was in broken English and threatened to avenge terrorists killed in Afghanistan by poisoning food supplies in the convoys.

"We received a letter containing greyish powder in a sealed plastic sachet, which we didn't open," the diplomat told AFP, speaking on condition of anonymity.

Dip Chip biosensor uses microbes to instantly detect almost any toxic substance

Source: http://www.gizmag.com/dip-chip-microbe-biosensor/22572/

Once upon a time, tasters were employed by the well-to-do, in order to check that their food or drink wasn't poisonous. Today, there are electronic biosensors that can do more or less the same thing. Unfortunately, as was no doubt sometimes the case with the tasters, the biosensors can't always give us immediate results. Additionally, they're usually only able to test for specific substances, and not simply for "anything that's toxic." An experimental new device known as the Dip Chip, however, is said to address both of those problems.



The Dip Chip biosensor, with a key for scale

The biosensor was created by Professors Yosi Shacham-Diamand and Shimshon Belkin, of Tel Aviv University and the Hebrew University of Jerusalem, respectively.

It contains microbes, which have been genetically modified to produce a biochemical reaction whenever they're exposed to a toxic material, not unlike the reactions that occur in humans and other animals. A dip stick-like tube holds the microbes immobilized, next to the device's sensing electrodes. When that tube is introduced to a substance, the microbes will react accordingly, with any chemical signals released by them being converted into an electrical signal. The device analyzes the output of the electrodes, and delivers a "toxic" or "not toxic" diagnosis.

The Dip Chip reportedly gives very few false readings, either positive or negative. Because it simply senses toxicity in general, it could reportedly be used to detect any kind of poisonous substance – even ones that haven't been heard of yet. It also provides results in real time, so could be invaluable for field use by people such as soldiers or campers.

Shacham-Diamand hopes that the Dip Chip can be miniaturized to the point that it could be used with a smartphone or other mobile device. A larger version of it has already been produced, however, designed for the continuous online monitoring of municipal water supplies.

The technology could conceivably also be used in place of lab animals, for testing the toxicity of newly-developed materials.

Panel debates bioterrorism protection for children

Source:http://www.foxnews.com/us/2012/05/17/panel-debates-bioterrorism-protection-for-children/

The Obama administration is asking a presidential commission to help decide an ethical quandary: Should the anthrax vaccine and other treatments being stockpiled in case of a bioterror attack be tested in children?

"We can't just assume that what we have for adults works for children," Health and Human Services Secretary Kathleen Sebelius told the panel Thursday.

Controversy over whether to open pediatric studies of the anthrax vaccine led Sebelius to ask the Presidential Commission for the Study of Bioethical Issues to tackle the question. The commission began its deliberations Thursday; recommendations are expected by year's end.

Sebelius made clear that the question is far broader than anthrax.

"There are serious ethical issues around the development of medical countermeasures for children" in general, she said.

Developing protections for youngsters is critically important, but in a way that puts "our children's safety as our highest priority," Sebelius said.

A decade after the anthrax attacks in the United States, the government has a multibillion-dollar stockpile of tools to fight back against some of the threats that worry defense experts. Notably missing is information on how to treat children in various emergencies — whether the same drugs their parents will get will work or be safe for them, and even what dose youngsters should receive.

Thus the debate on whether to conduct studies now, before millions of children might need to try an untested product in an emergency. Even if those studies were offered, there's no way to know how many parents would agree to enroll their children.

Testing medications in children always requires extra safeguards. It's fairly straightforward to test a potential treatment for cancer or some other childhood disease. But if a child won't receive a direct medical benefit, federal regulations say studies are allowed only if testing adults can't provide the answers and if the risks to participating children are minimal.

Anyone exposed during an anthrax attack would require 60 days of powerful antibiotics, or antibiotics until a vaccine could kick in. Last fall, the National Biodefense Safety Board, which advises the government, recommended child testing of the anthrax vaccine, but only if outside ethical experts agreed such studies could be done appropriately.

The shots have been widely used in adults, including U.S. troops, and are considered safe for them, said the board chairman, Dr. John Parker, a retired Army major general who has been vaccinated.

Side effects include shot-site soreness and redness, muscle aches, fatigue and headache. Rare but serious allergic reactions have been reported.

The bioethics commission wrestled with how to define "minimal risk" when there is no imminent emergency, and the chairwoman, Dr. Amy Gutmann, wondered whether people urging such testing would enroll their own children.

Parker responded that he's discussed that with first-responders and some in the military. "There are groups out there that would want their families protected as much as they are protected as they do their job, in fear of bringing something home," he said.

Other doctors told the panel that 60 days of antibiotics can cause bad side effects for children, including diarrhea, other infections and dangerous allergic reactions. Plus there's concern that many people wouldn't take the full course, Parker said.

New Book: Living Weapons

Biological Warfare and International Security
By Gregory D. Koblentz (July 2011)

"Biological weapons are widely feared, yet rarely used. Biological weapons were the first weapon prohibited by an international treaty, yet the proliferation of these weapons increased after they were banned in 1972. Biological weapons are frequently called 'the poor man's atomic bomb,' yet they cannot provide the same deterrent capability as nuclear weapons. One of my goals in this book is to explain the underlying principles of these apparent paradoxes."—from *Living Weapons*

Biological weapons are the least well understood of the so-called weapons of mass destruction. Unlike nuclear and chemical weapons, biological weapons are composed of, or derived from, living organisms. In *Living Weapons*, Gregory D. Koblentz provides a comprehensive analysis of the unique challenges that biological weapons pose for international security. At a time when the United States enjoys overwhelming

conventional military superiority, biological weapons have emerged as an attractive means for less powerful states and terrorist groups to wage asymmetric warfare.

Koblentz also warns that advances in the life sciences have the potential to heighten the lethality and variety of biological weapons. The considerable overlap between the equipment, materials and knowledge required to develop biological weapons, conduct civilian biomedical research, and develop biological defenses creates a multiuse dilemma that limits the effectiveness of verification, hinders civilian oversight, and complicates threat assessments.

Living Weapons draws on the American, Soviet, Russian, South African, and Iraqi biological weapons programs to enhance our understanding of the special challenges posed by these weapons for arms control, deterrence, civilian-military relations, and intelligence. Koblentz also examines the aspirations of terrorist groups to develop these weapons and the obstacles they have faced. Biological weapons, Koblentz argues, will continue to threaten international security until defenses against such weapons are improved, governments can reliably detect biological weapon activities, the proliferation of materials and expertise is limited, and international norms against the possession and use of biological weapons are strengthened.

CONTENTS

Press Reviews

"Koblentz provides an up-to-date and comprehensive analysis of biological weapons as a strategic problem that should become the standard text in the field. . . . The book draws lessons about intelligence, verification, and oversight, and also about what strategic value the offending countries sought to extract by pursuing such weapons. . . . Through a careful examination of actual cases, Koblentz has done his best to get the true measure of the bioterrorist threat."—***Foreign Affairs*** **(January/February 2010)**

"*Living Weapons* is a succinct, highly readable analysis of the unique challenges presented by biological weapons. Koblentz provides an excellent summary of the historic utilities and disutilities posed by biological weapons to international actors and the potential erosion of constraints on their future use. Highly recommended."**—*Choice***

"Koblentz thoroughly addresses the wide range of challenges that biological weapons pose to countries in the 21st century. . . . He explores these issues by weaving together historical information on Iraqi, Russian, South African, and Soviet biological weapons programs with analysis of the scientific and security challenges biological weapons present . . . [and] he recommends several possible ways for countries to decrease, unilaterally and multilaterally, the threat posed by biological weapons."**—*Arms Control Today*** **(November 2009)**

"A readable, succinct, yet through review of the myriad issues surrounding biodefense from a policy perspective. . . . More importantly, *Living Weapons* provides a disturbing yet refreshing look at the myriad obstacles confronting those who would play a role—whether political, diplomatic, or scientific—in attempting to rein in the use of biology in war and terror."**—*Emerging Infectious Diseases*** **(October 2010)**

Experts

"*Living Weapons* promises to stimulate attention and provoke thought on a very important topic. Gregory D. Koblentz writes clearly about the problems posed by biological weapons and provides particularly good summary accounts of the Soviet, Iraqi, and South African offensive programs."**—John D. Steinbruner, University of Maryland, author of *The Cybernetic Theory of Decision***

"Gregory D. Koblentz's comprehensive and insightful study explores the unique dilemmas that biological weapons pose for defense, intelligence, arms control, and global governance. Filled with information and analysis, the book is a valuable resource for both scholars and policymakers."**—Jonathan B. Tucker, Ph.D., Senior Fellow, James Martin Center for Nonproliferation Studies, Monterey Institute of International Studies**

"*Living Weapons* presents a careful, authoritative analysis of a national security problem of great consequence that is often distorted by apocalyptic scenarios and ignorance of scientific complexities. With great clarity, Gregory D. Koblentz has moved the political discussion forward in an important and

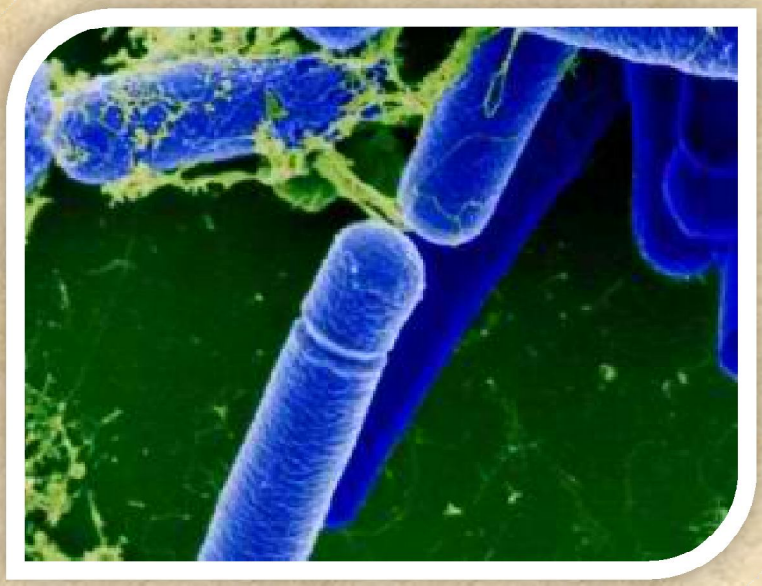
substantive direction that deserves a wide audience."**—Jeanne Guillemin, author of *Biological Weapons: From State-sponsored Programs to Contemporary Bioterrorism***

Boston subway authority and DHS plan bio-terror tests using dead bacteria

Source: http://www.gsnmagazine.com/node/26394?c=cbrne_detection

Planned tests of biological detection gear this summer at several stations on the city of Boston's "T" subway system will use a harmless dead bacteria to test how quickly pathogens can be found in the system.

The test is slated for the Cambridge and Somerville stations sometime this summer, said a statement from the Department of Homeland Security (DHS) Science and Technology Directorate (S&T) and the Massachusetts Bay Transportation Authority (MBTA). The statement didn't provide specific dates for the tests.



On May 16, the transit agency held a public meeting seeking interested parties to voice their concerns and comments. It said DHS will take into consideration all comments received by the close of business of June 15, 2012.

MBTA said DHS had conducted an environmental assessment and found no significant impact in using an innocuous, food-safe test bacterium to evaluate the ability of the system to rapidly detect hazardous biological materials in the subway.

DHS said sensors developed by QinetiQ and others were designed to detect hazardous biological materials and enable rapid responses within 20 minutes to reduce the impact of a biological attack. The sensors were installed in December.

The bacteria to be used is ***Bacillus subtilis***, or *B. subtilis* (photo), a soil bacterium that isn't transmittable to humans and has been studied extensively for human, animal, and environmental safety, and has ultimately been approved by the Environmental Protection Agency (EPA) for day-of-harvest use on produce as a bio-fungicide, explained the DHS Environmental Assessment. It said even thought the bacteria isn't transmittable to humans in live form and that using a live form would most closely resemble a biological attack, using live bacteria could impact immune sensitive populations, so it opted for the dead form.

The MBTA's public meeting in Boston on May 16 drew some concerned responses from those attending. According to *NECN.com*, one rider said despite assurances the bacteria wouldn't cause health problems, she said she was

While the systems are being evaluated, Massachusetts public health officials will be working closely with DHS and the MBTA to monitor the results, said the agency. The MBTA and DHS are coordinating these efforts with the Massachusetts Department of Public Health, the Cambridge Public Health Department, and the Somerville Health Department, with support from the Massachusetts Emergency Management Agency.

Detecting biological terror agents

Source: http://investors.positiveidcorp.com/releasedetail.cfm?ReleaseID=674032

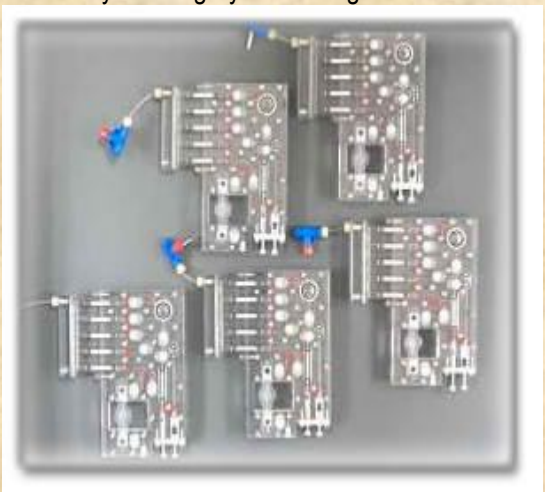
PositiveID Corporation yesterday announced it has made significant progress in testing its M-BAND, Microfluidics-based Bioagent Autonomous Networked Detector, in preparation for DHS's $3 billion BioWatch procurement. The company's M-BAND system

detects five organisms on the CDC Select Agents List, which is a requirement for BioWatch.

M-BAND, developed under contract for DHS, is an early warning system designed to detect the intentional release of aerosolized biological agents. It runs autonomously for up to thirty days between service cycles, continuously analyzing air samples, typically in high-traffic areas, for the detection of bacteria, viruses, and toxins with results in as little as three hours. Results from individual M-BAND instruments are reported via a secure wireless network in real time to give an accurate status for fielded instruments in aggregate. M-BAND can be remotely set to detect for DNA-based pathogens alone, with or without either RNA-based organisms or toxins, or for all three types of pathogens simultaneously at remotely programmable intervals.

In addition to the BioWatch opportunity, the company has submitted or is in the process of submitting bids for other government contract opportunities totaling more than $16 million across six different government agencies for both its M-BAND and Dragonfly Rapid MDx cartridge-based diagnostic system.

William J. Caragol, chairman and CEO of PositiveID, said, "As we prepare for the final request for proposal for BioWatch to be released from DHS, we have continued our internal testing of M-BAND. Our system is fully functional and, we believe, one of the only technologies capable of addressing the requirements of the BioWatch procurement. Furthermore, we believe our system not only performs better than the competition but also has a lower total cost of ownership."



Left: MFSI's Dragonfly Cartridge – provides cell lysis, nucleic acid purification, PCR amplification and fluorescent detection in less than 7 minutes on a 150 ul input sample. Proven applications include: environmental bacteria, human papilloma virus (HPV), and

antibiotic resistant bacterial such as MRSA. **Right:** Gel verification results of the processing and amplification of a duplex HPV PCR assay from human cells on the Dragonfly cartridge. Processing and amplification time was fully automated and less than seven minutes.

EDITOR'S RECOMENDATION

Small-scale Terrorist Attacks Using Chemical and Biological Agents: An Assessment Framework and Preliminary Comparisons
Source: http://www.fas.org/irp/crs/RL32391.pdf

A paper you have to read especially for the tables included:

List of Tables

- Table 1. Chemical agent comparison according to barriers to potential terrorist use
- Table 2. Biological agent comparison according to barriers to potential terrorist use
- Table 3. Toxin agent comparison according to barriers to potential terrorist use
- Table 4. Comparison of chemical agent characteristics
- Table 5. Comparison of biological agent characteristics
- Table 6. Comparison of toxin agent characteristics

Expanding the reach of an innovative virus-tracking software

Source: http://www.homelandsecuritynewswire.com/dr20120525-expanding-the-reach-of-an-innovative-virustracking-software

A biomedical informatics researcher who tracks dangerous viruses as they spread around the globe has restructured his innovative tracking software to promote even wider use of the program around the world.

Associate Professor Daniel Janies, Ph.D., an expert in computational genomics at the Wexner Medical Center at the Ohio State University (OSU), is working with software engineers at the Ohio Supercomputer Center (OSC) to expand the reach of SUPRAMAP, a Web-based application which synthesizes large, diverse datasets so that researchers can better understand the spread of infectious diseases across hosts and geography. An Ohio Supercomputer Center release reports that by separating SUPRAMAP's client application from the underlying server software, the goal is to reconfigure the server in a way that researchers and public safety officials can develop other front-end applications that draw on the logic and computing resources of SUPRAMAP.

Janies and his colleagues at Ohio State, the

American Museum of Natural History (AMNH), and OSC developed SUPRAMAP in 2007 to track the spread and evolution of pandemic (H1N1) and avian influenza (H5N1).

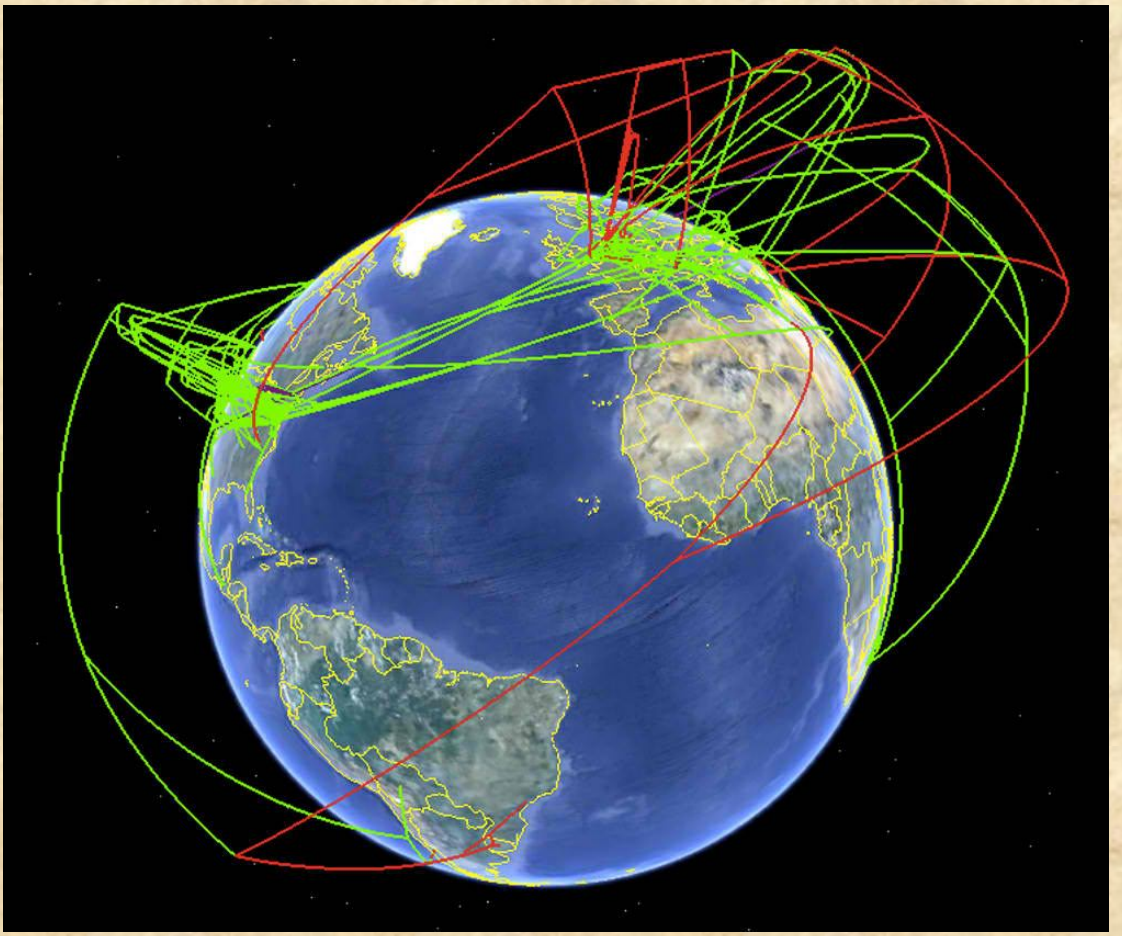
"Using SUPRAMAP, we initially developed maps that illustrated the spread of drug-resistant influenza and host shifts in H1N1 and H5N1 influenza and in coronaviruses, such as SARS," said Janies. "SUPRAMAP allows the user to track strains carrying key mutations in a geospatial browser such as Google EarthTM. Our software allows public health scientists to update and view maps on the evolution and spread of pathogens."

The original implementation of SUPRAMAP was built with a single client that was tightly coupled to the server software.

"We now have decoupled the server from the original client to provide a modular Web service for POY, an open-source, freely available phylogenetic analysis program developed at AMNH. The Web service can be used by other researchers with new ideas, data, and clients to create novel applications," said Ward Wheeler, Ph.D., curator-in-charge of scientific computing at AMNH and a coauthor with Janies and others on a recent article about the project in the journal *Cladistics*.

"To demonstrate the POY web service, we have produced a new client software application, GEOGENES," said Wheeler. "Unlike in SUPRAMAP, in which the user is required to create and upload data files, in GEOGENES the user works from a graphical interface to query a curated dataset, thus freeing the user from managing files."

The release notes that currently, this service is hosted on large shared systems at OSC, the center's flagship HP Intel Xeon Oakley Cluster, their IBM Opteron Glenn Cluster and on a smaller dedicated cluster at Ohio State's Wexner Medical Center.



"Decoupling the client from the server provides another advantage in that the implementation of the server can change to take advantage of advances in computing technology," noted Thomas Bitterman, a senior software engineer at OSC and co-author of the journal article.

"For example, the recent addition of the Oakley Cluster at OSC has made

available a large set of GPUs that could result in performance improvements."

To give their new software implementation a proper road test, the researchers examined groups of key mutations in a pathogen they hadn't tracked before — the H7 avian influenza virus. Infection of humans by the H7 virus is rare, but it has occurred among people who have direct contact with infected poultry.

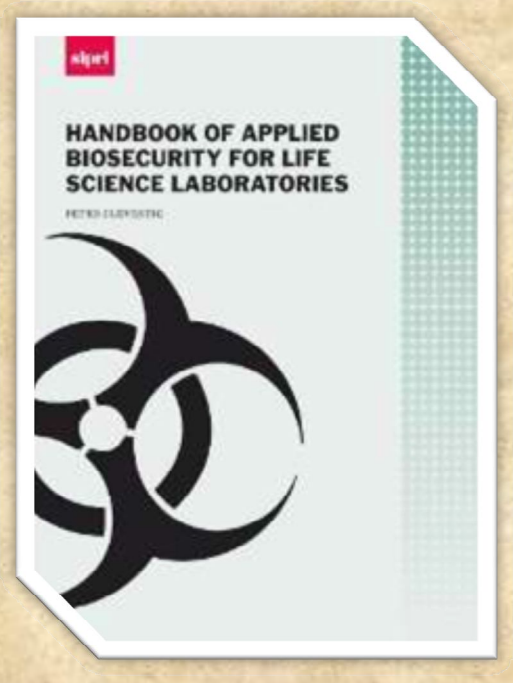
"H7 influenza, like H5N1 is largely an avian virus, but infects humans periodically, and therefore we wanted to see how it evolves," said Janies. "We have shown that pathogenicity of the H7 influenza is highly labile on a molecular evolutionary level and has occurred independently in many places around the world. Now that the H5N1 papers detailing transmission among mammals have been published, we can next pinpoint the natural geographic distribution of key sets of mutations that could lead to human-to-human transmission. Our maps will allow scientists to better deploy public health resources to protect citizens and forces in the field."

Handbook of Applied Biosecurity for Life Science Laboratories

By Peter Clevestig

Source:http://books.sipri.org/product_info?c_product_id=382&goback=.gde_3711808_member_118708243

Biosecurity covers a broad spectrum of potential risks and threats ranging from criminal activities to bioterrorism and espionage. This



handbook focuses on the laboratory related activities and basic components of applied biosecurity that are relevant to all laboratory employees. The role played by laboratory managers and principal investigators in safeguarding laboratory assets and the employees under their supervision is also highlighted.

This handbook provides guidance for personnel who work with infectious pathogens and toxins that may affect the health of humans, animals and plants. It aims to engage scientists, laboratory employees and students in laboratory biosecurity, and to provide practical advice that will ensure the secure handling and storage of biological materials.

Acknowledging biosecurity risks and the important role of the employee in maintaining biosecurity is crucial to keeping the workplace safe and secure. Safeguarding infectious agents is also a national legal obligation under the 1972 Biological and Toxin Weapons Convention and United Nations Security Council Resolution 1540.

Contents

Peter Clevestig *(Sweden) is a Senior Researcher with the Chemical and Biological Security Project of the SIPRI Arms Control and Non-proliferation Programme. He is a virologist by training and, before joining SIPRI, conducted research at the*

Department of Microbiology, Tumor and Cell Biology of Karolinska Institute (KI), Stockholm. He also served as the administrator of the KI Biosafety Committee. He is an active member of the Nordic Biosafety Network and the European Biosafety Association (EBSA). He has authored or co-authored several scientific publications, primarily in the field of virology, and regularly lectures on biosecurity issues at European scientific research facilities.

Biosafety concerns for labs in the developing world

By Ewen Callaway

Source: http://www.nature.com/news/biosafety-concerns-for-labs-in-the-developing-world-1.10687

Biocontainment labs across the Asia-Pacific region all too often fail to live up to the term. An inspection of dozens of labs has found that nearly one-third of the biosafety hoods intended to protect workers from deadly pathogens did not work properly — an offence for which a Western lab could be shut down. In one facility, only a shower curtain enclosed a table on which the brains of rabid dogs were routinely dissected.

Such deficiencies are symptomatic of a biosafety crisis in many of the laboratories that diagnose and study infectious agents in developing countries, say biorisk experts who attended a meeting at London's Chatham House on 17 May, where the results of the inspection were presented. The weaknesses could have repercussions around the globe if pathogens were released. "The strength of a chain is based on its weakest link, and developing countries are the weakest link," says Teck-Mean Chua, former president of the Asia-Pacific Biosafety Association based in Singapore, which co-sponsored the anonymized laboratory inspection.

Complaints of inadequate lab protocol in developing countries may not surprise many biologists, but they are attracting attention as scientists and research agencies in the West place increasing emphasis on biosafety. Discussions at the meeting skirted around the controversies surrounding the publication of research on mammal-transmissible forms of the H5N1 influenza virus. However, attendees did talk about how measures to protect lab workers and contain pathogens would affect research on diseases such as flu.

In most Western countries, rules on biosafety — meant to safeguard lab workers against infection — and biosecurity, which protects the general public, became much stricter after 2001, when anthrax attacks in the United States raised the spectre of bio-terrorism using laboratory-prepared pathogens. But stringent biosafety and biosecurity rules are unworkable

in many developing countries, where researchers often need to handle infectious agents such as anthrax and plague to protect public health, but lack the infrastructure of the West, says Nigel Lightfoot, an associate fellow at the Centre on Global Health Security at Chatham House, who chaired last week's meeting. "When you don't have any electricity, the answer is not to build a very high-security laboratory," he says. "You've got to move away from the costly bells-and-whistles solutions to what is practical."

Speakers suggested solutions such as small biocontainment boxes, for example, and also pointed out that pathogens that are endemic in a particular region present a lower biosecurity risk there than in Western laboratories. "We cannot stop them from working on things they need to for the health of their countries," says Tim Trevan, executive director of the International Council for the Life Sciences, a non-governmental organization based in Arlington, Virginia, which is interested in biosafety and biosecurity in the Middle East and Africa.

Lightfoot believes that "you're going to have dual standards" to cover different areas. But having two sets of lab rules may not sit well with either side, says Nicoletta Previsani, who heads the biorisk-management team at the World Health Organization (WHO) in Geneva, Switzerland. Scientists in developing countries may feel that they are being left with less-than-safe labs, whereas those in richer countries could feel overburdened by regulations that others don't have to follow.

Some meeting attendees, including Chua, called on the WHO, the Food and Agriculture Organization of the United Nations in Rome and the World Organisation for Animal Health in Paris to take the lead in establishing global standards for lab safety and security.

But Previsani says that such organizations cannot tell their member states how to operate their labs. Lightfoot adds that the WHO lacks the money and staff to act as a regulator. In January, the agency issued a five-year plan on laboratory biorisk management, in which it emphasized that it would be better placed in an organizational role, coordinating activities between stakeholders. Lightfoot argues that networks of non-governmental organizations and biosafety bodies ought to press developing nations to institute better lab standards. Donors could also help by paying more attention to the long-term sustainability of labs that they help to establish, adds Toby Leslie, an epidemiologist at the London School of Hygiene and Tropical Medicine, who has trained lab workers in Afghanistan. Too often, he says, money is spent on infrastructure and equipment without considering whether the laboratories can be operated safely by knowledgeable staff for years to come. A planned national health laboratory in Kabul, for instance, will need long-term support for maintenance and training. "I can't see a way that Afghanistan is going to be able to support it independently," says Leslie.

Ewen Callawa, *joined Nature in August 2010, after 2 years at New Scientist as Boston-based biomedical reporter. He attended the science writing program at the University of California, Santa Cruz and earned a masters degree in microbiology at the University of Washington. He spends his free time learning to bicycle on the left side of the road.*

50-Year Cholera Mystery Solved

Source: http://www.utexas.edu/news/2012/05/29/cholera/

For 50 years scientists have been unsure how the bacteria that gives humans cholera manages to resist one of our basic innate immune responses. That mystery has now been solved, thanks to research from biologists at The University of Texas at Austin.

The answers may help clear the way for a new class of antibiotics that don't directly shut down pathogenic bacteria such as *V. cholerae*, but instead disable their defenses so that our own immune systems can do the killing.

Every year cholera afflicts millions of people and kills hundreds of thousands, predominantly in the developing world. The infection causes profuse diarrhea and vomiting. Death comes from severe dehydration.

"If you understand the mechanism, the bacterial target, you're more likely to be able to design an effective antibiotic," says Stephen Trent, associate professor of molecular genetics and microbiology and lead researcher on the study.

The bacterium's defense, which was unmasked this month in the *Proceedings of the National Academy of Sciences*, involves attaching one or two small amino acids to the large molecules, known as endotoxins, that cover about 75 percent of the bacterium's outer surface.

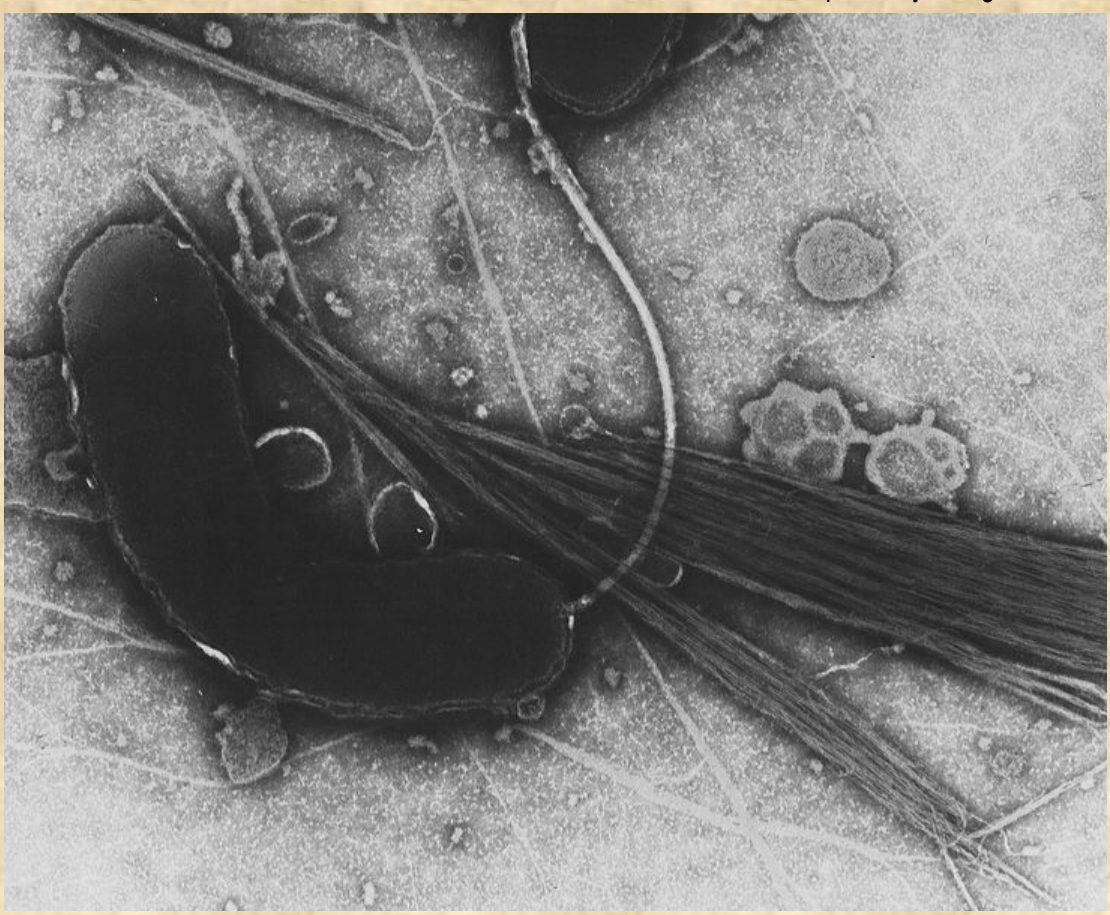
"It's like it's hardening its armor so that our defenses can't get through," says Trent.

Trent says these tiny amino acids simply change the electrical charge on that outer surface of the bacteria. It goes from negative to neutral.

called cationic antimicrobial peptides (CAMPs), are positively charged. They can bind to the negatively charged surface of bacteria, and when they do so, they insert themselves into the bacterial membrane and form a pore. Water then flows through the pore into the bacterium and pops it open from the inside, killing the harmful bacteria.

It's an effective defense, which is why these CAMPs are ubiquitous in nature (as well as one of the main ingredients in over-the-counter antibacterial ointments such as Neosporin).

However, when the positively charged CAMPs



Transmission electron microsope image of Vibrio choleraethat has been negatively stained. Vibrio choleraeis the bacteria responsible for the gastroinestinal disease cholera. In order to get the disease cholera, the bacteria must be able to colonize in the small intestine and a critical factor necessary for this colonization is the toxin-co-regulated pilus(TCP). 0395 is a wild type strain, showing the normal bundling of toxin-co-regulated pilus(TCP). Wild-type pili are clearly visible as 7 nm fibres that form bundles @ 0.2Ð0.3 µm wide and 3Ð6 µm long.

That's important because the molecules we rely on to fight off such bacteria, which are

come up against the neutral *V. cholerae* bacteria, they can't bind. They bounce away, and we're left vulnerable.

V. cholerae can then invade our intestines and turn them into a kind of factory for producing more cholera, in the process rendering us incapable of holding onto fluids or extracting sufficient nutrients from what we eat and drink.

"It pretty much takes over your normal flora," says Trent.

Trent says that scientists have known for some time that the strain of *V. cholerae* responsible for the current pandemic in Haiti and elsewhere is resistant to these CAMPs. It's that

resistance that is likely responsible, in part, for why the current strain displaced the strain that was responsible for previous pandemics.

"It's orders of magnitude more resistant," says Trent.

Now that Trent and his colleagues understand the mechanism behind this resistance, they hope to use that knowledge to help develop antibiotics that can disable the defense, perhaps by preventing the cholera bacteria from hardening their armor. If that happened, our CAMPs could do the rest of the work.

Trent says the benefits of such an antibiotic would be considerable. It might be effective against not just cholera but a range of dangerous bacteria that use similar defenses. And because it disarms but doesn't kill the bacteria outright, as traditional antibiotics do, it might take longer for the bacteria to mutate and evolve resistance in response to it.

"If we can go directly at these amino acids that it uses to protect against us, and then allow our own innate immune system to kill the bug, there could be less selection pressure," he says.

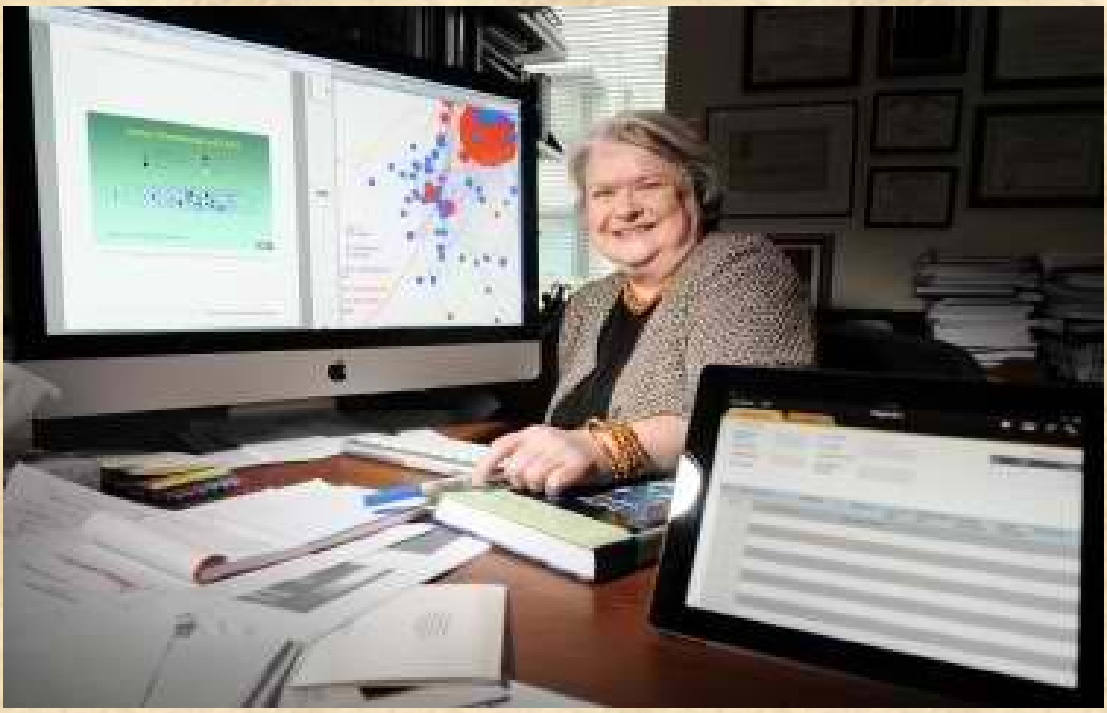
Trent's lab is now screening for compounds that would do precisely that.

How Infectious Diseases May be Transmitted on Aircraft

Source: http://www.gatech.edu/newsroom/release.html?nid=134291

A new study is expected to provide the first detailed information on how infectious diseases may be transmitted aboard commercial airliners. Sponsored by aircraft manufacturer Boeing, the research will document patterns of passenger movement inside aircraft cabins and inventory the microbes present in cabin air and on surfaces such as tray tables and lavatory fixtures.

The information provided by the three-year study could help improve health and safety for both passengers and airline flight crews. Researchers from two Atlanta universities, the Georgia Institute of Technology and Emory University, are working together on the project, in collaboration with environmental sustainability personnel from Atlanta-based Delta Air Lines.



"The ultimate goal of this project is to reduce the transmission of infectious diseases on aircraft," said Howard Weiss, a professor in the Georgia Tech School of Mathematics. "We will learn how people move around in aircraft and study the microbes that are there at different times during flights. From that information, we can start modeling the disease transmission and developing intervention strategies."

Airborne infectious diseases transmitted during commercial air travel are of concern to public health officials. In 2002, 20 people on an international flight were infected by a single SARS patient, which showed how air travel could serve as a conduit for the rapid spread of both emerging infections and pandemics of known diseases.

Researchers know that bacteria and viruses can be transmitted in three ways on aircraft: inhalation of small droplets coughed or sneezed by infected persons and carried significant distances in cabin air; inhalation of larger droplets that tend to fall within a meter of their sources, and transfer of droplets from surfaces into the eyes or noses of susceptible individuals. The latter – which may account for as much as 80 percent of the disease transmission – can occur when passengers touch contaminated surfaces, such as seat tray tables, lavatory door knobs or sink handles.

"By understanding the patterns of how infectious diseases may be transmitted from an infected person to an uninfected person, companies like Boeing may be able to design aircraft that better protect passengers and crew members," said Vicki Hertzberg, an associate professor in Emory University's Rollins School of Public Health. "That will put us in a better position from a public health perspective."

Using radio-frequency identification tags (RFID), Hertzberg has been studying how people interact – and potentially transfer infectious diseases – in medical facilities such as hospital emergency departments. On aircraft, however, the researchers won't be able to use such technology because of potential interference issues.

However, the researchers will use sophisticated sampling equipment carried aboard the aircraft to gather information about what's in the cabin air. They will also swipe certain touch surfaces, and both the wipes and air-sampling filters will be analyzed by polymerase chain reaction (PCR) and mass spectrometry equipment to identify the microbes present. To study passenger movements around the aircraft, the researchers plan to use a modern twist on an old-fashioned technique: graduate students watching and recording movement on an iPad.

"They will be actively looking at who's getting up and down, when they are doing it, and where they are going when they do," Hertzberg explained. "We will need to do this at a fairly high resolution with respect to time and place."

The researchers plan to put students on eight Delta flights using Boeing 757 aircraft. Filters from the air sampling and wipes from the surfaces will be analyzed in a California laboratory that can detect as many as 1,500 different bugs, among them, 300 different respiratory viruses and 1,200 different bacteria.

Delta has been advising Hertzberg and Weiss as they design the study, and will allow them to use mockups of aircraft cabins to test and practice their research techniques.

"Delta has a long history of collaborating with researchers on safety, health and environmental issues related to passenger aircraft," said Steve Tochilin, general manager of environmental sustainability for the company. "As examples, we are involved in ongoing partnerships with two FAA-funded university consortia focusing on airliner cabin environments, and noise and emission reductions. We look forward to working with Georgia Tech and Emory University on this research."

Once data on passenger activity is collected and microbes identified, Weiss and Hertzberg will create a computer model of the social network on an aircraft. That will allow them to study how infections can be transferred in the close quarters of an aircraft cabin.

Only in the last decade have researchers had the tools to determine that human movement differs from that predicted by completely random movement, as documented with dollar bill tracking, mobile telephone calls and sensors that can determine movement among conference attendees and students in elementary and high schools.

"The most interesting part of this from a mathematical standpoint is that this may be a new type of social network," Weiss said. "For many years, scientists have assumed that people move in a completely random fashion, and this study will provide data on that for the first time."

The researchers plan to spend the first six months of the project developing their research techniques, hiring students, and training those who will do the research. They expect to begin gathering data sometime next fall – just in time for annual cold and flu season.

Beyond the public health implications, better protecting passengers and aircrews could have a significant economic impact for aircraft manufacturers, airlines, airports and industries that depend on efficient air travel.

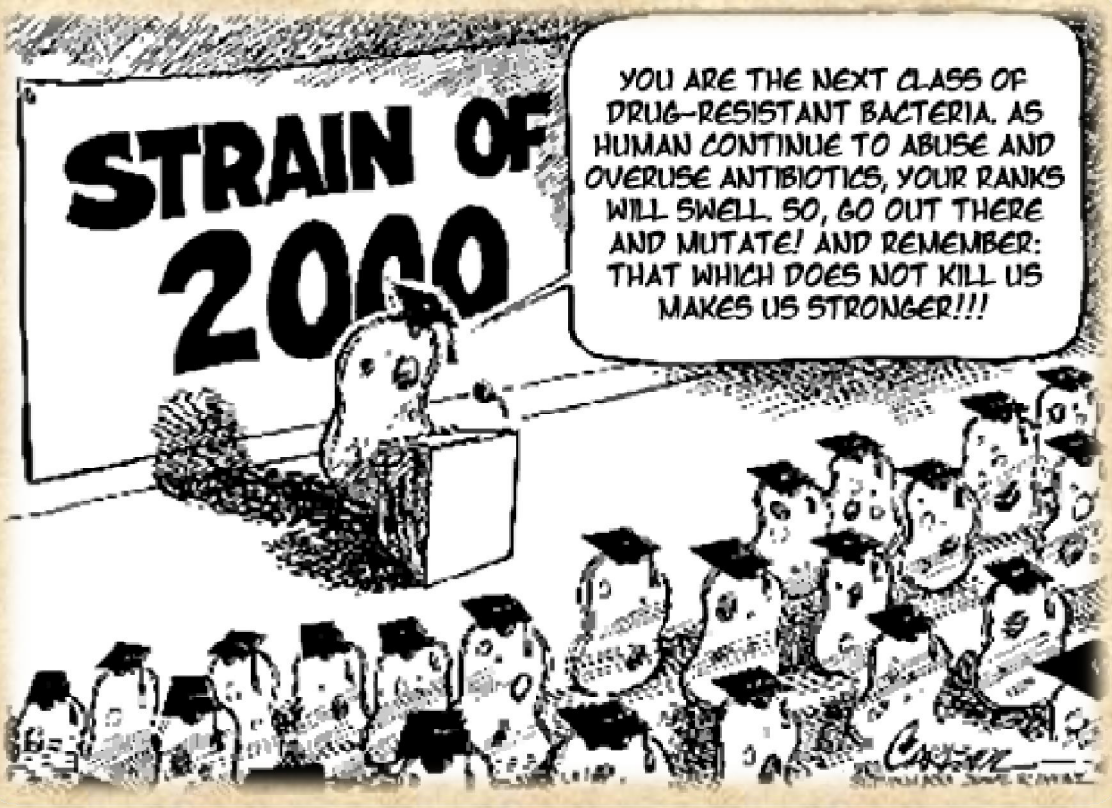
"Everyone wins if we can eliminate or reduce the air travel disruptions that could result from a pandemic," Weiss said.

Anthrax found in a dead heroin user from Regensburg, Germany

Source: http://www.promedmail.org

Blood cultures from a drug injecting heroin user who died last week [5 Jun 2012] at a hospital in Regensburg have shown the presence of *Bacillus anthracis*. The patient was hospitalized due to acute septic disease and died on the day of admission. Initial diagnostics tests were performed using PCR targeting the rpoB-, pagA-, and capC-genes at the Institute of Medical Microbiology and Hygiene, University of Regensburg pointing to *Bacillus anthracis* as the causative agent. The results were confirmed using additional chromosomal markers by the

Bundeswehr Institute of Microbiology in Munich. Further molecular typing of the strain is in progress.
The responsible Bavarian health authorities are involved in the management of the case in close contact with the diagnostic institutions and the police authorities. Health officials believe that contaminated heroin or a contaminated cutting agent mixed with the heroin may be responsible for the infection. Investigations by the German police authorities are in progress.
Doctors and diagnostic laboratories should consider anthrax as a possible disease in injecting heroin users presenting with fever or sepsis at the emergency room.



QUIZ: Answer

Colony of *Bacillus anthracis* on selective agar plate after 42 hours at 37°C
Source:http://www.niaid.nih.gov/topics/biodefenserelated/biodefense/publicmedia/pages/imag

e_library.aspx