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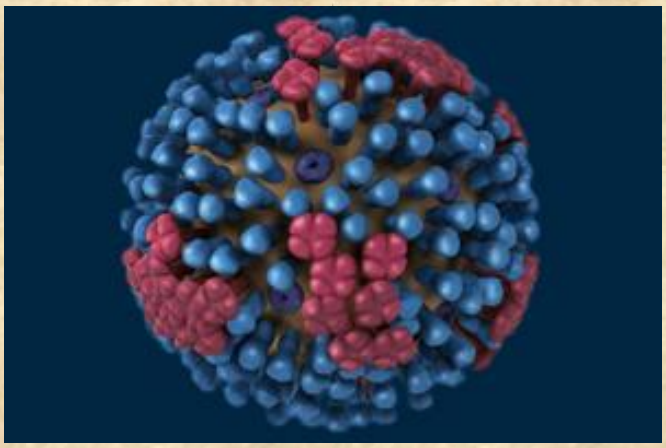
BIO NEWS

www.cbrne-terrorism-newsletter.com

New Flu Virus Found in Peruvian Bats

Source: http://news.yahoo.com/flu-virus-found-peruvian-bats-220011898.html

A brand new flu virus has been found in Peruvian bats, according to a new study from researchers at the Centers for Disease Control and Prevention.



The virus, called A/bat/Peru/10, belongs to a family of flu viruses known as influenza A, which mainly infect birds, but can also infect other animals, including people.

Influenza A viruses are named for two proteins on the virus' surface, hemagglutinin (H) and neuraminidase (N), such as H1N1. Previously, there were 17 known types of H proteins and 10 known types of N proteins. But the proteins on the surface of A/bat/Peru/10 are so distinct, that the researchers designated it a new virus: **H18N11.**

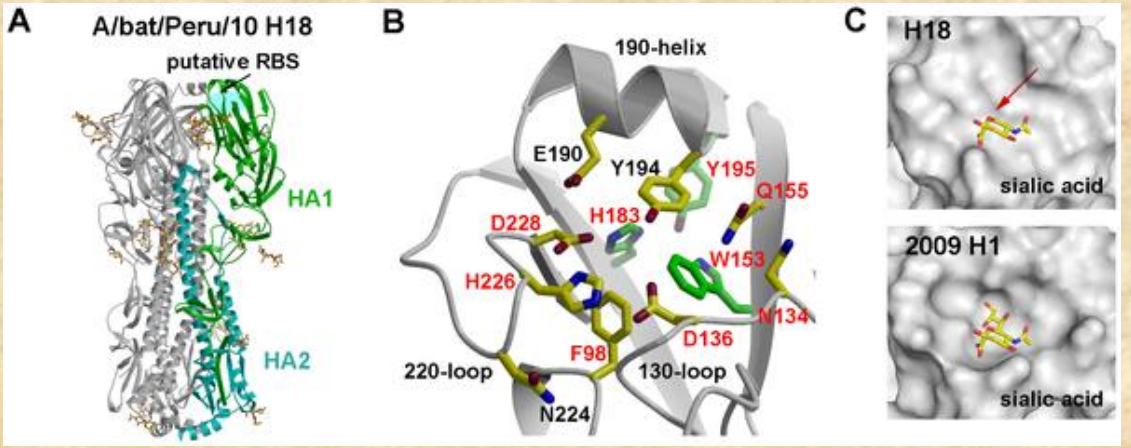
Tests done by the researchers so far suggest the virus is not an immediate concern for people, said study researcher Ruben Donis, associate director of Policy, Evaluation and Preparedness at the CDC's Influenza Division.

The researchers have not been able to grow the virus in human or primate cells, or by other methods, which is characteristic of viruses that do not infect humans, Donis said. The virus may have very specific requirements for growth, for instance it may only be able to replicate in the intestinal cells of bats, he said.

On the other hand, the researchers do not have enough information to say for sure that the new flu virus cannot eventually infect people, Donis said.

Last year, the same group of researchers identified a distinct influenza A virus, H17N10, in fruit bats living in Guatemala.

So far, flu viruses from bats are not known to infect people. But bats are known reservoirs for other types of pathogens that have found their way to humans, such as Severe Acute Respiratory Syndrome. Bats are also are suspected to be the original source of the virus causing the current outbreak of MERS.



Bats also provide a host for flu viruses to undergo genetic changes. The study found a high amount of genetic diversity among flu viruses in bats, indicating that flu viruses have evolved in bats for a very long time.

For some flu genes, "New World bats harbor more influenza virus genetic diversity than all other mammalian and avian species combined," the researchers wrote in the Oct. 10 issue

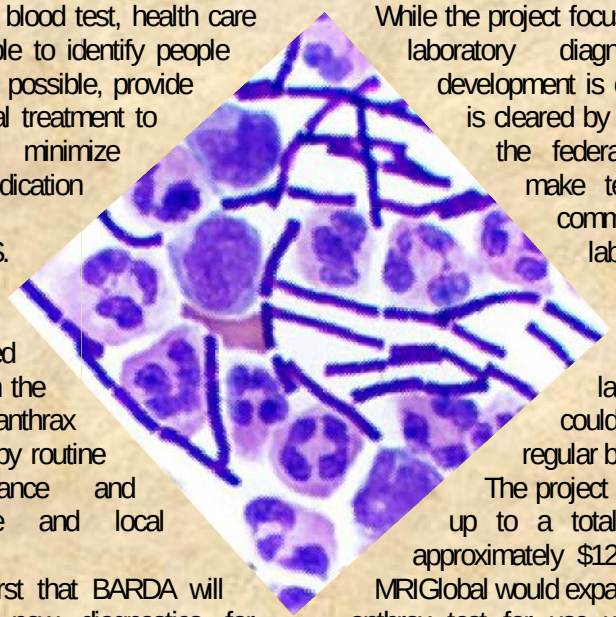
of the journal PLOS Pathogens..
The researchers found the new virus after testing samples from 114 bats in Peru. One sample, from a flat-faced fruit bat known as *Artibeus planirostris*, was found to have H18N11. Blood testing of other bats suggested that they may have been infected with H18N11 in the past. The researchers still do not know how H18N11 attaches to cells to enter them.

► **Read full paper at:**
http://www.plospathogens.org/article/info:doi/10.1371/journal.ppat.1003657;jsessionid=0885F7567D990DDE67658BA56B8DEF52

New Blood Test for Anthrax to Speed Post-Exposure Treatment

Source: http://globalbiodefense.com/2013/10/22/new-blood-test-for-anthrax-to-speed-post-exposure-treatment/?goback=.gde_3711808_member_580094707548293529 8#!

The U.S. Department of Health and Human Services will support development of a rapid blood test for anthrax infection that can be used by mainstream health care laboratories following an anthrax attack. The test is the first for anthrax to be supported by the Biomedical Advanced Research and Development Authority (BARDA) in the HHS Office of the Assistant Secretary for Preparedness and Response.
Diagnostic tests play a critical role in the early and accurate detection of anthrax infection. With a rapid, accurate blood test, health care providers would be able to identify people who are ill as early as possible, provide the appropriate medical treatment to save lives, and minimize unnecessary use of medication or hospitalization.
If cleared by the U.S. Food and Drug Administration, the test could fill this need and be used in labs in the affected area after an anthrax release was detected by routine bioterrorism surveillance and confirmed by state and local laboratories.
"This project is the first that BARDA will sponsor to develop new diagnostics for biothreats for use during public health emergencies," said BARDA Director Robin Robinson, Ph.D. "Quickly identifying people exposed to anthrax is crucial to providing appropriate care."
The contract for advanced development of the rapid blood test is with MRIGlobal of Kansas City, Mo., for 15 months and approximately $1.6 million . The development work includes studies needed to apply for FDA approval of the test for use on a commercially available laboratory testing instrument, the ABI7500 Fast Dx, made by Life Technologies, Inc. of Carlsbad, Calif.
MRIGlobal and Life Technologies will collaborate in the development of this test. The ABI7500 Fast Dx is used in health care laboratories around the country for routine identification of bacteria and viruses that cause disease, such as influenza.
While the project focuses on developing the laboratory diagnostic test, once development is complete and the test is cleared by FDA, the company or the federal government could make test kits available to commercial healthcare laboratories in a public health emergency. Training and drills with health care laboratory personnel could be conducted on a regular basis using the test.
The project could be extended for up to a total of five years and approximately $12 million. If extended, MRIGlobal would expand development of the anthrax test for use with additional testing instruments, as well as design tests for other biothreats.
The project is the latest in BARDA's biodiagnostics program and part of BARDA's comprehensive, integrated portfolio approach to the advanced research and development, innovation, acquisition, and manufacturing of



vaccines, drugs, therapeutics, diagnostic tools, and non-pharmaceutical products for public health emergency threats. In addition to radiological and nuclear agents, these threats include chemical and biological terrorism threats, pandemic influenza, and emerging infectious diseases.

HHS is the principal federal agency for protecting the health of all Americans and providing essential human services, especially for those who are least able to help themselves. ASPR leads HHS in preparing the nation to respond to and recover from adverse health effects of emergencies, supporting communities' ability to withstand adversity, strengthening health and response systems, and enhancing national health security.

A Dread Disease Spreads in Syria

By Christopher Dickey

Source: http://www.thedailybeast.com/articles/2013/10/30/a-dread-disease-spreads-in-syria.html

The suffering of Syria's little children knows no end. They have been slaughtered in their schools and gassed in their cradles by the Assad regime. More than a million are refugees; most are under the age of 11. And now they face one of the most horrible of human plagues: the paralyzing, suffocating disease of poliomyelitis, which mainly strikes kids under the age of five.

An Afghan health worker administers a polio vaccination to a child on the first day of a vaccination campaign in Herat on October 6, 2013. (Aref Karimi/AFP/Getty)

The World Health Organization has confirmed 10 cases in Syria so far, with more expected, and a full-blown epidemic possible. Indeed, as the WHO reports on its Web site, "as long as a single child remains infected, children in all countries are at risk."

The sources of the Syrian outbreak are not yet confirmed. Genetic sequencing, now under way, should help nail those down. But circumstantial evidence suggests that foreign jihadists flocking to the ranks of Al-Qaeda-allied rebel groups brought this curse with them.

The global immunization campaigns carried out since 1988 have eradicated polio completely in most of the world. There had not been a case in Syria since 1999. But there are three countries where polio remains endemic: Pakistan, Afghanistan and Nigeria. All have

ferocious jihadist movements, and in areas where those groups thrive, their terror campaigns make immunizations difficult if not impossible to deliver. (The C.I.A.'s reported use of a door-to-door immunization survey as cover to hunt down and kill Osama bin Laden in Pakistan certainly has not helped.)

All of the Syrian cases of polio reported so far have been in Deir al-Zour province near the Iraqi border. It is largely out of the control of the Assad regime, but is the scene of infighting among rebel factions.

If the world is not careful, one of this century's grim ironies could be the return and the spread of this horrific disease by terrorists who don't even know they have it.

A major outbreak in Somalia, another jihadist crossroads, offers a cautionary example. There, genetic sequencing shows the virus came from Nigeria. It's not known whether the carriers were members of Boko Haram, Nigeria's Al-Qaeda-allied group, but there has been increasing contact reported between the Nigerian terrorists and Al-Shabaab, the Somali-based organization whose members carried out the savage attack on a shopping mall in Nairobi in September.

Since May, 174 polio cases have been identified in Somalia, with the disease spreading across the borders to Kenya (14 cases) and Ethiopia (six cases).

The vast movement of refugee populations and other migrants means "this is a disease that can spread easily great distances before being detected," says WHO spokesperson Oliver Christiaan Rosenbauer. The vast majority of carriers, especially adults, never know they've been infected. The contagion is passed on when the feces of a carrier enter the water supply, where the virus can remain active.

"Obviously where separation of water for drinking or bathing is not great, or children play in water that has been used for defecation, that is where the problem comes," says Gregory Härtl, also of the WHO.

In the Horn of Africa, in response to the Somalia outbreak, the WHO has mounted an immunization campaign that now includes Kenya, Ethiopia, Djibouti, Yemen, South Sudan, Eritrea, Uganda, and other countries. Vaccination posts have been set up at key border crossings and transit sites, and, according to Rosenbauer, all this is starting to have an effect. Cases are starting to decline, especially in the area around Mogadishu where the outbreak began.

"Similar activities will need to be implemented now in Syria and neighboring areas," says Rosenbauer, "and that's certainly the plan, to implement a coordinated multi-country response to this."

The measures already in effect in Syria are an interesting reflection of what happens when a country settles into a state of near-permanent war. As it happens, a campaign to give supplementary immunization against polio, measles, mumps and rubella to 1.6 million Syrian children already was planned to begin October 24 "in both government-controlled and contested areas," according to the WHO. In the former, the Ministry of Health handles the campaign, while in the latter the Assistance Coordination Unit of the National Coalition of Syrian Revolution and Opposition Forces will try to help administer the program.

It appears to have been district health officers for the ACU who first identified the polio symptoms in several children.

Because of the success of global efforts to eradicate the disease, relatively few people know what it looks like or how terrifying its effects can be. But even in the United States, aging baby boomers can remember living in the shadow of a plague that would strike children with little warning, paralyzing part or all of their bodies, shriveling their limbs, and in some cases shutting down their respiratory systems so completely that they had to survive, if they lived at all, confined in what were called "iron lungs." That began to end after the development of the first polio vaccine in 1955, and the threat now seems as remote to most people as the black plague.

If the world is not careful, however, one of this century's grim ironies could be the return and the spread of this horrific disease by terrorists who don't even know they have it.

Christopher Dickey *is the Paris bureau chief and Middle East editor for Newsweek and The Daily Beast. He is the author of six books, including Summer of Deliverance and, most recently, Securing the City: Inside America's Best Counterterror Force—the NYPD.*

Investigational Anti-Influenza Drug, T-705a, Successfully Completes Phase 2 Clinical Trial

Source: http://www.hstoday.us/single-article/investigational-anti-influenza-drug-t-705a-successfully-completes-phase-2-clinical-trial/552d155bed5438c29d171fb191d02817.html

The successful completion of a Phase 2 double blind placebo-controlled clinical trial for the anti-influenza drug, T-705a (favipiravir), clears the way for Phase 3 clinical trials to begin in November. The investigational drug candidate is being developed by BioDefense Therapeutics (BD Tx) -- a Joint Product Management office within the Department of Defense (DoD) -- through a contract with Boston-based MediVector, Inc.

The results of the Phase 2 trial showed that twice daily dosing of T-705a demonstrated statistically significant decreases in time to alleviation of each of the six influenza symptoms. In addition, subjects receiving T-705a cleared the virus statistically significantly more quickly compared to placebo. T-705a appears safe and well tolerated with no serious adverse events reported during this study. With the successful completion of an End of Phase 2 meeting with the Food and Drug Administration, MediVector is proceeding to Phase 3 clinical trials.

"We are encouraged by this important achievement; it means BD Tx is one step closer to providing the military and our nation with safe therapeutics to counter biological threats," said Lieutenant Colonel Eric G. Midboe, US Army, Joint Product Manager for BD Tx. "The rapidly evolving viral flu strains, especially the emergence of drug resistant strains, make a broad-spectrum drug solution essential in any strategy to combat this and similar biological threats."

Military planners project that a flu-like pandemic could infect nearly 10 percent of the nation's military personnel per month, significantly reducing military medical and operational capabilities. BD Tx is facilitating the advanced development of T-705a in collaboration with MediVector to enhance the nation's biodefense response capability and to help protect the military from flu pandemics. In vitro studies of T-705a show significant viral reductions against multiple flu viruses, including H1N1 (seasonal and 2009 pandemic), H5N1, H7N9, and drug-resistant flu strains.

"We are concerned with not only naturally occurring flu strains, but also those that may be biologically engineered," said Dr. Tyler Bennett, assistant product manager for BD Tx. "T-705a has a unique mechanism of action that works by blocking viral RNA replication within the infected cell, giving T-705a the potential to be broad-spectrum. We intend to further test T-705a's efficacy against other viruses of interest to the DoD."

Krokodil: Deadly Drug May Be in United States

Source: http://www.cnn.com/2013/10/16/health/krokodil-zombie-drug/

The street drug Krokodil may have made its way to the United States from Russia, where it is a popular and less expensive alternative to heroin. News sources have reported unconfirmed cases in Arizona, Chicago, and New York in the past few weeks. The life expectancy of someone who is a regular Krokodil user is 2-3 years.

The drug desomorphine is an opiate first developed in the 1930s. According to the Drug Enforcement Agency (DEA)'s fact sheet on desomorphine (PDF, 56 Kb), there is no legal use for this drug today. This is another example of a drug that can be cheaply and relatively easily made in a home lab, and instructional materials are showing up on the internet.

Krokodil gets its name from its ability to eat away and rot a person from the inside by destroying blood vessels at injection sites, leaving the skin scaly and green. Users can die from gangrene, infection, and loss of skin. Amputations are common. The drug may be 3-10 times cheaper than heroin in the United States and Russia, and the DEA is concerned about its possible appearance here.

While the cases have not been confirmed, first responders should be aware of the possibility of this drug

being in the United States and familiarize themselves with the signs, symptoms, and treatment.

► **Read more at:** http://www.idhdp.com/media/41793/inj_damage_from_krokodil_in_eurasia.pdf

Dengue/DHF Update (90): AMERICAS

Source: http://www.promedmail.org

25 Oct 2013. Countries with more than 50 cases reported to PAHO/WHO by ministries of Health.

Region, Country / As of Week / No. Clinical cases / laboratory confirmed/ DHF -severe / Deaths / Dengue virus (D) types

Mexico and Central America

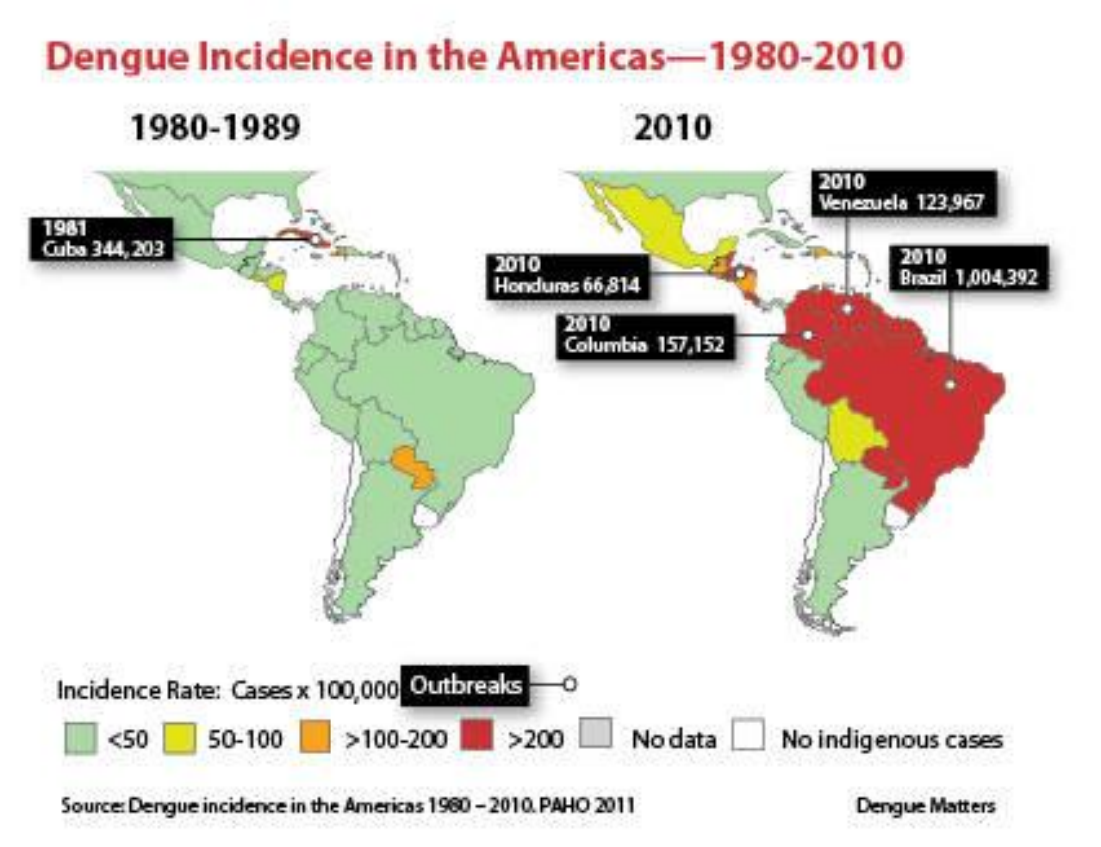
- Belize: wk. 28 / 93 cases / 0 cases / 3 deaths / D?
- Costa Rica: wk. 41 / 42 638 cases / 218 cases / 115 cases / 1 death / D1,2,3
- El Salvador: wk. 41 / 22 905 cases / 8398 cases / 360 cases / 3 deaths / D1,2,3
- Guatemala: wk. 39 / 7526 cases / 1864 cases / 21 cases / 6 deaths / D1,2,3,4
- Honduras: wk. 40 / 30 818 cases / 591 cases / 3779 cases / 26 deaths / D2,3
- Mexico: wk. 41 / 162 008 cases / 40 831 cases / 12 479 cases / 47 deaths / D1,2,3,4
- Nicaragua: wk. 37 / 31 338 cases / 4300 cases / 57 cases / 13 deaths / D1,2,3
- Panama: wk. 39 / 1255 cases / 1047 cases / 6 cases / 0 deaths / D1,2,3,4

Andean

- Bolivia: wk. 41 / 12 202 cases / 1276 cases / 55 cases / 8 deaths / D1,2,3
- Colombia: wk. 41 / 102 944 cases / 790 cases / 2575 cases / 124 deaths / D1,2,3,4
- Ecuador: wk. 39 / 11 662 cases / 0 cases / 60 cases / 11 deaths / D1,2,4
- Peru: wk. 40 / 10 878 cases / 8237 cases / 58 cases / 13 deaths / D1,2,3,4
- Venezuela: wk. 41 / 41 938 cases / 0 cases / 4099 cases / 0 deaths / D1,2,3,4

Southern Cone

- Argentina: wk. 41 / 7519 cases / 2036 cases / 55 cases / 8 deaths / D1,2,4
- Brazil: wk. 35 / 1 423 672 cases / 385 354 cases / 6552 cases / 456 deaths / D1,2,3,4
- Chile (31 cases, all imported from elsewhere)
- Paraguay: wk. 41 / 140 787 cases / 12 339 cases / 2122 cases / 233 deaths / D1,2,4



English, French and Dutch Caribbean

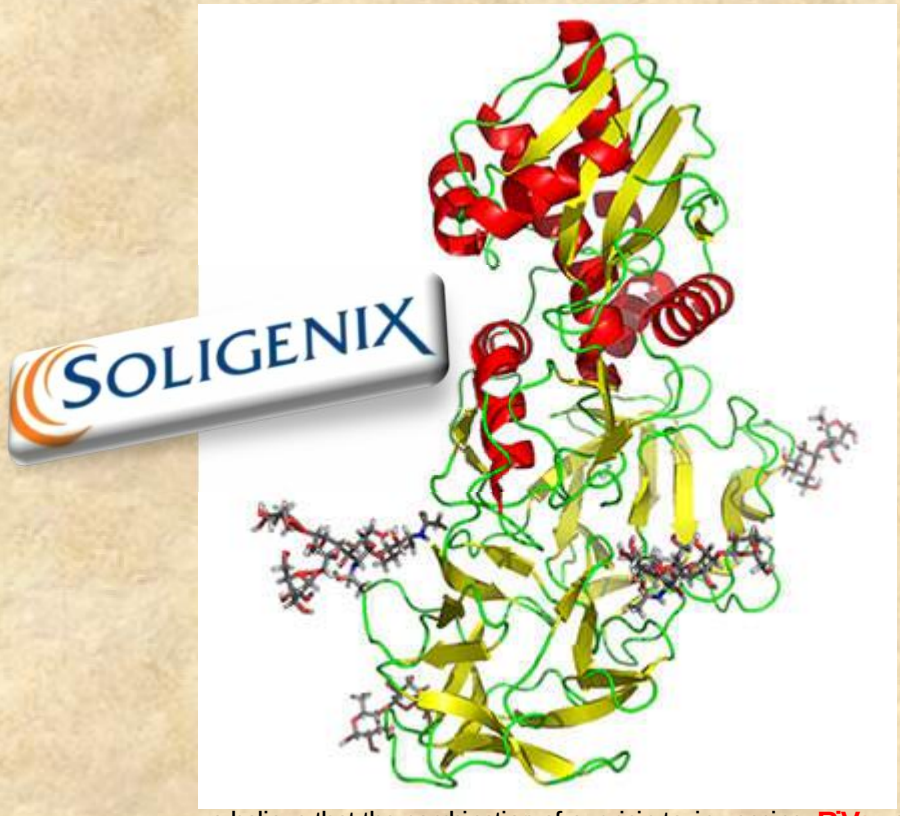
- Aruba: wk. 32 / 453 cases / 75 cases / 1 case /1 death / D1,4
- Barbados: wk. 32 / 981 cases / 464 cases / 10 cases / 0 deaths / D1,4
- British Virgin Islands: wk. 32 / 121 cases / 0 cases / 0 deaths / D?
- Cayman Islands: wk. 36 / 69 cases / 41 cases / 0 cases / 0 deaths / D1,4
- Curacao: wk. 29 / 292 cases / 66 cases / 0 cases / 0 deaths / D?
- Dominica: wk. 36 / 115 cases / 48 cases / 0 cases / 0 deaths / D1,4
- French Guiana: wk. 35 / 14 750 cases / 5102 cases / 73 cases / 5 deaths / D1,2,3,4
- Grenada: wk. 36 / 96 cases / 96 cases / 0 cases / 0 / D?
- Guadaloupe: wk. 35 / 1345 cases / 1345 cases / 17 cases / 3 deaths / D1,2,3,4
- Guyana: wk. 32 / 189 cases / 189 cases / 0 cases / 0 deaths / D2,4
- Jamaica: wk. 24 / 520 cases / 105 cases / 6 cases / 4 deaths / D?
- Martinique: wk. 40 / 4450 cases / 1172 cases / 59 cases / 0 deaths / D1,2,3,4
- Netherlands Antilles: wk. 35 / 436 cases / 78 cases / 0 cases / 0 deaths / D?
- St. Bartolome: wk. 35 / 660 cases / 341 cases / 17 cases / 1 death / D2,4
- St. Kits & Nevis: wk. 28 / 50 cases / 20 cases / 0 cases / 0 deaths / D?
- St. Lucia: wk. 40 / 102 cases / 2 cases / 2 cases / 2 deaths / D2
- St. Martin: wk. 35 / 1940 cases / 750 cases / 29 cases / 1 death / D2,4
- St. Vincent & Grenadines: wk. 36 / 68 cases / 10 cases / 0 cases / 0 deaths / D?

Soligenix submits proposal for development of thermostable ricin vaccine

Source: http://www.bioprepwatch.com/vaccine_development/soligenix-submits-proposal-for-development-of-thermostable-ricin-vaccine/333456/

Soligenix, Inc., a Princeton, New Jersey-based clinical-stage biopharmaceutical company, announced on Thursday that it submitted a full contract proposal to the U.S. government on Thursday for the development of a thermostable ricin vaccine.

Soligenix submitted the proposal to the National Institute of Allergy and Infectious Diseases' Division of Microbiology and Infectious Diseases in response to a broad agency announcement related to the development of vaccines against NIAID priority pathogens. The NIAID is interested in supporting the development of vaccines against potentially lethal pathogens and toxins using a dry formulation technology to minimize cold chain storage and preservative requirements and enhance stability.



Ricin

"We are pleased to submit our proposal to NIAID, who has been the main supporter of our thermostable ricin toxin vaccine development since its inception," Christopher Schaber, the president and CEO of Soligenix, said. "Although there are no guarantees, we believe that the combination of our ricin toxin vaccine, **RiVax** and our **ThermoVax** heat stabilization platform technology aligns well with the mission objectives of NIAID. In addition, our organizational structure and experience allows Soligenix to be a valuable strategic partner for NIAID, as well as with the other agencies we currently work with."

The submission of the proposal is non-binding and does not guarantee the award of a contract from NIAID. If successfully awarded, however, the resulting contract could result in a multi-year, multi-million dollar deal to develop RiVax as a candidate vaccine for biodefense threats.

Ricin is classified as a Category B biological agent by the U.S. Centers for Disease Control and Prevention. There are currently no U.S. Food and Drug Administration approved vaccines or therapeutics that can protect against ricin exposure or reverse its effects.

Pushing the envelope on cost/benefit analysis

By Nathan Blow

Source:http://www.biotechniques.com/BiotechniquesJournal/2013/September/Pushing-the-envelope-on-costbenefit-analysis/biotechniques-346232.html?goback=.gde_3711808_member_5803409129988960260#!

Today, whether we like it or not, there is a constant need to justify funding for cutting-edge research. Grant money is scarce, and thanks to the internet, journalists are reporting the latest discoveries faster than ever before, raising questions among the general public about the possible impact of these studies. It is with this in mind

that I think we are reaching a crossroads in public perception—with research on the avian influenza virus H7N9 likely to take center stage.

H7N9 has caused more than 130 human infections in China. Although the virus is not currently transmissible among humans, a team of researchers is suggesting that creating mutant viruses with different degrees of transmissibility in mammals will help us understand the potential for human-to-human transmission.

In a letter published this August in both *Science* and *Nature*, 22 researchers from 12 universities in the the US, Europe, and Asia present a case for performing gain-of-function [GOF] experiments in H7N9 to examine immunogenicity, adaptation, drug resistance, transmission, and pathogenicity (1,2). The authors argue that "classical epidemiological tracking does not give public health authorities the time they need to mount an effective response to mitigate the effects of a pandemic virus. To provide information that can assist surveillance activities—thus enabling appropriate public health preparations to be initiated before a pandemic—experiments that may result in GOF are critical."

Such experiments could provide new insights into virus function and possible paths of future evolution resulting in increased transmissibility to humans. The challenge, though, is to monitor and report that progress as a growing range of mutations are engineered in the lab.

Prior work by the same researchers examined the H5N1 virus and its capacity for airborne transmission between ferrets in the lab (3). This work was controversial, leading to several public discussions amongst government officials, researchers, and journal editors before that work was finally published.

The rationale behind new GOF studies in H7N9 is curious. While planning ahead for a potential pandemic is important, are vaccine developers willing to design vaccines against "hypothetical" viruses based on GOF mutations? Actually, work has already begun on an H7N9 vaccine, so it is not clear what impact new GOF studies would have.

While surveillance should be done, are GOF experiments really necessary given our current knowledge of the potential mechanisms by which viruses can acquire the ability to broaden their host range? Next-generation sequencing can decode a whole genome in a day, and airborne transmission can be determined quickly based on information from patients. Sequencing might not be a viable option in the developing world, so does the knowledge gained through GOF studies improve surveillance options? I'm not suggesting these questions could not be answered, rather I am echoing the need for greater transparency, as many have suggested.

Researchers must go to extra lengths to accurately explain the rationale behind experiments that might create more transmissible viruses and how they will be safely conducted. A nice article in *Nature Biotechnology* suggesting a new safeguard mechanism for GOF studies was recently published (3). Here, the authors took advantage of endogenous miRNAs in human cells to prevent transmission of viruses. The technique appears effective and provides a degree of possible containment when working with GOF viruses. Such techniques and approaches need to be highlighted as widely as the letters suggesting these experiments in the first place.

Hyperbole aside, this is a moment where scientists need to consider the psychological impact of their work on the general public. Fears about scientific experiments should not be used as a tool to get an experiment done or to stop such research altogether. There should not be any perception that scientists are simply creating a series of "monster viruses" that will be locked away in labs around the world; this only feeds public fears and future Hollywood movies. Providing clear explanations for the potential of such research, as well as the safeguards built into these studies, will help to reduce concerns and provide a stronger framework for experimental success.

The H5N1 studies led to lengthy discussions on the cost/benefits of engineering influenza viruses. In the end, it was decided that the benefits outweighed the potential risks. Now, as researchers push the envelope once again, it is important to revisit that cost/benefit question.

References

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2. Fouchier, R.A.. 2013. Avian flu: Gain-of-function experiments on H7N9. Nature 500:150-151.
3. Herfst, S.. 2012. Airborne transmission of influenza A/H5N1 virus between ferrets. Science 336:1534-1541.

Nathan Blow, Ph.D. *is Editor-in-Chief, BioTechniques*

Nanotherapeutics – Nanotechnology and Homeland Defense

Source: http://www.nanalyze.com/2013/11/nanotherapeutics-nanotechnology-and-homeland-defense/

In previous articles we have discussed the potential of nanotechnology enabled drug delivery systems such as those offered by Nanoviricides and Bind Therapeutics. One private company funded by the United States Department of Defense (USDOD), Nanotherapeutics, is targeting a broad range unique applications with their nanotechnology enabled drug delivery systems.

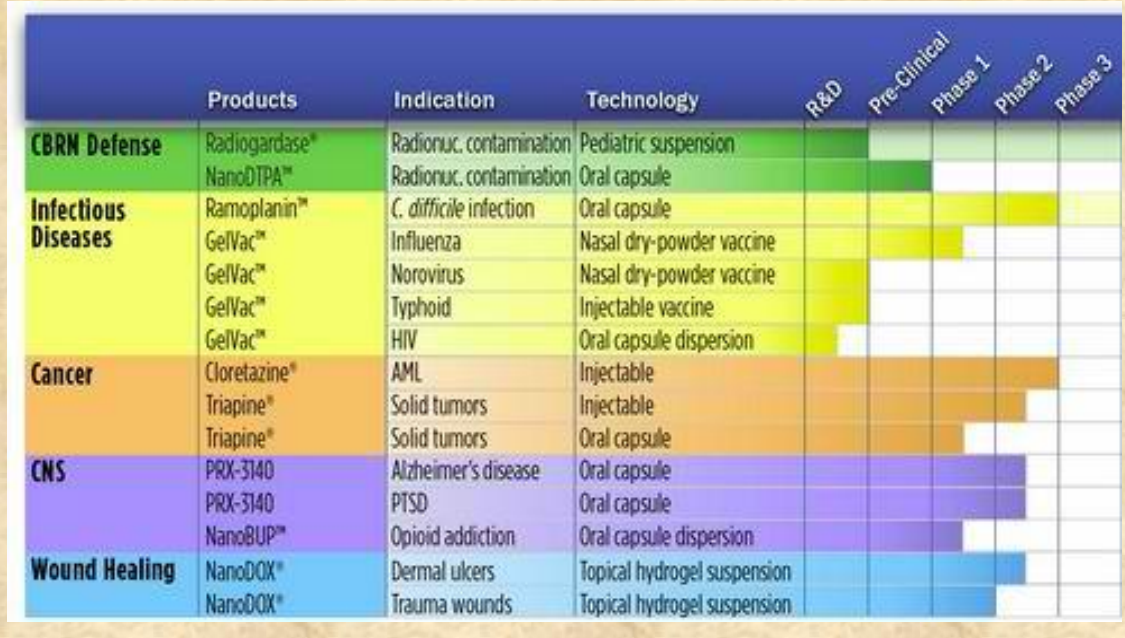
About

Little information seems to be available about privately held Florida company Nanotherapeutics and this may be due in part to the fact that they are working on some truly unique applications for the USDOD. Founded in 1999, Nanotherapeutics landed a massive Department of Defense contract in March of this year that could be worth as much as $360 million over 10 years to develop manufacturing processes for drugs to treat bioterrorism and radiological threats. The base contract was for $135.8 million and two years with options up to 10 years and $358.9 million. Just last month, the company held a ground breaking ceremony for a 165,000 square foot manufacturing and development center located on a 30-acre campus. The purpose of this development center is to enable faster and more effective development of medical countermeasures designed to protect military populations against chemical, biological, radiological and nuclear attacks and genetically engineered infectious diseases.

Technology and Products

The company uses a nanometer-scale particle technology to make new drugs and to make existing drugs more effective, including oral, inhaled and injectable drugs, and topical gels and creams. The company is working on some truly unique and varied applications of their technology with a very imprssive pipeline:

Their NanoDOX Hydrogel is a topical gel used to treat wounds sustained by soldiers which are often traumatic and can come apart after surgery (dehiscence). The associated mortality for dehiscence can range from 14% to 50%. The USDOD is funding clinical trials for this drug. Their NanoDTPA drug is a novel, oral



swallowed capsule formulation that is being developed for the treatment of radionucleotide exposure which can occur after exposure to a "dirty bomb". In a similar fashion, their Radiogardase insoluble capsules protect exposure to the second most frequently intercepted radiological material, Cs-137, which could be used to create a "dirty bomb" Their PRX-3140 drug is in Phase 2 clinical trials and aims to treat Post Traumatic Stress Disorders in soldiers. The Company is also developing an inhaled version of the injectable antiviral drug, cidofovir,for the treatment of the bioterrorism agent smallpox and has also published research which shows promise for a new oral HIV vaccine.

Even though biotech IPOs have been prevalent through 2013, the close relationship Nanotherapeutics has with the USDOD may prevent them from looking to a liquidity event anytime soon due to reasons of "national security". Nonetheless, the broad and unique applications of their drug delivery technology are quite interesting and the company merits further watching.

Haitian Cholera Strain Spreads To Mexico

October 23, 2013

Source: http://www.npr.org/blogs/health/2013/10/23/239803890/haitian-cholera-strain-spreads-to-mainland-with-mexico-outbreak

A nurse treats a cholera patient at the Juan Pablo Pina Hospital in San Cristobal, Dominican Republic,

in August. Health officials say that the strain of cholera circulating in the country— the same one that first appeared in Haiti three years ago — has also caused outbreaks in Cuba and now Mexico (Erika Santelices/AFP/Getty Images)

A South Asian strain of cholera that was introduced into Haiti three years ago this month has now spread to this continent's mainland.

is the fourth Western Hemisphere country to experience the cholera outbreak. It's a disease that's very hard to stamp out once it gets into an area with poor water and sanitation.

Mexican health officials first picked up on the problem Sept. 9, through routine surveillance of hospital cases of severe diarrhea. Since then there

have been 171 reported cases in Mexico City and states to the north and east. One victim has died.

, deputy director of the Pan American Health Organization, says it was all but inevitable that cholera would spread beyond the Caribbean. "It was always a major concern that it would be exported to other countries, as has recently happened in Mexico," he tells Shots.

Since it was introduced into Haiti — very likely by United Nations peacekeeping troops from Nepal who were billeted at a camp with poor sanitary facilities — cholera has in Haiti and the Dominican Republic (which share the island of Hispaniola) and Cuba. Nearly 9,000 have died.

Andrus fully expects it will spread further. "We are advocating throughout the region for countries to be on their guard," he says.

Cholera is thought to have invaded Cuba via infected health personnel who work in Haiti and travel back and forth. Cuba has reported nearly 700 cholera cases and three deaths, although many are skeptical that that nation is fully reporting the extent of its outbreak.

Andrus says vacationers visiting Cuba — who probably got cholera from contaminated food — have exported the disease to Chile, Venezuela, Italy, Germany and Holland. So far those cases haven't touched off outbreaks. But as the Mexican epidemic shows, it can easily happen if an imported case contaminates water or food in an area with poor sanitation.

"You have those situations throughout Latin America," he notes. "We are the region of the greatest disparities."

The last time the Americas saw a major cholera epidemic was 22 years ago. It was allegedly brought by a ship that discharged its bilge water in a . The disease spread all the way up the continent, sickening more than 1 million people and killing 10,000 or so, until it hit the U.S.-Mexican border. There it was stopped by modern water- and sewage-treatment facilities in the United States.

Andrus says PAHO is worried this latest epidemic will have a similar impact.

"It's really, for us, a defining moment," he says. "To what extent are we concerned about spread? Well, it's really a regional threat and now a global threat to health."

It took Mexico more than 10 years to bring its last cholera epidemic under control. This time sanitary conditions are better, so it might not take that long. But Andrus says it won't be easy to stamp out.

"It won't be 10 years, [but] it won't be days or weeks," he says.

Dr. Maureen Birmingham, PAHO's representative in Mexico, writes in an email to NPR that authorities there are monitoring the population for spread of cholera and focusing on prompt treatment of affected people, along with providing clean water and sanitary facilities to vulnerable communities.

Birmingham says Mexico is not currently considering use of an oral cholera vaccine that was last year by the World Health Organization for use in outbreaks. The WHO has reportedly stockpiled about 1 million doses of the vaccine, which costs $1.85 a dose and requires two doses.

In any case, the cholera vaccine is a stopgap measure. All public health authorities agree the only real solution is clean water and adequate sewage treatment. And many of them hope the current outbreak will stimulate major efforts to bring clean water and sanitation to the hemisphere's poorest communities.

"Cholera's one of those infections that catches attention in a way that few infections do — plague, Ebola, pandemic influenza, cholera," says of the Massachusetts General Hospital. "It's one of those ones that everybody sort of sits up straight for. It is one of the ones that tests the system."

But of the Institute for Justice and Democracy in Haiti points out that the United Nations has found only 10 percent of the $2.4 billion it says it needs to rid Haiti and the Dominican Republic of cholera over the next 10 years.

"Right now 10 percent of the funding is probably not enough even to get started," Concannon tells Shots. "And so the U.N. needs to feel some serious pressure to do a more serious job of raising the money."

Concannon's group is trying to do just that. Earlier this month it against the U.N. in U.S. District Court for its alleged role in introducing cholera to Haiti. Filed on behalf of cholera victims, the action seeks, among other things, to force the U.N. to raise the money to stamp out cholera on Hispaniola.

Cholera in Mexico

UPMC CENTER FOR HEALTH SECURITY

There have been 7 distinct cholera pandemics during the last 2 centuries, each caused by a different strain of *V. cholerae*. The current pandemic, caused by the O1 El Tor biotype, has been occurring since 1961.[1] The ongoing cholera O1 epidemic in Haiti, which has caused more than 600,000 cases and 8,000 fatalities to date, has prompted concern about wider spread of this bacterium into the Western Hemisphere, particularly now that cases linked to Haiti have been detected in the US, Cuba, and the Dominican Republic.[2] Mexico, the most recent nation to face imported cholera has reported 176 cases, 57 of which were hospitalized.[2] This is the first local transmission of cholera in Mexico since the 1991-2001 epidemic and has been linked to the Haitian strain.[2]

Toxin Mediated Disease

Following a 12- to 72-hour incubation period, infection with *V. cholerae* causes severe watery diarrhea ("rice water") caused by the action of the cholera toxin that binds to cells lining intestinal mucosa. The toxin is present in all strains of pathogenic *V. cholerae* species. The action of the toxin increases concentrations of cAMP, blocking intestinal absorption of sodium and chloride and promoting the secretion of water and chloride by the crypt cells of the intestine. This produces the voluminous diarrhea of cholera. Diagnosis is usually made based on clinical suspicion coupled with stool culture or serology.[1]

Relatively Simple Treatment

The primary treatment is fluid replacement. The mainstays of fluid resuscitation are oral rehydration solution (ORS) or IV lactated ringer's solution. Antimicrobial therapy as an adjunct to fluid resuscitation has been shown to decrease the diarrhea duration and stool volume by approximately 50%. Antibiotics with activity against *V. cholerae* include tetracyclines, macrolides, fluoroquinolones, and trimethoprim-sulfamethaxazole. However, resistance to tetracyclines and fluoroquinolones has been detected. Other adjuncts include oral zinc supplementation. Zinc is essential to the function of many enzymes, including those responsible for regeneration of intestinal epithelium, and is depleted in patients with severe diarrhea. There is no FDA-approved vaccine against cholera, though vaccines are available and used widely internationally.

Outbreaks in the US

Each year, cholera cases linked to travel to an endemic region or domestic seafood and/or water exposure are diagnosed within the US. In 2009, prior to the Haitian outbreak, 12 cases occurred in the US and were of the O1, O139, O75, and O141 serogroups.[3] In 2011, the last year for which surveillance data is available, there were a total 55 cases of cholera 42 O1 in the US. The vast majority of serogroup O1 cases were travel-related, with many patients linked to Haiti or the Dominican Republic.[4] Additionally, an 11-person domestic outbreak of the O75 strain occurred in 2011 and was linked to consumption of raw or undercooked oysters from a specific harvest region.

With cholera now endemic in Haiti and cases occurring as close as Mexico, Cuba, and the DR, physicians should be on alert for patients infected with this bacterium and initiate treatment rapidly when clinically suspicious cases present.

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NanoDOX

Source: http://www.nanotherapeutics.com/?q=products_nanodox

NanoDOX® 1% Doxycycline Monohydrate Hydrogel (NanoDOX®) is a topical gel that is intended for direct contact with the wound and is applied to the entire surface of the wound bed. A secondary dressing, such as gauze or non-adhering dressing, will be applied to cover NanoDOX® and wound tissue allowing NanoDOX® to provide a moist, wound healing environment.

The molecular environment of chronic inflammatory diseases, like diabetic foot ulcers, contains abnormally high levels of pro-inflammatory cytokines (TNF-α and IL-1β) and abnormally high levels of proteases (matrix metalloproteinase (MMPs) and neutrophil elastase), which are theorized to prevent normal wound healing. Doxycycline is an antibiotic that is an inhibitor of high levels of active proteases, including MPMs. Topical treatment of diabetic ulcers with a molecule that reduces inflammation and proteases activity could promote healing by reducing the destruction of endogenous growth factors, receptors, and extra cellular matrix proteins that are essential for wound healing. Doxycycline is an inexpensive, FDA approved antibiotic that also inhibits MMPs and TNF-α converting enzyme (TACE) activity. Its therapeutic benefit in animal models and clinical studies of ulcerative diseases is due to its ability to inhibit MMPs, not from its antibiotic effect. A published clinical study by Chin has demonstrated that topically applied doxycycline (not NanoDOX®) is successful in treating diabetic foot ulcers. If these characteristics also apply to the proposed clinical trials then NanoDOX® would constitute an important new therapeutic tool for the treatment of partial and full thickness diabetic, chronic cutaneous (dermal) ulcers that have adequate blood supply.

Nanotherapeutics entered into a Cooperative Research and Development Agreement (CRADA) with the North Florida/South Georgia Veterans Health System to conduct the Phase 2a clinical trial, "A Randomized, Double-Blind Study to Evaluate the Safety and Efficacy of NanoDOX® 1.0% Doxycycline Monohydrate Hydrogel in Diabetic Adult Subjects with Lower Extremity Ulcers Compared to Placebo Hydrogel," at the Malcom Randall VA Medical Center in Gainesville, Florida. Recruitment began in February 2009 and the trial has been completed.

The 20-week Phase 2a double-blind, one center, two-arm study with a two (2) week run-in, evaluating the safety and efficacy of a once-daily administration of NanoDOX® topically applied to diabetic ulcers in concert with professionally administered Standard of Care (SoC) procedures as described by Standard Operating Procedure(s) of the Department of Veterans Administration Hospitals has been completed. Patients with infected wounds received oral antibiotics and were not included in the topical portion of the study until the infection was shown by wound biopsy analysis to have been resolved. Following a two (2) week run-in of all patients receiving SoC treatment for diabetic ulcers, patients received either the investigational material or the placebo applied as a part of their wound care. Each patient received 2cc packets of either the test article or the placebo for a once-daily home treatment accompanied by a dressing change. Results indicated no safety concerns and an encouraging exploratory efficacy signal.

A pilot study using NanoDOX® to treat dehisced surgical wounds is being developed through an agreement with The Henry M. Jackson Foundation. The study, "Double-Blinded, Single-Site, Pilot Study of NanoDOX® versus Placebo Hydrogel for Dehisced Surgical Wounds," is expected to begin in 2013 at Walter Reed Army Medical Center and is supported by funding through the Department of Defense Appropriations Act.

An additional 24 subject prospective, randomized, open label Phase 2 study will evaluate the efficacy of NanoDOX® Hydrogel topically applied to orthopedic traumatic wounds receiving vacuum assisted closure therapy versus vacuum assisted closure therapy alone. This trial is set to begin in 2013 with the University of Missouri and Walter Reed Army Medical Center.

NanoDTPA™

Diethylenetriamine pentacetic acid (DTPA) is a chelator that forms stable complexes with certain metals in the body and produces more rapid elimination. DTPA has been shown effective in depleting certain radionucleotides from the body and has been approved for intravenous (IV) administration by the FDA for that purpose. In the event of a mass exposure, such as a nuclear spill or a "dirty bomb" (an explosive

device that spreads radioactive material across an area using conventional or non-nuclear explosives), internal contamination may occur through inhalation or dermal exposure (through open wounds or shrapnel). DTPA is approved for the treatment of radioactive contamination of Americium-241, Californium-252, Cerium-141, 144, Curium-244, and Plutonium-239, 238. IV administration makes it impracticable to treat a large number of exposed people in the event of a terrorist attack with a dirty bomb. Changes in how DTPA is made (formulated) could improve the drug's absorption and lead to it being taken less often, or in smaller amounts, or promote improved patient compliance. The NanoDTPA™ program has been established to develop a new formulation of DTPA that can be easily administered by oral means.

NanoDTPA™ is a novel, oral swallowed capsule formulation of DTPA that is being developed for the treatment of radionucleotide exposure. The specific formulation and capsule size has been optimized for use during an event such as a nuclear spill or population exposure to radiation after a "dirty bomb" event. There is also potential for use of this product for iron chelation for the treatment of iron overload. Iron overload often results from repeated blood transfusions for the treatment of Beta-thalassemia, Myelodysplastic syndromes, and Sickle Cell Disease.

Preclinical studies of this oral capsule formulation have demonstrated good pharmacokinetic and safety profiles in rodent and dog models. An IND package was submitted to the FDA in 2010, ultimately seeking FDA drug approval via Section 505(b)(2) and a submission under the 'Animal Rule'.

Polio emergence in Syria and Israel endangers Europe

By Martin Eichner and Stefan O Brockmann

Source: http://www.thelancet.com/journals/lancet/article/PIIS0140-6736%2813%2962220-5/fulltext

WHO has confirmed an outbreak of at least ten cases of polio in Syria, where vaccination coverage has dramatically decreased during the civil war.[1] Furthermore, wild-type poliovirus 1 (WPV1) has been isolated from sewage and faeces from asymptomatic carriers in Israel since February, 2013.[2] Tourists and travellers could bring the infection to other countries. Precautions during the Hajj in Saudi Arabia in October, 2013, ensured that visitors from regions with known polio transmission were vaccinated, but Syria was not on the list.[3] Moreover, hundreds of thousands of people are fleeing Syria and seek refuge in neighbouring countries and Europe. Because only one in 200 unvaccinated individuals infected with WPV1 will develop acute flaccid paralysis (case/infection ratio C=0·005), infected individuals can spread the virus unrecognised.[4, 5] Inactivated polio vaccine, which is used throughout Europe, only partly prevents vaccinees from infection, but it reduces transmission and is highly effective in prevention of acute flaccid paralysis,[4] and thus further reduces the ratio of acute flaccid paralysis to infection. In regions with low vaccination coverage (eg, Bosnia and Herzegovina [87%] or Ukraine [74%]), particularly those with low coverage of inactivated polio vaccine (eg, Austria [83%]),[1] herd immunity might be insufficient to prevent sustained transmission.

Assuming a borderline effective reproduction number R of 1·1, we expect to see C(Rn+1—1)/(R—1) cases of acute flaccid paralysis within n transmission generations. It might take more than 30 generations of 10 days[5]—nearly 1 year of silent transmission—before one acute flaccid paralysis case is identified and an outbreak is detected, although hundreds of individuals would carry the infection. Vaccinating only Syrian refugees—as has been recommended by the European Centre for Disease Prevention and Control[6]—must be judged as insufficient; more comprehensive measures should be taken into consideration. Oral polio vaccination provides high protection against acquisition and spreading of the infection, but this vaccine was discontinued in Europe because of rare cases of vaccination-related

acute flaccid paralysis. Only some of the European Union member states still allow its use and none has a stockpile of oral polio vaccines.2 Routine screening of sewage for poliovirus has not been done in most European countries,2 but this intensified surveillance measure should be considered for settlements with large numbers of Syrian refugees.

We declare that we have no conflicts of interest.

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PathoQuest and Covance to Offer Next-Generation Sequencing-based Biosafety Assessments

Source: http://www.hstoday.us/single-article/pathoquest-and-covance-to-offer-next-generation-sequencing-based-biosafety-assessments/a4c19e486e935e535e1889fffdbda9b8.html

Covance Inc. and PathoQuest have announced an exclusive agreement to collaborate in providing Next-Generation Sequencing (NGS) based biosafety assessments.

This unique new technology for virus screening allows a single comprehensive assay to overcome the current limitations with predefined sets of known viruses.

According to the announcement, "This innovative biosafety testing approach, combined with Covance's regulatory expertise, provides a flexible testing solution to all biotherapeutic clients and makes biologic medicines safer."

Since viral contamination poses a significant potential safety risk to patients, regulatory agencies are increasingly focusing on the use of advanced analytical technologies like NGS for detection of viral contaminants. The new NGS-based platform can detect and identify viral contaminants within biologic compounds such as monoclonal antibodies or vaccines) throughout the entire lifecycle of the product.

"This collaboration will provide Covance clients with a high-quality solution to the critical problem of viral contamination of biologics during development and in released product," said Dr. Raymond Kaiser, global vice president of Biopharmaceutical Chemistry, Manufacturing and Control (CMC) Solutions for Covance. "As a cutting-edge company in the field of NGS-based virus identification, PathoQuest's capability dovetails perfectly with our CMC analytical solutions to provide our clients access to the latest technology and patients with safer medications."

"Covance's global footprint and extensive experience in BioCMC development, together with their established in-house biosafety testing capabilities, offer perfect synergies to help clients access our NGS-based adventitious

assay globally," said Dr. Luc Boblet PhD, co-founder and CEO of PathoQuest. "In an evolving regulatory environment, we anticipate that NGS will soon become the standard approach in biosafety assessment. Our technology will help clients meet that standard now and well into the future."

"The industry is increasingly adopting the technology, with several high-profile instances of viral contamination of commercially released biologic drugs detected by NGS," the announcement said, adding that "the NGS solution offered by Covance and PathoQuest overcomes the primary limitation of traditional approaches that only identify a predefined short list of viruses. In contrast, this new solution provides a universal test for identifying any virus in a single, comprehensive analysis that minimizes false negatives."

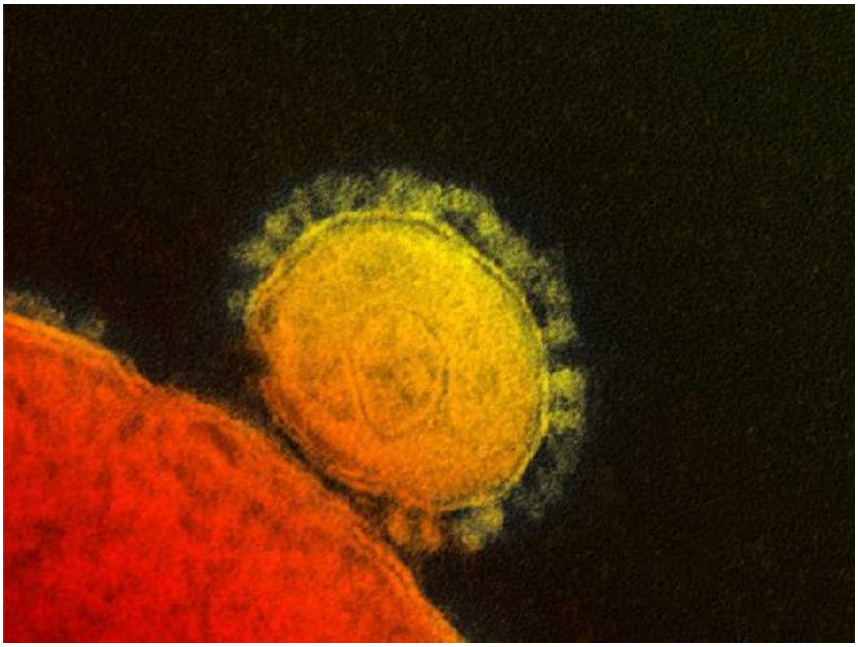
Covance and PathoQuest "will provide clients with a wide range of options for adventitious virus identification. This includes a rapid detection protocol for the critical evaluation of major issues within production processes and a more comprehensive approach for development and characterization of cell banks and biological production systems. For small, emerging and virtual biotech companies, representing a growing and valued segment of Covance's client base, this solution allows them access to a unique technology early in the development process that will increase the value and safety profile of their molecule."

Oman says first MERS-coronavirus sufferer dies in hospital

Source: http://www.reuters.com/article/2013/11/10/us-coronavirus-oman-idUSBRE9A90F520131110

Oman's first MERS coronavirus patient **died** in hospital on Sunday from lung failure, state news agency ONA said.

The Middle East Respiratory Syndrome Coronavirus (MERS-CoV), which can cause coughing, fever and pneumonia, emerged in Saudi Arabia last year and has been reported in **Qatar, France, Germany, Italy, Tunisia and Britain.**



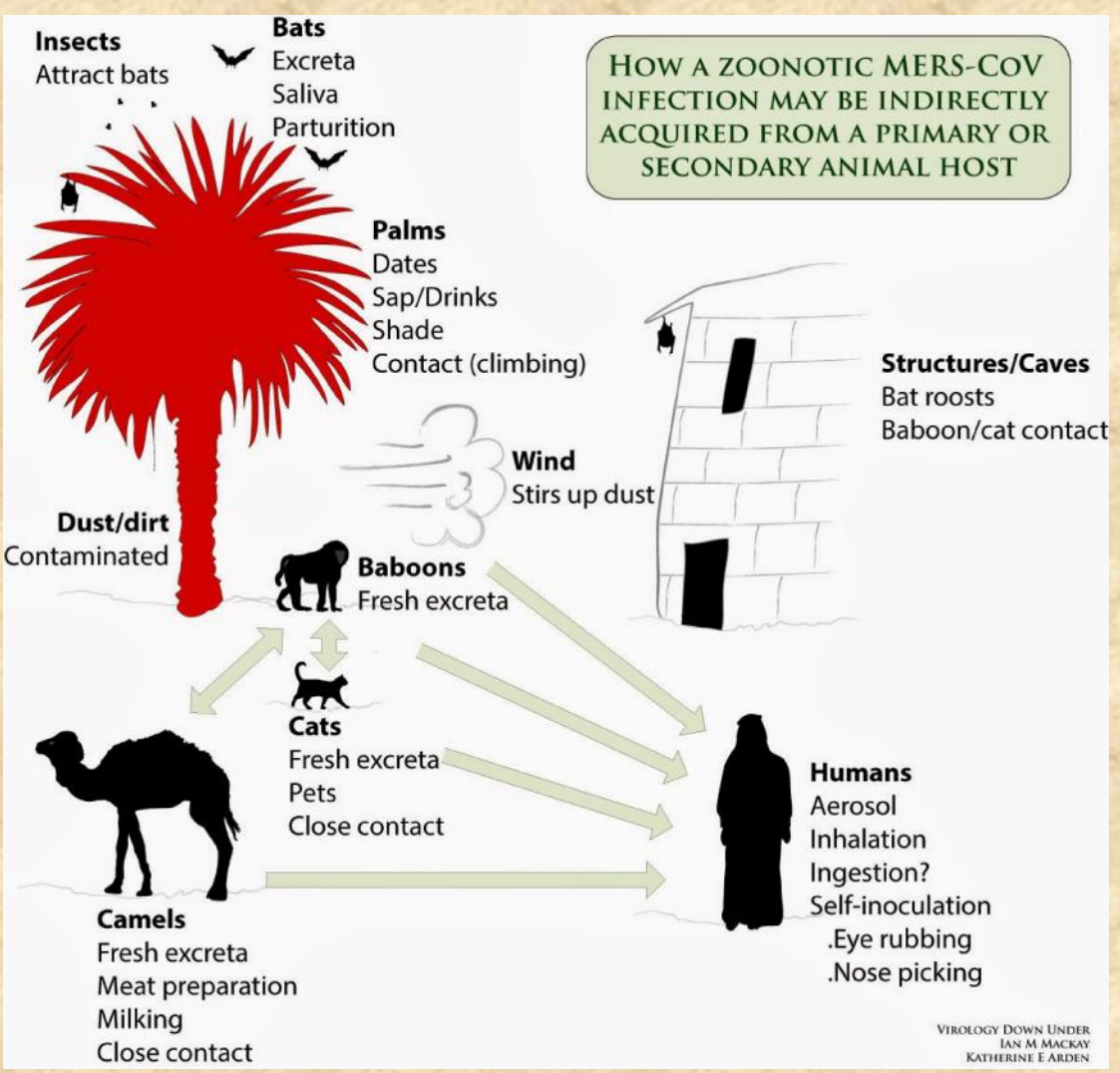
ONA quoted the Health Ministry as saying the 68-year-old man, who was admitted to hospital last month in the oasis town of Nizwa, southwest of Muscat, had been suffering from diabetes and high blood pressure, among other complaints.

The English-language Oman Observer said last month the man had contracted the virus after contact with someone from outside the country.

Qatar, Saudi Arabia and the United Arab Emirates last week reported four other people who had been admitted to hospital with the disease, while Qatar's Supreme Health Council said one patient had recovered after hospital treatment.

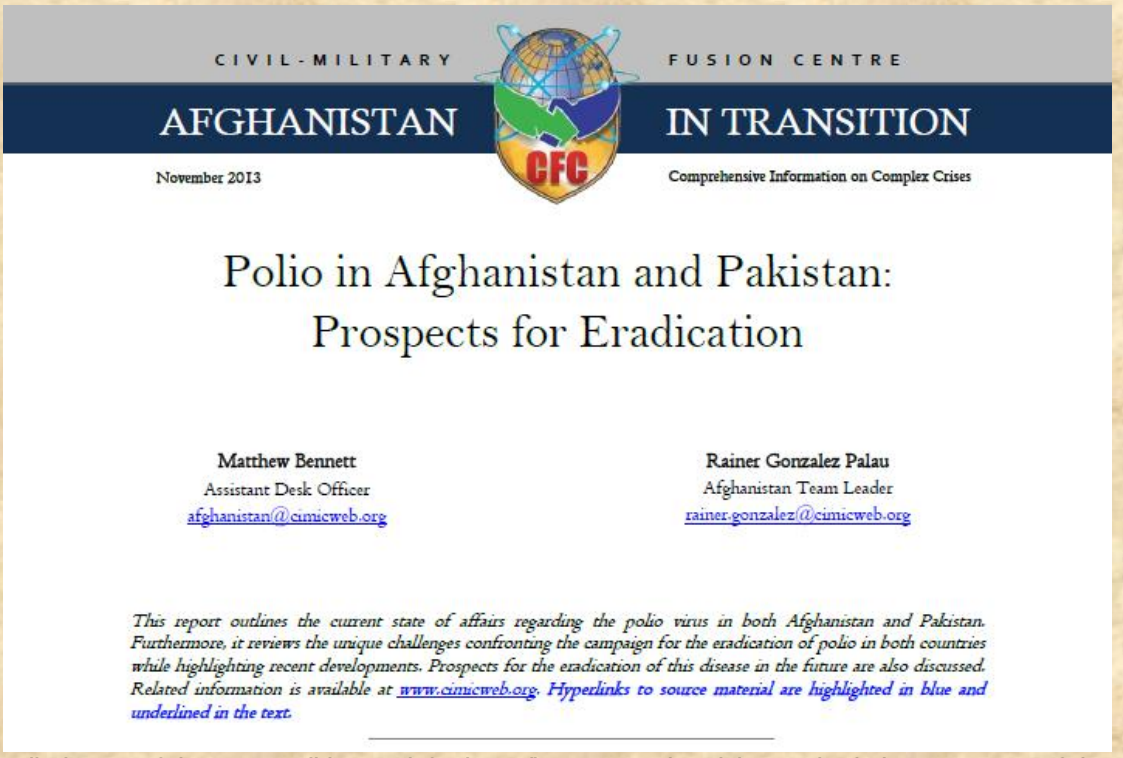
The World Health Organisation said on November 4 it had been informed of 150 laboratory-confirmed cases of infection with MERS-CoV worldwide, including 64 deaths, since September 2012.

In a study into what kind of animal "reservoir" may be fuelling the outbreak, scientists said this month they had found strong evidence it is widespread among dromedary camels in the Middle East.



Polio in Afghanistan and Pakistan: Prospects for Eradication

Source: https://www.cimicweb.org/Pages/v6/welcome.html



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AFGHANISTAN IN TRANSITION

November 2013

Comprehensive Information on Complex Crises

Polio in Afghanistan and Pakistan: Prospects for Eradication

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This report outlines the current state of affairs regarding the polio virus in both Afghanistan and Pakistan. Furthermore, it reviews the unique challenges confronting the campaign for the eradication of polio in both countries while highlighting recent developments. Prospects for the eradication of this disease in the future are also discussed. Related information is available at www.cimicweb.org. Hyperlinks to source material are highlighted in blue and underlined in the text.

Polio is one of the most well-known infectious diseases on the globe, endemic in many parts of the world until 1952 when American medical researcher and virologist Jonas Salk created a vaccine capable of safeguarding against the crippling disease. Polio's notoriety is largely due to its propensity to infect young children and result in crippling, life-long disabilities, inordinate emotional suffering and financial stress for those infected. Following the development of the vaccine, health organisations and national governments around the world began earnest efforts to vaccinate their populations, particularly the youth, in hopes of eliminating the virus. In 1988, the World Health Assembly launched a massive, worldwide global polio eradication initiative. In 1994, polio was officially declared to be eradicated from the Americas. In 2002, Europe announced the continent was polio-free. By 2003, only six remaining polio endemic countries remained: Afghanistan, Egypt, India, Niger, Nigeria and Pakistan. By 2006, both Egypt and Niger were declared officially free of the disease. Further, in 2012, India was declared polio-free. While each of these milestones represents great achievements, three countries remain that have yet to stop the transmission of polio: Afghanistan, Nigeria and Pakistan. This report provides a global overview of polio. Firstly, it will outline the situation in polio non-endemic countries as well as recent outbreaks in the Middle East and Horn of Africa regions. Subsequently, the document will focus on the on-going fight against polio in both Afghanistan and Pakistan while highlighting the unique challenges that exist in the political and geographical context of these two specific nations.

Needed: More Biothreat Training for First Responders

By Steven P. Bucci & Jennifer Corrente-Bucci

Source:http://www.domesticpreparedness.com/Commentary/Viewpoint/Needed:_More_Biothreat_Training_for_First_Responders/

In its December 2008 "World at Risk" report, the U.S. Congress's Commission on the Prevention of WMD Proliferation and Terrorism emphatically declared that biological weapons are the most dangerous threat the United States is facing. That report, issued by a commission led by two respected former senators – Democrat Robert "Bob" Graham and Republican James "Jim" Matthes Talent – and a score of distinguished scientists, should not have been easy to ignore; but that is exactly what the federal government has done. The report did not arbitrarily dismiss the threats posed by nuclear and chemical weapons, but the former are very difficult to obtain, emplace, and

actually use, and the nation's first responders are reasonably well trained and equipped to deal with the latter, so the threat posed by biological weapons is still probably the worst-case scenario to deal with. For example, when movies or television shows portray a biological attack, they often evoke an overwhelming fear. Moreover, despite possessing a fairly sophisticated medical response system, U.S. citizens are still woefully underprepared, at best, to deal with a biological threat. Rather than serving as a motivator, therefore, the "fear factor" associated with biological weapons seems to have actually caused many citizens to ignore the threat – apparently hoping that it will simply go away.

First Responders, First Line of Defense

Making the nation even more vulnerable to biological threats is the fact that many critics have called for the defunding of programs such as the federal government's Project BioShield – largely because it cannot yet produce *perfect* results. Another complication is that there also has been a lack of biothreat training for law enforcement officers, firefighters, and even emergency medical responders, primarily because such training is: too complicated; and/or too highly science-related. These criticisms seem to ignore the fact that the nation's first responders are and will continue to be the first line of defense in dealing with biological attacks, just as they are in more "traditional" attack scenarios.

Although many first responders have received the extensive training needed to cope with chemical or explosive threat agents, the present system of relying on local doctors and nurses to serve as the initial "detection" screen for biological threat agents continues. This is despite the fact that, to augment and expand the current system, there is an urgent need to give other responders additional training in the signs and symptoms related to biothreat incidents.

Around the world today, the biowarfare threat posed by rogue nations, terrorist groups, and individual "lone wolf" terrorists seems likely to become incrementally worse for the foreseeable future. Moreover, those seeking to develop or purchase virulent bioweapons will not hesitate to use them. In short, the threat posed by biological terrorism is today not receding. As U.S. and allied intelligence and law enforcement teams have made it more difficult for other nations (or groups) to successfully execute conventional attacks, the attackers are more likely to turn to other weapons, such as bioagents.

Obviously, current U.S. efforts to develop and improve the nation's technological biodetection capabilities must continue and expand. Moreover, the training of personnel working in the biowarfare field require more training. The U.S. Army Chemical School at Ft. Leonard Wood, Missouri, is the principal U.S. Department of Defense facility for training in all aspects of response to attacks involving weapons of mass destruction of any type. Such training, therefore, would probably be the best starting point for developing a viable, exportable program of instruction for not only military personnel but also for law enforcement officers, firefighters, and emergency medical technicians. The rationale is obvious: U.S. responders, civilian as well as military, must know what to look for, how to carry out the field testing of biological agents, and – using all relevant means of detection – how to recognize patterns.

A Race Against Time & Strain

Combating the destructive effects of bioweapons will always be a race against both time and the biological strain released. A concerted effort is now urgently needed to push the limits of education and training for the nation's frontline defenders. Overworked emergency-room doctors should not be the only "intellectual trip wires" available to recognize and cope with a bioweapon incident. The threat is simply too great, and an enabling solution is readily available, so there is no valid reason *not* to begin mitigating this obviously major threat.

In fact, the domestic response community should reach out to the military, the nation's public health authorities, and the scientific community, in an effort to immediately begin developing the instructions needed to expand and improve the bio-related diagnostic and response capabilities of *all* of the nation's first responders. Each person directly involved should become a "detector" – and all members of the domestic response community should be provided the tools and training necessary to effectively counter this most dangerous of the numerous threats now facing the nation.

***Steven P. Bucci, Ph.D.**, former Green Beret, is director of the Allison Center for Foreign Policy Studies at The Heritage Foundation. He also is an adjunct professor of leadership at George Mason University and an associate professor of terrorism studies and cyber security policy at Long Island University. He serves on the advisory board of the MIT Geospatial Data Center and is an advisor to the Prince of Wales/Prince Edward Fellowship program at MIT and Harvard. He previously served as a lead consultant to IBM on cyber security policy and as a special forces commander in the U.S. Army, where he assumed the duties of military assistant to Defense Secretary Donald H. Rumsfeld. After retiring from the Army in 2005, he served as deputy assistant secretary of defense for homeland defense and defense support to civil authorities at the Pentagon, and was the primary civilian overseer of U.S. Northern Command.*

***Jennifer Corrente-Bucci** is a Summa Cum Laude Graduate from Lee University in Bio-Chem. Her knowledge of the hard science concepts required to appropriately address the requirements of domestic preparedness is exceptional. Combined with her present efforts to obtain an advanced degree in Homeland Security Management, she is an outstanding resource for advancing the study of how to best ready the nation's response forces.*

*Additional contributions to this article were made by **Captain Philip S. Bucci**, a U.S. Army Chemical Corps officer who graduated from both the Officer Basic and Advanced Courses at Ft. Leonard Wood. Trained to deal with chemical incidents, as well as nuclear and biological hazards, he uses his expertise to prepare other military first responders as they ready themselves for deployments both at home and overseas. He also is a skilled practitioner in incident-response operations.*

Lying in wait: Anthrax toxin may lurk for days in cells as a lingering threat

Source: http://www.homelandsecuritynewswire.com/dr20131115-lying-in-wait-anthrax-toxin-may-lurk-for-days-in-cells-as-a-lingering-threat

An anthrax infection can be fatal even when the infectious agent is no longer detected. Research carried out at the Ecole Polytechnique Federale de Lausanne (EPFL) reveals the way its lethal factor manages to turn invisible to the immune system.

The bacterium responsible for anthrax develops a strategy reminiscent of the Trojan horse tale. **Its pathogenic factor is able to penetrate inside a cell in such a way that it becomes completely invisible to both the immune system and medical analysis. Furthermore, it manages to exit the cell several days later, and then it continues to poison other cells.**

An EPFL release reports that this mechanism was discovered by researchers from EPFL, the University of California at Berkeley, and the National Institute of Health in Washington, D.C. It finally explains the reason why some living organisms succumb to the disease up to two weeks after the disappearance of the last signs of bacterial presence. "This remained a mystery for more than fifty years," said Gisou van der Goot, who heads a research unit at EPFL's Global Health Institute. "The bacteria would disappear after the administration of antibiotics, but the subject still died a few days later."

The researchers focused in the way the anthrax toxin was able to get inside the cell. Composed of two

elements — a "protective antigen" and a "lethal factor," the toxin does not merely create a passage across the cellular membrane. Instead, it introduces itself by endocytosis, a process by means of which the pathogen is "swallowed" by the cell.

The intoxication does not stop there. Once inside the cell, anthrax's lethal factor is sheltered by the cell's membrane, forming an "endosome," in which it can wait for several days. Then, it can either be released inside the cell, causing it to malfunction, or it can be released towards the external environment inside small vesicles — called exosomes — and get into another cell. "The immune system has no reason to react, since it only detects exosomes whose membrane is composed by the very same molecules making up the cell's endosomes," explained Gisou van der Goot.

This is the first time that scientists have been able to describe the transmission of a pathogen agent for an extended time period and throughout a long distance within the living organism. Their work has been subsidized by the Swiss National Science Foundation and the NCCR "Chemical Biology." It was published today in the *Cell Reports* journal. "There is still much to learn about exosomes. The results of this research will help us to better understand them," continued Gisou van der Goot.

As for the battle against anthrax, this research will lead to the development of drugs specifically targeting the lethal factor while being able to penetrate the cell's membrane.

— Read more in Laurence Abrami et al.: "Hijacking multivesicular bodies enables long-term and exosome-mediated long-distance action of anthrax toxin," Cell Reports *(14 November 2013)*

Bioterrorism - 1, You - Nil

Source: http://www.acdemocracy.org

"...Obama also called for a strategic biosurveillance plan to be implemented within 120 days, but no such plan has been announced."

So, how well are you being protected from terrorist-borne pathogens?

The answer is either "we don't know" or "hardly at all." While the government has done is nothing about cyber attacks, electromagnetic pulse attack, "dirty bombs," and most everything else terrorist groups and states would think to do, it is also busy doing nothing much about bioterrorism except producing strategy papers and spending money hand-over-fist.

In the meantime, information about biological weapons in the hands of Al Qaeda's Syrian branch, al-Nusrah, surfaced last month. However, al-Qaeda's interest in acquiring biological and other WMD has been known since October 1997. In August 2002, then CIA Director George Tenet told the Senate Intelligence Committee that Bin Laden's "operatives have trained to conduct attacks with toxic chemicals or biological toxins."

Shortly after the 9/11 attacks, the U.S. government established an anti-bioterrorism program (called BioWatch). By 2003, when it was made public, BioWatch "filters" (devices taking air samples) had been deployed in 31 cities and more than $60 million had been spent on the program. To examine the samples, someone has to go around once a day to collect them. If

a pathogen is detected after chemical analysis, a committee including "CDC and FBI officials, state and county health department directors, and DHS's chief medical officer" has to convene to decide what to do. In the past ten years, attempts have been made to make "filters" that also analyze and transmit data to authorities. No progress.

One wonders if any of those exposed to a terrorist-disseminated pathogen would still be around by the time the filters were collected and analyzed and the committee deliberations ended. Clearly, the authorities would know we have been attacked only after the sick flood emergency rooms and hundreds/ thousands die.

Meanwhile, as with instructions for handling dirty bombs, DHS has developed no advisement as to how localities should respond to biological attack if it does occur. As Lilly Chapa says below.

"President Obama issued a National Strategy for Biosurveillance in July 2012 that mentioned strengthening local partnerships to improve BioWatch capabilities. However, the strategy does not include a framework to guide the systematic identification of risk, assessment of resources needed to address those risks, and the prioritization and allocation of investment across the entire enterprise, according to the GAO."

"In his strategy, Obama also called for a strategic biosurveillance plan to be implemented within 120 days, but no such plan has been announced."

However, there have been 149 BioWatch Actionable Results (BARS) to date. Tens of millions of dollars have been spent by different cities for elaborate exercises, but no biohazard requiring anything beyond investigative action was reported. It seems that BioWatch had adopted the government's ever-hopeful Ostrich mentality: If you see nothing, then there's nothing to worry about.

Lilly Chapa, writing on the Security Management website, details all of the problems with BioWatch and our whole approach to bioterrorism protection. It's not a pretty picture.

The State of Bioterrorism Surveillance

By Lilly Chapa

Source: http://www.securitymanagement.com/article/state-bioterrorism-surveillance-0012857?utm_source=Bioterrorism+-+1%2C+You+-+Nil&utm_campaign=ACD+BLOG&utm_medium=email

"Part of what keeps programs like this alive is the concern that if we take it down and defund it, and then, God forbid, something happens in that narrow sliver of threat space, there will be hell to pay."

A week after the 9-11 attacks, five threatening anonymous letters were sent to media outlets. Two weeks later, reporter Robert Stevens became the first person to die from inhaling anthrax that was enclosed with the letters. The case widened as anthrax-laden letters were sent to two Senators-one of the letters arrived at a Capitol Hill office and the other was routed to a mail facility, where it infected postal workers. Before the terror ended, 22 people developed infections and five died.

In response, the federal government set up the BioWatch program, an early warning network of sensors that would detect biological attacks before widespread public infection could occur. By the time President George W. Bush publicly announced the program in 2003, BioWatch filters had been deployed in 31 cities and more than $60 million had been spent on the program.

The program came under criticism early on. In 2003, a congressional report raised concerns about almost every aspect of BioWatch, from the funding to the implementation to the scope of coverage. Today, more than $1 billion has been spent on the program, which has expanded to 34 cities across the United States, yet the concerns about the program remain.

BioWatch Basics

BioWatch has deployed outdoor collectors in all of the cities where it is operational and indoor collectors in three locales; more can be deployed during major events. The collectors hold filters that gather air samples, and a government worker manually retrieves the filters and

delivers them to laboratories for testing every 24 hours.

The Department of Homeland Security (DHS) Office of Health Affairs oversees and coordinates the BioWatch program. The Environmental Protection Agency (EPA) monitors the filters, which are deployed with existing EPA equipment that monitors air quality. The Centers for Disease Control and Prevention (CDC) provides technical assistance in testing the air samples for pathogens terrorists are likely to use in a biological attack, including anthrax, small pox, plague, and tularemia. The FBI gets involved whenever a BioWatch Actionable Result (BAR), a positive result, is recorded. But state and local health officials take on the brunt of the day-to-day management of the program.

Actionable Results

If a lab testing shows a BAR, a BioWatch Advisory Committee meets to analyze the situation to decide whether the city should go to a full-scale response or if the BAR is due to naturally occurring bacteria in the environment that simply resembles the reading of a pathogen. The committee members include CDC and FBI officials, state and county health department directors, and DHS's chief medical officer.

While the committee deliberates, the local resources of the public-health community are put on alert to look for symptoms of the suspected pathogen; law enforcement officials are sent out to investigate; and additional samples are taken from buildings in the area. The city has to handle the cost of these efforts.

There have been 149 BARs to date, and while none have been due to an actual bioattack, localities have been forced each time to take those costly precautions in the time between a BAR reading and a determination that no real risk exists. While the DHS does not consider this a false alarm, because technically there was a correct reading of a substance that later proved of no concern, others consider these false alarms, leading to criticism of how the system works.

Arthur Kellermann, a RAND analyst who served on the Institute of Medicine (IOM) committee that issued a report on BioWatch for Congress in 2009, says that during hearings for the IOM report, local public health officials said their cities' public health funds were "devastated" whenever a BAR occurred.

These BAR readings can also cause trouble at large-scale events. In 2005, for example, several Washington, D.C. BioWatch detectors registered positive results during an anti-war protest on the National Mall. Public health officials had to make a tough decision in what the IOM refers to as a "high-regret action" situation. In this case, the choice was whether to evacuate the thousands at the Mall or take the chance that serious illness or worse could occur. After further investigation, officials decided not to evacuate the area, and fortunately, no one got sick.

Such alarms have also occurred during events such as the 2004 and 2008 Superbowls, the 2008 Democratic National Convention, and the 2006 National League Baseball playoffs. However, the DHS has said they are working to lower the incidence of unnecessary BARs, and there have been no alarms so far in 2013.

The high number of BARs might lead decision makers into what Kellermann calls the car alarm mind-set: "If you live in a neighborhood where a car alarm goes off every night, after two to three weeks, you just ignore it."

But unnecessary alarms are only one problem.

Ongoing Efforts

Efforts have been underway for nine years to develop a way to automate the sample analysis-to have the analysis conducted within the same device that collects the sample-a "lab-in-a-box" approach that would not require human interaction, saving staff time and yielding results in six hours, versus the current 24 hours that it takes to get results from the lab. But as discussed in a June House Energy and Commerce Committee hearing, DHS officials have spent more than $300 million on various generations of this technology without success, including BioWatch Gen-2.5, which was deployed for two years until it was deemed ineffective, and Gen-3, which also was deemed to have failed in a first round of testing. But Brian Beaulac of Boeing, which works on Gen-3 installations for DHS, asserts that the technology and chemistry behind Gen-3 does work and that the system simply needs adjustments. BioWatch program manager Dr. Michael Walter made similar assertions at the congressional hearing. The DHS is expected to release a progress report on the new technology this fall.

After various investigations on BioWatch, including a 2011 National

Academy of Sciences (NAS) report and a series of articles in the Los Angeles Times, legislators took notice of the program's troubles. In 2012, the Senate and House Appropriation Committees removed the $40 million requested by DHS for Gen-3 and ruled that the experimental program may not receive further funding until the DHS certifies that the science involved in Gen-3 is proven. Both the House and the Senate committees have been looking into the program, as has the Government Accountability Office (GAO).

The aforementioned false alarm and technology issues were among the findings of these investigations. Another concern was the lack of coordination among all the players. "The BioWatch program appears to lack necessary coordination, communication, and collaboration among the several communicators at federal, state, and local levels that must be fully engaged for a functional system," the NAS report states.

There has been a communication gap between the DHS and local public health officials since the beginning of BioWatch: the DHS has withheld information from local officials about the locations of BioWatch sensors in their own jurisdictions, and for years some local officials were unclear on the exact criteria of a BAR or how to respond. The lack of communication evolved into distrust between the two groups and weakened BAR response capabilities, the NAS report said.

Leadership turnover has also created confusion and made accountability elusive. During the House hearing on BioWatch in June, representatives grew frustrated with Dr. Walter, who was unable to discuss problems occurring before he came in 2009. When asked whether the first lab-in-a-box technology, Gen-2.5, had been pulled because it didn't work, Walter said he did not know because that program predated him.

The DHS had also been charged with running an internal investigation on the program, but Walter said he didn't know the results of the investigation or whether an investigation had taken place.

Last year, the GAO reported that the DHS did not develop critical knowledge before proceeding with the Gen-3 acquisition.

The agency began working on Gen-3 more than a year before completing key parts of the Acquisition Life-Cycle Framework, which is used to minimize waste and determine whether the DHS should move forward with proposed acquisitions.

BioWatch officials stated that they did not justify the necessity of Gen-3 or explore more cost-effective alternatives because there was already departmental consensus about the program, but Walter said they are addressing GAO's concerns.

Steve Caldwell, director of homeland security and justice issues at the GAO, tells Security Management that Gen-3's acquisition was rushed and incomplete. "We think part of that problem is not following good acquisition practices in terms of not coming up with good initial requirements, justifying the program, or analyzing alternatives, which they are doing now with hindsight," Caldwell says. "Once you have those things in place, it's developing reliable and complete estimates of performance schedules and costs, and trying to stick to those and hitting certain decision points to go forward when you have data, not just moving the program forward ahead of time."

Although DHS says Gen-3 will greatly reduce detection time, experts doubt it will make much difference if other problems aren't corrected.

The NAS report also revealed that local officials have little faith in the BioWatch program as a whole. "Some [local public health officials] stated to the committee that they would be unlikely to administer prophylaxis on the basis of a BAR alone, waiting instead until clinical cases occur before taking that step," the report noted.

Overall value

The GAO's Caldwell says that they do not question the overall value of a biosurveillance program, despite concerns with BioWatch. "It seems completely reasonable to us because we've got demonstrations of terrorists using that kind of thing, and we're certainly not questioning the need for something that would be able to do some kind of monitoring in key places," he states.

That view isn't shared by everyone. Given that "we're never going to have enough money to cover every possible contingency for every possible threat," says Kellermann, this particular approach, which "addresses such a narrow piece of the threat space," may not be the best use of limited resources.

Those funds may be better directed elsewhere, say others. For example, Rep. Tim Murphy (R-PA), speaking at

the congressional hearing on the program, said "It makes no sense to expand outdoor monitoring for a less likely large-scale attack, while not addressing the declining number of public health responders who are needed in any kind of attack."

Focusing on the core public health infrastructure and building capacity that would allow the country to respond to a much wider range of threats would be a better strategic choice, Kellermann says.

A 2009 Center for Strategic and International Studies paper reported that the U.S. response to bioterrorism overemphasizes detection and countermeasures at the expense of prevention and strengthening public health.

"Rebuilding the U.S. public health infrastructure would provide both better detection and better capability to treat the impacts of a biological attack, as well as improve surge capacity to deal with other mass casualty incidents," the report states.

For example, implementing electronic medical records and digital links between hospitals and public health authorities would greatly enhance management in the event of a biological attack, says the report.

Future Prospects

President Obama issued a National Strategy for Biosurveillance in July 2012 that mentioned strengthening local partnerships to improve BioWatch capabilities. However, the strategy does not include a framework to guide the systematic identification of risk, assessment of resources needed to address those risks, and the prioritization and allocation of investment across the entire enterprise, according to the GAO.

In his strategy, Obama also called for a strategic biosurveillance plan to be implemented within 120 days, but no such plan has been announced.

In August, the House Energy and Commerce Committee asked the GAO to do another report on Gen-3, which Caldwell says they plan to do.

He also notes that there is no mention of Gen-3 in the 2014 budget, which means Gen-3 is in a holding pattern. However, the DHS recently extended the current BioWatch program in Washington, D.C., Baltimore, and Richmond with a six-month, $750,000 contract that funds the manual testing of the filters every 24 hours.

Meanwhile, Kellermann says that BioWatch is "in a league of its own," both in stature and in number of skeptics.

"There's so many levels of concerns about the technology and the premise that I think Congress' skepticism and the experts' skepticism is warranted," Kellermann says. But he notes, "Part of what keeps programs like this alive is the concern that if we take it down and defund it, and then, God forbid, something happens in that narrow sliver of threat space, there will be hell to pay."

Israel secretly detained al-Qaeda suspect Baraq

Source: http://www.bbc.co.uk/news/world-middle-east-24984373?utm_source=Sailthru&utm_medium=email&utm_term=*Morning%20Brief&utm_campaign=MB%2011.18.13

Israel has secretly held a suspected al-Qaeda biological weapons expert since 2010, it has been revealed.

A military court placed Samir Abdul Latif al-Baraq in "administrative detention", which allows indefinite detention without charge or trial, after he was arrested in July 2010.

His detention was revealed on Monday when lawyers petitioned the Israeli Supreme Court for his release.

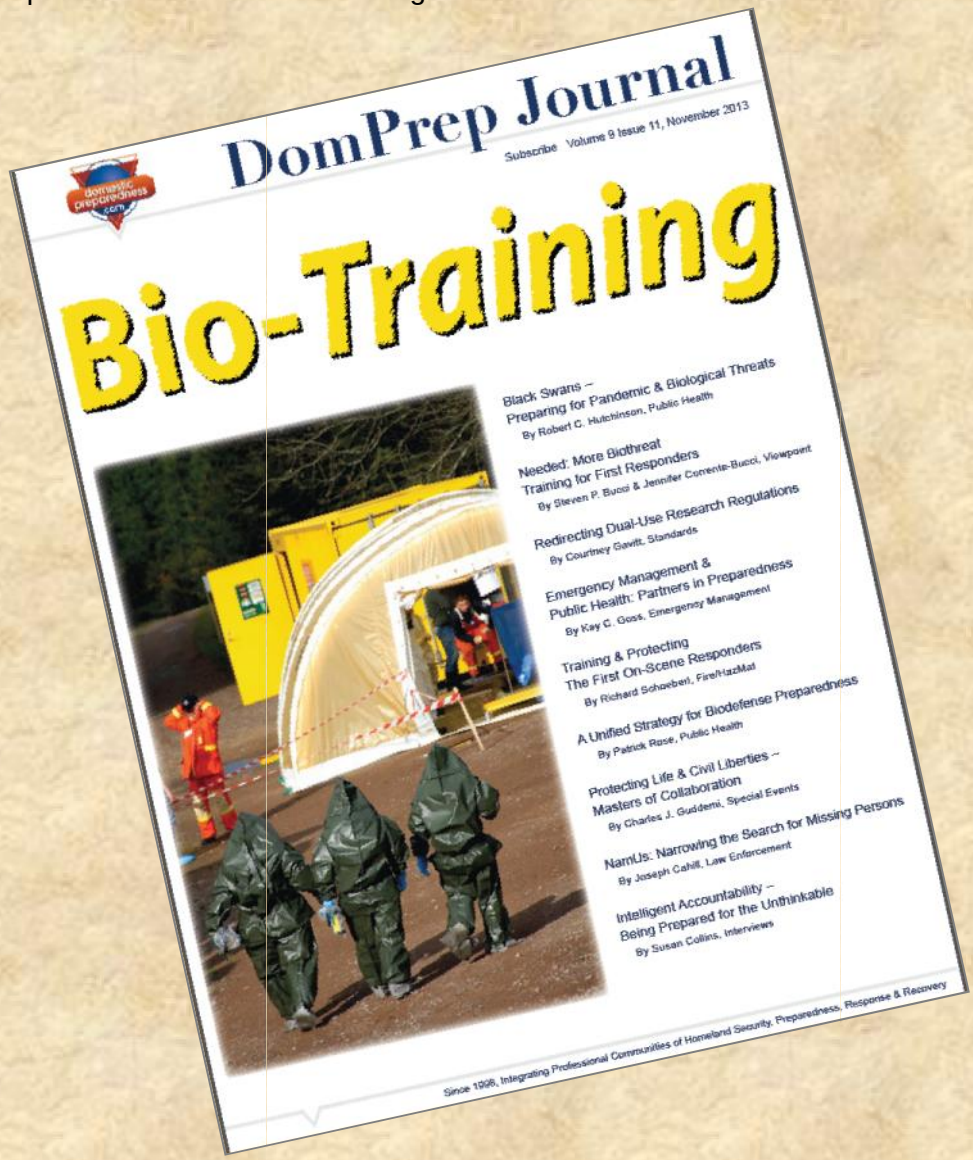
Israeli prosecutors say the Palestinian was planning attacks on Israelis.

They claim that releasing Mr Baraq would endanger the entire Middle East, but his lawyers have challenged them to produce any evidence.

'Point of no return'

According to court documents disclosed on Monday, Mr Baraq was born in Kuwait in 1974 and moved to Pakistan in 1997 to study microbiology.

The following year, he attended a militant training camp in Afghanistan, and in 2001 was recruited by Ayman al-Zawahiri, the current leader of al-Qaeda, the documents say.
He then allegedly acquired "knowledge and experience" in non-conventional weaponry.
Israeli prosecutors said Mr Baraq spent three months at the US military detention camp at Guantanamo Bay in 2003, and was imprisoned in Jordan between 2003 and 2008 for "terrorist activity" and **involvement in an al-Qaeda biological weapon project.**
He was expelled from Jordan on 11 July 2010 and was subsequently arrested by Israeli troops at the Allenby Bridge border crossing while trying to enter the West Bank.
Mr Baraq was then placed in administrative detention, which is subject to renewal every six months by a military court.
The Israeli military says it uses administrative detention only when it fears an immediate risk to security or to protect informants.
Israel's justice ministry said it wanted to extend Mr Baraq's detention, arguing that releasing him would mark a "point of no return for the development of significant jihadist infrastructure in the region".
But his lawyer, Mahmid Saleh, told Israeli Army Radio: "If he is such a senior terrorist, then why hasn't he been prosecuted? There is no evidence against him."



U.S. gathers vaccine researchers to talk bioterrorism threat Q fever

Source: http://www.fiercevaccines.com/story/us-gathers-vaccine-researchers-talk-bioterrorism-threat-q-fever/2013-11-20

While anthrax, smallpox and other "category A" bioterrorism threats dominate the collective public consciousness, a larger pool of lower-priority agents are also a danger. Q fever falls into this second tier, but the U.S. government is still sufficiently concerned to gather researchers to talk vaccine development.

The Defense Threat Reduction Agency (DTRA) has called for researchers with an interest in Q fever vaccine development to attend a webinar next month. At the webinar, DTRA will outline its interest in a vaccine for **Q fever, which affected 134 people in the U.S. in 2011**. **The largest outbreak was linked to exposure to goats, which along with sheep are carriers of the bacteria.** While the rarity of the disease--and its low virulence--mean it is currently a minor health problem, the fear is that someone will turn it into a weapon.

DTRA knows this is possible because the U.S. researched it as part of its biological weapon program. **The bacteria's stability in aerosols across a range of temperatures and high-infection rate make it suitable for use as a biological weapon.** In the 1970s, the Soviet Union developed a Q fever-based biological weapon, and some believed Saddam Hussein was also running a program, *USA Today* reports. U.S. troops fighting in Iraq reportedly returned home with the disease.

Fewer than 2% of people hospitalized with Q fever die, but the bacteria could still debilitate a country if used as a weapon. Symptoms include fever, vomiting and general malaise. If used as a weapon, the number of cases would soar, and the only vaccine--developed in Australia--is associated with multiple side effects.

New Inhibitors Could Help with Treatments for Anthrax, MRSA

Source: http://globalbiodefense.com/2013/11/26/new-inhibitors-could-help-with-treatments-for-anthrax-mrsa/?goback=.gde_3711808_member_581364842209530266O#!

Inhibitor compounds developed by UC Irvine structural biologists and Northwestern University chemists have been shown to bolster the ability of antibiotics to treat deadly bacterial diseases such as MRSA and anthrax.

The discovery by UC Irvine's Thomas Poulos and Northwestern's Richard Silverman builds on previous work in which they created compounds that inhibit an enzyme called neuronal nitric oxide synthase. These have demonstrated the potential to treat neurodegenerative diseases by blocking overproduction of cell-killing nitric oxide within neurons.

Now the researchers are learning that the compounds may have another important function. After Poulos and Silverman read a study suggesting that nitric oxide synthase helped pathogenic bacteria resist antibiotics, their laboratory teams paired the inhibitor compounds with currently used antibiotics to see if they could suppress NOS – and increase the antibiotics' effectiveness.

"We found that NOS inhibitors were extremely successful at inhibiting neurodegeneration in an animal model, and if they could be successful combating other diseases, we wanted to identify that as quickly as possible to help other people," said Poulos, Chancellor's Professor of biochemistry, chemistry and pharmaceutical sciences at UC Irvine.

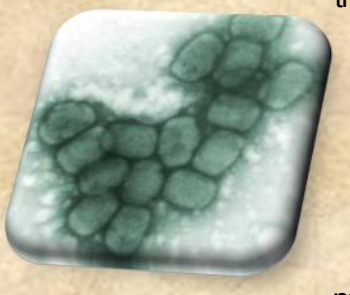
The researchers tested their compounds on *Bacillus subtilis*, nonpathogenic bacteria very similar to *Staphylococcus aureus* (known as MRSA), and *Bacillus anthracis*, which causes anthrax. Bacteria treated with the NOS inhibitors and an antibiotic were killed off more efficiently and completely than bacteria treated with only an antibiotic. The scientists then compared the three-dimensional structure of the inhibitors bound to the bacterial NOS with those bound to the neuronal NOS and determined that they bonded quite differently.

"Now that we know which region of the NOS to target, we should to be able to develop compounds that selectively bind to bacterial NOS," Poulos said, adding that his team will also need to try out those compounds in animal models.

The study, published in the Oct. 31 issue of *Proceedings of the National Academy of Sciences*, was supported by National Institutes of Health grants.

Bavarian Nordic Completes Smallpox Vaccine Delivery to SNS

Source: http://globalbiodefense.com/2013/12/02/bavarian-nordic-completes-smallpox-vaccine-delivery-to-sns/?goback=.gde_3711808_member_581364820931827 3026#!



Bavarian Nordic recently announced it completed the delivery of 20 million doses of IMVAMUNE smallpox biodefense vaccine to the U.S. Strategic National Stockpile (SNS) for use in the event of a smallpox emergency in the U.S.

This order completion is the result of a decade-long research and development partnership between Bavarian Nordic and the U.S. government and fulfills the original contract awarded in 2007, valued at USD 549 million.

"Bavarian Nordic is proud to be a part of fulfilling a US government requirement for bioterrorism preparedness by delivering 20 million doses of IMVAMUNE," said Anders Hedegaard, President and CEO of Bavarian Nordic. "This accomplishment shows that when resources and commitment are applied, industry and government can successfully work together to achieve great things."

Since 2010, Bavarian Nordic has been delivering the vaccine to the SNS. It is being stockpiled for emergency use in individuals with compromised immune systems, such as people with HIV or atopic dermatitis, including children and pregnant and nursing women, who are not recommended to take the previous generation vaccine due to increased risk for severe side effects.

In April, the U.S. government awarded Bavarian Nordic a new contract valued at up to USD 228 million to supply 8 million additional doses of IMVAMUNE needed to maintain the 20 million dose stockpile over time.

Background

Bavarian Nordic initiated the development of IMVAMUNE in 1999. After the U.S. terrorist attacks of 2001, the government expanded its investment in medicines and vaccines to protect against potential bioterrorism agents, by establishing the Project BioShield initiative.

Although smallpox was eradicated worldwide, the government considers it a high-priority bioterrorism threat. While traditional, replicating smallpox vaccines have been effective in eradicating the disease, they are not recommended for up to 25 percent of the population due to the risk of adverse events, including death and severe disability. Therefore, the U.S. government initiated a program to develop and procure a smallpox vaccine suitable for this special population.

IMVAMUNE is a non-replicating vaccine that, unlike traditional vaccines, cannot spread in the vaccinated person.

Therefore, none of the serious side effects normally associated with traditional vaccines have been seen with IMVAMUNE.

In 2003 and 2004, Bavarian Nordic received two contracts from the U.S. National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health (NIH), for the clinical development of IMVAMUNE. In 2007, BARDA awarded the company a procurement contract to supply 20 million doses of the vaccine.

In April 2013, BARDA awarded Bavarian Nordic a new contract valued at up to USD 228 million to supply 8 million additional doses of IMVAMUNE needed to maintain the 20 million dose stockpile over time. The first USD 110 million of the new order is secured, and the remaining portion will be secured based on availability of funds in 2014.

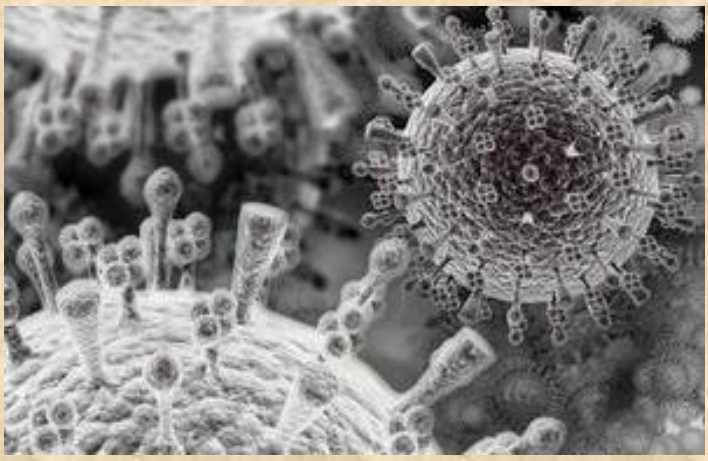
The company is continuing its work with BARDA on an enhanced freeze dried vaccine formulation, which is expected to increase flexibility for use in an emergency and reduce stockpiling costs based on a longer shelf life.

IMVAMUNE has also been supplied to other government stockpiles around the world. Earlier this year, the vaccine was approved in the European Union under the trade name IMVANEX®. In the U.S., registration studies are currently ongoing.

1950s pandemic flu virus still a health threat today, particularly to those under 50

Source: http://www.homelandsecuritynewswire.com/dr20131210-1950s-pandemic-flu-virus-still-a-health-threat-today-particularly-to-those-under-50

St. Jude Children's Research Hospital scientists have evidence that descendants of the H2N2 avian influenza A virus that killed millions worldwide in the 1950s still pose a threat to human health, **particularly to those under 50.** The research has been published in an advance online edition of the *Journal of Virology*.



A St. Jude Children's Research Hospital release reports that the study included twenty-two H2N2 avian viruses collected from domestic poultry and wild aquatic birds between 1961 and 2008, making it the most comprehensive analysis yet of avian H2N2 viruses.

Researchers reported the viruses could infect human respiratory cells. Several strains also infected and spread among ferrets, which are susceptible to the same flu viruses as humans.

Based on those and other indicators, one virus was classified as posing a high risk for triggering a pandemic.

Researchers found evidence the viruses were susceptible to current antiviral medications and could likely be controlled with an available prototype vaccine.

Such protection was unavailable in 1957 when an H2N2 virus that included genes from avian flu viruses emerged. Federal health officials estimate the 1957-58 pandemic killed one to two million people worldwide. While the H2N2 strain disappeared from flu viruses circulating in humans in 1968, it has persisted in the world's bird population.

"This study suggests H2N2 has the characteristics necessary to re-emerge as a significant threat to human health in part because most individuals under the age of 50 lack immunity to the virus," said corresponding author Robert Webster, Ph.D., a member of the St. Jude Department of Infectious Diseases. "This highlights the importance of continued surveillance of viruses circulating in animals and additional research to enhance our ability to identify viruses that are emerging health threats."

The research stems from the institution's role as a National Institute of Allergy and Infectious Diseases Center of Excellence for Influenza Research and Surveillance. St. Jude is also home to the only World Health Organization Collaborating Center focused on the spread of animal flu viruses to humans.

Historically, pandemic flu viruses arise when bird and human flu viruses swap genes. The mixing can result in novel viruses capable of spreading efficiently in humans and against which the human immune system is unprepared. "One school of thought regarding emerging flu viruses is that in more than 100 years, only three of the 18 subtypes of influenza A have caused pandemics. The H2 subtype is one," Webster said. The H2N2 viruses in this study remained genetically similar to the 1957 pandemic strain.

Along with being able to infect human trachea and other mammalian cells growing in the laboratory, five viruses also infected ferrets, according to researchers. Ferrets are a reliable

model for studying flu's spread in humans. The five strains were among the nine H2N2 viruses that researchers tested in ferrets.

The release notes that three of the strains demonstrated a surprising ability to spread among ferrets housed in the same cage. The strains included the Dk/HK319/79 virus, which researchers classified as having high pandemic potential. The virus was isolated in 1979 from a duck in Hong Kong. The other viruses were classified as having low to intermediate pandemic potential. None of the viruses studied in ferrets spread via airborne transmission.

In addition, none of the viruses showed changes in the two viral proteins viewed as indicators of avian flu virus adaptation to human infection and transmission. Those markers are the hemagglutinin (HA) protein that the virus uses to infect cells and the PB2 protein, which is required for viral replication. The viruses in this study had HA and PB2 proteins with a preference for infecting avian, rather than human cells.

"While these viruses genetically look very avian, this study shows they can behave like mammalian viruses and replicate in multiple mammalian models of flu," said the study's first author, Jeremy Jones, Ph.D., a postdoctoral fellow in Webster's laboratory. "That is troubling because some of the original H2N2 pandemic viruses looked avian when the pandemic began in 1957, but in a few short months, all of the isolated viruses had picked up the genetic signatures of adaptation to humans. Our results suggest the same could happen if the H2N2 viruses again crossed from birds into humans."

Work is underway at St. Jude to identify other changes that are critical to the ability of avian flu viruses to infect and replicate in mammalian cells, Jones said.

The research was supported in part by the National Institute of Allergy and Infectious Diseases, the National Institutes of Health, the Department of Health and Human Services and ALSAC.

— Read more in J. C. Jones et al., "Risk Assessment of H2N2 Influenza Viruses from the Avian Reservoir," *Journal of Virology* (13 November 2013)

A New Weapon in the War Against Superbugs

Source: http://www.aftau.org/site/News2?page=NewsArticle&id=19485

TAU researchers find a protein that viruses use

to kill bacteria

In the arms race between bacteria and modern medicine, bacteria have gained an edge. In recent decades, bacterial resistance to antibiotics has developed faster than the production of new antibiotics, making bacterial infections increasingly difficult to treat. Scientists worry that a particularly virulent and deadly "superbug" could one day join the ranks of existing untreatable bacteria, causing a public health catastrophe comparable with the Black Death.

Now research led by *Dr. Udi Qimron* of *Tel Aviv University*'s *Department of Clinical Microbiology and Immunology* at the *Sackler Faculty of Medicine* has discovered a protein that kills bacteria. The isolation of this protein, produced by a virus that attacks bacteria, is a major step toward developing a substitute for conventional antibiotics. "To stay ahead of bacterial resistance, we have to keep developing new antibiotics," said Dr. Qimron. "What we found is a small protein that could serve as a powerful antibiotic in the future."

Dr. Ido Yosef, *Ruth Kiro,* and *Shahar Molshanski-Mor* of TAU's Sackler Faculty of Medicine and Dr. Sara Milam and Prof. Harold Erickson of Duke University contributed to the

research, published in the *Proceedings of the National Academy of Sciences*.

Teaming up with a killer

Bacterial resistance is a natural process. But over the past sixty years or so, the misuse and overuse of antibiotics has pushed more and more bacteria to become more and more resistant, undermining one of the pillars of modern health care. Recently, the World Health Organization named growing antibiotic resistance one of the three greatest threats to public health.

Bacteriophages, often referred to as "phages," are viruses that infect and replicate in bacteria. Because they coevolved with bacteria, they are optimized to kill them. As proof of their endurance, phages are the most common life form on earth, outnumbering bacteria 10 to one. In places like the former Soviet Union, phages have been used to treat bacterial infections for the past hundred years. Harmless to humans, they inject their DNA into bacteria and rapidly replicate, killing their hosts.

"Ever since the discovery of bacteriophages in the early 20th century, scientists have understood that, on the principle of the 'enemy of my enemy is my friend,' medical use could be made of phages to fight viruses," said Dr. Qimron.

Breaking out the little guns

Dr. Qimron and his colleagues set out to understand how all 56 proteins found in T7, a particularly virulent phage that infects *Escherichia coli* bacteria, contribute to its functioning. They discovered that one of the proteins, called 0.4, impedes cell division in *E. coli*, causing the cells of the bacteria to elongate and then die. The protein is common to many bacteria and a similar process occurs in all bacteria, so the finding may have wide application.

No bacteriophage preparation has been approved in Western medicine for treating systemic bacterial infections. One reason is their inability to penetrate body tissues effectively. They are filtered effectively from the bloodstream by the spleen and liver, and occasionally neutralized by antibodies. But the 0.4 protein is much smaller than a whole phage, and so should be able to penetrate tissue better, getting to the bacteria to do its deadly work.

The major challenge for pharmaceutical companies will be figuring out how exactly to deliver the protein as a drug, said Dr. Qimron. In the meantime, he continues to hunt for other proteins that kill bacteria.

— Read more in Ruth Kiro et al., "Gene product 0.4 increases bacteriophage T7 competitiveness by inhibiting host cell division," Proceedings of the National Academy of Sciences (11 November 2013)

Texas woman admits to sending ricin-laced letters to Obama, Bloomberg

December 10, 2013

Source: http://www.foxnews.com/us/2013/12/10/texas-woman-admits-to-sending-ricin-laced-letters-to-obama-bloomberg/?goback=.gde_3711808_member_581629734058303488 2#!

A Texas woman has pleaded guilty to sending ricin-laced letters to President Barack Obama and New York Mayor Mike Bloomberg.

Shannon Guess Richardson entered her guilty plea Tuesday in Texarkana, Texas.

Her attorney, Tonda Curry, has said the plea deal caps any prison sentence at 18 years.

Curry said Richardson was ready to admit her role in sending toxic letters to Obama, Bloomberg and the head of Bloomberg's pro-gun control group.

Prosecutors say that before her arrest in June, Richardson tried to frame her now-estranged husband for mailing the letters containing ricin, a powdery substance that can cause respiratory failure if inhaled. Richardson has had minor roles in the television series "The Walking Dead" and the movie "The Blind Side."

EDITOR'S COMMENT: Yet another Texas story after my recent adventures in Houston, TX (October 2013 issue – Editor's Corner)!

Bio-Intelligence Chips for Countering Bioterrorism Threats

Source: http://globalbiodefense.com/2013/12/09/bio-intelligence-chips-for-countering-bioterrorism-threats/?goback=.gde_3711808_member_581618323064202035 5#!

The Intelligence Advanced Research Projects Activity (IARPA) is interested in developing biomarkers to rapidly assess an individual's potential involvement in chemical or biological weapons (CBW) related activities.

The Bio-Intelligence Chips Program (BIC) intends to develop new analytical approaches to assessment based on cross-correlating multiple biomarkers found in physiological fluids to assay human exposure to agents and activities indicative of CBW production and handling. BIC performers will identify signatures associated with specific threat hypotheses that comprise sets of biomarkers corresponding to exposures consonant with particular CBW involvement scenarios.

The human adaptive immune system is known to carry a long-term memory of the body's exposure to environmental irritants, chemical toxins, and biological antigens, i.e., molecules associated with pathogenic organisms and viruses. Human immune memory resides in circulating antibodies as well as in T and B memory cells (lymphocytes), and in plasma and T- helper cells that secrete antibodies directed against specific antigens. Immune memory can be extremely long-lived. Certain forms of persistent responses have already been well established through biomedical research, while other forms presently remain less well characterized. To test a threat hypothesis, the long-term immune memory may be assayed for the presence of biomarkers that resulted from agent and environmental exposures occasioned through CBW production or handling activities.

The BIC program targets design and development of bioassays that can rapidly identify biomarkers from a small amount of human sample (≤100 mL). It is not required that final results be demonstrated on a portable platform; however future scalability to a portable platform should be described. CBW threats of interest fall into three categories: virus, bacteria, and toxins derived from bacteria or chemicals.

BIC is interested in omni-omic expressions encompassing, but not limited to: genomics, transcriptomics, proteomics, metabolomics, epigenomics, microbiomics, immunomics, glycomics, and lipodomics.

The best known of these omics categories is genomics, which deals with bioinformatic data developed from the analysis of DNA sequences. The other categories categories include: (1) transcriptomics, the analysis of information derived from RNA transcription levels of expressed genes within a cell population; (2) proteomics, the analysis of expressed proteins and their associated modifications; (3) metabolomics, the analysis of levels of metabolites (small organic molecules, including regulatory peptides) associated with the maintenance of homeostasis; (4) epigenomics, the study of heritable changes that are not directly encoded in DNA sequences; (5) microbiomics, the analysis of the species, numbers, and locations of parasitic and commensal organisms, e.g., bacteria that live endosymbiotically with their hosts; (6) immunomics, the analysis of information pertaining to changes in the immune system, particularly those associated with adaptive immunity; (7) glycomics, the analysis of all glycan structures in an organism including the glycan's interaction with lectins and other biomolecules; and (8) lipodomics, the analysis of pathways and networks of cellular lipids in biological systems, including the quantification of lipids, the analysis of their conjugates (e.g., glycans) and their interactions with proteins, metabolites and other lipids.

The expected duration of the BIC program in its entirety is five years. This solicitation, however, seeks responses to only Phase I of the program, which will be 24 months in duration.
During Phase I, performers will refine exposure hypotheses for chosen threats, identify and validate biomarkers, based on one or more omics; acquire and preprocess samples; and conduct experiments using large-scale and/or laboratory-on-a-chip (LoC) instrumentation. After performers confirm candidate biomarkers that produce reliable biosignatures, they will develop bioassays suitable for low-volume scaling such as those required for LoC implementation. Assuming success, performers will submit duplicate samples and associated metadata to the IARPA team for independent testing.

Madagascar village 'hit by bubonic plague'

Source: http://www.bbc.co.uk/news/world-africa-25324011

A village in Madagascar has been hit by a deadly outbreak of the bubonic plague, medical experts on the island have confirmed.
Tests were carried out after at least 20 people in the village, near the north-western town of Mandritsara, were reported to have died last week.

The International Committee of the Red Cross warned in October that Madagascar was at risk of a plague epidemic.
The disease is transmitted to humans via fleas, usually from rats.
Bubonic plague, known as the Black Death when it killed an estimated 25 million people in Europe during the Middle Ages, is now rare.
Last year, Madagascar had 60 deaths from the plague, the world's highest recorded number.
The Pasteur Institute of Madagascar confirmed on Tuesday that tests taken from bodies in the village last week showed that they had died of the bubonic plague.
The BBC's Tim Healy in the capital, Antananarivo, says health officials have now gone to the remote area to investigate.

There has been a programme to exterminate rats, fleas and cockroaches in Madagascar's prisons to avoid outbreaks of the plague, which is spread because of unhygienic conditions, he says.
The Pasteur Institute said there were concerns that the disease could spread to towns and cities where living standards have declined since a coup in 2009 and the ensuing political crisis.
On 20 December a second round is being held of presidential elections aimed at ending the political deadlock.

An ICRC-led programme is working to reduce prison rat populations

What is bubonic plague?

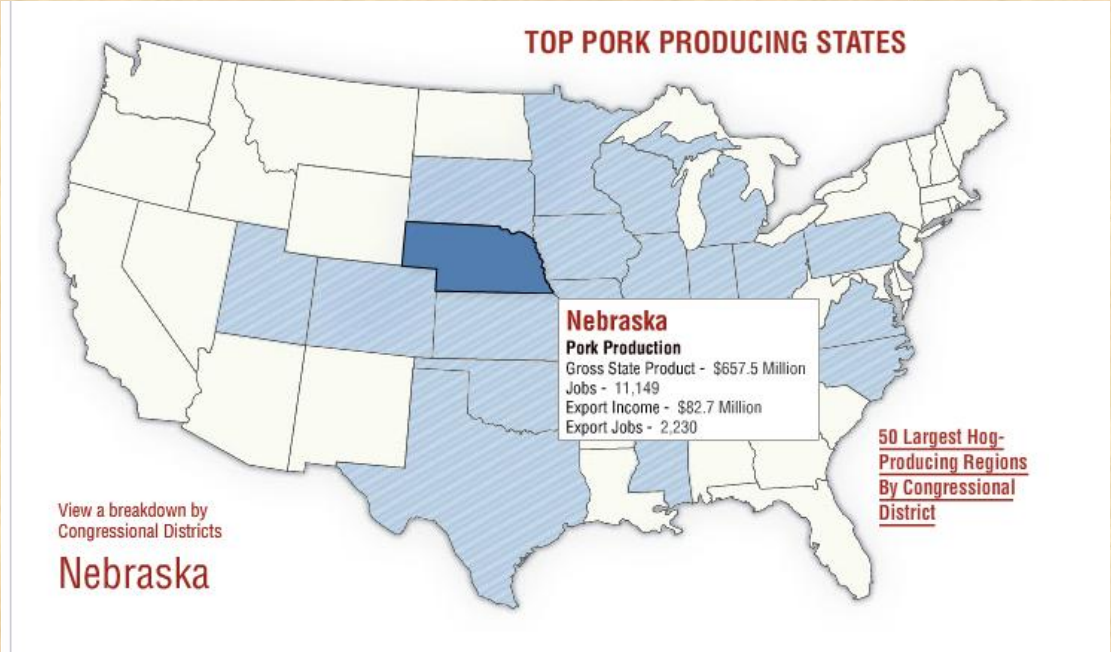
- Caused by the bacterium *Yersinia pestis*
- Essentially a disease of wild rodents, spread by fleas
- Plague spreads to humans either by the bite of infected fleas or rats
- Does not spread from person to person
- Patients develop swollen, tender lymph glands (called buboes) and fever, headache, chills and weakness
- It is treatable if caught early, but can be lethal

U.S. states affected by deadly pig virus now at 20 - USDA

Source: http://www.newsdaily.com/health/991003bac0160460f0ce7ecaa2ce2017/us-states-affected-by-deadly-pig-virus-now-at-20-usda

Dec 13 - Nebraska has become the latest U.S. state to be hit by a deadly pig virus, bringing the total number of states affected to 20, the U.S. Department of Agriculture said this week.
The Porcine Epidemic Diarrhea virus (PEDv) had never been reported in North America until May, when it was discovered in the United States.
The virus has fueled market concerns that U.S. hog supplies will decline steeply next spring and summer.
PEDv caus es diarrhea, vomiting and severe dehydration. Hog epidemiologists have found that a large number of very young piglets infected with the virus die.
While the disease has tended not to kill older pigs, mortality among very young pigs infected on U.S. farms is commonly 50 percent, and can be as high as 100 percent, according to veterinarians and scientists studying the outbreak.
To date, more than 1,500 cases, each of which could represent thousands of infected animals, have been reported in 20 states across the Hog Belt. The states include such major pork producers as Iowa, North Carolina, Minnesota and Oklahoma.

As defined by the USDA, each diagnostic case could represent multiple animals at either a single farm site or several locations. The USDA's National Animal Health Laboratory Network released its latest pig virus data on Wednesday.



Source: http://www.nppc.org/pork-facts/ (interactive map)

Nebraska, the sixth-largest pork production state, had 1.35 million hogs spread over 2,200 operations as of Sept. 1, according to USDA data.

The spread of the disease has heightened scrutiny of the U.S. trucking industry, as livestock transportation vehicles have been targeted as a possible means of transmission.

The National Pork Board has issued biosecurity guidelines urging transporters to clean, disinfect and dry vehicles that are used to transport pigs and hogs.

The guidelines also include stricter standards for handling of manure by producers and commercial haulers.

Pandemic outbreak dynamics

Source: http://www.youtube.com/watch?v=ECJ2DdPhMxI

An interesting video simulation

Infections are the true beneficiaries of war

By Jonathan Ball

Source: http://www.bbc.co.uk/news/health-24962331#!

History has repeatedly shown that contagion makes an easy bedfellow with human conflict.

Take the poliovirus outbreak in Syria - and Israel and Egypt too - caused by related strains that can be traced back to Pakistan.

War and insurgency provide the ideal conditions for bacteria and viruses to take a foothold, so it is little surprise that poliovirus has become entrenched - endemic - in Pakistan and Afghanistan and has now re-emerged in the Middle East.

Similarly in Africa, political obstruction to vaccination campaigns means that poliovirus continues to circulate in northern Nigeria and igniting an outbreak in war-torn Somalia and the wider Horn of Africa.

Many public health experts believe that the lack of vigorous vaccination programmes meant that this was an outbreak waiting to happen.

The evidence is clear. These viral strongholds are threatening the global polio eradication programme.

Chronicles of contagion

- 165 AD: Roman soldiers returning from the Parthian war spark the Antonine Plague (probably smallpox) that ravages the Roman Empire.
- 1155: Emperor Barbarossa contaminates drinking water by disposing human corpses in wells in Italy.
- 1618-48: The Thirty Years War. Typhus fever caused by a bacterium spread through the faeces of blood-sucking lice was rampant and lead to the cancellation of some battles.
- 1763: British settlers give two blankets and a handkerchief from a smallpox hospital to two visiting Native American chiefs.
- 1805-14: The Napoleonic wars. Typhus fever wreaked havoc, killing more French soldiers than the war effort itself.
- 1853-56: Crimean war. British forces are decimated by cholera outbreaks.
- 1870-71: Franco-Prussian war. A particularly aggressive form of smallpox virus, originating in France, was introduced into Prussia by French prisoners of war incarcerated in camps. This spread through the civilian population, but not to the Prussian soldiers - they had been protected.
- 1914-18: World War I. Across the world the influenza pandemic kills millions. In Russia, peace was followed by widespread famine and a constant flow of refugees blighted by cholera, dysentery, malaria, typhoid and typhus.
- 1939-45: World War II. The Japanese poison more than 1,000 Chinese wells with cholera and typhus and drop plague-infested fleas.
- 2011: The CIA was reported to have established fake vaccination programmes in Pakistan to secure DNA samples during the "war on terror" and the search for Osama Bin Laden. The ensuing mistrust has hampered legitimate polio vaccine programmes.
- 2012-13: Environmental samples test positive for the presence of poliovirus in Egypt, Israel, the West Bank and the Gaza Strip and cases of polio reported in Syria.
- May 2013: WHO report on the isolation of wild poliovirus from a young girl in Somalia, which had been polio-free since 2007.

Breeding grounds

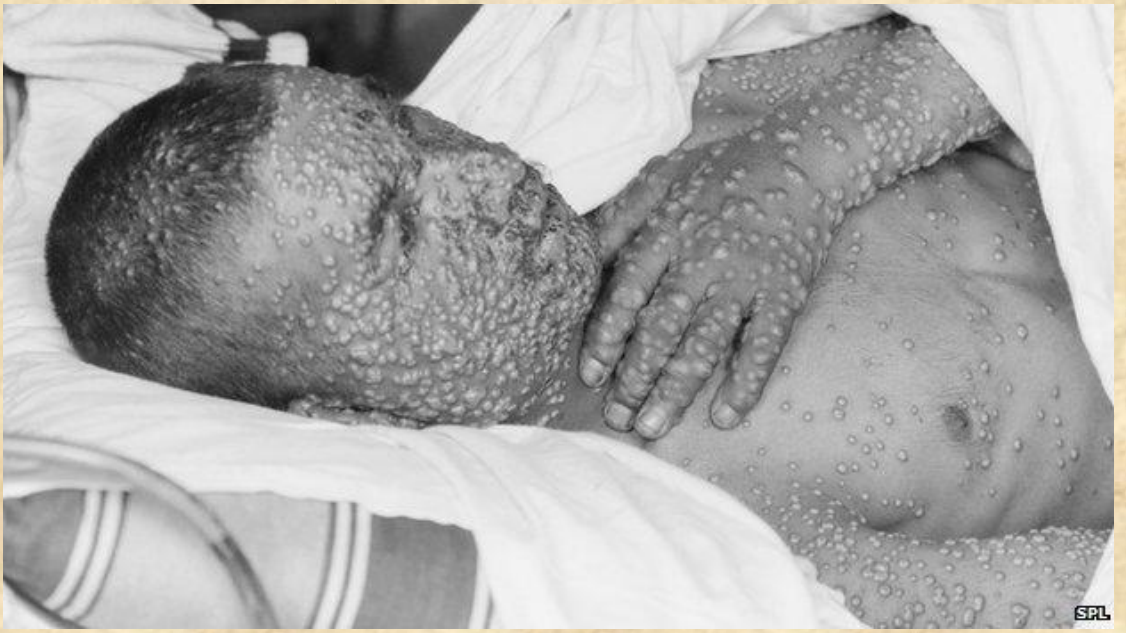
Throughout history, infectious diseases have strongly influenced and been influenced by war, as Matthew Smallman-Raynor, professor of analytical geography at the University of Nottingham, explained: "While the nature of warfare has changed down the ages, the link between war and disease remains as strong as ever.

"Today, as in the past, the wartime collapse of hygiene and healthcare systems means that familiar infections rapidly re-establish themselves opportunistically in war-torn populations."

Civilians and soldiers end up living in crowded and insanitary conditions, ideal breeding grounds for a range of bacterial, viral and parasitic infections. In Syria, a typhoid epidemic has taken hold in the eastern province of Deir Ezzor.

Damage to road networks leaves healthcare workers unable to get vaccines and medicines to the people needing them.
Most vaccines have to be kept cool until they are used, but interruptions to power supplies and lengthy journeys prevent this.
In Syria, poor vaccine coverage, coupled with overcrowding, lack of clean water and poor sanitation, is undoubtedly helping fan the flames of the poliovirus outbreaks.
But it is not just overcrowding and poverty that cause problems. Mass movement of troops and refugees greatly facilitates the spread of infectious disease.
Many civil wars in Africa have been accompanied by increases in infectious diseases, such as HIV. There is even anecdotal evidence of Lassa fever outbreaks due to refugees eating infected rats to survive.

Depths of time
Vast mobilisation of troops during World War I undoubtedly played a part in one of the most devastating contagions of modern history - the 1918 influenza pandemic.
Although widely known as the Spanish flu, no one knows for sure where the virus originated. Some believe it was introduced into Europe by American soldiers, although accounts of serious respiratory



diseases in Europe in earlier years can also be found.
Three waves of infection led to the demise of 50 million to 100 million people worldwide - around one in 18 people - and more than twice as many people as the war itself.
According to Prof Smallman-Raynor, the impact of war and infection can be traced back to the depths of time.
"Down the centuries, infectious diseases that have spread in consequence of war have decimated the fighting strength of armies, caused the suspension and cancellation of military operations and brought havoc to the civil populations of belligerent and non-belligerent states alike.
"Indeed, the available evidence yields a surprising statistic.
"Until relatively recent times at least, the greatest human losses in wartime were not due to bombs and bullets but, rather, losses from infections disseminated in both military and civilian populations," he said.
Germs as weapons
Nothing musters disease quite like war.
Humans were quick to cotton on to the destructive power of infectious diseases and used them to attack.
The nefarious use of smallpox in North American conflicts perhaps stands out above all others.

Several accounts describe how European settlers used this virus to inflict suffering and death on Native Americans.
So perhaps it is of little surprise that the occupying British forces, when faced with the later civil unrest in the American War of Independence, turned to their old ally for help.
Before the advent of vaccination, the way to protect individuals from severe smallpox infection was to give them a small and controlled dose of smallpox itself. This is known as variolation.
But variolated people are infectious to others - a fact not lost on the British generals who, on at least two occasions, sent variolated people to spread death and disease among the rebellious Americans.
George Washington, realising the risk, ordered mass variolation of his own troops - an action that no doubt helped win the war.
And war efforts have also been used to justify and shield unethical research, none more so than in Nazi Germany, as Paul Weindling, Wellcome Trust research professor in medical history at Oxford Brookes University, explained.
He said: "The attack on the Soviet Union and the North African campaign prompted bacteriologists and the SS to conduct large-scale research in concentration camps and psychiatric hospitals.
"Thousands of inmates were deliberately infected with malaria, hepatitis and typhus in order to test vaccines and drugs."
The perpetrators were prosecuted at the Nuremberg medical trial and one of the outcomes was the Nuremberg code on permissible research, which requires that individuals involved in medical research give their voluntary consent.
The current poliovirus outbreaks are sad reminders that infectious diseases are one of the few true beneficiaries of war.
The progress on polio eradication has been monumental, but overall success is hanging by a thread.
At the eleventh hour, will war, insurrection and mistrust give succour to poliovirus?
After so much progress and effort I sincerely hope not, but only time will tell.

Jonathan Ball *is Professor of virology at University of Nottingham.*