

9 July 2009

This supplement has been prepared to present scientific and technical news items that may be of more interest to technical personnel at RDT&E activities and the labs, or the medics rather than the broader readership of the basic CB Daily. Due to the nature of the material, the articles, if available online, are usually only available through subscription services thus making specific links generally unavailable. Thus, usually only the bibliographic citation is available for use by an activity's technical library.

Should you wish to be removed from this S&T Supplement address group, just send an email to one of the people listed at the bottom of this message. This will not affect your continued receipt of the CB Daily

Chem-Bio News – S&T Edition

1. CHEMICAL WEAPONS CLEANUP: *“Researchers have found a safe, speedy and environmentally friendly way to clean up chemical weapons such as sulfur mustard, using a hydrogen peroxide-based microemulsion decontamination system.”*

2. NEW WAY TO MAKE SENSORS THAT DETECT TOXIC CHEMICALS: *“Researchers have developed a new method for making extremely pure, very small metal-oxide nanoparticles. They are using this simple, fast, and low-temperature process to make materials for gas sensors that detect toxic industrial chemicals (TICs) and biological warfare agents.”*

3. ECZEMA HERPETICUM AND CLINICAL CRITERIA FOR INVESTIGATING SMALLPOX: *“The Centers for Disease Control and Prevention (CDC), along with interested partners, developed a clinical algorithm for rapid evaluation of patients with acute generalized vesiculopustular rash illness (AGVPRI).”*

4. POTENTIAL IMPACT OF A 2-PERSON SECURITY RULE ON BIOSAFETY LEVEL 4 LABORATORY WORKERS: *“Directors of all major BioSafety Level 4 (BSL-4) laboratories in the United States met in 2008 to review the current status of biocontainment laboratory operations and to discuss the potential impact of a proposed 2-person security rule on maximum-containment laboratory operations.”*

5. IMMUNOGLOBULIN G IN EBOLA OUTBREAK SURVIVORS, GABON: *“To investigate the persistence of Zaire ebolavirus IgG, we studied laboratory-confirmed survivors of the 3 outbreaks in Gabon.”*

6. ANTHRAX DRUG COULD THWART TERRORISTS: *“An experimental drug called raxibacumab protected monkeys and rabbits against inhaled anthrax and could presumably be used to protect humans in the event of a terrorist attack, researchers reported today in the New England Journal of Medicine.”*

CB Daily Report

Chem-Bio News

CHEMICAL WEAPONS CLEANUP

By Ned Stafford
Chemistry World
July 08, 2009

“Researchers have found a safe, speedy and environmentally friendly way to clean up chemical weapons such as sulfur mustard, using a hydrogen peroxide-based microemulsion decontamination system.

The UK-based research team used a number of different techniques to measure and analyse catalytic oxidative decontamination of sulfur mustard (HD, bis(2-chloroethyl) sulfide), a strictly controlled

substance used in chemical warfare agents stretching back to the first world war.

One of the most practical ways to decontaminate these toxic substances is to oxidise the sulphur mustard to the sulfoxide with liquid decontaminants, but most suitable oxidants are water-soluble while sulphur mustard is water immiscible. This has been tackled in the past by using micellar or oil-in-water microemulsions, but still leaves the problem that most active liquid decontaminants are highly corrosive and not environmentally friendly.

Hydrogen peroxide solutions could provide an answer as they are stable, non-corrosive, atom efficient oxidants with low environmental impact - but uncatalysed hydrogen peroxide reactions with organic sulfides are slow so would need a catalyst to become a viable option.

The team investigated catalysts that are oil soluble or surface active to tune selectivity and reaction rates, and achieved decontamination half-lives as fast as 18 seconds with dilute hydrogen peroxide as the oxidant.

SANS (small-angle neutron scattering), SAXS (small-angle X-ray scattering), PGSE-NMR (pulsed-gradient spin-echo NMR), fluorescence quenching, and electrospray mass spectroscopy (ESI-MS) were all employed to study the distribution of sulfur mustard, its simulants, and their oxidation/hydrolysis products in a model oil-in-water microemulsion."

The full article can be found at: <http://www.rsc.org/chemistryworld/News/2009/July/08070902.asp>

[Return to Top](#)

NEW WAY TO MAKE SENSORS THAT DETECT TOXIC CHEMICALS

Newswise.com

July 08, 2009

"Researchers have developed a new method for making extremely pure, very small metal-oxide nanoparticles. They are using this simple, fast, and low-temperature process to make materials for gas sensors that detect toxic industrial chemicals (TICs) and biological warfare agents."

"They are using this simple, fast, and low-temperature process to make materials for gas sensors that detect toxic industrial chemicals (TICs) and biological warfare agents.

The researchers described their work in a recent issue of the journal *Materials Chemistry and Physics*.

Patricia Morris, associate professor of materials science and engineering at Ohio State, leads a team of researchers who develop solid materials that can detect toxic chemicals.

The challenge, she said, is to design a material that reacts quickly and reliably to a variety of chemicals, including TICs, when incorporated into a sensor.

"These are sensors that a soldier could wear on the battlefield, or a first responder could wear to an accident at a chemical plant," Morris said.

The material under study is nickel oxide, which has unusual electrical properties. Other labs are studying nickel oxide for use in batteries, fuel cells, solar cells, and even coatings that change color.

But Morris, along with Ohio State doctoral student Elvin Beach, is more interested in how nickel oxide's electrical conductance changes when toxic chemicals in the air settle on its surface. Beach applies a thin coating of the material onto microelectro-mechanical systems (made in a similar fashion to computer chips), with a goal of identifying known toxic substances."

The full article can be found at: <http://www.newswise.com/articles/view/554071/>

[Return to Top](#)

ECZEMA HERPETICUM AND CLINICAL CRITERIA FOR INVESTIGATING SMALLPOX

David A. Boyd, Leonard C. Sperling, and Scott A. Norton
Emerging Infectious Diseases
US Centers for Disease Control and Prevention
July 2009

“After the 2001 anthrax bioterrorism incidents, public health officials became concerned about bioterrorist threats of smallpox. The Centers for Disease Control and Prevention (CDC), along with interested partners, developed a clinical algorithm for rapid evaluation of patients with acute generalized vesiculopustular rash illness (AGVPRI) (1). In a surveillance system designed to detect an index case of smallpox, high specificity is critical to minimize false-positive reports of a disease that no longer exists in nature (2).

CDC's algorithm emphasizes 3 major clinical features of smallpox: febrile prodrome, typical appearance of characteristic lesions, and uniform lesion morphology (Table). The algorithm stratifies AGVPRI cases into high, moderate, and low likelihood of smallpox (3). Passive and active surveillance has stratified no case to high risk (4). We describe a patient whose illness fulfilled CDC's high-risk criteria for smallpox, although he actually had eczema herpeticum.”

.....

“This case shows the importance of Tzanck smears to rule out smallpox. When a patient with AGVPRI is evaluated for possible smallpox, rapid laboratory tests are necessary. Viral culture does not yield results quickly enough to avert infection control measures expected with a smallpox case. Indeed, CDC reports 7 incidents when patients with AGVPRI prompted emergency department diversions or hospital closures (1). Also, rapid confirmation of nonvariola etiology can help avert public panic, a potential problem in a suspected smallpox outbreak and a probable intended consequence of a terrorist attack.

The Tzanck smear must be performed by someone experienced in using the technique and interpreted by someone who can confidently and correctly distinguish herpesvirus nuclear inclusions from poxvirus cytoplasmic inclusions. DFA for HSV and VZV is relatively rapid, but in our case, the DFA result was positive for VZV, although viral culture and immunohistochemical staining later showed that the patient's infection was due to HSV-2. Had we been unable to confirm a nonvariola etiology, we would have proceeded to poxvirus testing. With no commercially available tests for smallpox, the algorithm advises close coordination among local, state, and federal public health authorities. Some state and federal reference laboratories can provide confirmatory tests, including PCR, for orthopoxviruses such as smallpox and monkeypox. Although not performed in this case, we recommend such testing if a simultaneous infection with an orthopoxvirus cannot be ruled out.”

The full article can be found at: <http://www.cdc.gov/eid/content/15/7/1102.htm>

[Return to Top](#)

POTENTIAL IMPACT OF A 2-PERSON SECURITY RULE ON BIOSAFETY LEVEL 4 LABORATORY WORKERS

By James W. LeDuc, Comments to Author Kevin Anderson, Marshall E. Bloom, Ricardo Carrion Jr, Heinz Feldmann, J. Patrick Fitch, Joan B. Geisbert, Thomas W. Geisbert, Michael R. Holbrook, Peter B. Jahrling, Thomas G. Ksiazek, Jean Patterson, and Pierre E. Rollin
Emerging Infectious Diseases
US Centers for Disease Control and Prevention
July 2009

“Abstract

Directors of all major BioSafety Level 4 (BSL-4) laboratories in the United States met in 2008 to review the current status of biocontainment laboratory operations and to discuss the potential impact of a proposed 2-person security rule on maximum-containment laboratory operations. Special attention was

paid to the value and risks that would result from a requirement that 2 persons be physically present in the laboratory at all times. A consensus emerged indicating that a video monitoring system represents a more efficient, economical standard; provides greater assurance that pathogens are properly manipulated; and offers an increased margin of employee safety and institutional security. The 2-person security rule (1 to work and 1 to observe) may decrease compliance with dual responsibilities of safety and security by placing undue pressure on the person being observed to quickly finish the work, and by placing the observer in the containment environment unnecessarily."

The full article can be found at: <http://www.cdc.gov/eid/content/15/7/e1.htm>

[Return to Top](#)

IMMUNOGLOBULIN G IN EBOLA OUTBREAK SURVIVORS, GABON

By Nadia Wauquier, Pierre Becquart, Clélia Gasquet, and Eric M. Leroy

Emerging Infectious Diseases

US Centers for Disease Control and Prevention

July 2009

"To investigate the persistence of Zaire ebolavirus IgG, we studied laboratory-confirmed survivors of the 3 outbreaks in Gabon."

.....

"All 20 survivors had positive test results for Zaire ebolavirus IgG (Table). The adjusted OD values at a dilution of 1:1,600 ranged from 0.3 to 3.4 in the 9 survivors of the 1996 outbreaks and from 0.7 to 3.5 in the 11 survivors of the 2001 outbreak. Adjusted OD values determined during the symptomatic period and/or a few days to 1 month after recovery were available for some survivors (Table). Specific IgG appeared by day 5 after symptom onset, increased during the symptomatic period (as shown by higher titers on day 10), peaked by day 30 (2 weeks after recovery), then declined slowly over several years. Zaire ebolavirus IgG remained detectable, often at high levels, >11 years after the infection.

These long-lasting IgG antibody responses found in 20 survivors of 3 different Zaire ebolavirus outbreaks rule out the hypothesis that low Ebola virus (and Marburg virus) seroprevalence rates found in epidemic regions of Africa are due to rapid loss of specific IgG. Whether this immunity is sufficient to protect from recurrent infection remains undetermined. These findings show that IgG ELISA is suitable for epidemiologic and epizootiologic investigations of Ebola and that Zaire ebolavirus IgG is an excellent indicator of Zaire ebolavirus circulation in humans."

The full article can be found at: <http://www.cdc.gov/eid/content/15/7/1136.htm#1>

[Return to Top](#)

ANTHRAX DRUG COULD THWART TERRORISTS

The Los Angeles Times

July 08, 2009

"An experimental drug called raxibacumab protected monkeys and rabbits against inhaled anthrax and could presumably be used to protect humans in the event of a terrorist attack, researchers reported today in the New England Journal of Medicine. Anthrax can be killed with antibiotics, but the death of the anthrax organisms releases a deadly flood of toxin. Raxibacumab is a monoclonal antibody, produced in animals, that binds to the toxin and removes it from the blood stream, preventing its lethal effects.

A vaccine against anthrax is available and is given to laboratory workers and some soldiers, but its use has been controversial because of the high incidence of side effects. The new research provides "an important addition to the existing arsenal" against anthrax, Dr. Gary G. Nable, director of vaccine

research at the National Institute of Allergy and Infectious Diseases wrote in an editorial in the same issue of the journal.

The antibody, called ABthrax, was developed by Human Genome Sciences of Rockville, Md., under a contract from the government's Biomedical Advanced Research and Development Authority following the 2001 attacks in which anthrax-containing letters were sent to journalists and politicians, killing five people. The company has already delivered 20,000 doses of the drug to the U.S. Strategic National Stockpile for emergency use."

The full article can be found at: http://latimesblogs.latimes.com/booster_shots/2009/07/anthrax-drug-could-thwart-terrorists.html

[Return to Top](#)

END of CB Daily Report.

Send subscription requests, unsubscribing requests, questions and comments to:

Steve Tesko: Steve.Tesko@anser.org

Copyright 2008. *Analytic Services Inc.*

[Analytic Services Inc. DMCA Copyright Notice: http://www.homelandsecurity.org/bulletin/Draft_ANSER_DCMA_Copyright_Notice.htm](http://www.homelandsecurity.org/bulletin/Draft_ANSER_DCMA_Copyright_Notice.htm)

Use of these news articles does not reflect official endorsement.

In accordance with Title 17 (USC), Section 107, this material is distributed without profit or payment and is intended for nonprofit research and educational purposes only.

Reproduction for private use or gain is subject to original copyright restrictions.

PRIVACY POLICY

Content provided in the *CB Daily Report* does not reflect the viewpoint(s) of Analytic Services Inc. Analytic Services Inc. does not share, publish, or in any way redistribute subscriber email addresses or any other personal information.