29 January 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. HOW EBOLA VIRUS AVOIDS THE IMMUNE SYSTEM: *"Using a cell culture model for Ebola virus infection, they have discovered that the virus disables a cellular protein called tetherin that normally can block the spread of virus from cell to cell."*

2. CHINA PUSHES FOR HIGHER QUALITY PATENTS: *"In an effort to boost the quality of patent applications, and encourage Chinese firms to obtain international patents, China has revised its patent law."*

3. TETHERED NANOCUBES SEEK OUT ANALYTES: *"Giving biosensors room to explore can improve their sensitivity, US scientists have found."*

4. VESICULAR STOMATITIS VIRUS-BASED VACCINES PROTECT NONHUMAN PRIMATES AGAINST AEROSOL CHALLENGE WITH EBOLA AND MARBURG VIRUSES: *"A vaccine based oil recombinant vesicular stomatitis virus (VSV) seems to be particularly robust as it can also confer protection when administered as a postexposure treatment."*

5. AN INTEGRATED MICROFLUIDIC PLATFORM FOR SENSITIVE AND RAPID DETECTION OF BIOLOGICAL TOXINS: *"The portable device being developed is readily applicable to detection of proteinaceous biomarkers of many other diseases and is intended to represent the next-generation diagnostic devices capable of rapid and quantitative measurements of multiple analytes simultaneously."*

6. POSTEXPOSURE IMMUNIZATION WITH MODIFIED VACCINIA VIRUS ANKARA OR CONVENTIONAL LISTER VACCINE PROVIDES SOLID PROTECTION IN A MURINE MODEL OF HUMAN SMALLPOX: *"In contrast to VACV-WR challenge, we found extended incubation periods after ECTV challenge, allowing successful therapeutic immunization with VACV-Lister and MVA when applied 2-3 days after exposure."*

CB Daily Report

Chem-Bio News

HOW EBOLA VIRUS AVOIDS THE IMMUNE SYSTEM
Infection Control Today Magazine
January 27, 2009

"Researchers at the University of Pennsylvania School of Medicine have likely found one reason why the Ebola virus is such a powerful, deadly, and effective virus. Using a cell culture model for Ebola virus infection, they have discovered that the virus disables a cellular protein called tetherin that normally can block the spread of virus from cell to cell.

"Tetherin represents a new class of cellular factors that possess a very different means of inhibiting viral replication," says study author Paul Bates, PhD, sssociate professor of microbiology at the University of Pennsylvania School of Medicine. "Tetherin is the first example of a protein that affects the virus replication cycle after the virus is fully made and prevents the virus from being able to go off and infect the next cell." These findings appear online this week in the Proceedings of the National Academy of Sciences.

When a cell is infected with a virus like Ebola, which is deadly to 90 percent of people infected, the cell is pirated by the virus and turned into a production factory that makes massive quantities on new virions. These virions are then released from that cell to infect other cells and promote the spreading infection.

Tetherin is one of the immune system's responses to a viral infection. If working properly, tetherin stops the infected cell from releasing the newly made virus, thus shutting down spread to other cells. However, this study shows that the Ebola virus has developed a way to disable tetherin, thus blocking the body's response and allowing the virus to spread. "

The full article can be found at: http://www.infectioncontroltoday.com/hotnews/ebola-virus-avoids-immune-system.html

Return to Top

CHINA PUSHES FOR HIGHER QUALITY PATENTS
By Hepeng Jia and Yue Yuan
Chemistry World (UK Royal Society of Chemistry)
January 26, 2009

"In an effort to boost the quality of patent applications, and encourage Chinese firms to obtain international patents, China has revised its patent law.

The amendment, passed by the standing committee of the National People's Congress on 27 December 2008, will take effect on 1 October 2009. It is intended to encourage independent innovation, said Chen Guangjun, director of the standing committee's science and technology office."

"The new law adopts an international 'absolute standard for novelty' principle for patent authorisation rather than the 'relative novelty' which was previously stipulated. A patent can

be approved under relative novelty if the invention or technology is new in China. But with the new 'absolute' principle, a Chinese patent can only be given to an invention or technology that is totally novel worldwide.

Meanwhile, the law now encourages Chinese citizens to obtain international patents by removing the requirement for them to apply first for a Chinese patent. Cao Man, president of new energy company Qingdao Tianren Environmental Technology, predicts that the higher patent standard will drive innovation in low carbon technologies in the long term but will have very limited short-term impact. 'We are still catching up with foreign technologies and most players in the field do not have enough innovative technologies that are ready to be patented,' Cao told Chemistry World."

The full article can be found at: http://www.rsc.org/chemistryworld/News/2009/January/26010901.asp

Return to Top

TETHERED NANOCUBES SEEK OUT ANALYTES
By Nina Notman
Chemistry World (Royal Society of Chemistry)
January 27, 2009

"Giving biosensors room to explore can improve their sensitivity, US scientists have found. The team used tethers to extend the speed and sensitivity of blood glucose detectors, and say they hope the same approach could improve the detection of cancer and Alzheimer's.

A team led by Timothy Fisher at Purdue University have developed a new type of biosensor coined a 'nano-tetherball biosensor' based on nanocube-shaped sensors tethered by conducting carbon nanotubes to electronic circuitry. 'We wanted to test this structure as a biosensor, and used glucose as our first test because the plentiful literature offers a good basis for comparison,' explains Fisher.

The team built the sensor from the bottom up, starting from a porous alumina support. The team grew individual single-walled carbon nanotubes in the tiny pores of the support, and as these grew they extended out of the pores and formed a loosely interlaced network of nanotubes on the support's surface."

The full article can be found at: http://www.rsc.org/chemistryworld/News/2009/January/27010902.asp

Return to Top

VESICULAR STOMATITIS VIRUS-BASED VACCINES PROTECT NONHUMAN PRIMATES AGAINST AEROSOL CHALLENGE WITH EBOLA AND MARBURG VIRUSES
Health & Medicine Week

February 2, 2009

“Considerable progress has been made over the last decade in developing candidate preventive vaccines that can protect nonhuman primates against Ebola and Marburg viruses. A vaccine based oil recombinant vesicular stomatitis virus (VSV) seems to be particularly robust as it can also confer protection when administered as a postexposure treatment."

"While filoviruses are not thought to be transmitted by aerosol in nature the inhalation route is among the most likely portals of entry ill the setting of a bioterrorist event. At present, all candidate filoviral vaccines have been evaluated against parenteral challenges but none have been tested against an aerosol exposure. Here, we evaluated our recombinant VSV-based Zaire ebolavirus (ZEBOV) and Marburg Virus (MARV) vaccines against aerosol challenge ill cynomolgus macaques. All monkeys vaccinated with a VSV vector expressing the glycoprotein of ZEBOV were completely protected against an aerosol exposure of ZEBOV. Likewise, all monkeys vaccinated with a VSV vector expressing the glycoprotein of MARV were completely protected against all aerosol exposure of MARV. All control animals challenged by the aerosol route with either ZEBOV or MARV succumbed. Interestingly, disease in control animals appeared to progress slower than previously seen in macaques exposed to comparable doses by intramuscular injection.”

The full article can be found at: (T.W. Geisbert, et. al., “Vesicular stomatitis virus-based vaccines protect nonhuman primates against aerosol challenge with Ebola and Marburg viruses”. Vaccine, 2008;26(52):6894-6900). Link not available

Return to Top

AN INTEGRATED MICROFLUIDIC PLATFORM FOR SENSITIVE AND RAPID DETECTION OF BIOLOGICAL TOXINS
Gastroenterology Week
February 2, 2009

“Towards designing a portable diagnostic device for detecting biological toxins in bodily fluids, we have developed microfluidic chip-based immunoassays that are rapid (<20 minutes), require minimal sample volume (<10 microL) and have appreciable sensitivity and dynamic range (microM-pM). The microfluidic chip is being integrated with miniaturized electronics, optical elements, fluid-handling components, and data acquisition software to develop a portable, self-contained device.”

"The device is intended for rapid, point-of-care (and, in future, point-of-incident) testing in case of an accidental or intentional exposure/intoxication to biotoxins. Detection of toxins and potential host-response markers is performed using microfluidic electrophoretic immunoassays integrated with sample preconcentration and mixing of analytes with fluorescently labeled antibodies. Preconcentration is enabled by photopolymerizing a thin, nanoporous membrane with a MW cut-off of approximately 10 kDa in the sample loading region of the chip. Polymeric gels with larger pores are located adjacent to the size exclusion membrane to perform electrophoretic separation of antibody-analyte complex and excess antibody. Measurement of the ratio of bound and unbound immune-complex using sensitive

laser-induced fluorescence detection provides quantitation of analyte in the sample. We have demonstrated electrophoretic immunoassays for the biotoxins ricin, Shiga toxin I, and Staphylococcal enterotoxin B (SEB). With off-chip mixing and no sample preconcentration, the limits of detection (LOD) were 300 pM for SEB, 500 pM for Shiga toxin I, and 20 nM for ricin. With a 10 min on-chip preconcentration, the LOD for SEB is <10 pM."

"The portable device being developed is readily applicable to detection of proteinaceous biomarkers of many other diseases and is intended to represent the next-generation diagnostic devices capable of rapid and quantitative measurements of multiple analytes simultaneously."

The full article can be found at: (R.J. Meagher, et. al., "An integrated microfluidic platform for sensitive and rapid detection of biological toxins". Lab On a Chip - Miniaturisation for Chemistry and Biology, 2008;8(12):2046-53). Link not available.

Return to Top

POSTEXPOSURE IMMUNIZATION WITH MODIFIED VACCINIA VIRUS ANKARA OR CONVENTIONAL LISTER VACCINE PROVIDES SOLID PROTECTION IN A MURINE MODEL OF HUMAN SMALLPOX
Health & Medicine Week
February 2, 2009

"However, the feasibility of short-term vaccination (i. e., vaccination shortly before exposure) with vaccinia virus (VACV) is uncertain. We tested the rapid protective capacity of vaccines based on VACV strain Lister (VACV-Lister) and on modified VACV Ankara (MVA) in different mouse models, comparing lethal infections with VACV strain Western Reserve (VACV-WR) or ectromelia virus (ECTV). In contrast to VACV-WR challenge, we found extended incubation periods after ECTV challenge, allowing successful therapeutic immunization with VACV-Lister and MVA when applied 2-3 days after exposure. Rapid protection from respiratory tract ECTV infection was significantly affected by vaccine dose and was associated with occurrence of poxvirus-specific antibodies. Vaccinations in type I interferon receptor-deficient mice were protective, whereas recombination activating gene 1-deficient mice lacking mature T and B cells failed to mount immunity after short-term vaccination, confirming an essential role of adaptive immune responses. ECTV infection in mice models the course of human smallpox."

"Our data provide evidence to substantiate historical data on the usefulness of postexposure vaccination with conventional VACV and the new candidate MVA to protect against fatal orthopoxvirus infections."

The full article can be found at: (N. Paran, et. al., "Postexposure Immunization with Modified Vaccinia Virus Ankara or Conventional Lister Vaccine Provides Solid Protection in a Murine Model of Human Smallpox". Journal of Infectious Diseases, 2009;199(1):39-48). Link not available.

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

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.