Controversial Influenza Research Grabs International Attention

At the January CAB meeting, GNL scientific director Dr. Scott Weaver provided a recap on a pathogen that has been making headlines these past few months – H5N1 or “avian” influenza. Here’s his summary:

The ethics of biodefense research has attracted international attention following the generation of H5N1 influenza strains adapted for transmission between ferrets. Unlike typical “seasonal” influenza strains that circulate from person-to-person but are generally only life-threatening in elderly people, the H5N1 strains are not transmissible between people but are deadly, with about a 50% fatality in all ages. Since they emerged in Asia in 1997, the main fear has been their potential to evolve the ability to spread among people via coughing and sneezing. Such a “doomsday” strain, which could kill millions of people worldwide, could occur by two natural mechanisms: 1) reassortment, whereby two different influenza strains infect a person and exchange their genetic segments, combining transmissibility and virulence, or; 2) H5N1 strains could mutate (change single letters in their genetic code) to acquire human transmissibility.

Influenza laboratories have been using ferrets as animal models to study influenza transmissibility because they respond much like humans to infection. The National Institutes of Health, which funded the work making news, argues that by determining if and how human transmissibility can evolve, we can better prepare to detect and respond with drugs or vaccines to combat the “doomsday” strain before it evolves. University of Wisconsin scientists tested the reassortment theory by swapping genes from an H5N1 strain with those of a human strain, which led to efficient transmission between ferrets although virulence remained low. Another group from the Erasmus Medical Center in Rotterdam passed an H5N1 strain between ferrets and observed an increase in transmissibility with the retention of high virulence, suggesting that a “doomsday” H5N1 strain may indeed evolve in nature. Both groups submitted their findings to prestigious biomedical journals.

Despite the impressive scientific achievements of these studies, two main concerns have been raised about whether they are ethical and should be published: 1) Both projects were conducted at biosafety level 3 (BSL3) rather than at the highest containment level – BSL4 – raising questions about the potential for escape of the transmissible viruses via infection of a scientist or by theft, and; 2) by publishing the methods used to generate transmissible H5N1 strains, journals may instruct terrorists or rogue states in the creation of biological weapons. The latter represents the “dual use” dilemma, where the scientific benefits of research must be weighed against the potential for the findings to be used for harm.

The U.S. National Science Advisory Board for Biosecurity (NSABB) last fall recommended that key details of the studies be redacted. Earlier this year the World Health Organization, at a special meeting on the topic, agreed on a plan to extend a voluntary research moratorium but to publish the full results of the studies. Given the differing opinions and new data available, the NSABB will meet this spring to revisit the issue.

UTMB scientists have worked with H5N1 influenza strains for several years in our BSL4 Shope laboratory, including experiments with ferrets to model human infections. Antiviral drugs and vaccines have been tested and experiments to understand how H5N1 strains cause severe disease have been undertaken. However, we have no plans to create more transmissible influenza strains.
CHALLENGES OF THE GLOBAL EXPANSION OF BIOCONTAINMENT LABORATORIES

As the scientific community works through the difficult issues raised by the creation of an avian influenza virus that is potentially transmissible among humans, there is an overarching need to ensure that personnel working in biocontainment research facilities around the world, and especially those who may work on dangerous pathogens like H5N1, are well trained and that their facilities are adequately prepared and resourced in terms of the safety and security. In fact, that’s part of the need that UTMB is working to fill through the creation of the National Biocontainment Training Center (www.utmb.edu/nbtc).

The GNL’s Dr. Jim LeDuc was among the authors of a recent report issued by The National Academies National Research Council entitled, Biosecurity Challenges of the Global Expansion of High Containment Biological Laboratories that seeks to inform future discussions on how best to proceed with this and similar difficult situations involving especially dangerous diseases, public health, and scientific investigations. The report is based upon discussions involving expert representatives from 32 countries who gathered in Istanbul, Turkey in July 2011. Dr. LeDuc and his colleagues presented their report at the Biological Weapons Convention meeting in Geneva, Switzerland in December 2011.

Among their conclusions – not all biocontainment labs are built to the same standards and these variations represent unique biosecurity challenges. Newly formed groups like the International Federation of Biosafety Associations and UTMB’s NBTC are making strides in building a culture of safety and security as a foundation for biocontainment laboratory operations but much work remains to be done. Download a copy of the report at www.nap.edu.

SEALY CENTER FOR VACCINE DEVELOPMENT’S VACCINES FOR CHRONIC DISEASES SYMPOSIUM

On February 7-9, 2012, the Sealy Center for Vaccine Development (SCVD) hosted the fourth in a series of symposia centered around the theme of The Changing Landscape of Vaccine Development. Each symposium includes speakers who discuss different components of the vaccine development pathway from the bench to the bedside to the global community.

This fourth symposium, entitled Vaccines for Chronic Diseases, held at the beautiful Moody Gardens Hotel, Spa and Convention Center in Galveston, Texas, brought together experts in the areas of Addiction, Cancer, Neurodegenerative Disease and Chronic Infectious Disease Vaccine Development. The SCVD hosted more than 170 attendees representing 5 countries (United States, United Kingdom, Egypt, Switzerland and The Netherlands) who listened to 38 speakers from academic institutions, biotech and pharmaceutical companies, and government agencies and organizations give talks about their cutting-edge vaccine research and clinical trials results.

TOPICS IN BIOSECURITY SYMPOSIA SERIES HOSTS NOTABLE FALL SESSIONS

One of the ways that UTMB ensures that personnel working in biocontainment research facilities here on campus are well resourced in terms of the safety and security is via interaction with world renowned biosecurity experts. The GNL and the NBTC’s successful lecture series, Topics in Biosecurity, hosted several outstanding sessions this fall that drew capacity crowds of faculty, students, staff and community.

Attendees heard from national leaders and decision makers in biosecurity, including:

- Edward H. You, Supervisory Special Agent in the FBI’s Weapons of Mass Destruction Directorate, Biological Countermeasures Unit.
- Dale Klein, PhD, Associate Vice Chancellor for Research in the Office of Academic Affairs for The University of Texas System and former Chairman of the U.S. Nuclear Regulatory Commission and U.S. Assistant Secretary of Defense for Nuclear, Chemical and Biological Defense programs.
- Stewart Simonson, a 20 year veteran of in policy-making sectors including nearly five years with the U.S. Department of Health and Human Services (HHS) where he served as the first appointee to the role of Assistant Secretary for Preparedness and Response.
- George W. Korch, Jr., PhD, co-chair of the Federal Experts Security Advisory Panel. Dr. Korch is a senior science advisor to the Assistant Secretary for Preparedness and Response at the U.S. Department of Health and Human Services and former commander of the USAMRIID.

More to come from this exciting series in 2012 and you are invited!

SPEAKER REQUESTS: Do you know of a local civic or educational group that might enjoy hearing from one of our researchers? As a reminder, our team is engaged in ground-breaking research across a variety of areas and we are happy to share news of that work with you. We can assemble guest speakers and interesting presentations for any age group. Send us a note at www.utmb.edu/gnl/contact for further information.

Upcoming CAB Meeting Dates:
Please plan to join us on the following upcoming CAB meeting dates from 8 a.m.–10 a.m. in the Caduceus Room located on the sixth floor of the UTMB Administration Building:
- FRIDAY, APRIL 27, 2012
- THURSDAY, JULY 19, 2012
- WEDNESDAY, OCTOBER 10, 2012

Email reminders will also be sent out prior to each meeting.