

# Emerging Diseases with Significant Impact on Public Health and Animal Health

Friday, October 16<sup>th</sup>, 2020 11:00 am – 1:00 pm EST

Moderators: Shuping Zhang and Jerry Saliki

## U.S. SARS-CoV-2 Animal Diagnostics and Laboratory Collaborations

*Mia Torchetti DVM, MS, PhD, Director*

Diagnostic Virology Laboratory, National Veterinary Services Laboratories

*Christina Loiacono DVM, PhD, Dip. ACVP, Coordinator*

National Animal Health Laboratory Network, National Veterinary Services Laboratories

The first detection of an animal in the U.S with COVID-19 was confirmed at the National Veterinary Services Laboratories (NVSL) on April 4<sup>th</sup>, 2020, in a clinically ill tiger at the Bronx Zoo in New York. Since then, the USDA has worked diligently to support the testing of animals in the US for SARS-CoV-2 to both learn more about the virus and provide information to help better understand the role animals play in the transmission of SARS-CoV-2. The NVSL including the National Animal Health Laboratory Network (NAHLN) and the APHIS One Health Office collaborate closely with other Federal partners to provide a One Health approach in order to better understand this emerging threat and the role animals may play in its spread. This talk will describe the diagnostic work that has been done at NVSL to confirm the presence of SARS-CoV-2 in animals, provide some characterization of the virus present in the US, and share how the NAHLN in collaboration with NVSL and other federal agencies is offering diagnostic support.



**Dr. Mia Torchetti** is the Director of the Diagnostic Virology Laboratory (DVL) at the National Veterinary Services Laboratories (NVSL). Dr. Torchetti earned her veterinary degree and master's in epidemiology at Colorado State University, then moved to the Agricultural Research Service (ARS) in Athens, Georgia, for her PhD and postdoctoral work. Dr. Torchetti has led the DVL-Avian section through the largest animal health outbreak in U.S. history during the 2014-2015 introduction of highly pathogenic Eurasian H5 and participated in national and international collaborations in the response to the low pathogenic H7N9. In response to the Covid-19 outbreak, Dr. Torchetti and her team are actively validating diagnostic tests for Covid-19 from animal species, confirming presumptive positive results, and providing support to diagnostic labs across the nation.



**Dr. Christina Loiacono** joined NVSL in 2005 as a veterinary pathologist focused on foreign animal disease diagnostics and education. She transitioned to NVSL's National Animal Health Laboratory Network as Associate Coordinator in 2011 and was selected to be the network Coordinator in 2017. Dr. Loiacono received her veterinary degree from the Virginia-Maryland College of Veterinary Medicine and completed a residency in anatomic pathology and a PhD at the University of Missouri-Columbia. She currently leads a network of 60 Federal, State and University-associated animal diagnostic laboratories across the US providing surveillance and outbreak response testing for 14 diseases of high consequence.

## **Emerging Diseases: Antibody responses to SARS-CoV-2**

*James E. Crowe, Jr., M.D., Director*

Vanderbilt Vaccine Center, Vanderbilt University Medical Center, Nashville, TN

Antibodies to the SARS-CoV-2 spike protein appear to be the principal determinants of immunity to the virus. We have isolated thousands of human monoclonal antibodies from the B cells of humans who have recovered from natural infection. We will discuss detailed studies that reveal the genetic, molecular and structural basis for potent inhibition of virus replication.



**Dr. James E. Crowe** received his MD degree from the University of North Carolina at Chapel Hill, where he also completed his pediatrics residency. He is currently Professor of Pediatrics and of Pathology, Microbiology and Immunology, and the Ann Scott Carell Chair, Vanderbilt University Medical Center. He is the Founder of IDBiologics, Inc., an early stage biotech company developing human monoclonal antibodies for infectious diseases. His team has over 300 papers in high-quality science journals.

Dr. Crowe was elected to the National Academy of Medicine in 2014 and National Academy of Inventors in 2017. He is also an elected Fellow of AAM, AAAS, ASCI and AAP, IDSA, APS, and others. He has been the recipient of investigator awards from the March of Dimes, American Society for Microbiology, Pediatric Infectious Diseases Society, and Society for Pediatric Research. He was awarded the Judson Infectious Daland Prize of the American Philosophical Society, the Oswald Avery Award of the IDSA, the E. Mead Johnson Award for Excellence in Pediatrics, the Outstanding Investigator Award of the American Federation for Medical Research, the Norman J. Siegel Award of the American Pediatric Society, the Samuel Rosenthal Prize for Excellence in Academic Pediatrics, the Stanley J. Korsmeyer Award of American Society for Clinical Investigation, the Distinguished Medical Alumnus Award from UNC School of Medicine, Chapel Hill, NC. His research team was selected as Best Academic Research Team at the 11th Annual Vaccine Industry

Excellence Awards. He was awarded the inaugural 2019 Merck Future Insight Prize, a 1M Euro prize shared with Pardis Sabeti.

### **Influenza at the human-animal interface.**

*Richard Webby, PhD.*

World Health Organization Collaborating Center for Studies on the Ecology of Influenza, St Jude Children's Research Hospital, Memphis, TN.

The past two decades has seen an increasing awareness of the importance of zoonotic influenza and also an increasing case count. Highly pathogenic avian influenza viruses have spread to many regions of the world and swine influenza viruses have increased in diversity and spawned a pandemic. These trends have led to renewed attempts to assign risk to animal influenza viruses and to implement potential control strategies. At the global scale, collaboration between animal and human health sectors has led to development of formal risk assessment algorithms that have guided preparedness activities and identified areas where gaps exist in data. Identifying ways to fill these gaps must remain a top priority for all partners with expertise to contribute.



**Dr. Richard Webby** received his PhD from University of Otago, New Zealand. He is a member of St. Jude Infectious Diseases Department and Graduate School of Biomedical Sciences. Dr. Webby is the Director of the World Organisation for Animal Health/Food and Agriculture Organization of the United Nations Swine Influenza. Since 2008, Dr. Webby has been serving on US National Pork Board Influenza Advisory Committee. He also served as the Research Leader in Public Health and Epidemiology, *Scientific American* 50.

Dr. Webby's research interests include influenza virus ecology, influenza vaccination, influenza virus pathogenicity, and determinants of host susceptibility to influenza. His research was highlighted in *Nature Magazine*: *Nature* 480(7376):S4-5, 2011. Q&A: The flu catcher -an interview with Richard Webby. Dr. Webby is a recipient of many prestigious awards, including 2010 Special Recognition Award "In honor of extraordinary work in H1N1 influenza research," National Institute of Allergy and Infectious Diseases.

## ***Streptococcus zooepidemicus* in Swine: Natural and Experimental Infection**

*Rachel J. Derscheid, DVM, PhD, DACVP*

In September of 2019, high death loss was noted at a swine buying station in Ohio. Tissues were submitted to Iowa State Veterinary Diagnostic Laboratory (ISUVDL). This submission and a subsequent submission from this site identified *Streptococcus zooepidemicus* as the cause of acute mortality in swine of various ages. A subsequent case from Tennessee was submitted to the ISU VDL and also identified *S. zooepidemicus* as the cause of acute mortality. The isolate from this case was utilized in developing a challenge model to better understand disease dynamics. This talk will share the findings of our diagnosticians in the submitted cases as well as our research findings thus far.



**Dr. Rachel Derscheid** is an assistant professor and diagnostician at Iowa State University Veterinary Diagnostic Laboratory. She received her DVM at Iowa State University in 2007, then completed a PhD in Veterinary Pathology with Dr. Mark Ackermann concurrently with her pathology residency at Iowa State. After a post-doc position at Oregon National Primate Research Center as a primate pathologist, she returned to Ames to the Diagnostic Laboratory in 2013. Her primary role at the diagnostic laboratory is in professional practice as a diagnostic pathologist, serving clients across the United States as well as internationally. Her research work focuses primarily on Mycoplasmas of swine, with additional collaborations on topics arising from casework, such as the recent identification of *Streptococcus zooepidemicus* as a cause of high mortality in swine. Additional professional interests include increasing

diversity and inclusion in veterinary medicine and women's veterinary leadership development. She and her husband are lifelong Iowans and Iowa State Cyclone fans raising two young Cyclones on an acreage near Collins, IA.