IOWA STATE UNIVERSITY
College of Veterinary Medicine

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Veterinary Diagnostic Laboratory
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PRRS 1-4-4

Porcine reproductive and respiratory syndrome (PRRS) is the most economically significant swine disease in North America. The etiologic agent is an RNA virus named porcine reproductive and respiratory syndrome virus (PRRSV). Large genetic variability exists between PRRSV strains. The whole PRRSV genome is composed of approximately 15,100 base pairs (bp). The open reading frame-5 (ORF5) genome region represents 4% of the genome (603 bp) and has been primarily used to investigate PRRSV epidemiology and genetic diversity.

Reports of a very aggressive PRRSV strain affecting swine primarily in Iowa and Minnesota was identified in 2020-2021. **This new aggressive PRRSV strain is associated primarily with increased reproductive failure, pre-weaning mortality, downstream mortality, and a higher level of viral concentration in tested samples, i.e., low cycle threshold (Ct) values.** Analysis conducted at the ISU VDL found that the PRRSV strain associated with these outbreaks of severe disease was a variant strain classified as PRRSV RFLP 1-4-4 Lineage 1 C variant (PRRSV 1-4-4 L1C variant).

The first detection of this strain at the ISU VDL occurred in June 2020. Until May 2021, nucleotide homology within this phylogenetic group was > 98% suggesting low genetic variability. Since May 2021, genetic variability has been observed with some strains having < 98% nucleotide homology within their phylogenetic group.

Between September 1, 2020 and August 31, 2021, more than 5,000 cases requesting PRRS ORF5 sequencing have been processed by the ISU VDL, and 284 submissions with ORF5 sequences were classified as the PRRSV 1-4-4 L1C variant. Of these 284 L1C variant ORF5 sequences, 73.6% (209) were associated with 180 distinct premises from: Iowa (152), Minnesota (22), Nebraska (2), Illinois (1), Indiana (1), Missouri (1), and South Dakota (1). Premises were identified as grow-finish (81), nursery (18), breeding herd/isolation (18), finisher (5), and other (64). The remaining 75 submissions without a premise identification number were derived primarily from Iowa (51) and Minnesota (15).
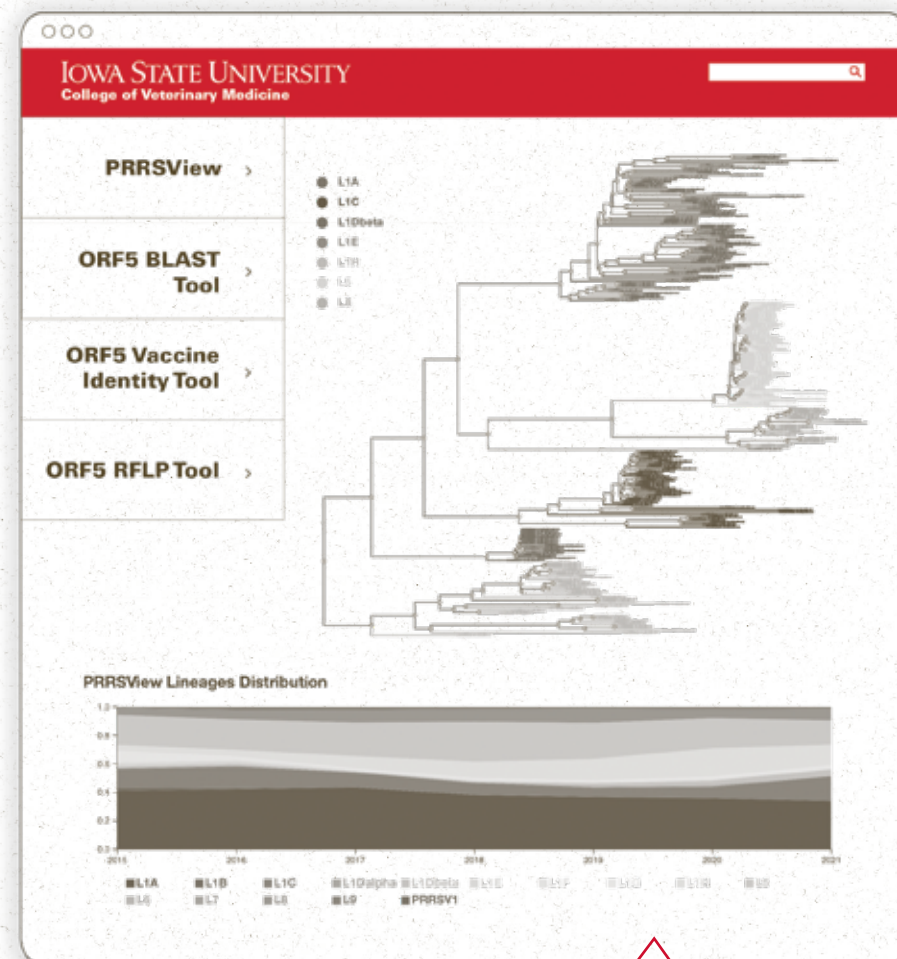
A new tool, **ISU PRRSView**, has been recently added to the VDL webpage (https://prrsv.vdl.iastate.edu/). ISU PRRSView will help VDL clientele analyze their PRRSV ORF5 genetic sequence data. ISU VDL clientele can take advantage of 3 sets of tools available in PRRSView: 1) blast tool which compares an input sequence with other ISU VDL PRRSV sequences, 2) perform ORF5 vaccine identity by comparing sequence identity of the input sequence to a modified live virus (MLV) PRRSV vaccine ORF5, and 3) ORF5 RFLP tool to classify the input sequence according to RFLP pattern and PRRSV Lineage classification.

The ISU VDL will continue to work with collaborators and clients to track the spread of the PRRS 1-4-4 L1C variant.

MEET OUR NEW DIAGNOSTICIANS:

In 2021, the ISU VDL onboarded 3 new diagnosticians to our Pathology group. Coming to us from diverse backgrounds and with varied experiences, they look forward to working together with clients as they strive to improve animal health.

Description of Release:

○ One-time release of case number

○ All cases

DATA RELEASE FORM

Effective date

09/03/2021

Tyler Harm

Dr. Tyler Harm grew up in Schleswig, Iowa where he worked on his family's farm training cutting horses and raising cattle. He received his bachelor of science degree in biology from Buena Vista University in 2013. He completed his Doctorate of Veterinary Medicine in 2017 at Iowa State University. He then entered a combined Ph.D./residency program in Veterinary Pathology at Iowa State University which he completed in 2021.

Tyler joined the Virus and Prion Unit at the National Animal Disease Center in 2020, where he worked on prion pathobiology and preventative measures associated with livestock. Tyler joined the VDL as a veterinary pathologist and clinical faculty member in the summer of 2021. At the VDL, Tyler enjoys being a part of a great group of dedicated individuals that strive to improve livestock agriculture and advance the field of veterinary pathology. Tyler has a variety of research interests but is particularly interested in neuroinflammatory, neuroinfectious, and ocular diseases.

Tyler and his wife, Ariel, spend their free time with their dogs, hiking at national parks across the USA, and traveling.

Marta Mainenti

Dr. Marta Mainenti was born and raised in Verona, Italy, also known as 'the city of love' for being the setting of the popular (and tragic) love story of 'Romeo and Juliet'. She earned her DVM degree in 2011 from the University of Padua, Italy. Her passion for veterinary pathology started when she was a veterinary student. After graduation, she worked at the University of Padua, the Royal Veterinary College of London, and the Istituto Zooprofilattico Sperimentale delle Venezie (the equivalent of a state veterinary diagnostic laboratory in Italy), while also earning a post-DVM diploma at the University of Milan. She completed her anatomic pathology residency at the Utah State University VDL before joining the ISU VDL as a diagnostic pathologist in 2021.

Her favorite part about working at the ISU VDL is the opportunity to be helpful to the community and animal owners through the diagnosis and prevention of animal diseases. Marta is also a cat lover, an avid traveler, and one of her favorite things to do is enjoy great food with great company.

Marcelo Almeida

Dr. Marcelo Almeida is from Brasilia, the capital of Brazil, a city of 2.5 million people. Growing up in an urban environment, he wanted to be a small animal veterinarian, but everything changed halfway through vet school after a field trip to a small farrow to finish farm as part of a swine production class. From that day, Marcelo wanted to work with swine. After receiving the DVM from Universidade de Brasilia in 2003, Marcelo worked as a veterinarian for a swine production company called Pif Paf for two years. The need to understand how things worked a little better led him back to school where he obtained a Masters degree in Preventive Veterinary Medicine from the Universidade Federal do Rio Grande do Sul in 2008.

In 2016, he came to Iowa State University to pursue a Ph.D. in Population Sciences in Animal Health, and during that time took additional training in Veterinary Pathology. In March 2021, he joined the faculty at the ISU VDL as a swine diagnostician. His favorite part of working at the ISU VDL is working with veterinarians to improve swine health through diagnostics and research. Additionally, having the support of brilliant minds at Iowa State University makes the job even more fun.

In his free time, Marcelo enjoys reading, good music (rock from the 60s until the 90s), and sports. He also enjoys training for and competing in triathlons. Currently, his time is spent with his dogs and learning how to care for his lawn which is challenging business.

Share and Request data through the Web Portal (Data Release Form Update)

VDL clientele who utilize the Client Web Portal now have the ability to fill out and submit an electronic data release form. The electronic data release form is used for sharing case information with other clinics, veterinarians, or other external entities. ISU VDL clientele have the flexibility to share a single case as a one-time release or opt for a broader release spanning multiple cases and/or an extended period of time.

To access the Data Release form, navigate to the Tools tab of the Client Web Portal and click on the sub-heading "Data Release Form". Fill out all of the fields and click submit. Once submitted the ISU VDL will be notified of your data release. If more information is needed from you, we will reach out at that time.

For questions related to the web portal, please contact Dr. Katie Woodard or Jordan Kraft (isuvdl@iastate.edu / 515-294-1950).

Questions?
Please contact ISU VDL Client Services
515-294-1950 —— isuvdl@iastate.edu