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Animal Health MATTERS Newsletter

Department of Veterinary and Biomedical Sciences

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Animal Health MATTERS

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Animal Health MATTERS

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SDSU and SHIC Study on Senecavirus Offers Keen Insights

From: Swine Health Information Center

A recent study of Senecavirus A (SVA, formerly known as Seneca Valley virus) offers valuable new insights into this increasingly important disease pathogen to the U.S. pork industry. This work, partially funded by the Swine Health Information Center (SHIC), led by Dr. Diego G. Diel, DVM, MS, PhD, South Dakota State University, has uncovered more information about the infection biology and pathogenesis of the virus that may help to ease detection, and ultimately, control of the tenacious virus.

“This study provides significant insights on the pathogenesis and infectious dynamics of SVA in swine,” Diel said. “In addition to confirming findings of previous studies that demonstrate the role of SVA as the causative agent of vesicular disease in pigs, our study shows that SVA is shed in oral and nasal secretions and feces of infected animals for up to four weeks post-infection.”

SVA Study Methodology

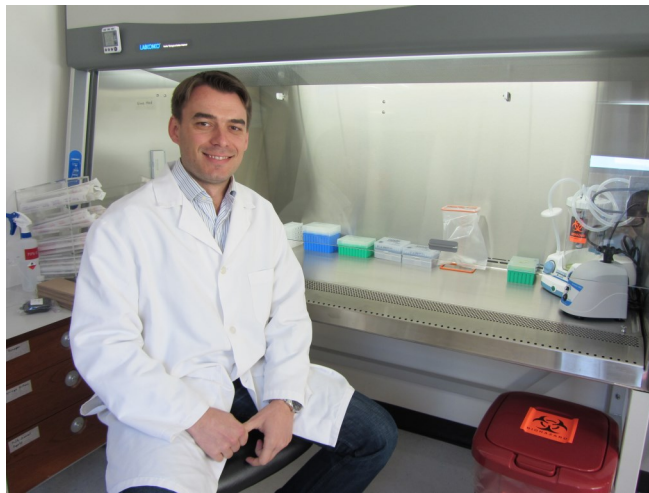
SVA is an emerging picornavirus that has been recently associated with vesicular disease and neonatal mortality in swine. Many aspects of SVA infection biology and pathogenesis, however, remain unknown. In this study, Diel and his colleagues investigated the pathogenesis of SVA in finishing pigs that were inoculated via the oronasal route with a contemporary SVA strain SD15-26. Then they monitored the pigs for clinical signs and lesions associated with SVA infection.

Viremia was assessed in serum and virus shedding monitored in oral and nasal secretions and feces by real-time reverse transcriptase PCR (RT-qPCR) and/or virus isolation. Additionally, viral

load and tissue distribution were assessed during acute infection and following convalescence from disease.

Study Finds Tonsil Is One Primary Target Tissue

Clinical signs characterized by lethargy and lameness were first observed four days post-inoculation and they persisted



Dr. Diego Diel, SDSU

for about two to 10 days. Vesicular lesions were observed on the snout and feet, affecting the coronary bands, dewclaws, interdigital space and heel/sole of SVA-infected animals. In addition, the investigators detected a short-term viremia between days 3 to 10 post-inoculation. Also, they found virus shedding between days 1 to 28 post-inoculation in oral and nasal secretions and feces.

Interestingly infectious SVA was consistently recovered from the tonsil during the first seven days of infection and, the virus RNA was detected in the tonsil of all SVA-infected animals using real-time quantitative PCR and in situ hybridization (ISH) performed on tissues collected on day 38 post-inoculation. Serological

responses to SVA were characterized by early neutralizing antibody responses (5 days post-inoculation), which coincided with a progressive decrease in the levels of viremia, virus shedding and viral load in tissues.

“We have shown that SVA has a predilection for lymphoid tissues with the tonsil being one of the main targets of virus replication,” Diel said. “These results provide an improved understanding of SVA infection biology and may lead to enhanced prevention and control strategies in the future.”

What’s Next for SVA Research?

Looking ahead, Diel says there are several key questions that need to be addressed regarding SVA infection biology. They are:

1. The role of the virus on neonatal losses and diarrhea.
2. Whether the genetic differences between contemporary and historical isolates led to an increased virulence of the current isolates.
3. What is the duration of immunity?
4. Whether infected animals become carriers after convalescence from the vesicular disease.

Full article published ahead of print at the Journal of General Virology: <http://jgv.microbiologyresearch.org/content/journal/jgv/10.1099/jgv.0.000631>

The mission of the Swine Health Information Center is to protect and enhance the health of the United States swine herd through coordinated global disease monitoring, targeted research investments that minimize the impact of future disease threats, and analysis of swine health data. For more information, visit <http://www.swinehealth.org> or contact Dr. Sundberg at psundberg@swinehealth.org. ■

Director's Message: Innovation in the Laboratory and Being Proactive in the Protection of Animal Health

Jane Hennings, DVM, MS — Director ADRDL



As a result of new, emerging diseases entering the US over the last several years, a “proactive” approach is being taken, particularly by the swine industry, to provide funding for the development of new tests and reagents to protect pig health. One of these agencies providing funding and facilitating these projects is called the “Swine Health Information Center” (SHIC). The mission of the Swine Health Information Center is “to protect and enhance the health of the United States swine herd through coordinated global disease monitoring, targeted research investments that minimize the impact of future disease threats, and analysis of swine health data.”



To date, the ADRDL has received funding of several grants to fulfill this mission. One of these grants is to find out why there is now a severe disease caused by

Seneca Valley Virus A (SVA). The importance of this disease is that clinically, it looks like Foot and Mouth Disease (FMD). Dr. Diego Diel in our laboratory found that the disease is similar to what is being seen in Brazil and China, but is genetically different than what was observed historically in the US. The information from this grant was able to help us with development of a commercial SVA Virus real-time PCR, in collaboration with an industry partner. The studies on this virus are further described in this issue of Animal Health Matters.

Additional funding was given to the department for the “Development of a high throughput real-time RT-PCR assay (dry, room temperature stable and fluid formats) for the detection and discrimination of Senecavirus A (SVA), Foot-and-mouth disease virus (FMDV) and Swine Vesicular Disease virus (SVDV)”. This “multiplex” test (also developed in conjunction with a commercial partner) would allow for testing for 3 agents at the same time to quickly detect any of these viruses and thereby prevent their transmission.

In swine, encephalomyocarditis virus (EMCV) can cause acute myocarditis and mortality in young pigs or reproductive failure in sows. Mortality rates ranging from 20-100% have been reported in neonatal piglets, so it is important to detect this virus before it enters a farm. This funded study will develop a rapid diagnostic test to detect EMCV and make it commercially available for any laboratory to use.

In regard to studies funded at the lab that help the beef industry, Dr. Joy Scaria was awarded a grant by the SD Beef Industry Council on “[Control of Salmonella to improve Pre-Harvest food safety and antibiotic stewardship in beef production.](#)” His initial studies showed that when compared to other regions, the prevalence of *Salmonella* in South Dakota was much lower and it may be that the low prevalence could be because of feedlot management practices. By identifying specific practices that keep prevalence of *Salmonella* relatively low, a set of recommended practices might be used by other producers. This is just one of the objectives for this study. ■

Bovine Abortion—Sample Submission Guidelines

Larry D. Holler DVM, Ph.D.

The following are guidelines to ensure the proper samples are submitted for abortion cases to the ADRDL:

1. Fetus and placenta— The entire fetus and placenta, chilled, not frozen, are the preferred specimens when transportation can be arranged.

- When the entire fetus cannot be submitted to the laboratory, the following specimens are the minimum if a complete examination is to be done.:

Formalin fixed	Fresh (chilled)
lung	lung *
liver	liver
kidney	kidney
spleen	spleen
heart	heart
brain (1/2)	brain*
skeletal muscle (tongue, diaphragm)	placenta*
placenta (grossly examine for focal lesions)	

2. Also collect:

- Stomach content - 1-3 ml in sterile syringe**
- Thoracic fluid or heart blood from fetus - 3-5 ml in sterile syringe**
- Maternal blood should be collected and 3 - 5 ml of serum should be separated from the clot. Serology on individual animals is often unrewarding. Samples should be saved for further evaluation in a whole herd profile at a later date, if not submitted with the initial case.

Put the fresh tissues in sterile bags, and chill or freeze if delivery to the lab will be prolonged. Put formalin-fixed tissue in an unbreakable, leak-proof container. Label samples accordingly. Ship in an insulated container with enough ice packs to maintain refrigerated conditions until arrival at the lab.

- *package these tissues in separate whirl pacs
- **transfer to sterile tube if possible

Do not hesitate to contact the laboratory for assistance in sample collection or submissions procedures! Procedures will vary from lab to lab. ■

South Dakota One Health Meeting Covers Bacterial Zoonotic Disease

Russ Daly, DVM, SDSU

A crowd of over 60 people participated in the most recent “South Dakota One Health” seminar held August 25, 2016, at Chamberlain. The subject for the seminar was “Bacterial Zoonoses of Central and Western South Dakota,” specifically diving into conditions such as anthrax, tularemia, plague, and brucellosis. Attendees were from a wide variety of backgrounds and fields of expertise, including health care providers, veterinarians, public health agencies, animal health agencies, Native American tribes, lab technicians, and researchers.

Attendees heard from Dr. Lon Kightlinger, State Epidemiologist, on the epidemiology of these diseases in South Dakota; Greg Schroeder, Wind Cave National Park, on tularemia and plague in wildlife; Dr. Dale Miskimins, SDSU, on these diseases in domestic animals; Dr. Susan Hoover, Sanford Health, on the medical approach to human illnesses due to these diseases; Andy Klitzke, SD Department of Health, on the bioterrorism aspects of these germs; Dr. Dustin Oedekoven, State Veterinarian, on regulatory aspects of brucellosis and anthrax; and Dr. Russ Daly, SDSU, on *Brucella canis* in stray dogs. The seminar culmi-

nated in a panel discussion on the approach to preventing zoonotic diseases on South Dakota Indian reservations.

South Dakota One Health Seminars are organized through a collaboration with SDSU, USD Sanford School of Medicine, the South Dakota Department of Health, and the South Dakota Animal Industry Board. Support for meeting logistics and lunch was provided by the South Dakota Area Health Education Center, through the Bush Foundation.

The next South Dakota One Health seminar will take place on Wednesday, January 25, 2017, at the USD Sanford School of Medicine in Sioux Falls. The



State Epidemiologist Dr. Lon Kightlinger (second from right) makes a point during the panel discussion on zoonotic disease prevention on South Dakota Indian reservations held at the South Dakota One Health meeting on August 25, 2016. (L-R) Randolph Runs After, Cheyenne River Sioux Tribe; Zach Ducheneaux, Intertribal Ag Council; Kightlinger; Dustin Oedekoven, State Veterinarian.

topic will be “Vaccine Preventable Diseases in People and Animals.” For more information on this seminar, check igrow.org, or contact russell.daly@sdstate.edu. ■

Small Ruminant, Poultry Serology Offerings Expanded at the ADRDL

The ADRDL’s serology section has expanded their small ruminant serology tests in response to requests by clients:

- Ovine Progressive Pneumonia (OPP)/Caprine Arthritis and Encephalitis (CAE) ELISA**
 - Set up same day for 30+ samples, otherwise once weekly on Friday. \$4/sample
- Brucella ovis* ELISA**
 - Set up most days of the week during show and sale season; otherwise twice weekly on Tuesday and Friday. \$4/sample
- Q Fever (for all species) ELISA**
 - Set up once weekly on Friday; \$9/sample

- Brucella melitensis* card test (goats)**
 - Set up every weekday; \$1.50/sample

In addition, a new portfolio of turkey serologic tests has been established:

- Hemorrhagic Enteritis Virus (HEV) ELISA**
- Ornithobacterium rhinotracheale* (ORT) ELISA**
- Bordetella avium* ELISA**

Pricing and set-up schedule for the turkey tests are still in development. Call the serology lab at 605-688-5171 for questions. ■

Upcoming Holiday Schedule for the ADRDL:

2016

Friday, December 23

Christmas holiday; lab closes at noon

Monday, December 26

Christmas holiday; lab closed

2017

Monday, January 2

New Year’s Day holiday; lab closed

Monday, January 16

Martin Luther King Day holiday; lab closed

Monday, February 20

Presidents’ Day holiday; lab closed

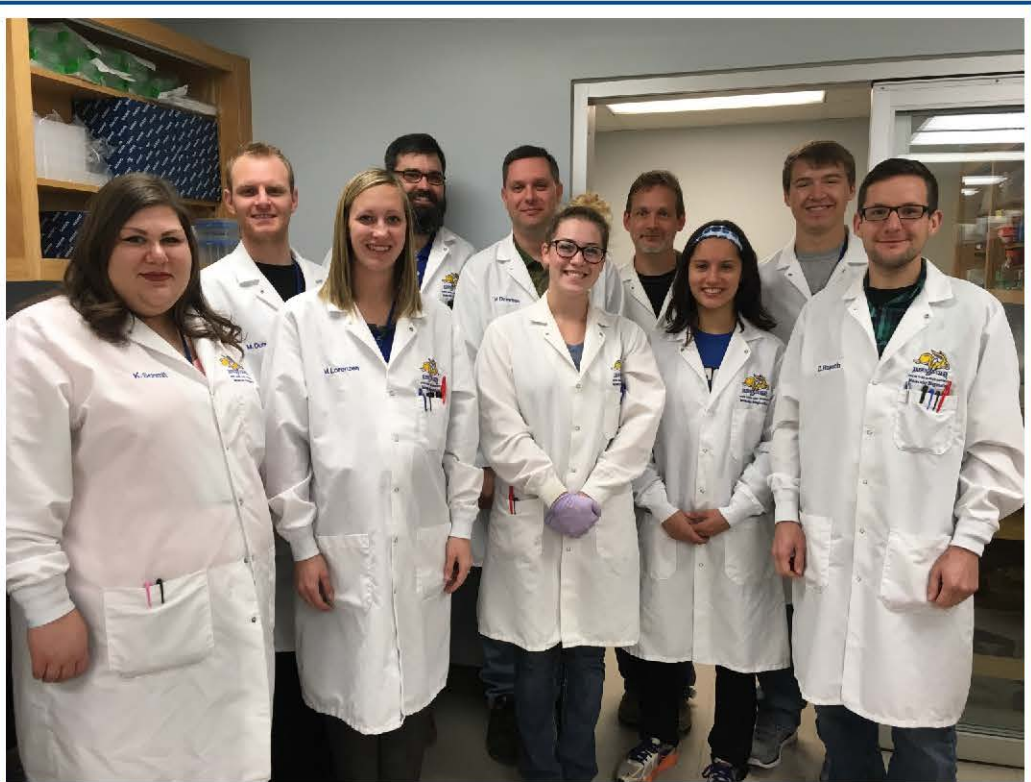
Molecular Diagnostics Section Evolves, Adds New Tests

Russ Daly DVM, SDSU

One of the busiest sections at the SDSU Animal Disease Research and Diagnostic Laboratory is the Molecular Diagnostics section, better known to many as the “PCR lab”. The field of molecular diagnostics has revolutionized diagnostic veterinary medicine over the past two decades, and the adoption of these molecular techniques by the veterinary profession and livestock industries is reflected in the workload of this section at SDSU.

“Molecular Diagnostics” is the broad term for procedures that detect an infectious agent or its potential to cause disease by analyzing the DNA or RNA of the organism. Polymerase Chain Reaction (PCR) is the most commonly employed molecular diagnostic procedure. PCR allows for the exponential amplification of an organism’s genetic material. This procedure may have several advantages over traditional culture techniques:

1. It may detect organisms more quickly than culture. For example, the causative agent of John’s disease in cattle may take up to 16 weeks to be grown in culture, while a PCR procedure may produce results in less than a day.
2. It may detect viruses or bacteria that don’t grow very well in culture systems, such as *Lawsonia intracellularis*, or porcine epidemic diarrhea virus. In other cases, organisms may be present in such small numbers that culture is difficult.
3. PCR may be useful in detecting the presence of bacteria in patients that have been treated with antibiotics, where culture is difficult at times.
4. Since PCR techniques have the ability to detect specific areas of the organism’s genome, the procedure may be useful in detecting different species of an organism, such as *Mycoplasmas*. It also can be employed to determine whether isolates of organisms such as *Clostridium perfringens* carry certain toxin genes, allowing those organisms to be “typed.”
5. PCR techniques in many cases



Molecular Diagnostics staff (L-R): Kelly Schmit, Michael Dunn, Melissa Lorenzen, Travis Clement, Matt Dammen, Celena Sass, Roger Clement, Jasmine Piepho, Alex Rogen, and Dana Rausch.

can lend themselves to automation and high throughput – in the case of real-time PCR methods.

In some cases, however, PCR may not be the diagnostic procedure of choice. It is more expensive than most other methods, for example. In addition, since these techniques detect nucleic acid, a positive test does not necessarily mean that viable organisms were present in the sample. Because of its sensitivity, interpretation of results from certain samples may be unclear, e.g. differentiating pathogens from normal flora in upper respiratory samples from cattle.

Besides PCR techniques, genetic sequencing is also a role of the molecular diagnostic lab. Sequencing has proven to be a very useful tool for practitioners dealing with PRRS virus in swine operations, for example. Differentiating wild virus from vaccine virus, or determining whether an emerging infection is due to a novel PRRS strain or a strain endemic to a particular operation are critical applica-

tions of molecular sequencing. Sequencing has become even more of an integral part of the Molecular Diagnostic section with the recent acquisition of a Sanger Sequencer allowing for quicker turnaround for PRRS ORF5 sequencing to help meet the client’s needs. In addition, a MiSeq instrument has also been brought online for next generation whole genome sequencing, greatly aiding ongoing research and development.

In fiscal year 2016, SDSU’s molecular diagnostic section completed over 259,000 PCR tests. The majority of these tests are on pooled samples, so the actual number of samples handled by the section far surpasses that number.

The SDSU ADRDL molecular diagnostics section has a national reputation in Porcine Reproductive and Respiratory virus (PRRS) diagnostics. Currently, a large proportion of tests run by the molecular diagnostics section are to detect PRRS in serum, semen samples, or tissue.

Porcine Epidemic Diarrhea Virus (PEDV), Swine Deltacoronavirus, and TGE also make up a large proportion of the section's testing activities, along with bovine trichomoniasis. Since the highly pathogenic avian influenza outbreak of 2015, avian influenza screening has also been a frequent test request.

In addition to diagnostic work, the section also supports the research mission of the SDSU Veterinary Science Department by performing many tests for research projects, and the development of new molecular tests. As the needs of veterinary practitioners and surveillance/regulatory programs evolve, the molecular diagnostics section has responded by adding new tests on a regular basis (see box).

A staff of two research associates, five senior microbiologists, one microbiologist and three student workers keeps this busy section running:

Research Associate III: Travis Clement, MS is a 2005 graduate of SDSU with a BS degree in Microbiology and a 2008 graduate of SDSU with a MS degree in Biological Sciences. He has worked full-time in the Molecular Diagnostic section since 2005, though Travis had worked as a student in the section during his undergraduate course years. His section responsibilities include everyday management of the Molecular Diagnostic section and new test validation and development. He also supervises three full time employees in the receiving section. In June 2013, the Professional Staff Advisory Council awarded Travis with the Professional Staff Award for Excellence in Professional Service.

Senior Microbiologist: Roger Chapin is a 1992 graduate of SDSU with a degree in Microbiology and has over 15 years of experience at the SDSU ADRDL, including work with the bacteriology section, following two years at the South Dakota State Health Labora-

tory in Pierre. His section responsibilities consist of Johne's, BVDV, Clostridium and E. coli testing, in addition to new test development and validation.

Senior Microbiologist: Matthew Dammen, BS is a 1997 graduate of SDSU with a degree in Microbiology and has over 14

Recent PCR Tests Added by ADRDL:

- Avian Influenza Virus (Matrix, H5, and H7)
- Porcine Coronavirus (Epidemic Diarrhea, Deltacoronavirus, TGE)
- Anaplasma marginale
- Epizootic Hemorrhagic Disease (EHD) virus
- Bluetongue virus
- Porcine Parvovirus
- Porcine Teschovirus
- Bovine Rotavirus
- 16S DNA Sequencing
- Bovine Herpesvirus-1 (IBR virus) SNP analysis
- Porcine Epidemic Diarrhea Virus S1 sequencing
- Porcine Senecavirus
- Vesicular Stomatitis virus

years of experience at the ADRDL. His area of specialization in the section is DNA sequencing and data analysis. He also assists with both conventional and real-time PCR testing, new test development and section quality assurance.

Research Associate II: Julie Nelson, BA, MS, MA has a Master's Degree in Biology from SDSU in 1989 and has been a part of the ADRDL since 1986. Julie works in the PCR lab in the mornings and Saturdays, does testing for the Specialized Research Testing Section in the afternoons, and assists with research into porcine diseases such as PRRS, PED, PDCoV in her spare time.

Senior Microbiologist: Michael D. Dunn, BS graduated from SDSU in 2010 with a degree in Microbiology with a specialization in Infectious Disease. He started working full time in the Molecular Diagnostics section of the ADRDL soon after, though Michael had worked as a student in both the Molecular Diagnos-

tics and Serology sections since 2008. Areas of emphasis in the section include PRRSv, Vesicular stomatitis virus, and Seneca Valley virus. He is currently working towards a Master's in Public Health degree.

Senior Microbiologist: Kelly Schmit is a 2011 graduate from the University of Minnesota-Duluth with a Bachelor of Science degree in Cell and Molecular Biology. After graduation, she was lured to the prairie and started working in the Serology section of the ADRDL in September of 2011. She recently moved to the Molecular Diagnostics section where she is honing her skills by using real-time PCR to detect pathogens in bovine and porcine samples.

Senior Microbiologist: Dana Rausch, MS is a 2011 graduate of SDSU with a BS degree in Biology and a 2014 graduate of SDSU with a MS degree in Biological Sciences.

He started working full time in the Molecular Diagnostics section of the ADRDL in 2014 and specializes in molecular sequencing. Dana also assists in routine real-time PCR testing as well as general laboratory maintenance.

Microbiologist: Melissa Lorenzen is a 2015 graduate of SDSU with a degree in Medical Laboratory Science. She has been with ADRDL for one year specializing in porcine diagnostic testing.

Student help: Alex Rogan (Pre-Vet Major), Celena Sass (Entrepreneurial Studies Major), and Jasmine Piepho (Biology Major).

The molecular diagnostics section is always interested in communication with their clients and is eager to answer any questions that arise about current or possible future tests. They can be reached at 605-688-5171. ■

New Employees

Laboratory Technician Samantha Stykel, Necropsy

Samantha grew up in the town of Dell Rapids, with a passion for all types of animals, particularly horses. She received a B. S. degree in Animal Science and Pre-Veterinary Medicine with an Equine Science Certificate from Kansas State University in 2015. After graduation she spent three weeks in Europe, and soon thereafter completed an internship at Rood & Riddle Equine Hospital in Lexington, KY. Samantha's role at the ADRDL is that of Laboratory Technician for the necropsy floor. That puts her in charge of student workers, along with the tasks of unloading animals, and assisting pathologists with necropsy cases on the floor. Samantha especially enjoys how every day at the ADRDL brings something different and no two days are the same.



Accountant Jolene Landmark

Jolene recently joined the Department of Veterinary and Biomedical Sciences as an accountant. In her position she plays a role in the wide variety of accounting processes necessary for the department and ADRDL, working closely with budget administrator Bridget Skeels. Jolene grew up on a farm near Dawson, MN, graduating from Dawson-Boyd High School and then the North Dakota State College of Science. After graduating from NDSCS, she attended SDSU for one year before taking a position at First Bank and Trust of White. After more than 6 years there, she began working at SDSU, first in the Department of Pharmaceutical Sciences and later in the Academic Programs Office for the College of Ag and Bio. Jolene is married with 3 children and enjoys spending time with her family, going to her kids' activities, gardening, playing golf and fishing. She serves on the Deubrook Area School Board and is an active member of the Deubrook Booster Club.



Programmer/Analyst Vijaya Akode, Information Technology

Vijaya is a native of Hyderabad, India, a city known for Information Technology services, and had the dream from a young age of becoming an IT professional. After she attained her bachelor's degree in Computer Science and Engineering, she worked for a startup company in India for a year. Following her marriage, she moved to the US, enrolling in a Master's program in computer science at the University of South Dakota, where her husband is on the research faculty. She accomplished her MS degree in only a year and a half, writing her thesis on analysis, development and implementation of parallel algorithms to find longest common subsequences of two strings. She then joined the Veterinary and Biomedical Science Department, where she works to develop software tools for the diagnostic lab, primarily using the Dot Net and MS SQL server platforms. Although Vijaya came from a big city, she has grown to love to living in South Dakota "because it is so disciplined, very peaceful and caring."



Aren Field, Laboratory Technician

Aren is a new laboratory technician in the receiving section. She is a native of Renville, MN, and attended SDSU for three years before transferring to Iowa State University. There she earned BS degree in Animal Science, in addition to an Associate Degree in Equine Management through Ellsworth Community College. Following graduation, she worked as the 4-H Program Assistant for Kingsbury County, then as the 4-H Youth Program Advisor for Hamlin and Kingsbury Counties. She lives in Volga and enjoys spending time with her three children, Audrey, Matthew and Anna, riding horses and working outdoors. Aren particularly enjoys meeting and getting to know clients of the ADRDL and visiting with them when they drop off samples.



ADRDL Continues Their Critical Role Supporting Animal Exports

Linda Fawcett, SDSU

“Head’um up and Move’um out” was a phrase many of us remember from the old western series Rawhide where the cowboys were moving the beef up the trail to the railheads and eventually to the people to consume. The past several years that same phrase could have been used for thousands of beef and dairy animals here in the United States that were shipped by boat and plane to faraway lands. Live animals were sent to countries such as Turkey, Russia, Kazakstan, Jordan, and more recently Sudan, Thailand and Viet Nam.

Many people have asked me why we were involved in sending live animals to such faraway places-why not just send semen or embryos? In visiting with many people involved in the exporting business over the years, the answer became quite clear. Many of these countries did not have a base of cattle to work with. For instance, at the beginning of these projects Russia only had 1 cow for every 279 people-which makes it a little hard to feed a nation, let alone improve on their livestock’s genetics. Also as a country’s economy worth improved and more spending capital was available to the population, a better protein source was in demand. Beef and dairy products were extremely expensive and not readily available. Developing beef herds, feedlots and dairies in Turkey cut their consumers’ cost nearly in half.

The ADRDL actually isn’t new to the export business. In the 90’s we worked with an exporter out of Minnesota on several projects shipping cattle to Saudi Arabia, Egypt and Morocco-with many of those animals coming out of the Midwest area. In the last several years, that same exporter passed on to others his satisfaction with the way we handled his project.

Since then, we have worked with many members of the Livestock Export Association from across the country with their test needs and help in coordinating

these projects. A number of herds from South Dakota and surrounding states contributed livestock to these projects. Many of these animals need pre-shipment testing before going into isolation and then again within 30 days of shipment.

Such export testing has expanded our workload immensely. In doing so, we were able to buy supplies and diagnostic



kits in higher volume and therefore at a cheaper rate. This kept our costs down not only for the exporters but for regular routine diagnostics. I believe it also brought forth awareness to the producers the importance of overall animal health and more awareness of disease prevalence and control. It also generated business for other ag-related businesses such as veterinarians, feed producers, truckers and landowners who invested in creating isolation areas for these animals. Many of these projects involved 1000 plus animals per shipment.

The ADRDL’s role in supporting US animal exports overseas is constantly evolving as world events and economics affect the purchasing countries. What has not changed, however, is our commitment to accurate and timely diagnostic testing for all of our client stakeholders. ■

Continuing Education Events

December 3-7, 2016

American Association of Equine Practitioners Annual Convention, Orlando, Florida; <http://www.aaep.org/info/annual-convention>

January 28, 2017

West River Veterinary Medical Association Meeting, Rapid City. Topic: Dentistry. For more information call 605-394-4889.

February 11, 2017

James Bailey Herd Health Conference, Brookings, SD.

Theme: Herd Health for Backyard and Hobby Herds and Flocks. (605) 688-6649 or www.sdvvetmed.org

March 31—April 2, 2017

Academy of Veterinary Consultants Spring Conference

Westin Dallas Fort Worth Airport Hotel, Irving, TX; <http://www.avc-beef.org>

June 1-2, 2017

SDVMA Summer Meeting

Ramkota Hotel & Conference Center, Pierre, SD; www.sdvvetmed.org

August 13-16, 2017

South Dakota Veterinary Medical Association Annual Meeting

Ramkota Hotel & Conference Center, Sioux Falls, SD; www.sdvvetmed.org

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Animal Health MATTERS

The SDSU Veterinary and Biomedical Sciences Department conducts research, teaching, professional service, and extension service to South Dakota and the surrounding region. An entity within the SDSU Veterinary and Biomedical Sciences Department, the South Dakota Animal Disease Research and Diagnostic Laboratory is a full-service, all-species diagnostic laboratory accredited by the American Association of Veterinary Laboratory Diagnosticians (AAVLD). The AAVLD accreditation program complies with international expectations for quality diagnostic services under the guidance of the World Organization for Animal Health (the OIE). The ADRDL collaborates with the USDA National Veterinary Services Laboratory on many federal disease monitoring and eradication programs and is a member of the National Animal Health Laboratory Network. For information regarding the laboratory's Quality System, contact Rajesh Parmar – ADRDL Quality Manager, at 605 688 4309.

Editor: Russ Daly, DVM

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