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Animal Health MATTERS Newsletter

Veterinary and Biomedical Sciences

4-15-2014

Animal Health MATTERS

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Recommended Citation

Daly, Russ and Hennings, Jane, "Animal Health MATTERS" (2014). *Animal Health MATTERS Newsletter*. Paper 27.
http://openprairie.sdstate.edu/vbs_news/27

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Vol. 17, Issue 1

Animal Health MATTERS

April 2014



Porcine Epidemic Diarrhea Virus Testing and Research in High Demand at SDSU's ADRDL

R Daly, E Nelson, T Clement, SDSU

Since its emergence in the United States just a year ago, Porcine Epidemic Diarrhea Virus (PEDV) has spread to swine herds in 27 states. The virus, closely related to Transmissible Gastroenteritis Virus (TGEV), causes severe diarrhea and dehydration in suckling pigs, and affects older animals as well. Prior to April, 2013, the virus had only been known to infect swine herds in Asia and Europe.

Scientists at South Dakota State University's Animal Disease Research and Diagnostic Laboratory collaborated with other diagnostic laboratories to help characterize the first detections of PEDV in the US. The lab was one of the first in the nation to develop a PCR test for the virus, and was a leader in the initial isolation and culture of PEDV on tissue culture. This step was instrumental in the development of additional diagnostic tests to better characterize the virus.

The "workhorse" of SDSU's PEDV diagnostics stable is the **real-time PCR test for PEDV**. This can be requested in conjunction with PCR testing for TGE virus. Recommended samples are fecal material, fecal swabs, small intestine from affected pigs, oral fluids, and environmental swabs. As is the case with all PCR tests, this is a very sensitive test that detects RNA specific for PEDV. It does not differentiate infectious virus from inactivated virus.

Cost for the PEDV PCR is \$30 per sample, which includes TGEV as well. Results are typically available on the same day the submissions arrive at the lab.

SDSU was one of a consortium of four diagnostic laboratories that began reporting PEDV testing results on a confidential basis. Systematic confidential reporting to the National Animal Health Laboratory Network began in mid-June, 2013. Since then (to March 14, 2014), the ADRDL has run 6,416 PCR tests on 2,245



Photo: National Pork Board

Write-in PEDV or SDCV on Submission Forms

Don't see the PCR tests for PEDV or SDCV on the ADRDL submission form? Don't worry – we are running those tests, but the submission form is still in the process of being updated. Until then, write in your request for those tests at the bottom of the sheet in the "Comments/Special Requests" area and we will take care of the rest. Please call the lab at 605-688-5171 if you have questions.

Clinical Signs Associated with Swine Deltacoronavirus in a Northeastern Nebraska Sow Herd

R Daly, D Miskimins, SDSU ADRDL

In late January, 2014, a breed-to-wean sow herd located in northeastern Nebraska experienced an outbreak of profuse diarrhea in their adult sow population. Clinical signs began as semi-solid stools in sows that progressed rapidly to a profuse, watery, foamy diarrhea with a foul odor. When initially detected, about 5% of the herd was affected. Diarrhea made its way through the entire herd over the course of 2-3 weeks, although this progres-

sion was aided by the use of feedback procedures by the herd owners. As they became affected, sows exhibited temporary inappetence and vomiting. No sows in this 1300-sow herd died as a result of this illness, and most of the animals were back to normal after 5-6 days.

Fecal samples from the affected sows were submitted to the SDSU ADRDL, where PCR tests for PEDV (Porcine Epidemic Diarrhea Virus), TGE (Transmissible Gastroenteritis), and *Lawsonia intracellularis* (causative agent of proliferative ileitis) were negative. A Group B salmonella spp. was isolated from 2 of 6 fecal samples submitted. The significance of that isolate was hard to determine, as no tissue samples were available for this outbreak.

Fecal samples were submitted to Dr. Ben Hause from Newport Laboratories, who performed metagenomic sequencing on the samples. Swine deltacoronavirus (SDCV) was detected in the sample, along with Group A rotavirus. The herd owners had already begun feedback to sows by the time sequencing results were available. The infection was quite slow to take hold throughout the herd, but all sows eventually were affected.

Approximately one week following the onset of diarrhea in the sows, litters of baby pigs began to experience severe scours as well. At 1 to 2 days of age, pigs broke with a profuse watery diarrhea that was unresponsive to antibiotic treatments. Gross necropsy examinations revealed evidence of segmental villous atrophy, a finding that was

PEDV (Continued on page 3)

Swine Deltacoronavirus (Continued on page 5)

Director's Message: ADRDL Contributes to Animal Health Locally, Nationally, and Globally

Jane Hennings, DVM, MS — Director ADRDL

On Wednesday, March 19th, Senator Tim Johnson and staff visited South Dakota State University (SDSU). Our department was able to state what we were doing for and with the government in regard to veterinary and biomedical sciences and health. The following is what was presented and I hope it will help in understanding how we are contributing locally, nationally and internationally. We have a fantastic staff, with people who are willing to do their best with the resources provided.



The Veterinary & Biomedical Sciences Department at SDSU accommodates the state laboratory called the Animal Disease Research and Diagnostic Laboratory (ADRDL) which assists the SD Animal Industry Board for detection of infectious diseases and research for animal health. The ADRDL tests approximately 400,000 to 600,000 samples per year that come to us on a nationwide basis. Our expertise is in infectious disease research and diagnostics, particularly in livestock species such as cattle and swine. We also perform much of the national export testing for livestock being transported to other countries.

National funding is of great importance to us since we will often discover a new disease through our diagnostic sections (eg. Virology, Pathology, Molecular Diagnostics, Bacteriology, Serology, Food Safety, Clinical Pathology, Histopathology) through which we receive samples and then will develop new tests, vaccines and other biosecurity measures to help alleviate losses from these diseases.

One such disease was Porcine Reproductive and Respiratory Syndrome (PRRS) which was discovered as a new disease in 1990. It used to be called "Mystery Swine Disease" until we helped discover that it was an RNA virus infect-

ing pigs. This work was helped through Agricultural Experiment Station, competitive USDA, commodity and industry funding and included:

- Proof and characterization of the causative virus (PRRSV) through gnotobiotic facilities within the department
- Commercially available PCR based test for detection
- Monoclonal antibody reagents
- First generation vaccine in conjunction with Boehringer-Ingelheim Veterinaria

Subsequently we have received additional USDA and Agricultural Experiment Station Grants listed for FY2013 under "Research Projects" related to:

- second generation PRRSV vaccine candidates,
- the immune response to PRRSV
- improved diagnostics

Currently, we are dealing with Porcine Epidemic Diarrhea Virus (PEDV) which was first found in the US in May of 2013. We received the first sample at the laboratory in May 2013 and were quickly able to develop routine testing for it and develop commercially available reagents. Our research now is on vaccine development and biosecurity research.

The Veterinary and Biomedical Sciences Department also participates in other Federal Programs such as:

The National Animal Health Laboratory Network (NAHLN) where we are one of the laboratories that tests for foreign animal diseases and other infectious disease as needed including:

- Foot and Mouth Disease (FMD)
- Rinderpest
- African Swine Fever Virus (ASF)
- Highly Pathogenic Avian Influenza (HPAI)
- Exotic Newcastle Disease
- National Surveillance for Classical Swine Fever
- National Surveillance for Influenza in swine
- National Surveillance for Pseudorabies

We are also part of the Food Emergency Response Network (FERN) where we do research and diagnostics and are prepared to test for *E. coli* 0157:H7, *Listeria*, *Salmonella* or *Campylobacter*. Some examples follow:

- ◇ National Food Emergencies
 - ◆ Salmonella Tomato/Pepper Outbreak
 - Over 1200 people nationwide were sickened in 2008 by a Salmonellosis outbreak. Originally suspected to be tomatoes, but further testing indicated peppers were the culprit.
 - We received tomatoes collected by the FDA, as their labs were overwhelmed by tomato testing.
- ◇ High Profile Surveillance
 - ◆ 2008 National Democratic Convention
 - Was a high profile event due to President Obama's nomination – we received food samples from the convention submitted to us by the FDA for threat agent (Anthrax) testing.

Finally, the ADRDL is part of the Veterinary Laboratory Investigation Response Network (Vet-LIRN)

- ◇ Large Dog Treat Warning
 - ◆ Not a recall, but FDA has warned consumers about Chicken Jerky dog treats.
 - We have received samples from FDA to conduct testing for Staphylococcal enterotoxin.

The Veterinary and Biomedical Sciences Department is on the front lines of Animal and Public Health. We are experiencing significant growth in high throughput testing, research and outreach. Subsequently, we have had to move sections to another building to accommodate the growth. We are requesting additional space and retro-commissioning of the current building so we can continue to accommodate the significant state, national and international needs of animal and public health through integrated research, diagnostics, teaching and outreach. ■

PEDV

(Continued from page 1)

case submissions. 844 (13.2%) of the tests and 379 (16.9%) of the cases have been positive. The majority (59.7%) have been oral fluid samples, although fecal samples have accounted for a significant proportion (26.7%) of submissions. SDSU has provided PEDV testing on samples from 16 different states.

An additional service offered through the ADRDL is that of **genetic sequencing of PEDV**. In this procedure, the S1 domain of the viral spike protein is sequenced. Analysis can then be performed to determine if the sequence is similar to the original strain of PEDV detected in the US, or the more recent variant PEDV. The cost for sequencing runs \$200 and the turnaround time is 3-4 business days.

Serological testing is also offered at the ADRDL and has been utilized by practitioners from a wide area as well. The serologic test currently available is an **indirect fluorescent anti-**

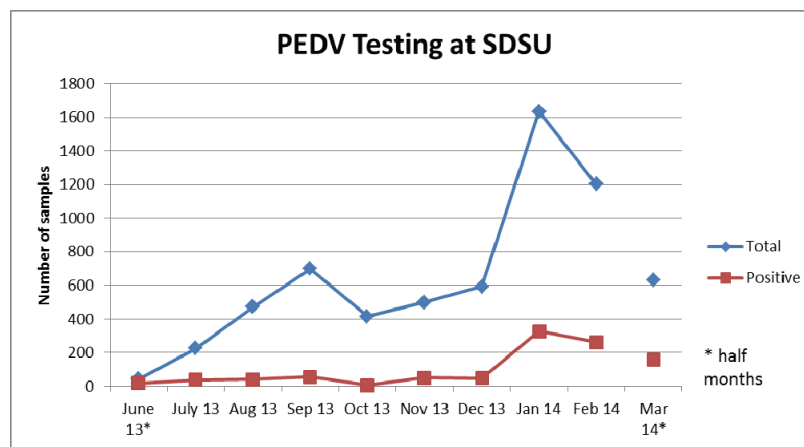
body (IFA) test. The test detects antibodies against PEDV which are typically detectable 7 to 14 days following an exposure. Results are reported out as titers; any that are equal to or greater than 1:40 are considered positive.

Cost for the PEDV IFA is \$5.50 per sample for a screening test at a 1:40 dilution, or \$15.00 per sample for testing at four dilutions from 1:40 through 1:320, and results are typically available within one day following submission.

While these tests are in high demand, ongoing research at SDSU is close to yielding even better techniques to aid

veterinarians and their clients. ELISA and virus neutralization serologic techniques are expected to be brought online soon, which will greatly enhance testing efficiency and accuracy.

ADRDL and Veterinary and Biomedical Sciences Department scientists are also hard at work on applied research projects examining critical questions about the behavior of PEDV, hopefully leading to a better understanding of PEDV control and prevention. SDSU research projects include looking at the duration of antibody levels in sows that have undergone PEDV feedback protocols, assessment of sow and piglet immunity towards PEDV, new technologies in measuring the immune response in affected animals, and assessment of the survival of PEDV in the environment and its susceptibility to disinfectants. Along with these projects, the ADRDL is playing a critical role in supporting the research work of others, providing diagnostic and technical support to a wide variety of investigators across the country. ■



Dr. Step Highlights Successful Bailey Herd Health Conference

Seventy veterinarians were in attendance at the 2014 James Bailey Herd Health Conference held on Saturday, February 8, on the SDSU campus in Brookings. The theme for this year's event was food animal vaccination programs. D. L. Step, DVM, DACVIM, Professor in food animal research, extension, and production medicine at Oklahoma State University served as the keynote speaker. Dr. Step highlighted the latest research in beef cattle vaccination programs, from calves at branding time through entry into the feedlot.

The meeting also featured talks by SDSU Veterinary and Biomedical Sciences faculty: Drs. Chris Chase, covering the interactions among stress, diet, and vaccination programs; Larry Holler on current sheep and goat vaccination programs; and Jane Hennings with an update from the department and ADRDL. Drs. Curt Vliestra and Barry Kerkaert from

Pipestone Veterinary Clinic updated the group on current recommendations for dairy and swine operations, respectively.

Attendees enjoyed SDSU ice cream during the afternoon break, as well as a greeting from Dr. Jim Bailey himself. Dr. Bailey served as SDSU's Extension Veterinarian from 1968 to 1985.

New to the conference this year was a Friday afternoon continuing education session that centered around SDSU's Animal Disease Research and Diagnostic Laboratory. Thirteen veterinarians, technicians, and animal health industry representatives visited each of the ADRDL lab sections and heard updates on

Porcine Epidemic Diarrhea Virus, *Bibersteinia* isolations, and MALDI-TOF bacterial identification technology, among other topics. ■



Speakers at the 2014 Bailey Herd Health Conference participated in a forum to wind up the day's presentations: (L-R) Drs. Larry Holler, SDSU; Curt Vliestra, Pipestone Veterinary Clinic; D. L. Step, Oklahoma State University; Chris Chase, SDSU; and Barry Kerkaert, Pipestone Veterinary Clinic. (Photo: Janice Kampmann)

Detecting and Discovering Viruses at SDSU's ADRDL

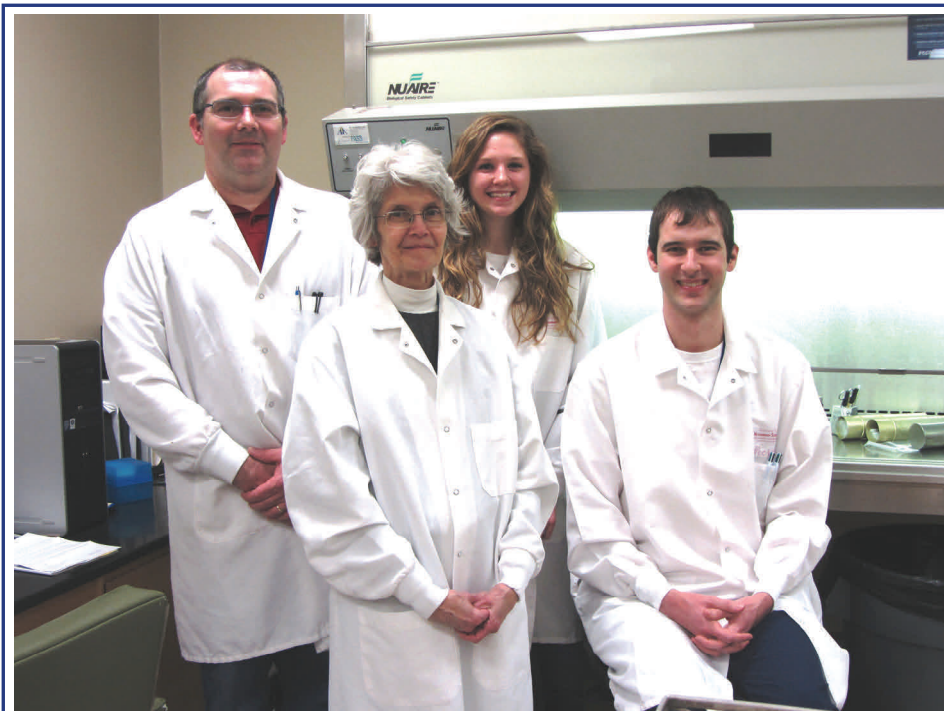
Russ Daly, DVM, SDSU

Viral diseases such as Porcine Epidemic Diarrhea Virus, influenza, Bovine Viral Diarrhea Virus, and PRRS are all animal issues that have grabbed headlines in recent months. Of the most important and emerging disease threats that veterinarians, livestock producers, companion animal caretakers, wildlife biologists and public health experts concern themselves with, viruses are always at the top of the list. A talented, experienced group of scientists at SDSU's Animal Disease Research and Diagnostic Laboratory supporting those people in their efforts is the virology section.

For the general public, perhaps it's the rabies exams that are consistently the most newsworthy of the virology section's annual duties. While the section performed 521 examinations for rabies this past fiscal year (of which 29 were positive), the section does much more for diagnosticians and veterinarians through the course of a year. In fiscal year 2013, SDSU's virologists performed more than 9,300 different procedures, a number that has been rising over the past several years. Bovine virus isolation procedures are among the most common requests, along with Bovine Viral Diarrhea Virus (BVDV) and Infectious Bovine Rhinotracheitis Virus (IBR) fluorescent antibody (FA) tests. But FA procedures looking for evidence of viral infection in samples from swine, horses, cats, dogs, sheep, and wildlife are also common requests.

One particular niche the virology section has been filling extremely well is that of fish diagnostics. Virus isolation for pathogens important to coldwater fish species such as Viral Hemorrhagic Septicemia (VHSV), Large Mouth Bass Virus (LMBV), and Spring Viremia of Carp Virus (SVCV) have been popular requests from the region's growing aquaculture, bait fish, and ornamental fish industries.

On a daily basis, the virology section provides diagnostic support to the ADRDL pathologists working up case submissions. But support is also afforded to ADRDL researchers through viral diagnostics for research projects, and to other sections within the lab as well. For example, cell culture lines are provided to the serology section for their use in viral neutralization procedures. The virolo-



The virology section at SDSU: (L-R) Lyle Braun, Research Associate, Pam Leslie-Steen, Co-Section Leader; Haley Peterson, student worker; Craig Long, Senior Microbiologist. Not pictured: Chris Chase, Co-Section Leader.

gists work closely with the molecular diagnostics section as well, and supply materials to many different survey and research studies throughout the country.

A well-trained and experienced staff of four full-time personnel and one student worker oversee and carry out the duties of the virology section at SDSU:

Pam Leslie-Steen MS, Co-Section Leader, Assistant Professor, has over 40 years experience with veterinary diagnostic virology at the ADRDL, and had experience prior to that in the animal vaccine industry. She holds bachelor's and master's degrees in biology and microbiology from SDSU. While all section personnel are well cross-trained in all of the diagnostic procedures, Pam works with rabies cases and specimens from swine, small ruminant, and companion animal submissions.

Chris Chase, DVM, PhD, DACVM, Co-Section Leader and Professor, has served as co-section leader in virology for the past several years. Dr. Chase obtained his DVM degree from Iowa State University and PhD in immunology and virology from the University of Wisconsin-

Madison. He is involved with research at SDSU examining the initial events of viral infections as well as development of better methods to prevent viral infections in animals. Dr. Chase has served the veterinary profession in numerous important ways, including SDVMA and AVMA councils and committees. He was named the South Dakota Veterinarian of the Year in 2009. Dr. Chase is extensively involved with graduate and pre-veterinary student advising and teaching.

Lyle Braun, MS, Research Associate II, recently completed 25 years of service working for the State of South Dakota, mostly at the ADRDL. He has BS and MS degrees in Microbiology from SDSU, and began his career at the ADRDL with the serology section. Shortly thereafter he began working as the research technician for Dr. Chris Chase, working on all aspects of bovine virus research, concentrating mostly on BVDV, research he continues to this date. Simultaneously with these responsibilities, he worked in

Virology (Continued on page 5)

Swine Deltacoronavirus

(Continued from page 1)

confirmed with histopathology at the ADRDL. Fecal samples were PCR-negative for PEDV and rotavirus groups A, B, and C; and were negative for rotavirus and TGE on fluorescent antibody tests. There were no significant bacteria grown from the samples. Samples sent to the Ohio Animal Disease Diagnostic Laboratory were PCR positive for SDCV at a CT level of 21, indicating a significant level of virus present in the samples.

Baby pigs experienced watery scours in the crates and an increase in death loss was noted, but not to the extent of those losses reported in cases of PEDV infections. At its worst, approximately a 10-15% mortality rate was observed. Notably, sows that had recovered from diarrhea themselves were unlikely to have affected litters, if they were no longer clinical by the time they had farrowed. In total, the outbreak lasted approximately 3 weeks with no apparent lingering effects.

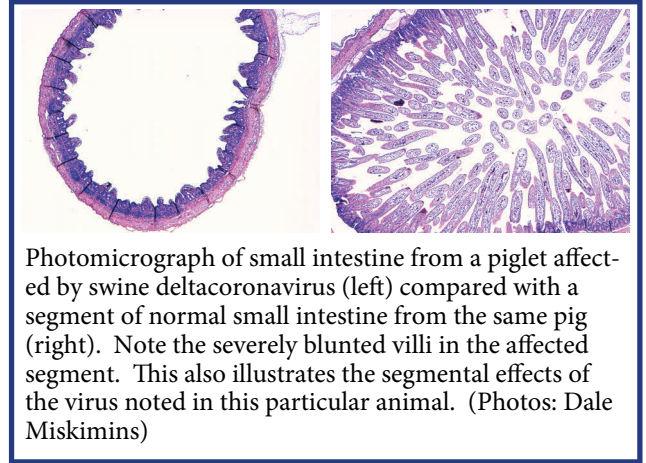
When encountering the clinical signs in the sow herd, the herd owner's first thought was that of a PEDV outbreak, especially in light of the number of surrounding herds that had already experienced "breaks" of PEDV. When diagnostic testing was negative for PEDV and TGEV, other methods of viral identification were sought. The timing of this submission coincided closely with the announcement by the Ohio Department of Agriculture that they had characterized SDCV in submissions to their laboratory.

Certain clinical features of this outbreak contrast with, while others are similar to, reports of PEDV outbreaks across North America. Notably, this outbreak did not result in the high mortality rates in baby pigs that PEDV can exhibit. Additionally, the spread of the virus throughout the herd was much slower than has been observed with most of the PEDV outbreaks. Similarly to PEDV, the clinical signs associated with SDCV affected all ages of pigs – baby pigs as well as adults – throughout the herd. There is very little known about herd immunity following an outbreak associated with SDCV. Due to its lack of relatedness with PEDV, it may be assumed that there would be little to no cross-protection between the two viruses.

Deltacoronaviruses comprise one of the newer classifications of coronaviruses. In the past, coronaviruses had been di-

vided into three groups: alpha-, beta-, and gamma-coronaviruses. Both PEDV and TGEV belong to the alphacoronavirus group, while bovine coronaviruses belong to the betacoronavirus group. The SDCV identified in the Ohio herds was sequenced and found to be closely related to a SDCV strain detected in Hong Kong in 2012.

In the days since this case, SDSU has added a real-time PCR test for SDCV. From March 7 through March 18, 2014, the ADRDL had already tested 83 submissions for SDCV (see box). Positive submissions were largely from units in Minnesota and North Carolina, and approximately half the positive SDCV cases also were positive on PCR. The overwhelming majority of samples were fecal samples or oral fluid samples submitted for real-time PCR. However, a case of diarrhea in 17-week old pigs included tissue submission. These pigs were positive for both PEDV and SDCV, with virus demonstrated in



Photomicrograph of small intestine from a piglet affected by swine deltacoronavirus (left) compared with a segment of normal small intestine from the same pig (right). Note the severely blunted villi in the affected segment. This also illustrates the segmental effects of the virus noted in this particular animal. (Photos: Dale Miskimins)

lesions that featured villous blunting in the small intestine.

Swine deltacoronavirus appears to be associated with diarrheal disease in older as well as younger pigs. As the case report indicates, SDCV may be a consideration in herds that test negative for PEDV; however, this virus appears to coincide with PEDV in a significant proportion of cases submitted to SDSU's ADRDL. As the newest identified potential pathogen of North American swine herds, its role in clinical disease is worthy of further investigation. ■

SDCV Submissions to SDSU: March 7-18, 2014

	Total	SDCV Positive
Case submissions	83	19 (8/17 cases were also positive for PEDV)
Samples	261	43

Virology

(Continued from page 4)

the virology section with bovine diagnostic samples. Lyle's responsibilities have gradually expanded to training and teaching undergraduate and graduate students in virologic techniques and infectious diseases. Currently Lyle's responsibilities within the section are bovine virus diagnostics - particularly virus isolation and fluorescent antibody testing of tissue sections. He also performs fish virus isolation testing and shares responsibility for rabies testing.

Craig Long, MS, Senior microbiologist, has a BS degree in microbiology and an MS in biological sciences, both from SDSU. Craig has laboratory experience through internships with the

State Health Laboratory in Pierre, SD, as well as work in fermentation and ethanol production. Prior to starting at the ADRDL, Craig taught introductory undergraduate biology classes in Brookings and Sioux Falls. His duties at the lab include porcine fluorescent antibody tests and setting up and maintaining cell cultures for influenza virus isolation.

Student Worker: **Haley Peterson** is a native of Beresford and is pursuing a degree in biology as well as pre-veterinary medicine. She is involved on campus as secretary of the SDSU Pre-Veterinary Club. Haley has been employed in the virology lab since the fall of 2013 and has primary responsibilities of maintaining and passaging cell cultures. ■

Post Exposure Rabies Treatment for People Currently Rabies-Vaccinated

According to CDC guidelines, if a person has previously received pre-exposure rabies vaccinations, only two doses of **vaccine** (on the day of exposure and then 3 days later) are needed. **Human rabies immune globulin (RIG) is not required.** The same recommendations happen to be true for people who have received rabies vaccinations as a part of prior postexposure treatment. The South Dakota Department of Health is able to offer guidance on these questions (1-800-592-1861).

For people who have never been vaccinated against rabies, post-exposure anti-rabies vaccination should always include administration of **both** passive antibody and vaccine. The combination of human rabies immune globulin (HRIG) and vaccine is recommended for both bite and non-bite exposures, regardless of the interval between exposure and initiation of treatment.

Adverse reactions to rabies vaccine and immune globulin are not common. Newer vaccines in use today cause fewer adverse reactions than previously available vaccines. Mild, local reactions to the rabies vaccine, such as pain, redness, swelling, or itching at the injection site, have been reported. Rarely, symptoms such as headache, nausea, abdominal pain, muscle aches, and dizziness have been reported. Local pain and low-grade fever may follow injection of rabies immune globulin.

Postexposure Prophylaxis for Previously Immunized Individuals

Treatment	Regimen
Wound cleansing	All postexposure prophylaxis should begin with immediate thorough cleansing of all wounds with soap and water. If available, a virucidal agent such as povidine-iodine solution should be used to irrigate the wounds.
RIG	RIG should not be administered.
Vaccine	Human Diploid Cell Vaccine (HDCV) or Purified Chick Embryo Cell Vaccine (PCECV) 1.0 mL, IM (deltoid area), one each on days 0 and 3.

Postexposure Prophylaxis for Non-immunized Individuals

Treatment	Regimen
Wound cleansing	All postexposure prophylaxis should begin with immediate thorough cleansing of all wounds with soap and water. If available, a virucidal agent such as povidine-iodine solution should be used to irrigate the wounds.
RIG	If possible, the full dose should be infiltrated around any wound(s) and any remaining volume should be administered IM at an anatomical site distant from vaccine administration. Also, RIG should not be administered in the same syringe as vaccine. Because RIG might partially suppress active production of antibody, no more than the recommended dose should be given.
Vaccine	HDCV or PCECV 1.0 mL, IM (deltoid area), one each on days 0, 3, 7, and 14.

Pre-Exposure Rabies Vaccinations

Veterinarians, people who work with rabies in laboratory settings and animal control and wildlife officers are just a few examples of groups that should consider rabies pre-exposure vaccinations (see table).

Although pre-exposure vaccination does not eliminate the need for additional therapy after a rabies exposure, it simplifies management by eliminating the need for rabies immune globulin and decreasing the number of doses of vaccine needed.

Pre-exposure prophylaxis may also protect people whose post-exposure therapy is delayed and provide protection to people who are at risk for inapparent exposures to rabies.

The South Dakota Veterinary Medical Association has been partnering with the South Dakota Department of Health to offer rabies serologic testing at the SDVMA Annual meetings. This testing is done on a cost-recovery basis by the Department of Health.

Source: CDC (http://www.cdc.gov/rabies/medical_care/) ■

Rabies Pre-exposure Prophylaxis Guide

Risk Category	Nature of Risk	Typical Population	Pre-exposure Recommendations
Continuous	Virus present continuously, often in high concentrations. Specific exposures likely to go unrecognized.	Rabies research laboratory workers; rabies biologics production workers.	Primary course (3 IM injections: days 0, 7, and 21 or 28). Serologic testing every 6 months; booster vaccination if antibody titer is below acceptable level.
Frequent	Exposure usually episodic, with source recognized, but exposure also might be unrecognized.	Rabies diagnostic lab workers, spelunkers, veterinarians and staff, and animal-control and wildlife workers in rabies-enzootic areas. All persons who frequently handle bats.	Primary course. Serologic testing every 2 years; booster vaccination if antibody titer is below acceptable level.
Infrequent	Exposure nearly always episodic with source recognized.	Veterinarians and terrestrial animal-control workers in areas where rabies is uncommon to rare. Veterinary students. Travelers visiting areas where rabies is enzootic and immediate access to appropriate medical care including biologics is limited.	Primary course. No serologic testing or booster vaccination.
Rare (population at large)	Exposure always episodic with source recognized.	U.S. population at large, including persons in rabies-epizootic areas.	No vaccination necessary.

Antimicrobial Resistance the Subject of Latest South Dakota “One Health” Workshop Group Meeting

Russ Daly, SDSU

Antimicrobial resistance in human and animal populations was the topic for the latest version of the South Dakota Public Health/Zoonotic Diseases working group meeting, held February 19, 2014 at SDSU.

According to the CDC, antimicrobial resistance has emerged as a significant public health threat. Human infections from resistant bacteria are becoming more common, and some pathogens have become resistant to multiple types or classes of antibiotics. Because antibiotics are used in animal populations as well as in people, the subject of antimicrobial resistance is sometimes a contentious one. Some public health advocates point to animal uses of antibiotics as a significant contributor to overall resistance, while some animal producers insist the problem lies with overprescribing antibiotics in people.

Rather than lay blame or try to solve a complex problem in the course of a day, presenters at this meeting highlighted the efforts undertaken by both human and animal health professionals in South Dakota to more responsibly use antibiotics for the future benefit of people and animals alike.

Brad Laible, Professor of Pharmacy Practice at SDSU and Clinical Pharmacist at Avera McKennan Hospital in Sioux Falls, gave an overview of experiences with antimicrobial stewardship in a large hospital setting. **Dr. Susan Anderson**, Director of the Frontier and Rural Medicine Program at USD Sanford School of Medicine in Vermillion, gave a family practice physician’s perspective on antibiotic uses in South Dakota’s community and clinic settings. Both highlighted the challenges faced by health providers when patients expect prescriptions for antibiotics for conditions for which they are not effective. **Lon Kightlinger**, State Epidemiologist with the South Dakota Department of Health, outlined the current epidemiology of antimicrobial resistant bacterial infections in South Dakota, highlighting carbapenem-resistant Enterobacteriaceae, the incidence of which has risen dramatically in the state in a very short period of time.

On the animal side, **Dr. Darrel Kraayenbrink**, a veterinarian from Platte, SD, outlined the common uses of antibiotics in South Dakota livestock populations. **Russ**



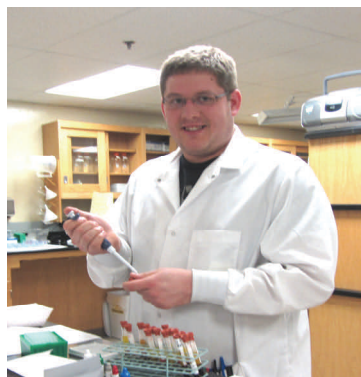
Dr. Lon Kightlinger, State Epidemiologist, addresses participants in the latest One Health working group meeting on the subject of antibiotic resistant bacterial infections in South Dakota. (Photo: Russ Daly)

Daly, State Public Health Veterinarian, spoke on antimicrobial resistance patterns in livestock diagnostic submissions, and also gave examples of animal management methods (e.g., all-in, all-out production) that reduce the need for antibiotics in animals. **Dustin Oedekoven**, State Veterinarian, gave an overview of new FDA regulations that will result in more veterinary oversight for antibiotic use in animal agriculture.

Other participants included representatives from beef cattle, swine, and dairy producer groups, the state medical association, Department of Health and Animal Industry Board staff, and

SDSU faculty and students. The conversation and dialogue among all participants was very helpful in creating an understanding of the current efforts and challenges faced by physicians and livestock producers in maintaining healthy populations of people as well as animals.

This session represented the fifth in a semiannual series of meetings that tackles a zoonotic disease issue of interest to interested stakeholders. The meetings are a joint effort between the South Dakota Department of Health, Animal Industry Board, and SDSU Extension. ■



New Hire: Grant Miller

Grant Miller is the newest addition to the ADRDL staff. He began working as an emergency temporary hire in October of 2013 and moved to full-time status this past February. Grant obtained BS degrees in Microbiology (infectious disease specialization) and Biotechnology from SDSU in May 2013. Grant was involved in research as an undergraduate, looking at the diversity of archeal organisms in Salt Lake, Minnesota, using both anaerobic culturing and PCR techniques. ■

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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.

Animal Health MATTERS

Continuing Education Events

April 3-5
Academy of Veterinary Consultants Spring Meeting
 Grand Hyatt, San Antonio, TX www.avc-beef.org

June 5-6
SDVMA Summer Meeting
Ramkota Inn, Pierre, SD
 (605) 688-6649 or www.sdvmed.org

June 19-21
Nebraska VMA Summer Meeting, Midtown Holiday Inn, Grand Island, NE www.nvma.org

June 29-July 1
Montana VMA Summer Meeting, Hilton Garden Inn, Missoula, MT www.mtvma.org

August 10-13
South Dakota Veterinary Medical Association Annual Meeting
Ramkota Inn, Sioux Falls, SD
 (605) 688-6649 or www.sdvmed.org

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