Animal Health MATTERS

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VBSD/ADRDL Researchers Benefit from New Oscar Olson Research Laboratories at SDSU

Russ Daly DVM, SDSU

SDSU faculty and staff, along with family and co-workers of the late Oscar Olson, celebrated the dedication of the remodeled Oscar E. Olson Research Laboratories on January 22.

The eight new laboratories are located in the former Olson Biochemistry Laboratory space in the Animal Science Complex building on North Campus Drive. A $1.455 million project renovated the space to provide state-of-the-art laboratory facilities for researchers conducting projects on behalf of the South Dakota Agricultural Experiment Station. An animal science teaching lab was also included in the project.

The ceremony featured comments from Daniel Scholl, director of the South Dakota Agricultural Experiment Station; Barry Dunn, South Dakota Corn Utilization Council Endowed Dean of the College of Agriculture and Biological Sciences; Jill Thorngren, dean of the College of Education and Human Sciences; as well as reflections by family members and SDSU staff past and present.

Honored guests included Kris Olson Sanchez, daughter of Oscar Olson; Katie Hanigan and Adam Spellman, grandchildren of Oscar Olson, and Professors Emeriti and former Olson colleagues Royce Emmerick, Ivan Palmer, Nancy Thiem, and Rick Wahlstrom.

Olson served SDSU and his native state of South Dakota as an educator and researcher. He was head of Station Biochemistry from 1951 to 1973, dean of the graduate school from 1958 to 1965 and served as acting dean of agriculture in 1958 and 1965.

“As a leading researcher on selenium toxicity and other agricultural subjects, Dr. Olson provided a rare blending of scientific achievement with solutions to a variety of practical agricultural problems,” Scholl said. “His dedication to research continued long after his retirement in 1979.”

“In this space, Dr. Oscar Olson’s legacy continues, as we use our best resources to solve real problems on behalf of the citizens and stakeholders of South Dakota,” he continued.

Scientists from SDSU’s Veterinary and Biomedical Sciences Department and Animal Disease Research and Diagnostic Laboratory in particular, are beneficiaries of the new space.

Dr. Diego Diehl’s research is focused on understanding the underlying molecular mechanisms that allow viruses to infect animals. Understanding what makes viruses cause disease and how they affect disease progression and the animal’s immune system is critical to developing new vaccines and disease control strategies. Dr. Diehl is especially interested in developing vaccines using virus “vectors”: larger harmless viruses that

Oscar Olson Research Laboratories
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In 1967, SD state statutes were established for the SD Animal Disease Research and Diagnostic Laboratory. They are stated below.


Animal disease research and diagnostic laboratory established--Supervision by Board of Regents. The State Animal Disease Research and Diagnostic Laboratory is hereby established and shall be maintained at South Dakota State University under the supervision and direction of the State Board of Regents.


Direction of animal disease research activities--Cooperation with Animal Industry Board. It shall be the duty of the director to direct the activities of the State Animal Disease Research and Diagnostic Laboratory in the conduct of studies, research, and diagnoses with respect to animal diseases, and to work in conjunction and in cooperation with the Animal Industry Board in furtherance of the livestock industry of South Dakota.


To fulfill these state statutes, there is a need for renovation and expansion of the laboratory. There is currently a bill making its way through the current legislative session to fund a design study for a potential expansion and upgrades to the State Animal Disease Research and Diagnostic Laboratory.

The benefits for renovation and expansion of the laboratory are so that we can:

1) continue to do the job we are currently doing…“to protect animal health for the state” since there are infrastructure issues that need to be addressed.
2) promote worker safety since state personnel deal with some highly infectious agents and need to have the necessary workable systems in place to protect human health.
3) accommodate for growth within the laboratory which includes:
   a) addition of new diagnostic and research sections.
   b) additional new types of tests are now performed.
   c) new technologies have been added with new instrumentation: For example, DNA sequencing has been added for determining the “fingerprint” of various pathogens, for vaccine design, for development of new tests for pathogen detection and for determining where the disease organism may have originated. This work is essential for modern disease control measures.
   d) new diagnostic tests, reagents and vaccines are being developed within the laboratory.
   e) new Federal funding programs (not available in 1993) are now available providing funding for state of the art testing at the ADRDL to better serve stakeholders including:
      a. USDA Food Emergency Response Network. This network integrates the nation’s food-testing laboratories at the local, state, and federal levels into a network that is able to respond to emergencies involving biological, chemical, or radiological contamination of food.
      b. USDA National Animal Health Laboratory Network (NAHLN). This network is needed for foreign and emerging animal disease testing which provides for a quality national program and same day testing for emergencies.
      c. FDA GenomeTrakr program for monitoring of food borne pathogens and traceability.
      d. FDA Veterinary Investigation Response Network (Vet-LIRN). This testing helps the center of Veterinary Medicine investigate potential problems with regulated products such as animal feeds and animal drugs.
   f) provide space for increased grant funding. Many of these grants provide for the development of new tests, new vaccines and anti-bacterial agents and other control measures to be applied in the “field”. The increased grant funding allows for hiring of new scientists who need additional space to do the work and ultimately providing better service to our stakeholder industries and contributing to economic development. Research in animal diseases by the SD ADRDL is mandated in the State Statute 13-58-15.
   g) provide a high containment Biosafety level (BSL) 3 laboratory space. BSL3 laboratory space is now the standard among veterinary diagnostic laboratories for the safety of state employees, the state’s livestock industry and the general public. These facilities are for working with highly pathogenic agents which can be found in South Dakota, along with other emerging or foreign animal diseases that could be identified in the state.

We want to thank the SDVMA, veterinarians, producers and general public for the support for the laboratory and we are looking forward to providing the services that you need. Please feel free to contact us at any time for input on how we can serve you better.
Darrell Johnson Honored by Department

Professor emeritus Darrell Johnson was honored by SDSU’s Veterinary and Biomedical Sciences Department with the inaugural John Thomson Award. The award is given to an individual who has shown outstanding dedication and service to the veterinary community through their efforts at the SDSU ADRDL. Dr. Johnson received the award at the annual James Bailey Herd Health Conference held February 13, 2016, on the SDSU campus.

Dr. Johnson joined the staff of the ADRDL in 1976 as a pathologist and served the veterinarians of the region there until his retirement in 2001. In addition to his regular caseload, he served as interim department head and lab director in 1986. He then served five years as associate laboratory director under Dr. John Thomson – most of that time involved with plans to renovate the ADRDL, which was complete in 1995. He was honored by the SDVMA with the Veterinarian of the Year award in 1990.

Dr. Johnson graduated with BS degrees from North Dakota State University and served in the US Army before completing his DVM degree at Kansas State University in 1963. He spent 10 years in private practice before returning to Kansas State for his PhD, which he received in 1976.

Darrell is now retired and living in Brookings with his wife of 55 years, Bette.

Comments on Dr. Johnson and his award

“...I consider Darrell the rock that the Animal Disease Research and Diagnostic Laboratory (ADRDL) was built on. He was not only an outstanding veterinary pathologist but an accomplished leader with a clear understanding of the needs of those being served by the ADRDL. Darrell exemplifies the dedication and work ethic of our faculty and staff in the ADRDL that built a national reputation as a leader in veterinary diagnostics...there is not a more deserving person to receive special recognition from South Dakota State University than Dr. Darrell Johnson.”

Dr. John U. Thomson, Stephen G. Juelsgaard Dean Emeritus, College of Veterinary Medicine, Iowa State University

“...Wise, fair and honest were hallmarks of [Darrell’s] leadership. One of Dr. Johnson’s major contributions to the VBSD/ADRDL came late in his career, when he was in charge of developing design consensus for the 1993 lab renovation. The necropsy room design with pass through windows surrounded by support labs was very unique for the time...and has been incorporated in other labs around the country. Thank you Dr. Johnson, for your past leadership and congratulations for this recognition.”

David H. Zeman, DVM, PhD, DACVP, Professor, Head & Director Emeritus, SDSU

Pork Quality Assurance Advisor Training Scheduled at SDSU

Veterinarians and swine professionals are invited to an Advisor Training for the new version of PQA Plus on Tuesday, May 3rd in Brookings. The session will run from 9:30 to 4:00 pm, and will be held in the classroom of the new SDSU Cow-Calf Unit (2900 Western Avenue - 7/8 mile north of the intersection of the Hwy 14 Bypass and Western Avenue; the new SDSU Swine Unit will still be in its final stages of construction and unavailable).

All PQA Plus Advisor certifications for PQA Plus Version 2.0 will expire August 31st, 2016, regardless of when an Advisor was trained in the PQA Plus version 2.0 program. This training will be held prior to the June 2016 roll-out of the new PQA Plus program at the World Pork Expo. Advisors attending this training will be able to use the new PQA Plus version 3.0 immediately after the World Pork Expo.

There is a $15 registration fee, and participants should pre-register to ensure adequate materials. To pre-register, email Dr. Bob Thaler at Robert.thaler@sdstate.edu by Friday, April 29, 2016.

Alternate PQA Plus Advisor trainings can be found at: http://www.pork.org/pqa-plus-certification/advisor-training/
Specimen Receiving and Necropsy Sections at the ADRDL: Getting the Diagnostic Process off to a Great Start

Russ Daly DVM, SDSU

At its core, the SDSU ADRDL’s purpose is to answer important questions about animal health for individual animals as well as for large populations, of a wide variety of species. The evidence containing those questions – and eventually answers – comes to the lab in an even greater variety of materials. It could be a 1000-pound Quarter Horse on the back of a trailer. It could be an insulated cardboard box stuffed with newspapers, ice packs, and plastic bags filled with tissue sample from a calf. Or it might be a huge cooler filled with hundreds of blood tubes from a sow farm. Taking those specimens and starting that diagnostic process is the responsibility of a group of dedicated staff members working in specimen receiving and necropsy at the ADRDL.

In the case of tissue or blood samples collected by veterinarians in the field and shipped to the lab via UPS, FedEx, or the US Postal Service, staff members and student employees perform the daily morning ritual of opening boxes, reading test request forms, making sure samples match the forms, and determining where the samples will go from there. This takes place in the newly-remodeled specimen receiving office, formerly home to the molecular diagnostics section. Samples of tissues for examination by pathologists are passed through the window to the necropsy room for further processing. Blood samples are carted down the hall for the serology lab. Samples for PCR testing, such as fecal samples for PEDV testing, or swabs from poultry for influenza testing, are carted across the hall for processing in the newly-relocated molecular diagnostics laboratory.

Each individual sample is recorded and entered into the lab results reporting database, and a unique case number is assigned to each submission. A faculty case coordinator or pathologist is assigned to each case right off the bat in the receiving office. With the volume of samples that come to the lab each day, the initial processing of these samples necessarily takes teamwork. Specimen receiving staff members Margaret Janssen, Zach Lau, and Laura Schanning take on this daily effort, with processing assistance from clerical staff Rita Miller and Nan Nesbit. Necropsy technician Myron Olson and several student employees also play a key role in this process.

For pathology cases, the necropsy floor is the next stop. There the pathologists process each individual case, designating samples to go to the appropriate ADRDL sections for further testing. One lung sample from a calf that died from pneumonia might go to several different sections: bacteriology for bacterial culture, molecular diagnostics for PCR testing, virology for FA or virus isolation, and to tissue processing to be made into histopath slides.

Smooth and meaningful processing of samples on the necropsy floor takes more than just a pathologist and student help. Clerical staff support is also critical, so ordered tests get entered into the laboratory information management system correctly and that samples get sent to the right laboratory sections. The lab technicians making this process possible are Margaret Janssen and Zachary Lau. These two professionals don lab coats, boots, and disposable gloves and join the pathologist on the floor, assisting them with these procedures. Margaret grew up on a dairy farm near Elkton, SD, and has worked at the ADRDL since 1979. Zach has a degree from SDSU in Wildlife and Fisheries and grew up in the Jasper, Minnesota area. He has worked at the ADRDL since January, 2015.

Visitors who are viewing the necropsy floor from the window in the public receiving area of the ADRDL on any given day will usually see at least one whole animal on the floor or on one of the stainless steel tables in the necropsy room. These animals could be as small as baby pigs from a farrowing house suffering from neonatal diarrhea (scours) or as large as a 1200-pound dairy cow found dead with no apparent clinical signs.

The ADRDL pathologist in charge of the necropsy section is Dr. Dale Miskimins. Dr. Miskimins received his DVM degree from Iowa State University and after practicing in food animal practices in central South Dakota, obtained his MS degree in pathology from Iowa State. Dale joined the SDSU ADRDL in 1990 after working at the Galesburg, Illinois, veterinary diagnostic laboratory.
Myron Olson is the ADRDL’s lead necropsy technician, and supervises the student workers, along with assisting the pathologists in opening up specimens, and keeping the necropsy room clean and in good repair. For people who transport animals to the ADRDL, Myron is often the first person at SDSU they interact with once they back up their truck to unload their specimen. He is in his 18th year at the ADRDL.

These professionals have noted many changes over the years working on the necropsy floor, many of them emblematic of changes in animal agriculture in the region. As livestock operations and the veterinary profession shift towards surveillance programs and ante-mortem testing, they’ve noted fewer whole bodies submitted to the ADRDL, but with a large increase in the numbers of blood and oral fluid samples to process. Preventive medicine programs have also affected the numbers of whole-body necropsy cases submitted to the laboratory. Biosafety procedures have also significantly intensified throughout the years—an increased awareness of worker safety means that many procedures that were performed out in the open are now done under biosafety cabinets or hoods.

These staff members, along with the five ADRDL pathologists, have a front row seat to the continual changes in the dynamics of animal disease in our region. Emerging syndromes such as Highly Pathogenic Avian Influenza and Porcine Epidemic Diarrhea Virus have had significant immediate effects on the number and type of sample submissions to the lab. These emerging disease issues at their core have their diagnostic beginning on the necropsy floor.

Despite these changes in animal agriculture and in the submissions to the ADRDL and in veterinary diagnostic labs throughout the country, the animal brought to the necropsy lab by a farmer in need of help remains one of the best examples there is of a dynamic, engaged service organization being looked to for answers. No matter how well preventive medicine and ante-mortem surveillance methods become established, we will never get to the point where infectious disease is a non-issue. It takes observant, dedicated individuals to detect those emerging and changing diseases in animals—and much of that starts right on the necropsy floor.

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carry pieces of the disease-causing virus, in order to protect animals against disease. “The ultimate goal of our research is to translate the knowledge generated with studies on basic aspects of virus-host interactions into improved vaccines and/or viral vaccine vectors for animal disease prevention and control,” he says.

Dr. Feng Li’s work looks to explain the interactions between disease-causing viruses and their animal – or human – hosts, with an emphasis on tricky viruses such as influenza (Types A, B, C, and the newly-discovered type D), porcine epidemic diarrhea virus (PEDV), and HIV.

“A particular interest of the lab is to use this information to develop effective, next-generation vaccine and antiviral therapeutic strategies,” says Li.

Dr. Eric Nelson’s group’s focus is on emerging and trans-boundary animal diseases caused by viruses. They work very closely with the ADRDL, other veterinary diagnostic laboratories, and animal health companies, and have a long history of developing novel tests for emerging animal diseases. “Recently, much of our effort has focused on the development of highly specific reagents and diagnostic tests to help control several serious swine diseases that have recently emerged in the US,” says Nelson.

These efforts have resulted in developing blood tests that are now widely used by vaccine companies and other universities across the US for diagnosis of PEDV and porcine deltacoronavirus (PDCoV).

Dr. Joy Scaria and his group work to understand how the bacteria in the digestive tract of animals interact with the animal itself. This knowledge is then used to help develop new generation probiotics, or populations of beneficial bacteria, to improve digestive health and to prevent infections such as those that cause diarrhea in animals. “We use culturomics and metagenomic approaches for untangling interspecies networks of competition, collaboration, and communication of gut microbes,” Scaria says. In addition, his laboratory also uses cutting-edge next-generation genome sequencing (NGS) to track and control foodborne pathogens and antibiotic-resistant bacteria.

Other SDSU researchers benefiting from the Olson Research Laboratories are:

George Perry, Department of Animal Science, animal reproductive physiology and genetics laboratory;

Michael Gonda, Department of Animal Science, animal reproductive physiology and genetics laboratory;

Natalie Thiex, Department of Biology and Microbiology, mammalian cell biology laboratory.

Eduardo Huarte and Moul Dey, Department of Health and Nutritional Sciences, Dr. S.K. Dash Laboratory for Research on Nutrigenomics and Probiotics; and

Mark Messerli, Department of Biology and Microbiology, cell and tissue physiology laboratory.
Pieces and Parts

New Anaplasmosis PCR test online at ADRDL

The ADRDL has recently begun offering a PCR-based test to detect Anaplasma marginale in cattle samples. The test is setup twice a week on Monday and Thursday, at a cost of $30.00 per reaction. Please submit whole blood (EDTA) from affected animals. The PCR test is well validated and originally published by Reinbold et al. in the Journal of Veterinary Research in 2010 (volume 71, pages 1178-1188).

The serologic competitive ELISA test (cELISA) to detect antibodies against Anaplasma is the currently-employed screening test for A. marginale infection in cattle. In some cases, however, a positive serologic test may be the result of cross-reaction with other Anaplasma species. The PCR-based test can be employed to detect cattle specifically infected with A. marginale when a positive cELISA test pops up.

For questions about anaplasmosis diagnosis, call the lab at 605-688-5171.

Laura Schanning Joins ADRDL in Specimen Receiving

A new face in the ADRDL’s back receiving office is Laura Schanning, having joined SDSU in early February. Laura has a degree in Animal Science from SDSU in 2011, and has had a great deal of prior animal and laboratory work through previous positions working at the SDSU Animal Science Department, Alltech, and with SGS here in Brookings. Laura is a native of Gary, SD, where she continues to live and help her family with their commercial Angus and Red Angus operation.

Reminder: Case History Helps Calf Scours Diagnosis

A couple pieces of information that are helpful in guiding the process for calf scours diagnosis are calf age and whether the calf has been treated with antibiotics or oral vaccines. Please take a minute to jot that and any other pertinent information on the submission form you send with the samples. All of the ADRDL’s submission forms are online at http://www.sdstate.edu/vs/adrdl/forms/index.cfm.

Dr. Beverly Shelbourn Joins Veterinary and Biomedical Sciences Department as Instructor

A new addition to the SDSU VBSD teaching ranks is Bev Shelbourn, DVM. Dr. Shelbourn is serving as laboratory instructor for VET 223, Anatomy and Physiology of Domestic Animals, where she works with Dr. Alan Erickson in presenting the class. This year’s class has set a record for enrollment, with 136 students enrolled – primarily animal science and pre-veterinary students.

Dr. Shelbourn is splitting her time in the department with her duties as a staff veterinarian at Animal Medical Care in Brookings, where she practices companion animal and large animal medicine and surgery. She is a native of Winner and grew up near Valentine, NE. Bev has a biology degree from the University of Nebraska Omaha and obtained her DVM from Kansas State. Prior to moving to South Dakota in 2013, Bev served as an animal shelter veterinarian in North Carolina. In her spare time, Bev enjoys raising sheep, quilting, and the outdoors. She lives in Brookings with her husband Joe and sons Joseph and Coby.


SDSU Extension Beef Specialists have teamed up to produce the iGrow Beef: Best Management Practices for Cow-Calf Production Manual. This publication is a comprehensive look at beef production from the cow-calf stand point. All aspects of production are covered in the publication’s 58 chapters, including reproductive technologies, health handling, feeding strategies, genomic testing, expected progeny differences (EPD’s), and much more. Readers will find this publication to be an invaluable resource for cow-calf operations.

The publication is available at the iGrow Store in electronic PDF or iBook versions. Go to http://igrow.org/catalog/downloads/ for information.
Veterinarians Updated on Antibiotic Use at Bailey Herd Health Conference

Over 70 veterinarians traveled to Brookings to get updated on antibiotic use in beef cattle at this year’s James Bailey Herd Health Conference, held February 13, on the campus of South Dakota State University. The meeting’s keynote speaker was Dr. Virginia Fajt, DVM, PhD, DACVCP, Clinical Associate Professor in the College of Veterinary Medicine at Texas A&M University. Dr. Fajt first addressed the concept of antibiotic stewardship in beef cattle production. In the presentation, she outlined important components of stewardship, including a leadership commitment on behalf of the practitioner, an understanding of how decisions regarding antibiotic use are influenced, an acknowledgment of the social and moral obligations that go along with those decisions, considerations for tracking antibiotic use, and the need for ongoing education. A discussion of the evidence behind the effectiveness of feed-grade antibiotics was next presented by Dr. Fajt. This presentation identified the significant gaps in knowledge about the effectiveness of many of today’s uses of feed-grade antibiotics, along with a discussion about how veterinarians can critically evaluate the literature that covers these uses. Regulations that add in a layer of veterinary insight through the Veterinary Feed Directive will be fully implemented in January of 2017; those new rules were the focus of the third of Dr. Fajt’s subjects.

The group also heard from Dr. Simon Timmermans, a beef cattle veterinary consultant from Sibley, IA, who updated the group on current concepts in metaphylaxis and injectable antibiotic treatments for beef cattle. Dr. Timmermans outlined the rationale for mass medication of incoming feedlot animals, and gave an excellent overview of the current drugs available for these uses. Ancillary treatments and non-antibiotic interventions were also highlighted.

Dr. Dan Larson, a beef cattle nutritionist with Great Plains Livestock Consulting, offered the group a list of alternatives to the use of feed-grade antibiotics, including the concepts surrounding fetal programming, trace minerals, and micronutrients.

The veterinarians in attendance also heard results of a survey of South Dakota veterinarians and cattle producers regarding feed-grade antibiotic use, along with an update from the SDSU Animal Disease Research and Diagnostic Lab. A special appearance was made by Dr. James Bailey, 92, the namesake of the conference. Next year’s James Bailey Conference is scheduled for Saturday, February 11, 2017, on the SDSU campus.

Continuing Education Events

March 31—April 2 — Academy of Veterinary Consultants Spring Meeting
Westin Hotel, Irving, TX; http://www.avc-beef.org

May 3 — PQA Plus Advisor Training
SDSU, Brookings, SD; Robert.thaler@sdstate.edu to register

June 2-3 — SDVMA Summer Meeting
Ramkota Hotel & Conference Center, Pierre, SD; www.sdvetmed.org

June 15-17— Nebraska VMA Summer Meeting
Valentine, NE; http://www.nvma.org/

June 26-28—Montana VMA Summer Meeting
Best Western Heritage Inn, Great Falls, MT, www.mtvma.org

June 26-29— Wyoming VMA Summer Meeting
Lander, WY; http://www.wvma.org/

August 17-20 — South Dakota Veterinary Medical Association Annual Meeting
Ramkota Hotel & Conference Center, Rapid City, SD; www.sdvetmed.org
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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