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Animal Health MATTERS Newsletter

Veterinary and Biomedical Sciences

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Animal Health MATTERS

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Animal Health MATTERS



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Head/Director's Message

David H. Zeman, DVM, PhD
Head and Director

The Survey Says...

During 2006, the ADRDL launched an effort to gather input from our customers regarding our service. Maintaining customer satisfaction has always been important to the faculty and staff of the ADRDL. However, now our new Quality System Standard requires that we do this. It also requires that we analyze the results and make improvements to continually improve our service.

In the analysis of the 2006 survey below, 80 of our customers had responded. We thank you for your time and that excellent response. Customers were asked to strongly agree, agree, be neutral, disagree or strongly disagree on ten parameters of our service. They responded as follows:

- 93.75 % strongly agreed or agreed that our submission forms were easy to complete
- 96.25 % strongly agreed or agreed that the laboratory employees are helpful and courteous
- 78.75 % strongly agreed or agreed that the laboratory reports the results in a timely manner
- 66.25 % strongly agreed or agreed that computerized (internet) reporting is useful to them
- 90 % strongly agreed or agreed that the results are clear and easy to understand
- 93.75 % strongly agreed or agreed that laboratory findings are useful for their practice

- 81.25 % strongly agreed or agreed that service charges are reasonable & understandable
- 92.5 % strongly agreed or agreed that their concerns are addressed properly and promptly
- 65 % strongly agreed or agreed that the laboratory User's Guide & newsletter are helpful
- 92.5 % strongly agreed or agreed that overall they are quite satisfied with our laboratory's services

The ADRDL is satisfied with these encouraging results, but are also aware that we have not satisfied every customer. The ADRDL will continue to work hard to gain and keep your trust and business. We have already made some significant changes. For example, we noted some significant dissatisfaction with our biopsy service and after some analysis we launched our new biopsy team service, with the 24 hour turn-around time promise. The biopsy business is now growing in response to that. We are also planning to launch an awareness campaign to familiarize more customers with the benefits of 24/7 internet access to real-time test results.

We do count it a privilege to serve alongside all of you as we strive to improve animal health. Thank you.

Diagnostic News - SDSU ADRDL

Tritrichomonas Testing and PCR

Some states have recently approved the use of a single PCR test for *Tritrichomonas fetus* (to be performed on smegma swabs submitted in saline) rather than the currently accepted practice of requiring 3 negative cultures before a bull can be transported across state lines. To our knowledge, no AAVLD accredited lab (including the ADRDL) has a validated PCR test that can be performed directly from smegma samples.

We (the ADRDL) are currently in the process of performing the necessary in-house validation studies for the direct smegma PCR test—until the validation studies are completed, clients should continue to submit the traditional Trich pouches for culture and, if the culture is positive, subsequent PCR testing.

Update: Viral Hemorrhagic Septicemia

Regg Neiger, DVM PhD

You may remember hearing the news last fall that, due to outbreaks of viral hemorrhagic septicemia (VHS), the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS) issued an emergency order prohibiting the importation of certain species of live fish from two Canadian provinces into the United States. At the same time, the interstate movement of those same fish species was prohibited from the eight states bordering the Great Lakes.

Gary Whelen, from the Michigan DNR Fisheries Division summarizes in a VHS briefing paper (http://www.michigan.gov/documents/dnr/Viral-Hemorrhagic-Septicemia-Fact-Sheet-11-9-2006_178081_7.pdf) that VHS was first confirmed in Lake Ontario in Spring 2005 in freshwater drum. Then in Spring 2006, there were large scale mortalities of muskies in Lake St. Clair, freshwater drum in Lake Erie, yellow perch in Lake Erie, and round gobies in Lake Ontario. VHS was then confirmed in Lake St. Clair muskies from archived tissues that dated from 2003. One theory is that the VHS virus arrived in the Great Lakes via ballast water from the Maritime Provinces around 2002.

According to James Winton's laboratory at the USGS Western Fisheries Research Center Seattle, WA, (http://biology.usgs.gov/faer/documents/VHSV_fs2007.pdf) the new strain from the Great Lakes, now identified as VHSV Genotype IVb, appears most closely related to isolates of VHSV from mortalities that occurred during 2000-2004 in rivers and near-shore areas of New Brunswick and Nova Scotia, Canada. The type IVb isolate found in the Great Lakes region is the only strain outside of Europe that has been associated with significant mortality in freshwater species. As of mid-2007, VHSV strain IVb has been isolated from fish in Lake Michigan, Lake Huron, Lake St. Clair, Lake Erie, Lake Ontario, the Saint Lawrence River, inland lakes in New York, Michigan and Wisconsin as well as the coastal areas of eastern Canada. The new strain has an

exceptionally broad host range and has been isolated from over 25 species of finfish to date. Significant mortality has been reported in muskellunge, freshwater drum, yellow perch, round goby, emerald shiners and gizzard shad.

This outbreak has caused many states to issue new restrictions on the health requirements of fish coming into their states. Many are requiring fish be tested for VHS virus and other diseases. So even though South Dakota is considered free of VHS, fish from SD have to be tested so they can be moved to some of the other states. There is a shortage of laboratory capacity in the US to do all the VHS testing that needs to be done. Because of this fact, the SDSU ADRDL is in the process, with the help of SD Game Fish and Parks, to add VHS testing to our offerings. Hopefully this will make it easier for SD producers to sell and add value to their fish as "confirmed VHS-free fish."

Addition to Compounding Pharmacy Listing

In the July issue of Animal Health Matters, a listing of pharmacies that offer compounding services for veterinarians omitted the following listing:

Pharmacy Specialties, Inc.
Yankton Trail Professional Park
2333 W. 57th Street
Sioux Falls, SD 57108
Phone: (605) 334-1672

Holiday hours:

November 12 – Veteran's Day Observed
November 22 – Thanksgiving Day
December 25 – Christmas Day
January 1 – New Year's Holiday
January 21 – Martin Luther King, Jr. Day
February 18 – President's Day

Extension News - SDSU ADRDL

Bull Tail-Tip Necrosis Cases in South Dakota, Summer 2007

Russ Daly, DVM, SDSU

The summer of 2007 brought with it an unusual number of calls and questions regarding tail-tip necrosis, primarily affecting bulls on pasture. While this syndrome has been reported to us in the past, the calls this summer were more widespread and numerous.

Tail-tip necrosis is a well-described syndrome in confinement feedlot cattle housed in tight conditions with slatted concrete floors, and has been reported in bulls being fed out, steers and heifers. Most references mention the initial cause as trauma, either by tails being stepped on or caught in slatted floors. Risk factors identified include slatted concrete floors, close confinement (increased stocking density), warm humid weather (May through September), and heavier body weights. These particular reports indicate that lesions begin at the tip of the tail with an inflammatory

reaction that gradually extends proximally. Microbiology of these cases reveals bacteria such as *Arcanobacterium pyogenes* or *Bacteroides spp.* In some of these cases ascending infection will involve the coccygeal nerve supply and result in tail paralysis. Management of these cases involved amputation of the tail and treatment with antimicrobials. This syndrome has been recognized by many veterinarians in our area and a case has been documented at the SDSU ADRDL (picture available by clicking the “What’s Up Doc?” link on the SDSU Vet Extension web page). In this case a feeder steer was presented in sternal recumbency with tail tip necrosis and polyarthritis. *A. pyogenes* was isolated from the joints and from lung abscesses in this steer.

However, the cases reported this summer differ significantly from the confinement animal cases in several ways:

1. **Animals affected.** Bulls have been the most frequently affected animals in this summer’s cases, affecting older bulls as well as yearlings. In some herds, cows and calves have been affected.
2. **Environment.** In sharp contrast to the tail-tip necrosis outlined in the literature, this summer’s cases were exclusively on pasture or open drylots, where the trauma due to slatted concrete floors is not an issue.
3. **Progression of the lesions.** In almost all cases reported this summer, the initial problem noted was simply that of loss of the switch hair. This progressed to a dry necrosis of the distal 5-6” of tail, leading to that part of the tail falling off. What is similar about these cases compared to the confinement feedlot cases is that, in many cases, ascending infection would ensue from this point on the tail. In a few affected animals, it was reported that infection ascended up the tail to the distal spinal column, leading to weakness & recumbency.
4. **Geographic location.** Bull tail-tip necrosis cases reported to SDSU seemed to originate from two general geographic areas:
 - a. **Northeast – North Central South Dakota,** e.g. Walworth, Campbell, Edmunds, Brown Counties and adjacent areas of North Dakota.
 - b. **Central – East Central South Dakota,** e.g. Brule, Aurora, Hutchinson Counties.

Bull tail-tip necrosis: Theorized Causes

1. **Selenium toxicosis:** Loss of tail hair has long been recognized as a clinical sign of chronic selenium (Se) toxicity. In most of these cases, this hair loss was the first observed abnormality. However, hoof cracks and subsequent lameness, which are also associated with chronic selenosis, have not been reported in these bull tail-tip necrosis cases. Especially in central SD, high-Se forages may be encountered, making this a differential in those cases but not necessarily in cases seen elsewhere.

Diagnosis of chronic selenosis is attempted on serum, whole blood, tissues, and hair samples. Serum samples increase quickly after a toxic dose, but rapidly return to normal levels, making serum relatively

insensitive at detecting long-term exposure. Liver and whole blood Se levels remain elevated for a longer time. The normal whole blood Se reference range reported at SDSU is $.2 = 1.2$ ppm, but some investigators report that levels as high as 5 ppm may be seen in apparently healthy animals (Raisbeck).

→ Serum and whole blood samples collected from affected animals this summer have all been in the normal range (n = 9; whole blood results ranged from .331 to .640 ppm)

Hair samples reflect a longer-term indication of Se intake. The key with analysis of hair samples is to send enough hair – a good handful from the flank. High Se in hair samples has been reported to be from 1.4 – 45 ppm (Puls). Another reference (Raisbeck) indicates that hair Se concentrations are usually > 1 ppm in cattle on normal Se diets, and concentrations >5 ppm are indicative of high Se exposure. In one study designed to measure the effects of high Se diets on finishing steers, steers were fed diets w/Se higher than normal, but not in the toxic range for 126 days. In these animals, hair samples ranged from 4.00 – 10.54 ppm (Lawler).

→ Hair samples from this summer’s affected animals (n = 7) ranged from 1.22 – 2.16, with 5/7 higher than 1.4 ppm. 3/5 “high” samples came from north central South Dakota, an area not usually considered high in Se.

It is postulated that high Se may play a role in loss of switch hair, which then makes the skin of the tail more vulnerable to trauma or penetrating injury. Because hair samples were higher than what some references indicate as normal, selenium toxicosis is a consideration in these cases of bull tail-tip necrosis. High hair Se concentrations were found in hair from areas not expected to be high-selenium areas; however, investigations are still pending on the levels of Se present in feedstuffs. With current allowable levels of Se in mineral supplements, these sources are not expected to contribute enough to dietary Se to turn a marginal Se situation into a potentially toxic circumstance (Wright).

On the other hand, none of the hair samples approached very high (5.0 ppm) levels, and none of these cases showed other signs of selenium toxicosis (notably lameness or hoof lesions).

2. **“Tail mites”.** Several veterinarians have indicated that early treatment with external parasiticide products have resulted in an arrest in the progression of this syndrome. The tail is an area that *Chorioptes bovis* mites can affect; however, primary sites for these mites are the posterior areas of the legs. Affected animals so far have not been reported to have mange-like lesions elsewhere on the body, and submitted samples have not shown evidence of mites. In addition, the season of the year and

confinement of the syndrome to mostly adult animals makes the role of mange seem unlikely. However, the response to treatment that some practitioners have noted is interesting and encouraging.

3. Fly strike leading to dermatitis & ascending infection. Most producers and veterinarians have noted that fly infestations seemed more severe this summer (2007) than in past years, thanks to an increase in moisture across the state this year. Fly strike in the area of the tail affected could result in dermatitis followed by a deeper ascending infection. An additional related factor is that when bulls lose their tail switch hair, their ability to swat flies is impaired. The likelihood of trauma is also greater when the switch hair is gone. With increased flies and increased moisture, the time bulls spent in stock dams and dugouts was greater. The possibility then exists that excessive moisture could make the tail skin more vulnerable to penetration by environmental bacteria.
4. Ergotism. Ingestion of ergot alkaloids, present in ergot bodies on certain plants, can result in dry gangrene of the tail, feet, and ears. Of all the differentials on the list, this is perhaps the most difficult to gain a handle on. Ergot bodies can populate pasture grasses, especially wheatgrass. Normally, warm, moist weather during the growing season fosters the growth of this fungus on grasses. Most areas of the state experienced relatively dry weather following a moist spring, and to date, extension educators have not noted any particular problems with ergot this year on pastures. Diagnosis of ergotism in animals is based only on clinical signs coupled with the presence of ergot bodies (dark brown/purple banana shaped bodies in place of the seeds) in feedstuffs.
5. Trauma. As outlined with the confinement cattle syndrome, tail necrosis can be a common sequelae to any sort of trauma to the tail. While the opportunities would presumably be much lower on pasture than in a confinement, instances of tail trauma could occur, especially if bulls are using tails to swat flies more frequently than normal.

Other Findings

Bacterial culture of submitted tissue yielded one case in which *Staph. hyicus* was grown, the significance of which is unknown. Histopathologic examinations have revealed vascular lesions and dermatitis.

Serum mineral analyses in some cases have shown decreased copper levels. Rough hair coats, though not hair loss, has been one of the many effects of copper deficiency documented. It is also possible that low copper levels may, through immunosuppression contribute to the severity of tissue infection once it starts.

In most cases, animals have been in good condition and have no other outward signs of illness. Some individual bulls

have had problems with ascending infections. More subtle, but significant effects on individuals lie in the inability to use the tail for fly avoidance; and bulls raised for sale are not desirable to buyers if the animals are affected with this condition.

Recommendations

While the causes of this syndrome are still being investigated, enough is known from experiences of veterinarians to provide some general guidance about treatment of these cases.

1. Early cases may respond to topical treatment with external parasiticides (cases which have not progressed past simple loss of switch hair).
2. Presence of infection responds to aggressive therapy. This will involve amputation of the tail proximal to the infected area and treatment with appropriate antibiotics.
3. Pay attention to mineral supplementation on pasture, particularly copper levels. Proper copper levels will depend on the status of other trace minerals and sulfur in the water sources.
4. Optimize fly control for bulls. This was a particular challenge this year, but may reduce tail trauma and dermatitis due to fly strike.
5. Continue to submit samples from affected animals. The more information we have, the more likely we are to better define the problem. Preferred samples to submit are:
 - a. Biopsy or amputated tail portion: fresh & fixed
 - b. Serum sample – for mineral analysis (spun down & poured off)
 - c. EDTA tube of whole blood – for Se analysis
 - d. Hair sample – clip a handful of flank hair
 - e. Skin scrapings for chorioptic mange – performed in-clinic
 - f. Optional = forage & water samples

We welcome observations and ideas regarding these cases. While this syndrome is maybe not as economically important industry-wide as other issues, it still represents a real and significant event for the animals affected and their owners.

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Microchips and Cancer – AVMA Statement

The American Veterinary Medical Association (AVMA) is very concerned about recent reports and studies that have linked microchip identification implants, commonly used in dogs and cats, to cancer in dogs and laboratory animals. AVMA staff and member veterinarians are actively looking into any potential for this technology to induce tumor formation in dogs, cats, or people but must await more definitive data and test results before taking further action.

Based on the fact that a large number of pets have already been implanted with this microchip technology and there has been a relatively small number of confirmed cases of chip-induced tumors, the AVMA advises pet owners against a rush to judgment on the technology. In fact, there is a concern among veterinary medical researchers that some of the research into chip-induced tumors may be flawed, because the animals used were genetically predisposed to cancer. In addition, removal of the chip is a more invasive procedure and not without potential complications.

It's clear that there is a need for more scientific research into this technology.

For more information, contact Michael San Filippo, AVMA media relations assistant, at 847-285-6687 (office), 847-732-6194 (cell), or msanfilippo@avma.org.

From: http://www.avma.org/aa/microchip/breaking_news_070913.asp

Studies: New Treatments for Horses with Navicular Disease

Washington State University's College of Veterinary Medicine is currently performing two studies on two new treatments for horses with navicular disease. These studies are supported by the American Quarter Horse Association

and by CEVA, a pharmaceutical company that produces a drug for navicular disease.

Horses with clinical signs of navicular disease are needed for these studies. Horses for these studies must have clinical signs typical of horses with navicular disease and have radiographs of their front feet that do not show defects on the flexor cortex. Horses that meet these criteria will receive MRI evaluation of the front feet at no charge to the owner. The owner must agree to participate in either study if their horse meets the criteria for either study based on MRI findings. In one study, all costs are covered by the study. Expenses for the owner would not exceed \$2,000 dollars for the other study.

General requirements:

- Horses must be 4 years of age or older, and can be any sex and breed
- Cannot be pregnant, lactating, or have systemic disease
- Cannot have navicular bone flexor cortex defects present on radiographs
- Horses will receive a free MRI evaluation

Go to www.vetmed.wsu.edu and click on "Equine Navicular Disease Study" for more information

Pieces and Parts

REMINDER – Credit on Swine Diagnostics Continues.

As part of an ongoing USDA grant for Classical Swine Fever (CSF, or Hog Cholera) surveillance, practitioners are able to receive a **\$50 credit per pig** (up to 3 pigs per case; cannot exceed maximum bill for the case) applied to the diagnostic bill **if** appropriate specimens for CSF testing are included.

Appropriate specimens to qualify for the credit are:

- Any age sick or dead pig from any of our clients (not restricted to SD clients)
- Must submit **dead pigs with tonsils** or **collect and submit a fresh tonsil** during an on farm necropsy

There is no charge to our clients for the passive CSF surveillance activity. The program will continue until December 31, 2007 or until funds are depleted. This is a tremendous opportunity to participate in an important surveillance activity and receive free diagnostic support at the same time. Please contact the ADRDL if you have questions about this program.

Access to BVDV-PI calves sought.

SDSU Veterinary Science Department researchers are seeking access to 6-8 calves that have been diagnosed as BVDV-PI, for purposes of sample collection. If you know of producers who have kept such calves, please contact Dr. Chris Chase at 605-688-5171 or christopher.chase@sdstate.edu.

SDSU Extension Extra Spotlight:

1. Effects of Shipping and Heat Stress on Embryonic Mortality in Cattle (ExEx 2063). Researchers have demonstrated adverse effects of shipping animals and of

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heat stress in early gestation, manifested as early embryonic loss and low pregnancy rates. This publication explains those effects and offers solutions, such as the optimal time to move recently bred animals, to minimize these effects.

2. Effects of the Environment on the Nutritional Needs of Grazing Livestock (ExEx 4037). This publication outlines the various factors affecting energy requirements of grazed cattle, including frame size, breed, landscape, and season and temperature. It discusses the impact of forage quantity and availability, and gives practical advice on choosing supplementation for cattle on pasture.

These publications, along with many others, are available for free at <http://agbiopubs.sdstate.edu> or at your county extension office.

Request from Serology Section. Whenever it's possible, ship large serology submissions in the manufacturer's blood tube boxes (the kind where tubes are shipped upright in their individual compartments). The section currently has a need for those kinds of storage boxes. Call the serology section at 605-688-5171 if you have questions. Thank you!

New Submission Forms Available on ADRDL Website. Visit <http://vetsci.sdstate.edu>, click on "Diagnostic Laboratory", then "Submission Forms" to view recently added species- and test area-specific submission forms. Call 605-688-5171 or e-mail tanya.graham@sdstate.edu with questions or feedback about the new forms.

Research News - SDSU Veterinary Science Department

Research Spotlight: Dr. Weiping Zhang

Dr. Weiping Zhang joined the SDSU Veterinary Science Department and the Center for Infectious Disease Research and Vaccinology in 2005. He is a native of China, where he achieved his BS and MS degrees, before completing his PhD at Iowa State University. His research focuses on molecular pathogenesis of ETEC-associated diarrhea, vaccine development against porcine diarrhea, molecular marker development and molecular epidemiology.

Research activities in vaccine development against enterotoxigenic *Escherichia coli* (ETEC)-associated porcine post-weaning diarrhea (PWD)

Post-weaning diarrhea (PWD) caused by enterotoxigenic *Escherichia coli* (ETEC) is economically one of the most important diseases in the swine industry. Porcine PWD is characterized by severe diarrhea, dehydration, slow growth, weight loss, and death. It is estimated that ETEC-associated PWD disease causes up to 5% mortality of young pigs within herds, and nearly \$90 million in losses each year for swine producers in the U.S. alone. Yet, there are no commercial vaccines or effective treatments available to protect weaned pigs from PWD.

To develop an effective vaccine to protect young pigs from PWD, we must identify the virulence determinants in the disease. It has been suggested that the key virulence factors in ETEC-associated diarrhea are bacterial fimbriae and enterotoxins. Bacterial fimbriae attach *E. coli* strains to the porcine small intestine and cause bacterial colonization. Then, the colonized *E. coli* strains secrete enterotoxins, mainly heat-labile (LT) and heat-stable (STa, STb) toxins, which stimulate fluid hyper-secretion and result in diarrhea.

The number one question for our research program is: What are the virulence factors associated with PWD? Prevalence studies indicated that ETEC strains expressing K88 (F4), F18, K99, 987P or F41 fimbriae, and one or more enterotoxins [LT, STa, STb; another toxin, Stx2e, is associated with porcine edema disease (ED)] were isolated from young pigs with diarrhea. Our recent study on 304 *E. coli* strains isolated from pigs with PWD suggested that pathogenesis of PWD could be more complicated and other virulence factors including enteroaggregative *E. coli* toxin 1 (EAST1), and non-fimbrial adhesions, such as: adhesin involved in diffuse adherence (AIDA-I), porcine attaching and effacing-associated factor (paa) and *E. coli* attaching and effacing factor (EAE), could also contribute to PWD.

We found that fimbrial *E. coli* strains isolated from pigs with PWD express K88 (64.6%), F18 (34.3%), F41 (0.57%), K99 (0.57%), 987P (0%), LT (57.7%), STb (72.6%), STa (27.4%), Stx2e (17.4%), EAST1 (35%), AIDA-I (26.9%), paa (60%), and EAE (1.1%). The most common pathotypes associated with PWD are K88/LT/STb (42.5%), K88/LT/STb/EAST1 (23.9%), and F18/STa/STb/Stx2e (31.7%). These data indicate that K88 and F18, and LT, STa and STb are still the dominant fimbriae and enterotoxins associated with PWD, respectively. However, it is noticeable that EAST1 is commonly associated with PWD, and the paa adhesin shows surprisingly high prevalence in PWD.

Knowing that K88 and F18 fimbrial *E. coli* strains expressing one or more enterotoxins are the major causes of PWD, we seek to determine which of those enterotoxins play a major role in stimulation of fluid secretion in porcine small intestines. To identify virulence determinants of enterotoxins in PWD, we developed a study model using a model

pathogen (a genetically engineered *E. coli* strain expressing only one fimbria and one enterotoxin of interest at a time) and conducted animal challenge studies using gnotobiotic (germ free) piglets. We found LT toxin causes severe diarrhea disease in all pigs, and STb causes disease in 60 – 70% of pigs. A strain expressing STa toxin causes mild diarrhea in all pigs, but a strain expressing K88 fimbria alone does not cause any disease. Significance of EAST1 and STx2e in PWD currently is under investigation in our laboratory.

By now, we know that LT, STb, and STa enterotoxins stimulate fluid hyper-secretion and cause diarrhea in pigs. Thus, any effective vaccines against PWD must include antigens from LT, STb, and STa enterotoxins. However, there are two challenges in developing vaccines using enterotoxins as antigens. First, they are toxic--so native toxins cannot be directly used in vaccine development. Second, STa and STb are small toxins--they are poorly immunogenic, so using them as antigens will provide no protection. To resolve the toxicity problem, we used genetic engineering techniques to mutate the toxin genes to produce low- or non-toxic LT and STa proteins. These low- or non-toxic proteins then can be used as safe antigens. To resolve the poor immunogenicity problem, we also used genetic engineering methods to genetically fuse the STa and STb to a carrier protein to enhance their immunogenicity.

We have produced a non-toxic LT mutant toxin, which does not cause diarrhea in young pigs. This LT mutant is also an ideal carrier protein for STa and STb. One of our

current USDA-funded vaccine projects (awarded to Dr. Francis) using antigens from K88ac and genetic fusion of LT and STb shows great potential. Another of our ongoing research projects is to produce a non- or low-toxic STa mutant toxin, and a genetic fusion of LT and STa fusion protein as vaccine antigens.

We currently focus on live vaccine development against PWD, because of its high efficacy and low cost. Development of live vaccines needs a selection marker system; currently, antibiotic selection markers are the most commonly used. However, this has the potential to release antibiotic resistance genes into environment and increase populations of antibiotic-resistant pathogens, which may make medical treatments using antibiotics ineffective. One of our current research projects, funded by National Pork Board, is to develop a non-antibiotic selection marker for live vaccine development.

It is clear to us that antigens from F18 fimbria and perhaps EAST1 toxin need to be included as vaccine components because of their prevalence in *E. coli* strains associated with PWD. Our next research projects will assess the virulence contribution of EAST1 toxin in PWD and to select antigens from F18 fimbria as vaccine components. In addition, studying the virulence significance of non-fimbrial adhesins in PWD, such as the paa and AIDI-A adhesins, are also on our research agenda to better understand pathogenesis of PWD and develop better strategies to prevent or control this disease.

Student News - SDSU Veterinary Science Department

The following is a list of the incoming freshmen who have declared a pre-vet major for Fall semester 2007 at SDSU:

South Dakota

Brandon – Andrew Rogen
Brookings – Kristen Kludt
Brookings – Anne Schaefer
Chamberlain – Tyler Grussing
Clear Lake – Jessica Tetzlaff
Gann Valley – Rebecca Lutter
Garretson – Anthony Donelan
Gayville – Sarah Carda
Kimball – Heather Dykes
Oldham – Sarah Hojer
Parkston – Kendra Wiechmann
Sioux Falls – Heather Brandenburg
Sioux Falls – Stacy Erickson
Sioux Falls – Ben Lamp
White River – Jessica Ludvik

Minnesota

Andover – Abigail Barnes
Edgerton – Alexa Vanden Bosch

Fairmont – Anna Petrowiak
Holloway – Kimberly Boese
Lake Wilson – Cody Hill
Lakefield – Alyssa Hesemann
Minneota – Barbara Derynck
Pipestone – Emily Evans
Sleepy Eye – Melissa Lax
Wadena – Brittney Strayer
Iowa
Cherokee – Jade Dilocker
Cleghorn – Eric Rueter
Lester – Jennifer Bosch
Rock Valley – Chelsie Ver Mulm
Spirit Lake – Amanda Lindsey

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SDSU Veterinary Science Department

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The SDSU Veterinary Science Department conducts research, teaching, professional service, and extension service to South Dakota and the surrounding region. Entities within the department include the South Dakota Animal Disease Research and Diagnostic Laboratory, the Olson Biochemistry Laboratory, and the Center for Infectious Disease Research and Vaccinology.

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 monitor 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.

Phone: (605) 688-5171 · Fax: (605) 688-6003 · Website: <http://vetsci.sdstate.edu>

Calendar of Events

November 8-9 – Swine Disease Conference for Swine Practitioners, Scheman Building, Iowa State University, Ames, IA <http://www.ucs.iastate.edu/online.htm>

November 29-December 1 – Academy of Veterinary Consultants Winter Meeting, Renaissance Denver Hotel, Denver, CO <http://www.avc-beef.org>

December 1-5 – American Association of Equine Practitioners, Gaylord Palms Resort & Convention Center, Orlando, FL www.aaep.org

December 7-9 – Wyoming Veterinary Medical Association Winter Meeting, Casper, WY <http://www.wyvma.org/>

December 11-13 – Range Beef Cow Symposium XX The Ranch at Larimer County Fairgrounds, Ft. Collins, CO <http://www.rangebeefcow.com/>

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