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RETURN SERVICE REQUESTED

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www.vet.uga.edu/dlab

MEET THE FACULTY



Dr. Sree Rajeev is an Associate Professor in the Department of Infectious Disease, College of Veterinary Medicine, UGA. She has been working as the section head of the Bacteriology and Mycology division of the TVDIL since 2005. Dr. Sree Rajeev

received her Degree in Veterinary Medicine from Kerala Agriculture University, India in 1980, and her PhD in Comparative and Experimental Medicine from The University of Tennessee in 2002. She is a board certified Veterinary Microbiologist (Bacteriology and Virology in 2000 and Immunology in 2002). In India, she worked as a Veterinary Officer in Department of Animal Husbandry, Government of Kerala for 10 years. Prior to coming to Georgia, she was a Veterinary Microbiologist at the Animal Disease Diagnostic Laboratory, Ohio, for 3 years. Her major research focus is developing new and innovative methodologies for the diagnosis and prevention of leptospirosis in domestic animals.

Dr. Uriel Blas-Machado is a boarded veterinary pathologist and associate professor who joined the AVDL in 2005 after 4 years in the Oklahoma diagnostic laboratory in Stillwater, OK. He received his DVM from Louisiana State in 1987, after which he worked for 7 years as a mixed animal practitioner in his native Puerto Rico before returning to LSU to train and complete his graduate work in veterinary pathology in 1998. Dr. Blas continued pathology training in Comparative Pathology at the Wake Forest (Bowman Gray) School of Medicine in Winston-Salem, NC on an NIH fellowship. Dr. Blas also worked as Toxicologic Pathologist for Charles River Company in 1999 and 2000. He enjoys necropsy and is currently studying the pathogenesis of Bovine enterovirus-1 and how it affects our cattle industry. Dr. Blas also has expertise in laboratory animal pathology which has allowed him to successfully attract contract research projects and contribute to the development of the AVDL's Georgia Laboratory Animal Division.



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Do You Have A Difficult Case?

The faculty and staff at both laboratories are available for phone consultation on any submitted sample, and are pleased to help you with your more challenging cases. Pathologists are available to consult on the medical cases from cytology, biopsy, and necropsy submissions, while Microbiologists can consult on interpretation of your submitted cultures, PCR tests, and serology results. We want to help you help your patients – Call Us!

MESSAGE FROM THE DIRECTORS

Jeremiah (Jerry) T. Saliiki and Murray E. Hines II

We are once again pleased to share some information with you through the Spring 2011 issue of Diagnostic Veterinary Matters. In 2010, we faced several challenges, chief among which were the deteriorating budget situation and a difficult business environment that resulted in a slight decline in our caseload. We are happy to report that in spite of these challenges, the laboratory system begins the 2011 calendar year with our services intact and our highly trained staff still on board.

We want to extend a very warm welcome to our new Commissioner of Agriculture, Mr. Gary Black. We know that his new administration has ushered in an innovative era in the Department of Agriculture. We are ready and eager to fulfill our role as affiliated units of the Department of Agriculture to assist the Commissioner in implementing his vision for the future.

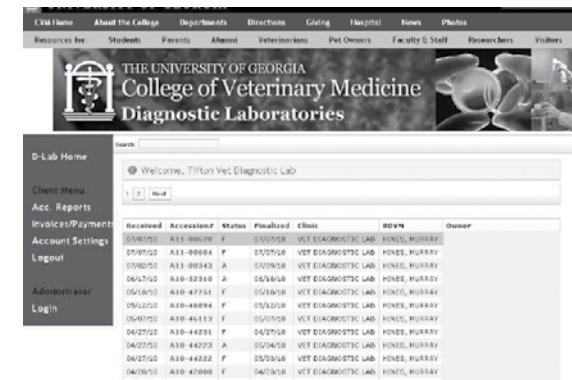
The budget situation and business environment remain as difficult challenges for the laboratories this year. In fact, the recently submitted

State budget from the Governor's office includes a 6% cut in the diagnostic laboratories' budget for the remainder of fiscal year 2011 (ending on June 30) and an additional 2% cut for FY 2012 (beginning on July 1). We have managed to retain the vast

majority of our services to you in the face of these difficult times by using a combination of management efficiency, technological improvements, postponement

of equipment replacements, and user fee increases. Going forward, we recognize that our user fees need to remain at modest levels for our laboratories to continue to fulfill their mission of disease surveillance in the state of Georgia. However, our inability to replace any major equipment over the last 3 years means we now risk service disruptions if major equipment failures occur.

As an example of the technological improvements we have implemented in the delivery of services to you, we invite you to visit our updated web site at www.vet.uga.edu/dlab. In particular, we want you to take note of our comprehensive list of test



services and to make use of our D-Lab web portal for obtaining results and making invoice payments online. It is now possible for you to view the results of all your cases submitted to either laboratory, view and print invoices and pay your bill online. We welcome any suggestions on further improvements in our delivery of services to you.

As in the past, we will continue our efforts to explore ways of using technology to keep operation

costs down, so we can continue to offer our clients with accurate and reliable diagnostic services at a reasonable cost. We look forward with excitement to fulfilling our role as affiliated units of the Department of Agriculture and the UGA College of Veterinary Medicine. We thank all our clients and the Department of Agriculture for the opportunity to partnership with you in promoting animal health, protecting agriculture, and contributing to the economic well-being and public health within the state of Georgia.

VETERINARY FORENSIC PATHOLOGY CASES – WHO CAN YOU CALL?

By Doris M. Miller DVM, PhD

The importance of the veterinarian's role in animal cruelty cases has recently been highlighted in the news media and numerous journals. In December, the AVMA endorsed a document called "Practical Guidance for the Effective Response by Veterinarians to Suspected Animal Cruelty, Abuse and Neglect" which is intended to aid veterinarians in establishing individual, practice-specific policies and procedures that best serve the needs of the animal, the client, the veterinarian and the community. This manual will shortly be available from the AVMA to all veterinarians on their website or by calling them at 1-800-248-2862. The association of animal cruelty and human-directed violence has been documented since the 1700's. In Georgia, veterinarians who testify in these cases are immune from civil and criminal prosecution per Georgia Code Section 4-11-17. To assist with preparing and producing veterinarians who are capable and confident in their abilities to recognize, report and investigate cases of animal cruelty, the UGA College of Veterinary Medicine is now providing basic forensic training to veterinary students. A review of the necropsy cases submitted to the Athens Veterinary

Diagnostic Laboratory from 2005 through 2010 revealed a doubling of the forensic/cruelty cases from 16 to 31 per year. The majority of these cases presented with a history of starvation, abandonment,



Forensic analysis in cat strangulation

suspicious death, gunshot, or trauma. Increased public awareness of reporting suspected animal cruelty, increased willingness to prosecute and increased training of animal control officers have been suggested as reasons for the increased submissions in addition to the economic downturn and increased home foreclosures. Questions about potential cases can be directed to Dr. Doris Miller at 706-542-5568 or 706-255-1196. She can help you with information on evidence collection and preservation, photographic documentation and working

with local authorities, other organizations, etc. Additional information is available at: www.avma.org, and www.ivfssa.org (the International Veterinary Forensic Sciences Association). Two recent books written for veterinary practitioners are: "Veterinary Forensics: Animal Cruelty Investigations," by Dr. Melinda Merck, Blackwell Publishing, 2007; and "Forensic Investigation of Animal Cruelty – a Guide for Veterinary and Law Enforcement Professionals," by Sinclair, Merck, and Lockwood, Humane Society Press, 2006. When submitting potential animal abuse, cruelty, or legal cases to a veterinary diagnostic laboratory please call ahead to alert the laboratory pathologist on duty and speak to him/her if possible. Submission forms should be completely filled out, including any additional background information. Information such as suspected trauma, gunshots, exposure to poisons, treatment by referring veterinarians and any reports or documentation from animal control are valuable to the pathologist. If bullet fragments are to be retrieved and returned to the law enforcement agency, radiographs will be taken at an additional charge.

ATHENS VETERINARY DIAGNOSTIC LABORATORY

1. Dr. Doris Miller won the 2010 E.P. Pope Award of the American Association of Veterinary Laboratory Diagnosticians (AAVLD) during the 53rd annual meeting in Minneapolis, MN, on Nov. 14, 2010. The Pope Award is the highest award given by the AAVLD and is presented to an individual who has made noteworthy and significant contributions to the Association in regard to implementing and advancing the recognition of the specialty of veterinary diagnostic laboratory medicine. Congratulations to Dr. Miller on winning this prestigious award that bestows honor not only on her but also to the Diagnostic Laboratories and the UGA College of Veterinary Medicine.
2. Paula Bartlett, Sara Bates, Ingrid Fernandez and Rachel Steffens successfully completed the 2010 proficiency tests for classical swine fever and foot-and-mouth disease. Their success helps the lab maintain its NAHLN certification for these tests and assures that our lab is prepared to handle any outbreaks of these devastating diseases in Georgia.
3. Dr. Angela Ellis has been recommended for promotion to Associate Professor, with tenure effective July 1, 2011. Congratulations on this achievement, which not only recognizes her stature but assures that she can continue to provide our clients with high quality diagnostic pathology services.
4. Jenny Embry successfully completed the Equine Infectious Anemia (Coggins) certification proficiency test. Jenny is now authorized to certify Coggins test results and sign the federal form.

TIFTON VETERINARY DIAGNOSTIC AND INVESTIGATIONAL LABORATORY

1. Dr. Moges Woldemeskel has been recommended for promotion to Associate Professor with tenure effective July 1, 2011. Congratulations to Dr. Woldemeskel for his achievements and for providing high quality diagnostic services for the Tifton Laboratory.
2. Dr. Debra Miller was also recommended for promotion to full professor effective July 1, 2011. However, she resigned from the Tifton Veterinary Diagnostic and Investigational Laboratory effective January 3, 2011. She had been a faculty member at the Tifton Lab for approximate 10 years. Dr. Miller has accepted a new position as an Associate Professor and Wildlife Pathologist at the Center for Wildlife Health at the University of Tennessee, Knoxville TN. We thank her for her dedicated service to the Tifton Laboratory and wish her all the best in her new position.
3. Dallas Ingram successfully completed the 2010 proficiency test for Johne's disease ELISA and Anaplasma ELISA tests. Julie Musgrove has successfully completed the 2010 proficiency test for Johne's disease ELISA and Pseudorabies gB ELISA tests. Kristie Goins has successfully completed the 2010 proficiency test for Anaplasma ELISA and Pseudorabies gB ELISA tests.
4. Julie Musgrove, Dallas Ingram, Kristie Goins, Jill Johnson and Michele Coarsey successfully completed the 2010 proficiency tests for foot-and-mouth disease and classical swine fever.



Dr. Lee Jones is the new **Field Investigator** for the Tifton VDIL and an Assistant Professor in the Department of Population Medicine. Lee Jones has a Master of Science from UGA in 1987, worked in bovine reproductive technology research, development and production until 1994 and received his DVM from Colorado State University in 1998. He practiced in Nebraska and founded Frontier Genetics, a cattle embryo transfer and equine breeding company. He has served the Nebraska VMA as a Director and Chairman of the Large Animal CE Committee, Chairman of the AABP Reproduction Committee and Director of the Beef Leadership Team with the North Central Repro Task Force. His research interests include beef cattle herd health, calf pneumonia, stocker/backgrounding health programs, and advanced reproductive technologies in beef cattle. He is available to train veterinarians in cattle reproductive programs and for practitioner case consultations. Contact him at the Tifton VDIL at 229-386-3340.

PERSONNEL HIGHLIGHTS

NEW PCR TESTS - ATHENS LABORATORY

Streptococcus zooepidemicus PCR Test

Streptococcus equi subsp. *zooepidemicus* (*S. zooepidemicus*) is a well recognized pathogen in horses. The most common presentation is respiratory disease but abscesses in lymph nodes and joints can also occur. In recent years *S. zooepidemicus* has been reported as a highly contagious cause of hemorrhagic pneumonia in dogs. Its ability to spread quickly has created big problems in pounds and shelters. Although, more often identified in group situations, reports have shown that individually

housed animals can also be affected. Over the past two years, several dog necropsy cases in the Athens lab have been diagnosed as *S. zooepidemicus* pneumonia. Due to the rapid onset and severity of the disease, diagnosis by culture is not productive as it can take from 24-72 hours for identification. To assist our clients with the diagnosis of *S. zooepidemicus* we have implemented a DNA test that it is both sensitive and specific and will allow diagnosis within 24hrs of receiving the sample.

S. zooepidemicus PCR can be ordered individually (\$30), or as

a package as we have made it part of our Canine Respiratory Panel* (\$95). Nasal swabs and lung tissues are the best samples.

S. zooepidemicus PCR is also suitable for screening samples from horses. In addition, we also perform PCR tests for *Streptococcus equi* subsp. *equi* and *Rhodococcus equi*. The turnaround time for these tests is 24hrs from sample receipt. If you have any questions about any of these tests or any other molecular tests, please, contact the laboratory at 706-542-5568.

| | | | |
|--|---|--|--|
| PRRS - \$30 Porcine Reproductive and Respiratory Syndrome Virus. Preferred Samples: Fresh lung tissue, serum. Turnaround time: 2-3 days. | IBR - \$30 Infectious Bovine Rhinotracheitis, Bovine Herpesvirus-1 (BHV-1) Preferred Samples: Fresh lung tissue, nasal swabs, lung lavage, semen. Turnaround time: 24 hours | Neospora caninum - \$30 Preferred Samples: Fresh tissues including brain, and fetal tissues. Turnaround time: 24 hours. | Toxoplasma gondii - \$30 Preferred Samples: CSF, aqueous humor, fresh tissues including brain any other affected tissue. Turnaround time: 24 hours. |
| Mycobacteria Identification/Speciation - \$100 Performed after in-house culture, or on submitted culture tube with isolate. Turnaround time: 7-14 days. | Cryptosporidium parvum - \$30 Preferred samples: Feces, fresh GI tissue (lower part of small intestine preferable). Turnaround time: 24 hours | Giardia spp. - \$30 Preferred samples: feces, fresh GI tissue (small intestine preferable). Turnaround time: 24 hours. | *Our Canine Respiratory Panel includes the following tests: Bordetella bronchiseptica, Canine adenovirus types 1 and 2, Influenza type A, Canine distemper virus, Mycoplasma spp and <i>S. zooepidemicus</i> . |

NEW ENHANCED MILK TESTING PANELS NOW OFFERED IN ATHENS AND TIFTON LABS

| Description | Fee | Contents |
|----------------------|--|--|
| Milk Panel 1 | \$8/sample | Aerobic culture with identification of up to 3 species and Mycoplasma culture with no speciation |
| Milk Panel 2 | \$16 for 1st sample; \$10 for subsequent samples | Same as milk panel #1 above plus somatic cell counts |
| Bulk Tank Milk Panel | \$20/sample | Aerobic culture, Mycoplasma culture, standard plate count, coliform count, and somatic cell count. Sensitivity is available upon request at no extra cost. |

CUMULATIVE ANTIMICROBIAL SUSCEPTIBILITY PATTERNS OF MOST COMMON BACTERIAL ISOLATES OBTAINED FROM CANINE EAR SAMPLES SUBMITTED FOR CULTURE TO TVDIL FROM 7/1/2009 TO 6/30/2010

By Sree Rajeev BVSc, PhD, DACVM



Agar plate demonstrating susceptibility testing on *Pseudomonas* sp

Otitis externa is one of the most common clinical problems encountered in small animal practices. Bacteria are a major cause of this condition and most of these agents normally colonize the ear canals and proliferate as a result of inflammation or damage to the external ear canal. Therapy consists of the removal of any predisposing causes and antibacterial therapy. The table given below illustrates the antimicrobial susceptibility data obtained from the most common bacteria isolated at the Tifton Veterinary Diagnostic and Investigational Laboratory from canine ear samples during 7/1/2009 to 6/30/2010.

| Organism | Number of isolates | List of antibiotics and percentage of isolates from each species resistant to each antibiotics | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------------------|--------------------|--|------|------|------|------|------|------|-------|------|------|------|-------|-------|------|------|------|------|------|------|------|------|------|------|------|
| | | AMCL | AMPL | CZOL | CFOX | CEPH | CLOR | CPRX | CLIND | ENRO | ERTH | GENT | IMPIN | NITRO | OXAC | PENG | TETR | TICR | TM-C | TMSZ | CEFD | CTIO | DIFX | ORBX | MARB |
| <i>Pseudomonas aeruginosa</i> | 130 | 100 | NA | 100 | NA | 100 | 86 | 7 | 100 | 37 | 99 | 18 | 1 | NA | NA | 98 | 11 | 10 | 98 | NA | 99 | 45 | 62 | 1 | |
| <i>Staphylococcus intermedius</i> | 117 | 2 | 65 | 2 | NA | 2 | 4 | 9 | 11 | 8 | 11 | 8 | 2 | 0 | 2 | 65 | 18 | NA | 2 | 2 | 15 | 3 | 9 | 9 | |
| <i>Streptococcus</i> sp group G | 68 | 0 | 0 | 0 | NA | 0 | 4 | 9 | 7 | 9 | 4 | 10 | 0 | NA | NA | 0 | 20 | NA | NA | 1 | NA | 0 | 10 | 30 | |
| <i>Proteus mirabilis</i> | 59 | 2 | 7 | 10 | NA | 10 | 31 | 2 | 100 | 5 | 100 | 3 | 97 | NA | NA | 92 | 2 | 0 | 7 | 0 | 0 | 8 | 7 | | |
| <i>E.coli</i> | 47 | 21 | 40 | 15 | 11 | 34 | 6 | 26 | 100 | 26 | 79 | 23 | 0 | 0 | NA | NA | 26 | 32 | 11 | 26 | 15 | 17 | 32 | 26 | 2 |
| <i>Enterococcus</i> sp | 36 | 3 | 11 | 100 | NA | 100 | 8 | 17 | 100 | 11 | 14 | 100 | 8 | 39 | NA | 8 | 28 | NA | NA | 100 | NA | 100 | 52 | 25 | 1 |
| <i>Staphylococcus schleiferi</i> | 24 | 4 | 21 | 4 | NA | 4 | 0 | 4 | 0 | 4 | 0 | 8 | 4 | 0 | 4 | 21 | 0 | NA | 4 | 4 | 4 | 8 | 13 | 9 | |

Name of antibiotics listed in the table: AMCL -Amoxicillin-clavulanate, AMPL-Ampicillin, CZOL -Cefazolin, CFOX- Cefoxitin, CEPH-Cephalothin, CLOR-Chloramphenicol, CPRX -Ciprofloxacin, CLIND -Clindamycin, ENRO-Enrofloxacin, ERTH-Erythromycin, GENT -Gentamicin, IMPIN -Imipenem, NITRO -Nitrofurantoin, OXAC -Oxacillin, PENG-Penicillin G, TETR -Tetracycline, TICR -Ticarcillin, TM-C-Ticarcillin-clavulanate, TMSZ-Trimethoprim-sulfamethoxazole, CEFD -Cefpodoxime, CTIO -Ceftiofur, DIFX-Difloxacin, ORBX -Orbifloxacin, MARB- Marbofloxacin; NA-not applicable(these antibiotics were not present in the panel used due to various reasons).

ENTEROTOXEMIA IN SHEEP AND GOATS

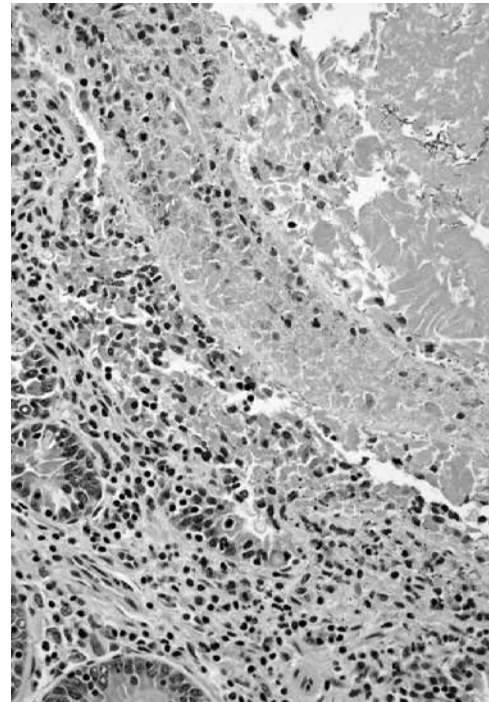
By Murray E. Hines II DVM, PhD, DACVP

Enterotoxemia, also known as overeating or pulpy kidney disease, is a condition caused by *Clostridium perfringens* type D. These bacteria are normally found in the soil and as part of the normal microflora in the gastrointestinal tract of healthy sheep and goats. Under specific conditions, these bacteria can rapidly reproduce in the animal's intestine, producing large quantities of toxins. The epsilon toxin produced by *C. perfringens* Type D is the most significant toxin in producing the disease. Young animals are most susceptible. Sudden and high mortality rates may occasionally occur in lambs and kids. Although adult animals are also susceptible to enterotoxemia, they develop immunity due to frequent exposure to low doses of these toxins.

Factors Associated with Enterotoxemia Outbreaks

Overgrowth of *Clostridium perfringens* type D in the intestine of sheep and goats resulting in enterotoxemia are more likely to occur during the following conditions:

- Excessive consumption of milk or feed with high concentrations of grain
- When natural immunity is compromised such as when ill, recovering from an illness or stressed
- When animals are heavily parasitized with gastrointestinal parasites, including nematodes, cestodes (tapeworms) and coccidia
- When the ration is rich in carbohydrates (grains) and low in roughage
- When motility of the gastrointestinal tract is reduced



Necrotizing enteritis and Clostridia bacteria

Common Signs of Enterotoxemia

The peracute form is most frequent in young animals. It is characterized by sudden death that occurs approximately 12 hours after the first signs of the disease appear. Some kids or lambs may show signs of central nervous disease, such as excitement or convulsions. Sudden death may occur in only minutes in kids or lambs showing neurological disease. Typical clinical signs include:

- Loss of appetite
- Abdominal discomfort
- Profuse and/or watery diarrhea that may be bloody

Diagnosis

Diagnosis is based on clinical signs, history of sudden death and confirmation by necropsy examination. Diagnosis can be confirmed by positive identification of enterocolitis, anaerobic culture, and identification of *Clostridium*

perfringens type D from the feces or intestinal contents from clinical or necropsy specimens of affected animals. The presence of hyperglycemia and glucosuria can strongly suggest enterotoxemia in live or dead animals. Necropsy data is important for the diagnosis of enterotoxemia. Therefore, dead animals or a complete set of necropsy tissues, feces, etc., should be submitted to the diagnostic laboratory for confirmation of the clinical diagnosis. A postmortem examination of the large and small intestines can identify watery contents, blood and fibrinous clots, and small ulcers on the mucosa. The kidneys on gross examination may have a soft pulpy consistency and encephalomalacia may occur within the brain (usually only seen in sheep). On microscopic examination there may be accelerated autolysis or diffuse acute necrosis of the proximal tubules in the kidney. Microscopic ulcers and superficial mucosal necrosis with numerous associated clostridial organisms and mild suppurative inflammation may be present in intestinal specimens. Intestinal lumens will often contain abundant clostridial organisms suggesting clostridial enteritis/enterotoxemia. Advanced postmortem autolysis often prevents definitive diagnosis of enterotoxemia at necropsy due to the extensive overgrowth of clostridial organisms after death of the animal. Specific DNA testing assays (PCR) for *Clostridium perfringens* type D may be useful for confirmation of the diagnosis. An ELISA kit is also available for the detection of several clostridial toxins including the epsilon toxin and identification of the *C. perfringens* organism itself from intestinal contents.

Treatment

Recommended treatments can include the following:

- *Clostridium perfringens* C & D antitoxin according to the manufacturer's recommendations (5 mL of C & D antitoxin subcutaneously)
- Antibiotics, especially penicillin
- Orally administered antacids
- Anti-bloating medication
- Pain reduction
- Intramuscular thiamine (vitamin B1) to prevent or treat the encephalomalacia
- Supportive therapy such as intravenous or subcutaneous fluids and corticosteroids
- Probiotics after antibiotic therapy to encourage repopulation of the microflora in the GI tract

Prevention

Effective vaccines are commercially available to prevent enterotoxemia in sheep and goats. All animals (especially young animals) within the herd should be vaccinated as it will reduce the chances that the animals will develop the disease. Use vaccines that are labeled for use in sheep and goats and follow the manufacturer's recommendations. Some of the commercially available vaccines against enterotoxemia are also combined with tetanus toxoid. Make sure the vaccine has been refrigerated, stored properly, and is not expired. Young animals should be vaccinated at 4 weeks of age and again one month later. All adults including bucks should be vaccinated at least once per year. Do not vaccinate animals that appear ill and keep good vaccination records for future reference.

HELPFUL HINTS: TIFTON LAB

GOOD NEWS! The Tifton Veterinary Diagnostic and Investigational Laboratory is now offering On-Line Results and On-Line Payments for clients. Please call Krista Mattocks at 229-386-3340 to set up your on-line account. You can access your on-line account at: <http://www.vet.uga.edu/dlab/>. Go to the TIFTON On-Line Results & Payments link. Sign in using your User Name and Password assigned by the Tifton Lab.

*As of March 31, we will no longer be offering the PRV serum neutralization or Latex agglutination test. These tests have been replaced by the PRV gB and g1 ELISAs.

*EIA forms: We are aware of several cases where horses or donkeys have been delayed at the

Canadian border and various state lines due to missing descriptions of marking on the EIA form. All markings must be drawn in with a written description at the bottom. Please check your forms carefully especially if the animals are being shipped. Once the forms leave the laboratory, they cannot be changed without permission from the State Veterinarian's Office.

*If you are shipping an animal overseas, please submit a copy of the destination country's regulations so that we can ensure the paperwork meets all of the export requirements. Some countries have very specific requirements for testing and by including a copy of the forms we can help you avoid delays. If you have any questions, please call the lab at 229-386-3340.

REGULATORY TESTS

The Athens and Tifton Diagnostic Laboratories have assumed responsibility of state brucellosis, pseudorabies and anaplasmosis regulatory testing since the closure of the Atlanta Brucellosis Laboratory. We would like to remind our clients that these tests are **no longer free** due to state budget cuts. The fees for each test are anaplasmosis (\$9.00), pseudorabies (\$5.00) and brucellosis (\$3.00).

NEW TESTS -TIFTON : AMMONIA TESTING

- The Tifton Diagnostic Lab now offers blood ammonia testing for small and large animals. Specimen: EDTA PLASMA (Purple Top Vacutainer)
- Procedure: Collect and mix thoroughly. Immediately centrifuge for three minutes and separate the plasma from the cells and refrigerate immediately. It is very important to keep it cold.
- Volume of specimen: 1 mL
- Shipping instructions: Ship overnight with ice packs. If collected on Friday, don't ship the specimen until Monday. Freeze and hold it until Monday then ship on ice packs. The specimen must stay cold.
- Fee: \$12.00 per sample.
- Test Schedule: Same day as received.