



Summer 2013

Your Continuing Contribution to Veterinary Medicine

Twenty years ago, the Division of Comparative Pathology established a section of our laboratory with the goal of providing a strong avian, exotic, and wildlife diagnostic test array to meet the changing needs of our veterinary clients. The response of the veterinary community has been exceptional. The wealth of unique samples that have been submitted to our laboratory as well as the funds derived from performing the clinical tests has combined to provide numerous opportunities to perform valuable research studies and further the field of veterinary medicine. Your contributions have been invaluable.

We know there are many options open to you in the selection of laboratories to perform your diagnostic testing. We value your continued consideration of our services and welcome your collaborative efforts in furthering the field of avian, exotic, and wildlife medicine.

Our commitment to specialized veterinary medicine:

79 presentations at national and international meetings
73 journal articles
4 book chapters

Our Commitment to Excellence

The University of Miami Avian & Wildlife Laboratory is managed by the faculty of the Division of Comparative Pathology. Our laboratory is directed by a Diplomate of the American College of Veterinary Pathologists and has operated as part of the university for the past 30 years serving practitioners throughout the world.

The main strength of the test services is our academic base. Our pathologists can use the broad expertise of other members of the Department of Pathology as well as the clinical and basic research faculty of other university departments. Furthermore, our staff includes faculty involved in basic research which not only broadens our proficiency in diagnostics but assists our service in meeting and understand your needs in special diagnostic cases.

See more about our lab at www.cpl.med.miami.edu
Contact us at (800)596-7390 or compathlab@med.miami.edu

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***Encephalitozoon cuniculi* Panel**

About the Assays

The antibody test is performed in the ELISA format and results are currently reported as a titer – meaning the sample is diluted and tested through the endpoint of its reactivity on the ELISA. CRP is a standardized automated assay providing quantitative results.

Sample Collection and Submission

Fresh non-hemolyzed serum or plasma samples are desirable. Freezing should be considered if delays greater than 4 days are present. All samples should be centrifuged and separated to a size appropriate transport tube even if a gel separator is present in the tube.

Interpretation of Results

It is common to have seropositive (ECUN IgG+) rabbits. However, those rabbits which are infected carry significantly higher titers of antibody. The mean titer of infected animals is 1:1324. In addition, they demonstrate significantly higher levels of gamma globulins. Notably, animals with ocular involvement vs. those with neurological or renal signs demonstrated lower amounts of antibody. Studies of experimentally and naturally infected rabbits have demonstrated a strong association of IgM titers with active infection. Studies are underway to address the longevity of these IgM titers at this time. The absence of IgM suggests exposure or previous infection; however, given our previous studies, high IgG titers without IgM seroconversion should still be strongly considered as infected animals.

CRP is a major acute phase protein in rabbits. This biomarker will increase with systemic inflammatory processes. While not diagnostic of ECUN infection, the elevation of this protein will be supportive of infection and results can be interpreted in conjunction with IgG and IgM titers. Acute phase proteins can provide key prognostic value. With a positive response to treatment, CRP levels can drop within 24 hours.

References:

- C. Cray, G. Arcia, S. Kelleher, R. Schneider, and K. Arheart. Application of ELISA and protein electrophoresis in the diagnosis of *Encephalitozoon cuniculi* infection in rabbits. *American Journal of Veterinary Research*, 70(4):478-482, 2009.
- C. Cray. New testing option for the diagnosis of *Encephalitozoon cuniculi* in rabbits. *ExoticDVM*, 11(2):27-28, 2009.
- C. Cray, M. Rodriguez, and Y. Fernandez. Acute phase protein levels in rabbits with suspected *Encephalitozoon cuniculi* infection. *Journal of Exotic Pet Medicine*, in press.

Using and establishing the diagnostic standards. No shortcuts in handling your samples.

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Acute Phase Protein Laboratory

The Acute Phase Protein Laboratory was established in 2010 after a lengthy research investigation to implement and validate new methodologies. Acute phase proteins (APP) are valued biomarkers in human medicine and have been commonly used in all areas of veterinary medicine in Europe for many years. These assays were not available in the United States until now.

APP are key markers of an inflammatory response. APP are commonly increased with trauma, infection, stress, neoplasia, and inflammation. This pathway to restoring function and healing is found in all animals and man. While these proteins are not specific for a particular disease, they have been valued in human and veterinary medicine for their sensitivity to underlying health problems. They are used as part of wellness exams where they provide valuable adjunct information to routine blood work like a complete blood count and biochemistry panels. In addition, in animals with acute or chronic disease, these markers have key value in prognostication. As the animal responds to treatment and since APP have a short half-life, the biomarkers drop very quickly.

In addition to our work with rabbits (see adjoining article on ECUN panel), we have studies in the following species: ferrets, birds, bearded dragons, sharks, turtles, dolphins, manatees, elephants, alpacas, horses, and zebra. Check our website to find updates on publications in this area.

Recent Presentations

Dr. Carolyn Cray presented findings of the application of acute phase protein biomarkers for the detection of inflammation which accompanies high levels of EEHV viral infection at the 9th Annual International EEHV workshop sponsored by The International Elephant Foundation and the Houston Zoo which was held in January in Houston. This novel application provides a foundation of highly sensitive diagnostic tests permitting routine monitoring of domestic and wild elephant populations that allow earlier treatment of elephants demonstrating EEHV symptoms and aid in prognostication during aggressive antiviral therapy and intensive care. This work was completed in collaboration with Baylor University, Houston Zoo, Saint Louis Zoo, and Feld Entertainment and the study is currently in press in the *Journal of Zoo and Wildlife Medicine*.

Dr. Cray also presented her collaborative work on acute phase proteins in a talk entitled, "Clinical pathology studies: from penguins to dolphins" at the Georgia Aquarium Research Symposium held on February 28 – March 1, 2013. This symposium gathered the scientific community to review recent research advances made possible through support from the Georgia Aquarium. Dr. Greg Bossart, Senior Vice President of Animal Care, Research, and Conservation at the Georgia Aquarium and adjunct faculty member in our laboratory, presented the plenary session on the second day entitled, "One Health and the Oceans: The Integration of Marine Mammal, Human, and Environmental Health in Practice."

Quality diagnostics with an active research program.

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Proud Sponsor of the 2013 AAV Meeting

We are pleased to again sponsor a session at the annual AAV meeting. This year we have the honor of sponsoring the Disease Syndromes session held on the opening day, August 4. Dr. Carolyn Cray will be presenting her current work entitled, "Alternative Antigen Detection Testing for Avian Aspergillosis" in this session. She is a co-author on 2 other presentations including a poster presentation entitled, "Monoclonal Bands Observed in Protein Electrophoresis of Plasma in Avian Samples".

As always, you will find our laboratory service represented in the exhibit hall. Please stop by to get all the latest news and updates on our clinical and research programs.

What You Might be Missing When You Don't Use Electrophoresis

With the advent of new protein analysis technologies, EPH is now routine in many laboratories and has been found to be very helpful in avian medicine. EPH profiles the acute phase response. This response has been found to be more sensitive than monitoring WBC counts alone in mammalian species.

The utility of EPH has been demonstrated as an accessory tool in the diagnosis of chlamydophilosis, aspergillosis, and sarcocystosis. In addition, our laboratory has also performed a retrospective study describing changes in EPH fractions in birds with liver disease.

Our laboratory was the first to publish an extensive study defining EPH as applied to psittacine species. Species specific reference intervals were presented. A goal of this publication was to aid other labs in standardizing their own avian EPH techniques. We have since published two other important papers. The first demonstrated that there are significant differences between EPH methods currently used at different laboratories. The second demonstrated the avian albumin measured on all chemistry analyzers is invalid and that albumin should be measured using EPH only.

Selected Citations from Our Laboratory:

Journal of Avian Medicine and Surgery, 12:4-10, 1998.

Veterinary Clinical Pathology, 36(1):67-72, 2007.

Journal of Avian Medicine and Surgery, 25(1):14-22, 2011.

Journal of Avian Medicine and Surgery, 25(2):102-111, 2011.

Dr. Cray is pleased to be a Scientific Committee Member for the 2014 International Society of Animal Clinical Pathology conference. The meeting is entitled, "*The Frontiers of Veterinary Laboratory Medicine - Cutting Edge and Ideas for the Future - for Inspiration and Motivation*". Look for more at www.isacp2014.org.



Recent and Upcoming Publications

C. Cray, M. Rodriguez, and Y. Fernandez. Acute phase protein levels in rabbits with suspected *Encephalitozoon cuniculi* infection. *Journal of Exotic Pet Medicine*, in press.

H. Beaufreere, J. Nevarez, N. Wakamatsu, S. Clubb, C. Cray, and T. Tully. Experimental diet-induced atherosclerosis in Quaker parrots (*Myiopsitta monachus*). *Veterinary Pathology*, early in press DOI: 10.1177/0300985813488958.

T. Passler, M.F. Chamorro, K.P. Riddell, M.A. Edmondson, E. van Santen, C. Cray, and P.H. Walz. Evaluation of methods to improve the diagnosis of systemic inflammation in alpacas. *J Vet Int Med*, early in press 10 MAY 2013, DOI: 10.1111/jvim.12102.

J. Stanton, C. Cray, M. Dickey, M. Rodriguez, K. Arheart, P. Ling, and A. Herron. Acute phase protein expression during elephant endotheliotropic herpesvirus-1 viremia in Asian elephants (*Elephas maximus*). *J Zoo Wildl Med*, in press.

F. Tang, S. Messinger, and C. Cray. Use of the indirect sampling method to produce reference intervals for hematology and chemistry analyses in samples from psittaciforms. *J Av Med Surg*, in press.

C. Cray and Y. Rivas. Serological survey for antibody to *Encephalitozoon cuniculi* in dogs in the United States. *J Parasitol*, 99(1):153-154, 2013.

C. Cray, K. Arheart, M. Hunt, L. Leppert, K. Roberts, S. McCulloch, J. Goldstein, C. Gonzalez, J. Sweeney, R. Stone, P.A. Fair, and G. Bossart. Acute phase protein quantitation in serum from healthy Atlantic bottlenose dolphins (*Tursiops truncatus*). *J Vet Diag Invest*, 25(1):107-111, 2013.

G. Bossart, K. Arheart, M. Hunt, L. Leppert, K. Roberts, S. McCulloch, J. Goldstein, C. Gonzalez, J. Sweeney, R. Stone, P.A. Fair, and C. Cray. Protein electrophoresis of serum from healthy Atlantic bottlenose dolphins (*Tursiops truncatus*). *Aquatic Mammals*, 38(4):412-417, 2012.

Visit Our Website

Please visit our updated website to learn more about the Avian & Wildlife Laboratory and the Acute Phase Protein Laboratory. All feedback is very much appreciated.

- Latest News and Publications
- Make a Payment
- Access Patient Results
- Test Updates

Acute Phase Protein Laboratory – Research to Service

- Established in 2010
- Over 13 papers published or under submission and 17 presentations
- More than 10 studies underway



Quality diagnostics with an active research program. An academic based laboratory service which provides routine and specialized test services while furthering the field of avian, exotic, and wildlife medicine.

Contact Us!

Client Services is available to serve you Monday through Friday. We can also be reached via the web.

Phone (800) 596-7390
(305) 243-6700

Fax (305) 243-5662

Email: compathlab@med.miami.edu

Web: www.cpl.med.miami.edu

Staff of Comparative Pathology

Norman Altman, VMD, DAVCP

Carolyn Cray, PhD

Julia Zaias, DVM, PhD, DACLAM

Greg Bossart, VMD, PhD

Susan Clubb, DVM

Ruth Ewing, DVM

Don Harris, DVM

*See you at AAV in
Jacksonville!*

