Researching Respiratory Physiology & Medicine in Dolphins

Diagnostic Approaches for the Polydipsic/Polyuric Patient

Featured Case:

Maxillomandibular Fixation in the Cat

Gary Norsworthy
DVM, DABVP
MAKING A DIFFERENCE IN GLOBAL CONSERVATION

Protect, Educate, Donate & Care

Abaxis and VetScan are registered trademarks of Abaxis, Inc. © Abaxis 2015.
Learn more about all of our products and services at www.abaxis.com.
06 Abaxis Distributors
A comprehensive list of North American Abaxis distributors

09 Coming to a Show Near You
Abaxis Tradeshow Schedule

32 Ti Map’s Story | A Rescued Moon Bear Completes His Long Journey Home
By Joost Philippa DVM, PhD
Senior Veterinarian

35 Tetanus in a Baby Scimitar-horned Oryx: a Multidisciplinary Approach
By Olga Amann, DVM, ECVM (Avian) Diplomate

10 Maxillomandibular Fixation in the Cat
By Gary Norsworthy, DVM, DABVP (Feline)

14 85 Pelicans Fighting to Survive
By J. Jill Heatley DVM, MS, DABVP, DACZM

16 Dr. Google Diagnosed Ringworm Instead of Immune-mediated Thrombocytopenia...
By Robert Lofsky, DVM

18 Researching Respiratory Physiology & Medicine in Dolphins
By Micah Brodsky, VMD

20 Diagnostic Approaches for the Polydipsic/Polyuric Patient
By Andrew Rosenfeld, DVM, ACVIM

24 Hypotrichosis in a Grizzly Bear
By Liza Dadone, VMD
Eric Klaphake, DVM, DACZM, DABVP (Avian), DABVP (Reptile/Amphibian)

28 The Drill: On the Brink of the Known...
By Ainare Idoiaga
What’s On Your Mind?

If you have a question, we’ll answer it. If you have a tip or valuable experience, we’ll share it. If you have a suggestion, we’ll take it to heart. We’ll be sharing many of your letters and emails in upcoming editions of Vetcom and together we’ll make this an extended and engaging conversation. So let us hear from you.

EDITORIAL TEAM
Valerie Goodwin-Adams
Director, Marketing
Editor in Chief
Andrew Rosenfeld
DVM, ACVIM
Animal Health Director
Medical Editor
Baerbel Koehler
Manager, Wildlife Medicine
Abaxis Europe
Andrew Ghiringhelli
Graphic Designer
Abaxis

ADVISORY BOARD
BRENT HOFF
DVM, DVSc (Clin Path),
DIPLOMA TOXICOLOGY
DON HARRIS
DVM
GARY NORSWORTHY
DVM, DABVP - FELINE
HEIDI WARD
DVM, DACVIM -
ONCOLOGY
JAN BELLOWS
DVM, DAVDC, DABVP
CANINE AND FELINE
KAREN ROSENTHAL
DVM, MS
KATE AN HUNTER
DVM
STEVE LEVY
VMD
KENDAL HARR
DVM, MS, DACVP
KENT ADAMS
DVM
MARK MITCHELL
DVM, MS, PHD, DIPL.
ECZM-Herpetology
MARY ANNA THRALL
DVM, MS, DACVP
TERRY C. GERROS
DVM, MS, DACVP
CHERYL A. LONDON
DVM, PHD, DACVIM -
ONCOLOGY

Interested in having your case featured in Vetcom? Send to vetcom@abaxis.com or click vet.abaxis.com/vetcom
Welcome to Vetcom, An Abaxis International Publication, volume #55. Vetcom is read by veterinarians, veterinary technicians and office staff from all over the world, therefore, our issues always have some international news and cases. Vetcom offers readers case studies, practice tips from a clinical perspective as well as educational opportunities and recent news from Abaxis.

STRATEGIC DIGITAL INSIGHTS
Are digital efforts at the center of your clinics strategy?
Strategies from a marketer. Me.

Today, a digital strategy - and the wealth of data and consumer insights that tells us digital is BIG - Video/Digital must be the cornerstone of any successful company or clinics go-to-market strategy. Customers are no longer limiting interactions with a brand or company solely through the traditional forms of media. The one-size fits-all approach is gone.

Today, a digital strategy should be the centerpiece of customer interaction as customers are spending so much time glued to a mobile device, your customers are likely to interact with your brand/clinic outside of the office. When planning your digital strategy, think beyond your website, think about a Youtube channel, apps, mobile ready websites and micro-sites. Consider, using your smart-phones or iPads video function to get customer testimonials then post on your website to enhance the customer experience.

Digital communication and digital platforms are here to stay. At Abaxis, we leverage digital media in an effort to educate via Abaxis University and communicate with the veterinary community, and according to our viewership data, video is a very popular media outlet.

In this print and digital issue of Vetcom we have some amazing cases from Dr. Norsworthy, to cases from around the world in our OnLocation section that will surely touch your heart.

Please note our digital plug-ins in the digital edition of Vetcom.

Sincerely,

Valerie Goodwin-Adams
Editor-in-Chief - Vetcom Publications
Director, Marketing
valeriegoodwin@abaxis.com
510-675-6604
Want to learn more about Abaxis Products and Services?
Log onto the Abaxis Veterinary Reference Center at www.abaxis.com/veterinary to view videos on:

- VetScan Analyzers
- Abaxis University
- VetScan Rapid Tests
- Abaxis Service and Support

Abaxis is Hiring
1. Multiple positions at corporate headquarters in Union City, CA
2. Field Sales
3. Marketing Professionals
4. Professional Service Veterinarians
For more information, go to www.abaxis.com

AUTHORIZED US ABAxis DISTRIBUTORS

Animal Health International ................................................................. 877-289-9252
Equipment Outreach, Inc. ................................................................. 888-996-9968
Great Western Animal Health Supply, Inc. ........................................... 800-888-7247
Hawaii Mega-Cor, Inc. ................................................................. 800-369-7711
Henry Schein Animal Health ................................................................. 855-724-3461
Merritt Vet Supply ........................................................................... 800-845-0411
Midwest Veterinary Supply ................................................................. 800-328-2975
MWI ......................................................................... 800-824-3703
Northeast Veterinary Supply (NVSCO) ................................................. 717-526-7990
Patterson Veterinary ......................................................................... 800-225-7911
Penn Veterinary Supply, Inc. ................................................................. 800-233-0210
Western Medical Supply Inc. ................................................................. 800-242-4415

CANADIAN DISTRIBUTORS

Associated Veterinary Purchasing ......................................................... 604-856-2146
Aventix* ................................................................. 877-909-2242
CDMV ......................................................................... 450-771-2368
Midwest Veterinary Distributors ......................................................... 204-233-8155
Veterinary Purchasing ......................................................................... 519-284-1371
Vet Novations Canada, Inc. * ......................................................... 866-382-6937
Western Drug Distribution ................................................................. 780-413-2508

*Distributor of Equipment only. No Reagents
INDUSTRY THOUGHT LEADERS
ONLINE CONTINUING EDUCATION (CE) FOR VETERINARIANS, TECHNICIANS AND PRACTICE MANAGEMENT PROFESSIONALS.

LEARN LIVE OR ON-DEMAND. YOU CHOOSE.
(some of the course offerings listed below)

Gary Norsworthy, DVM, DABVP
Renal Insufficiency in Cats

Andrew Rosenfeld, DVM, DABVP
Fluid Therapy and Diagnostic Monitoring of the Patient on IV Fluids
Evaluating for Liver Damage and Dysfunction
Managing the Acute and Chronic Renal Patient

Jan Bellows, DVM, DAVDC, DABVP
Dental Anatomy and Nomenclature – Cat
Dental Anatomy and Nomenclature – Dog
How to Skyrocket Your Dental Practice

Debra Horwitz, DVM, DACVB
Twitching, Itching and Licking: Behavioral Dermatology in Cats

Kendal Harr, DVM, MS, DACVP
Mineral Metabolism & Pathology - Part I
Mineral Metabolism & Pathology - Part II
General Quality Assurance

www.abaxisuniversity.com

Abaxis, Inc. – Animal Health 3240 Whipple Road, Union City, CA 94587. Abaxis and VetScan are registered trademarks of Abaxis, Inc. ©2014
CUSTOMER SAMPLING

Veterinary Facilities & Foundations

Medical/Research

Zoos/Aquariums

Universities

REGISTER ONLINE NOW AT THECVC.COM

SPACE IS LIMITED

ABAXIS INFORMATION

EVERYTHING YOU NEED TO KNOW ABOUT CANINE MAST CELL TUMORS | MAST CELL TUMOR WORKSHOP

Given by

DR. HEIDI WARD, DVM, DACVIM @ CVC in DC | Saturday, April 25 | 8AM - 12PM

REGISTER ONLINE NOW AT THECVC.COM

SPACE IS LIMITED
ON THE ROAD

The Abaxis Tradeshow Schedule

04/10/15 – 04/12/15
FLORIDA VMA
Orlando, FL

04/11/15 – 04/12/15
SAN DIEGO COUNTY VMA
San Diego, CA

04/18/15 – 04/19/15
AMVQ
Montreal, QB

04/24/15 – 04/26/15
CVC IN DC
Washington DC

05/15/15 – 05/17/15
NEW YORK STATE VMA
Rye Brook, NY

05/15/15 – 05/17/15
NEW YORK STATE VMA
Rye Brook, NY

06/18/15 – 06/19/15
VERMONT VMA
Burlington, VT

06/21/15 – 06/23/15
MONTANA VMA
Big Sky, MT

06/21/15 – 06/23/15
WYOMING VMA
Sheridan, WY

07/11/15 – 07/13/15
AVMA
Boston, MA

07/16/15 – 07/19/15
CANADIAN NATIONAL VMA
Calgary, AB
MAXILLOMANDIBULAR Fixation (MMF) is a form of closed reduction resulting in normal occlusion for repair of fractures of the jaw and luxation of the temporomandibular joints.\(^1\) It is performed with the mouth open or closed. Closed mouth fixation can be accomplished in several ways including the use of interarcade wiring,\(^2\) tape muzzle,\(^3\) and the use of a nylon loop placed subcutaneously around the nasal and maxillary bones and the mandible.\(^4\) Open mouth fixation has been performed by interdigital bonding of the canine teeth\(^5\) and external skeletal fixation.\(^6,7\) Each method has advantages and disadvantages. The main disadvantage of a closed mouth technique is the risk of aspiration following vomiting or regurgitation. Therefore, the use of an open mouth technique is generally preferred.

One of the significant issues in the use of MMF is the cat’s ability to eat during the time of fixation. Open mouth fixation may permit slurping of blenderized food; however, closed mouth fixation renders the cat incapable of oral ingestion of food. The use of an esophagostomy or gastrostomy tube is appropriate in open mouth fixation and mandatory in closed mouth fixation.

**Indication:** To fix the mandibular in relation to the maxilla following reduction or repair of
- Temporomandibular luxation
- Temporomandibular fracture
- Mandibular fracture
**Procedure**

- General anesthesia is induced.
- Anesthesia is maintained without intubation.
- An esophagostomy tube is placed using a standard placement technique.
- A 0.2 cm (5/64 inch) intramedullary pin is inserted dorsal to the left side of the hard palate between the roots of the second and third upper premolars. *Figure 1.*

After passing the wire through the nasal cavity it was passed ventral to the mandible using a large suture needle.

- The pin is directed laterally so it would exit the nasal cavity at the corresponding location on the right side of the skull. The pin is removed.
- A 20 ga. stainless steel wire is inserted through the nasal cavity entering and exiting the holes made by the pin. *Figure 2; Blue Arrow.*

- One end of the wire is threaded through the eye of a large, curved suture needle, which is inserted as near as possible to the lateral aspect of the left side of the mandible.
- The needle is directed ventral to the mandible and then lateral to the right side exiting in the contralateral corresponding location to its insertion. *Figure 2; Red Arrow.*
- The ends of the wire were twisted together partially closing the mouth but leaving about 0.5 cm of space between the upper and lower incisor teeth. *Figures 3 and 4.*

The two ends of the wire were twisted together to secure the fixation.

Incomplete oral closure left the incisors about 0.5 cm apart.
• Radiographs are made to confirm wire placement. Figure 5a, b.

Figure 5
Ventrodorsal (a) and lateral (b) radiographs show placement of the wire.

Completion of Procedure

• The wire is removed when the fracture is healed or there has been sufficient time for healing of the peri-TMJ structures. For TMJ luxation, approximately 10 days is generally sufficient.
• The cat is anesthetized.
• The wire is cut on both sides of the twisted union permitting removal by traction on the contralateral side of the jaw. Figure 6.
• The esophagostomy tube is removed either at the time the wire is removed or when it is evident that the cat is eating.

Figure 6
After cutting the wire on both sides of the twisted ends, it was extracted using needle holders.

References
Dr. Gary Norsworthy is a Diplomate of the American Board of Veterinary Practitioners (Feline) and owner of Alamo Feline Health Center where he is a full-time practitioner. He is the editor of six feline textbooks and has lectured extensively in the US, Canada, Brazil, and Australia. He and his practice have been the recipient of several professional awards. He regularly hosts senior veterinary students as part of their externship requirements. He and his wife have two children and four grandchildren.
RECENTLY, The Wildlife Center of Texas has admitted 85 critically injured brown pelicans from Galveston. These state-endangered birds have been impaled by fishing hooks and lures both internally and externally. Many have fishing line with weights tightly wrapped around their bodies, beaks, and legs. Radiographs reveal many have hooks, line, and sinkers deep in their gastrointestinal tracts that will require surgery. They are emaciated and suffering from infections, open wounds, and parasites.

The Wildlife Center of Texas is Houston’s ONLY wildlife trauma and rehabilitation center that accepts ALL injured, sick, or orphaned native wildlife species. Already this year, we have admitted 9,200 animals, comprising over 200 species. Our Emergency Wildlife Response Team is the “go-to” organization when natural or man-made catastrophes impact the environment and the animals. We are on call 24-7 and have been responding to oil spills for the last 30 years. With the increasing damage and destruction done to the environment and loss of habitat, the need for our life-saving services continues to grow.

I hope you’ll consider making a year-end tax deductible donation, right now to The Wildlife Center of Texas.
Advanced Veterinary Hematology with the Color VetScan HM5

The color VetScan HM5 hematology analyzer combines the simplicity of an intuitive user menu with proven accuracy and precision in a 5-part differential. Featuring a new touchscreen control, the HM5 is now easier to use than ever!

5-part CBC

Features & Benefits
- Flexibility for 15 different species
- Small sample volumes allow for smaller draw volumes
- Direct EOS counts for accurate measurements
- Intuitive touchscreen menu for simple, easy operation
- Results trending allows easy patient monitoring over time
- 5000 record data storage
- Easy to read combined chemistry/hematology printout

Abaxis and VetScan are registered trademarks of Abaxis, Inc. © Abaxis 2015.
Learn more about all of our products and services at www.abaxis.com
A new client came into our clinic thinking that his dog Henry, a six year-old neutered male American Eskimo Spitz had Ringworm. Based on his internet research, the new client told us that Henry had some Ringworm-like spots on his skin. The owner had recently moved and came into our clinic for the first time.

On general physical examination, I noted several random multi-focal areas of ecchymosis on the abdomen near the inguinal and axillary regions. There was also a small area of conjunctival hemorrhage on Henry’s left eye and retinal hemorrhage was noted on indirect ophthalmoscopic examination. There were no petechia seen on oral examination however, the gingival tissues were markedly erythemic and some gingival bleeding was evident.

After further questioning, the owner remarked that it was very unlikely Henry had access to any rodenticides. There was no history of trauma or recent tick exposure and the only medication Henry was receiving was his monthly topical Selamectin.

I advised the owner that Henry’s skin lesions were likely the result of a bleeding disorder and suggested we do some blood work to determine the cause. Henry was admitted into the clinic for the day. Using our in-clinic Abaxis analyzers, we were able to get a diagnosis within minutes.

We used our HM5 CBC, VetScan Chemistry and VSpro coagulation to determine that Henry’s skin lesions were the result of a marked Thrombocytopenia (Figures 1, 2, 3).
In fact, Henry had zero platelets which was confirmed on the blood film reading. Having the VSpro Specialty Analyzer on site helped us to rule out rodenticide poisoning and other coagulopathies. We obtained the medical records from Henry's previous Veterinarian and it was noted that Henry had been tested for tick-borne pathogens four months earlier.

Based on all of the above and the severity of the Thrombocytopenia, I concluded that this was most likely an idiopathic immune-mediated Thrombocytopenia.

Henry was immediately started on Prednisone, Azathioprine and Famotidine at 2mg/kg every 24 hours. Since the hematocrit was normal, I advised that Henry be discharged and cage-rested for the next two weeks until his platelet count started to return to normal. The possible sequelae were detailed to the owner and he was advised that if Henry’s condition got worse, he should go to a Veterinary referral centre, as he may require a blood transfusion.

One week later; Henry returned to our clinic and to our relief, his platelet count increased to 558 x 10e9/L (Figure 4). Thanks to our HMS CBC analyzer, we have been able to repeat the blood work every week and make recommendations on tapering the immunosuppressive medications all within the same appointment ie-without having to wait for outside lab results. Currently, Henry is doing great and so far, his platelet count has stabilized using 1mg/kg of Prednisone and Azathioprine.
IN August 2014, Dr. Andreas Fahlman (Texas A&M University – Corpus Christi) (TAMUCC), Dr. Micah Brodsky (Micah Brodsky, V.M.D. Consulting), and collaborators from Dolphinaris (Dr. Leonardo Ibarra, Mr. Carlos Camarena, Dr. Raul Fuentes, and Dr. Esmeralda Sepúlveda) came together in Quintana Roo, Mexico, to continue developing effective lung function testing in cetaceans (dolphins and whales). This project is part of a long-term study that includes collaborators from academic institutions, conservation organizations, zoo’s and aquariums around the world, including Dolphinaris.
Dolphins and whales are mammals, with similar respiratory anatomy to their terrestrial counterparts, however they routinely perform amazing feats of physiology. Some species can dive thousands of meters deep (the maximum recorded dive is deeper than 2900m) and hold their breath for up to two hours, while actively hunting. When they return to the surface the demands placed on their respiratory system are extreme. Dolphins can exchange up to 95% of their lung volume in a single breath (compared to approximately 50% in terrestrial mammals), with peak expiratory flows over 200 l/s reported in the literature. That flow rate is more than 10 times faster than a human, and approximately 2.5 times faster than a galloping horse (the respiratory super hero of terrestrial mammals).

The research team is working to develop minimally invasive testing methods for measuring respiratory parameters under physiologically normal conditions. In addition to providing key information on diving physiology, respiratory physiology, and measuring metabolism, this work has significant implications for clinical medicine. Respiratory tract disease is one of the most important causes of morbidity and mortality in wild dolphins and whales, as well as in collection animals. While lung function testing is routine in human physiology and medicine, testing dolphins presents numerous unique challenges that have historically precluded utilization of this important diagnostic tool. The methods developed by this team are likely to prove extremely valuable in the triage and evaluation of stranded marine mammals, providing critical, real time information on respiratory disease, metabolic derangement, and ventilatory disturbances that inform decisions on euthanasia, attempted rehabilitation, or attempted “immediate” release of these majestic animals.

With support from Abaxis, and our dedicated colleagues at Dolphinaris, we were recently able to test different techniques, and to identify novel approaches for obtaining arterial blood (this is extremely challenging in dolphins because of their vascular anatomy). The ability to estimate arterial blood gasses from respiratory gasses will allow for non-invasive real time assessment of blood gases. In addition, the work supported by Abaxis brings us closer to accurately characterizing the respiratory system of marine mammals and to validating our methodology and custom built equipment.

Like most wildlife, dolphins mask clinical signs of illness until they are very sick. Developing diagnostic tools with the potential to provide early diagnosis and localization of respiratory disease, in real time, is critical for enhancing our ability to provide cutting edge medical care for animals under direct human care. The physiological information we gather from these animals can be applied to free ranging, wild dolphins and whales, stranded animals, and those in rehabilitation. Understanding the normal, baseline physiological function of dolphins and whales has significant implications for conservation in the rapidly changing environment of the world’s oceans.
We have all had one every once in a while; an owner who comes in with the primary concern that their best friend is urinating in the house and drinking tons of water. The patient’s appetite can be generally good, their energy and all other factors appear normal; however, the patient cannot control their thirst and urination. The Polydipsic/Polyuric (PU/PD) canine patient can be a frustrating treatment challenge to the owner and the veterinarian.

And so did my enigma came in late one Friday afternoon. His name was Dylan, an 8 year old Male Neutered Beagle, with a complaint of polyuria and polydipsia for 4 weeks duration and inappropriate urination in the house. His medical history, noted that he was drinking more in the last month. He was not straining to urinate or producing a poor stream; he was simply urinating more volume, more frequently. There was no history of vomiting, diarrhea, coughing or sneezing. He was not being given any over the counter or prescription medications and had no known exposure to toxins. He had been on a Blue Buffalo Senior diet and his appetite was normal. Furthermore, he was current on his vaccinations, had no travel history and his two other beagle house mates were healthy.

A physical examination of Dylan revealed a slightly overweight beagle with mild lenticular sclerosis and mild dental tartar. All other physical systems appeared within normal limits. I explained to the owner about the many potential causes for the increased urination and thirst and started with some base line diagnostic tests. The results were as follows:

<table>
<thead>
<tr>
<th>Test</th>
<th>Findings</th>
<th>Normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBC</td>
<td>21,250 (h)</td>
<td>5,500-19,500</td>
</tr>
<tr>
<td>Lymphocytes</td>
<td>1250 (l)</td>
<td>1500-7000</td>
</tr>
<tr>
<td>Monocytes</td>
<td>750</td>
<td>0-850</td>
</tr>
<tr>
<td>Neutrophils</td>
<td>19,200 (h)</td>
<td>2500-12500</td>
</tr>
<tr>
<td>Eosinophils</td>
<td>50</td>
<td>0-1500</td>
</tr>
<tr>
<td>Basophils</td>
<td>0</td>
<td>0-100</td>
</tr>
<tr>
<td>RBC</td>
<td>5750</td>
<td>5500-8500</td>
</tr>
<tr>
<td>HCT</td>
<td>38%</td>
<td>35-55%</td>
</tr>
<tr>
<td>Hemoglobin</td>
<td>10.5</td>
<td>9.5-15</td>
</tr>
<tr>
<td>Platelet</td>
<td>225000</td>
<td>200000-500000</td>
</tr>
</tbody>
</table>
Urine culture and baseline cortisol levels were normal. The blood work was not conclusive for any obvious cause of the PU/PD. I listed the problem list as a stress leukogram, an elevated alkaline phosphatase, mild hyperglycemia, mild hypercholesterolemia, a low T4 and a hyposthenuric urine specific gravity. The low urine specific gravity supported the patient’s complaint.

With elevation in alkaline phosphatase and cholesterol, the concern of Cushing’s disease was the next possibility. An ACTH response test was completed the next day with hopes that this PU/PD beagle was Cushinoid. However, the next day showed a completely normal diagnostic test. With Hyperadrenocorticism (and hypoadrenocorticism) ruled out. Where was the next possibility? Could the patient need a water deprivation test? Could I really have a Diabetes insipidus patient? Do I need an internist to finish this case for me? This was tough.

To get a better understanding of how to handle these cases, the potential causes of primary PU/PD need to be discussed. The following are potential causes:

- Kidney Disease
- Liver Disease
- Hypercalcemia
- Hyperadrenocorticism
- Hypoadrenocorticism
- Diabetes Mellitus
- Diabetes Insipidus
- Psychogenic Polydipsia

### DIAGNOSTIC APPROACHES FOR THE POLYDIPSIC / POLYURIC PATIENT

#### VS2 Chemistry:

<table>
<thead>
<tr>
<th>Test</th>
<th>Findings</th>
<th>Normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albumin</td>
<td>2.6</td>
<td>2.5-4.4 g/dl</td>
</tr>
<tr>
<td>Alk Phos</td>
<td>552 (h)</td>
<td>20-150 IU/L</td>
</tr>
<tr>
<td>ALT</td>
<td>75</td>
<td>10-118 IU/L</td>
</tr>
<tr>
<td>Amylase</td>
<td>752</td>
<td>200-1200 IU/L</td>
</tr>
<tr>
<td>T Bilirubin</td>
<td>0.2</td>
<td>0.1-0.6 mg/dl</td>
</tr>
<tr>
<td>BUN</td>
<td>12</td>
<td>7-25 mg/dl</td>
</tr>
<tr>
<td>Calcium</td>
<td>10.7</td>
<td>8.6-11.8 mg/dl</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>5.6</td>
<td>2.9-6.6 mg/dl</td>
</tr>
<tr>
<td>Creatinine</td>
<td>0.7</td>
<td>0.3-1.4 mg/dl</td>
</tr>
<tr>
<td>Glucose</td>
<td>120 (h)</td>
<td>60-110 mg/dl</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>277 (h)</td>
<td>125 – 270 mg/dl</td>
</tr>
<tr>
<td>T4</td>
<td>0.5 (L)</td>
<td>1.1 – 4.0 µg/dl</td>
</tr>
<tr>
<td>TP</td>
<td>6.2</td>
<td>5.4-8.2 g/dl</td>
</tr>
<tr>
<td>Globulin</td>
<td>3.0</td>
<td>2.3-5.2 g/dl</td>
</tr>
</tbody>
</table>

#### Urinalysis results:

<table>
<thead>
<tr>
<th>Urinalysis</th>
<th>Results</th>
<th>Normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urine specific gravity</td>
<td>1.009</td>
<td>&gt;1.035</td>
</tr>
<tr>
<td>Protein</td>
<td>Neg</td>
<td>Neg</td>
</tr>
<tr>
<td>Blood</td>
<td>Neg</td>
<td>Neg</td>
</tr>
<tr>
<td>Glucose</td>
<td>Neg</td>
<td>Neg</td>
</tr>
<tr>
<td>pH</td>
<td>7.5</td>
<td>7.0</td>
</tr>
<tr>
<td>Sediment</td>
<td>No significant finding</td>
<td>Decreased Cellularity No crystals seen</td>
</tr>
</tbody>
</table>

Urine culture and baseline cortisol levels were normal. The blood work was not conclusive for any obvious cause of the PU/PD. I listed the problem list as a stress leukogram, an elevated alkaline phosphatase, mild hyperglycemia, mild hypercholesterolemia, a low T4 and a hyposthenuric urine specific gravity. The low urine specific gravity supported the patient’s complaint.

With elevation in alkaline phosphatase and cholesterol, the concern of Cushing’s disease was the next possibility. An ACTH response test was completed the next day with hopes that this PU/PD beagle was Cushinoid. However, the next day showed a completely normal diagnostic test. With Hyperadrenocorticism (and hypoadrenocorticism) ruled out. Where was the next possibility? Could the patient need a water deprivation test? Could I really have a Diabetes insipidus patient? Do I need an internist to finish this case for me? This was tough.

To get a better understanding of how to handle these cases, the potential causes of primary PU/PD need to be discussed. The following are potential causes:
DIAGNOSTIC APPROACHES FOR THE POLYDIPSIC / POLYURIC PATIENT

The blood work did not indicate kidney disease, hypercalcemia, diabetes mellitus and primary hypoadrenocorticism. With advanced testing, Hyperadrenocorticism and Atypical Addison's disease was ruled out. Utilizing the following algorithm, the diagnostic testing can be completed and the cause identified.
From this point, the following tests were run. Since liver dysfunction (waxing and waning liver disease) could not be ruled out based on blood work, bile acids were completed to determine functionality. Bile acids assay showed normal results.

At this point, my concerns were diabetes insipidus (renal or central) or psychogenic PD. Rather than move on to a dangerous water deprivation test, I opted for measure of serum osmolality. The serum osmolality test measures ion concentrations in the body. The rationale was that in Diabetes Insipidus, patients have a deficiency of vasopressin (antidiuretic hormone, or ADH), which normally allows for the passive reabsorption of water into the medullary tissue. Without ADH, the animal begins to become PU/PD, secondary to dehydration. To help combat the chronic dehydration, the patient’s intracellular fluid is pumped extracellularly. Fluid levels are lost within the body and hence serum solute increases; increasing osmolality in the face of dehydration. So elevations in measured serum osmolality support diabetes insipidus.

In cases of psychogenic PD, the patient begins to behaviorally drink more water, increasing the amount of fluid available to the body. To help combat the increase fluid intake, the patient moves increased amounts extracellular fluid intracellularly.

Fluid levels increase within the body, as serum solute decreases, decreasing Osmolality. This results in an overhydration in an animal with a dilute osmolality.

Dylan’s measured serum osmolality was high, suggesting that a lack of ADH was causing whole body dehydration, increasing the concentration of solute in the body. At this point, with all other possibilities ruled out, Dylan was started on oral vasopressin. Within 48 hours, the owner noticed a sharp decrease in water consumption and urination. Dylan’s condition is well controlled with medication.

This outcome supports the idea that with proper planning and an understanding of clinical diagnostics, PU/PD patients can be properly worked up in general practice. I recommend the following:

1. The medical team should develop clinical testing protocols that quickly aid the general practitioner in determining the cause and treatment options for the patient.
2. To effectively diagnose the patient, the medical team must have a complete understanding of the causes that produce polyuria and polydipsia.
3. Apply them to the medical history, findings of the physical examination and diagnostic results.

Input from these three, can be used to create a diagnostic protocol to help clinicians identify the disease at hand and apply appropriate treatment options.
Hypotrichosis in a Grizzly Bear

EMMETT and Digger are male grizzly bears that have lived together most of their lives. Both bears were born in the wild, but became “problem bears” when they learned to leave their natural habitat to scavenge food near humans. (This probably could have been prevented if bear-proof trash bins were more widely used.)
Both cubs were Orphaned and ended up in a wildlife rehabilitation center when they were about 1 year old. While not related, they were compatible and soon were playing together. Emmett and Digger later moved to Cheyenne Mountain Zoo in Colorado Springs to be animal ambassadors for their species.

As the bears matured, they continued to live together. When they were 5 years old, each bear was neutered under general anesthesia to help keep them from becoming territorial with each other. Their exams and blood work under anesthesia were non-remarkable.

The following winter, Emmett started to develop an abnormal hair coat. He looked to have dropped his outer coat from his entire body -- except his hump, head, distal portions of the legs and tail; the pattern was symmetric and non-pruritic. Digger continued to look normal.

Over the next few months, Emmett’s animal keepers used a positive-reinforcement-operant-training program to help the Zoo’s vet staff evaluate his skin condition. Keepers cued behaviors with hand gestures and words, then rewarded the desired behaviors with food “treats”. Emmett quickly learned he would get favorite foods when he participated in training sessions. With Emmett, voluntarily lining-up along a fence in his outdoor enclosure, vet staff did skin scrapings to confirm he did not have a parasitic dermatitis. Emmett was then trained for injections. He was given a local anesthetic injection in the shoulder (lidocaine, sodium bicarbonate, and bupivicaine) and an 8 mm skin punch biopsy was collected. During the skin biopsy, Emmett was given a special food treat - whipped cream; he didn’t even flinch.

On histopathology, the skin biopsy showed that all the hairs were in the telogen stage of the hair cycle; this included some in hairless telogen, while others were haired with hair shafts still in place. There was no significant inflammation. While there is little data on this kind of hypotrichosis in grizzly bears, the hair follicle changes were consistent with endocrinopathies such as hypothyroidism, hyperadrenocoricism, or sex hormone imbalances in domestic species. As bloodwork testing for these diseases would have required multiple anesthesias, Emmett was instead initially started on daily oral melatonin. Melatonin therapy sometimes helps dogs with sex hormone imbalances or idiopathic hair follicle arrest syndromes.
Emmett showed some clinical improvement with melatonin treatment in the spring and summer, but the condition returned the following fall and winter. While the melatonin dose was adjusted, this happened again seasonally the next two years.

Recently, the Zoo’s animal keepers have had success training Emmett for voluntary venipuncture from a hind foot.

With the bear seated on the ground, Emmett is cued to slide one foot into a specially designed small opening through his protective barrier. After shaving a small spot on his foot, a butterfly catheter is used to collect blood samples from a dorsal pedal vein.

With the blood samples, the Zoo’s veterinarians are tracking thyroid hormone values over the year, to see if this can help gain a better understand Emmett’s alopecia (Abaxis Thyroid Panel 3). While this pair of grizzly bears don’t hibernate, thyroid hormones are not as well understood in hibernating species as they are in most domestic animals. Long-term, this voluntary blood draw behavior may help the Zoo better understand whether an endocrinopathy may be causing Emmett’s hypotrichosis.

ACKNOWLEDGEMENTS
Thanks to the Cheyenne Mountain Zoo team: the grizzly bear zookeepers Rebecca Zwicker, Kristen Cox, and Jake Jachim for Emmett’s training; our Animal Behavior Programs Manager Jeremy Dillon; and to DeeAnn Wilfong, CVT, for collecting blood samples. Thanks also to Drs Sushan Han, Rodney Rosychuk, and Matt Johnson from the Colorado State University College of Veterinary Medicine, for interpreting the skin biopsy.
Introducing the Abaxis VetScan FeLV/FIV Rapid Test!
For the qualitative detection of Feline Leukemia Virus antigen and Feline Immunodeficiency Virus antibody in feline whole blood, serum, or plasma.

VetScan®
Single Tests for Vector-Borne and Fecal Diseases

VetScan Rapid Tests — Singles

The VetScan Rapid Test portfolio gives you more of what you want and less of what you don’t want from a single, rapid test — more options, more confidence, less hassle, less waiting. VetScan Rapid Tests deliver exactly what you’ve come to know from Abaxis. The perfect balance of price and performance.

Fast, accurate, easy and affordable — It’s a singularly better approach to rapids.

Bring better to your practice.

800.822.2947    vet.abaxis.com/rapids    vetscan@abaxis.com
The drill monkeys are among the rarest and most endangered primates in Africa. Together with their cousins, the more famous mandrills, they fill what is called the Mandrillus genera. Despite the robust anatomy and physical strength of drills, their small distribution is one of the main limits to their survival as a species. This species can only be found in a small area of the world, which is no bigger than the area of Switzerland, called the Cross-Sanaga area. Located in one of the biodiversity hot-spots of the world, the Guinean Forests of West Africa, this small area finds its boundaries between two rivers, the Cross River in Nigeria and the Sanaga River located in Cameroon. For a reason likely related to the formation of the continental plates, the evolution of the genera followed a different path, creating a new species and subspecies only known to this small piece of the planet.

This is how drills became a different species than mandrills. Their differences are not only morphological but also genetic and behavioural. With a hidden matriarchal system, they are one of the most socially complex monkeys of the African continent. Females play a crucial role in the establishment of their social group structure and choice of the dominant male. With different roles for each matriarchal line and differences between gender and age, drills tend to have very unique, quiet, structured and functional groups. This social power comes from the marked dimorphism between females and males; having only half of the size of the males, the female contribution to successful mating is crucial for the spread of a dominant male’s genes. Female drills are relentless in the search for an appropriate male, which is translated as high competition in their natural multi-female, multi-male group structures. As in many primate species, their health and welfare will determine their success in reproduction.

Twenty-five years ago, concerned about their wild population status and their survival as species, the
Pandrillus Foundation began what is now known as the most successful drill conservation breeding program in the world. With their two projects, Drill Ranch in Nigeria and Limbe Wildlife Centre in Cameroon, Pandrillus cares for 90% of the global captive drill population.

Limbe Wildlife Centre, a collaboration between the Government of Cameroon and the Pandrillus foundation, was created 20 years ago. At the base of Mount Cameroon National Park lies a rescue, rehabilitation and release project for Cameroon’s native wildlife. Cameroon’s ever-increasing human population, continued forest depletion and commercialized bush meat trade pose a high risk of extinction for many species, including drill monkeys. In this frame, Limbe Wildlife Centre placed all of the rescued drill monkeys into a very successful breeding group. With a total of 106 individuals in the group, which has recently reached its 4th generation, it is composed of 22 wild females and 17 wild males, all of whom were rescued from illegal hunting. This group, which is one of the most genetically diverse drill breeding groups in the world, is nearly ready to be moved to a future field site in the buffer zone of Mount Cameroon National Park as a first step to being released. This is a semi-captive condition for their gradual adaptation to the new natural environment together with an increase in the protection of the area. The clear choice for Mount Cameroon National Park is due to the fact that it is already home to a small and isolated wild drill group whose chance of survival without external assistance seems doubtful.

Limbe Wildlife Centre’s breeding group will be responsible for boosting the already precarious wild drill population at Mount Cameroon, giving them the last chance for survival.

It is well known that any conservation driven program also provides passive protection to the established area and we expect these animals will become the umbrella of so much needed protection for all wildlife existing in the second highest peak of the African continent.

The management of disease and known pathogen transfer is an important aspect of any animal translocation. In order to prevent posing an extra threat to the survival of the wild population already living on Mount Cameroon, we apply the primum non nocere in which we try to eliminate any risk of disease transfer. At LWC we have designed a pre-translocation general health check (PtGHC) program. The PtGHC will enable, through medical evidence, to identify the suitability of the individuals to be translocated into the future pre-reintroduction field site based in the Mount Cameroon National Park. Before any drill translocation takes place, the entire breeding group (106 individuals) will undergo a strict health analysis. This will determine whether they are fit as a group and as individuals to leave the urban area where they currently live and go to their new home in which they will be able to play their natural biological role into the future. Based on the IUCN guidelines for reintroductions and other conservation translocations, and in order to minimize risks, a series of tests will be performed under anaesthesia to the resident animals. These tests include the identification of possible pathogens that may affect the capacity of the animal to adapt as well as the health and identification of individual animals.

**Diagnostics**

A complete healthscreen is performed using the VetScan VS2 Chemistry Analyzer. We will be able to perform chemistry blood work by using the Comprehensive Diagnostic Profile rotors. We want to ensure that the drills under our care are fit to move into a forest environment. We expect that the research of serum chemistry values will lead us to generate statistically significant baseline data for healthy captive drills. This species-specific reference range will be a valuable tool that will be used to detect underlying health issues that will not only benefit captive drills in the world, but also future conservation programs.
### Clinical Case

As an example of the program, the Biochemistry and Hematology of 4 wild-born Drill Monkeys of different ages and genders that have already undergone the PtGHC are shown below.

<table>
<thead>
<tr>
<th></th>
<th>Unit</th>
<th>Baboon ref. Values</th>
<th>Koko Male (13 years)</th>
<th>Rajii Male (8 years)</th>
<th>Mahfor Female (6 years)</th>
<th>Ossing Female (3 years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALB</td>
<td>G/DL</td>
<td>4.7-5.0</td>
<td>4.0</td>
<td>4.0</td>
<td>4.0</td>
<td>4.0</td>
</tr>
<tr>
<td>ALP</td>
<td>U/L</td>
<td>123-194</td>
<td>163</td>
<td>202</td>
<td>151</td>
<td>912</td>
</tr>
<tr>
<td>ALT</td>
<td>U/L</td>
<td>15-117</td>
<td>147</td>
<td>37</td>
<td>132</td>
<td>58</td>
</tr>
<tr>
<td>AMY</td>
<td>U/L</td>
<td></td>
<td>174</td>
<td>208</td>
<td>222</td>
<td>216</td>
</tr>
<tr>
<td>TBIL</td>
<td>MG/DL</td>
<td>0.2-0.5</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.5</td>
</tr>
<tr>
<td>BUN</td>
<td>MG/DL</td>
<td>8.12-25</td>
<td>2</td>
<td>2</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>CA</td>
<td>MG/DL</td>
<td>9.7-10.1</td>
<td>8.5</td>
<td>9.5</td>
<td>8.7</td>
<td>9.2</td>
</tr>
<tr>
<td>PHOS</td>
<td>MG/DL</td>
<td>5.5-8.5</td>
<td>3.1</td>
<td>2.9</td>
<td>2.2</td>
<td>4.5</td>
</tr>
<tr>
<td>CRE</td>
<td>MG/DL</td>
<td>0.89-2.12</td>
<td>1.6</td>
<td>1.6</td>
<td>1.2</td>
<td>0.6</td>
</tr>
<tr>
<td>GLU</td>
<td>MG/DL</td>
<td></td>
<td>92</td>
<td>122</td>
<td>115</td>
<td>117</td>
</tr>
<tr>
<td>NA+</td>
<td>MMOL/L</td>
<td>140-153</td>
<td>139</td>
<td>139</td>
<td>137</td>
<td>138</td>
</tr>
<tr>
<td>K+</td>
<td>MMOL/L</td>
<td>2.7-3.10</td>
<td>4.0</td>
<td>4.3</td>
<td>2.7</td>
<td>3.5</td>
</tr>
<tr>
<td>TP</td>
<td>G/DL</td>
<td>7.0-7.4</td>
<td>6.7</td>
<td>8.4</td>
<td>7.5</td>
<td>6.6</td>
</tr>
<tr>
<td>GLOB</td>
<td>G/DL</td>
<td>2.3-2.3</td>
<td>2.7</td>
<td>4.3</td>
<td>3.5</td>
<td>1.7</td>
</tr>
<tr>
<td>WBC</td>
<td>X10^9/L</td>
<td>3.84-11.83</td>
<td>4.7</td>
<td>11.3</td>
<td>12.8</td>
<td>9.35</td>
</tr>
<tr>
<td>Neutrophils</td>
<td>X10^9/L</td>
<td>0.59-7.86</td>
<td>2.9</td>
<td>4.8</td>
<td>5.9</td>
<td>5.0</td>
</tr>
<tr>
<td>Lymphocytes</td>
<td>X10^9/L</td>
<td>1.0-5.54</td>
<td>1.32</td>
<td>3.5</td>
<td>4.9</td>
<td>4.18</td>
</tr>
<tr>
<td>Monocytes</td>
<td>X10^9/L</td>
<td>0.04-0.55</td>
<td>0.23</td>
<td>0.2</td>
<td>0.5</td>
<td>0.38</td>
</tr>
<tr>
<td>Eosinophils</td>
<td>X10^9/L</td>
<td>0.02-0.39</td>
<td>0.09</td>
<td>0.05</td>
<td>0.8</td>
<td>0.0</td>
</tr>
<tr>
<td>Basophils</td>
<td>X10^9/L</td>
<td>0.02-0.1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Reticulocytes</td>
<td>%</td>
<td>0 to 6</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Platelets</td>
<td>100 X10^9/L</td>
<td>70-368</td>
<td>288</td>
<td>258</td>
<td>220</td>
<td>315</td>
</tr>
<tr>
<td>PCV</td>
<td>%</td>
<td>33.5-41.5</td>
<td>34</td>
<td>39</td>
<td>36</td>
<td>40</td>
</tr>
<tr>
<td>Hb</td>
<td>g/dl</td>
<td>10.7-13.1</td>
<td>11.3</td>
<td>3</td>
<td>12</td>
<td>13.3</td>
</tr>
<tr>
<td>Plasma prot</td>
<td>g/L</td>
<td>Mean 73</td>
<td>70</td>
<td>75</td>
<td>72</td>
<td>63</td>
</tr>
<tr>
<td>hemoparasites</td>
<td>+/-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HIV 1/2</td>
<td>+/-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HCV</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HbsAg</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>MTB/MPTB</td>
<td>+/-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Together, Abaxis and the Limbe Wildlife Centre will give a greater opportunity for survival of one of the most fascinating and un-studied species in the world: the Drill Monkey.

For more information please visit our website [limbewildlife.org](http://limbewildlife.org) and subscribe to the monthly newsletter for the latest news.
A rescued Moon Bear completes his long journey home to Animal Asia’s Vietnam Bear Rescue

In July 2000, Animals Asia Foundation, a Hong Kong based charity, signed an agreement with the Chinese government to remove 500 endangered Asian black bears from bile farms in Sichuan province and work towards ending the practice. Today, the China Bear Rescue has placed 219 previously farmed moon bears at a Sanctuary in Chengdu, and is helping to advance the concept of animal welfare in China.

**Bile Bears**, sometimes called **Battery Bears**, are bears kept in captivity to harvest their bile, a digestive fluid produced by the liver and stored in the gall bladder. The bear species most commonly farmed for bile is the Asiatic black bear (Ursus thibetanus), although the sun bear (Helarctos malayanus) and the brown bear (Ursus arctos) are also used to collect bile. Both the Asiatic black bear and the sun bear are listed as Vulnerable on the Red List of Threatened Animals.

Bear bile has been used in Traditional Chinese Medicine (TCM) for thousands of years. Modern investigations showed that it has a wide range of pharmacological actions with little toxicological side effect and the pure compounds have been used for curing hepatic and biliary disorders for decades. However, extensive consumption of bear bile made bears endangered species. In the 1980’s, bear farming was established in China to extract bear bile from living bears with “Free-dropping Fistula Technique”. Bear farming is extremely inhumane and many bears died of illness such as chronic infections and liver cancer. Efforts are now given by non-governmental organizations, mass media and Chinese government to end bear farming ultimately. At the same time, systematic research has to be done to find an alternative for bear bile.
A team of Animals Asia veterinarians and Bear workers are in Vietnam’s seaside town of Phan Thiet sweating in the 30°C heat as they carry a 150kg moon bear down four flights of stairs.

This is a bear rescue, and a historical one at that. The beautiful Ti Map – whose name means Chubby Mouse – is the last bile farmed bear in the province, making Ninh Thuan only the second province in Vietnam to become Bear Bile Farm Free.

Once anaesthetised, Ti Map (Moon Bear) is taken out of his cage for the first time in 14 years. All his life he has periodically been anaesthetised with inappropriate drugs, and had a needle jabbed repeatedly in to his gall bladder so that his bile could be removed as an ingredient in traditional medicine. He has never known the natural world, just a lifetime of isolation and suffering in a small cage.

Despite being made illegal in 2002, the practice of farming bears for their bile persists in Vietnam with around 2,000 bears believed to be held on bear farms throughout the country.

Ti Map is one of the lucky ones. After so many years of bear bile farming, his owner Mr Viet had a change of heart.

“We believe that Animals Asia will take care of him much better than we can. We now know that bear bile farming is wrong,” he said.

As Ti Map is taken out of the cage, there is sudden concern – Ti Map has stopped breathing. As the senior vet on the rescue I order a stop and fortunately am able to resuscitate him with a blow to his chest.

Seven of us begin again to move Ti Map down the stairs to conduct a health check, but once we reach the second floor it becomes apparent that Ti Map has stopped breathing again, and I could not feel a pulse. This reaction to these anaesthetic drugs is very unusual, but luckily I managed to resuscitate Ti Map a second time. Once we had carried him down the remaining flights to the ground floor, I take the decision to abandon the health check, and reverse the routine small dose of anaesthetic.

Ti Map was loaded onto a truck and once awake, we began the 1,700km, three-day road trip up the coast of Vietnam back to our sanctuary in Tam Dao.

The next time we were preparing to perform a health check on Ti Map, the conditions were infinitely better. We were back in our well-equipped bear sanctuary in Tam Dao and were delighted to have a visiting anaesthesiologist from Edinburgh University on hand.

As expected, again Ti Map reacted very strongly to the anaesthetic drugs entering a deep plane of anaesthesia much faster than is typical for moon bears.

Throughout the health check we tried to keep him under light anaesthesia, and monitored him very carefully, to minimise any risk.

Now, Ti Map is finally on his way to Animals Asia’s Vietnam Bear Rescue Centre in Tam Dao, just 40km north of the capital Hanoi. Here, he will live alongside 110 other moon and sun bears rescued from the cruel bear bile industry living out the second half of his life in open near-natural enclosures that encourage the bears’ natural instincts.

Bile farmed bears typically have severe issues with their gallbladders, and sure enough, Ti Map’s appeared thick-walled on the ultrasound. At this point we were able to quickly and accurately test Ti Map’s blood in using an Abaxis HM5 CBC Analyzer. The CBC reading allowed us to rule out an acute infection, implying that thick walled gallbladder is indeed a chronic reaction to 14 years of bear bile extraction.

“Conclusion"

ON LOCATION VIETNAM
In future it may be necessary to remove the gall bladder, but for now we will wait until Ti Map’s next health check to ascertain any changes in his situation.

Thankfully, the rest of Ti Map’s health check revealed no major abnormalities.

The speed and accuracy of the HM5 is extremely useful when carrying out health checks on the 111 bears at our Vietnam Bear Rescue Centre.

The on-site analyzer provides us fast and accurate automated haematology results allowing us to detect hidden infections or blood disorders, which would otherwise be difficult to diagnose in bears. In the case of Ti Map, it gave us an extra avenue with which to interpret our ultrasound findings.

The HM5 CBC analyzer has also proven to be very useful in the small animal clinic, which we run for staff and neighbourhood pets when owners participate in our de-sexing programme. By diagnosing diseases and monitoring the recovery process of these dog and cat patients, the HM5 has become a tool which the wider community can benefit from too.

www.animalsasia.org
ASIS Park is the biggest zoological park in the Canary Islands. It is located on the tropical Island of Fuerteventura. It is one million square meters in size, has 250 species of animals (over 3,000 animals) and a Botanical garden of more than 150 square meters and thousands of tropical plants and cactuses.

One of the main attractions is our four-hectare African Savannah with a mixed collection of animals like zebras, mountain goats, Scimitar-horned Oryx and ostriches.

We have a large group of Scimitar/horned Oryx. Every year we get around 2-3 more newborns. The mortality rate was close to 0 last year but this last year we changed the group from a smaller enclosure (where they were kept alone) to the African Savannah where they live together with other species. Since then, we have seen more fights between the male Oryx and also between Oryces and mountain goats. Zebras also showed strange behavior trying to “adopt” the Oryx newborns (one female zebra was behaving like the mother of one of the baby Oryx during the first day of life).

The Scimitar-horned Oryx is listed on CITES Appendix 1. There has been no definite evidence of the survival of this species in the wild for more than 15 years. They may have formerly been widespread across North Africa, at least in arid and Saharan areas, but now...
extinct in the wild over all its range. Captive herds are kept in fenced protected areas in Tunisia, Senegal and Morocco (Sous Massa National Park, probably outside the known historical range) as part of long-term reintroduction programs.

A global captive breeding program was initiated in the 1960s. In 2005 there were at least 1,550 captive animals kept in managed breeding programs around the world (Gilbert 2005). In addition, a large number (probably >4,000) are kept in a private collection in the United Arab Emirates. Additional animals are likely held on private game ranches in the USA. As part of planned reintroduction projects, animals have been released into fenced protected areas in Tunisia (BouHedma National Park 1985, SidiToui National Park 1999, OuedDekouk National Park 1999), Morocco (Souss-Massa National Park 1995), and Senegal (Ferlo Faunal Reserve 1998, Guembuel Wildlife Reserve 1999). Reintroduction is currently also planned at a site in Niger.

In June 2014, three baby Oryx were born some days apart at our African Savannah. Everything was going well, and they were growing fast without problems. Mid July we observed that one of the babies had a small abdominal hernia about 3 cm long of the right side of the abdomen, next to the last rib. We suspected it was a traumatic injury from interspecies aggression but decided to wait since the baby was not showing any other signs of disease and the mother was still taking care of him. A couple days later a blood sample was taken and analyzed with Abaxis VetScan VS2 Chemistry Analyzer.

Results showed mild dehydration and oral fluids were given. One week later the baby Oryx had to be hospitalized since the mother abandoned him and he was showing signs of weakness. Physical examination and blood analysis (see attached table with progressive blood results) revealed mild dehydration (around 8%) and abdominal pain. After fluid therapy and standard treatment the baby recovered, but 1 day later he started showing neurological signs: opisthotonus, stiffness and rigidity of four limbs and seizures characterized by cycling with four limbs (mainly when exited). Taking into consideration the symptoms, blood work, physical examination and the previous trauma 2 weeks before, tetanus was suspected and therapy was started with tetanus antitoxin, penicillin and metronidazole. Also valium was given IV to control the seizures. VetScan analysis helped us to rule out other possible differential diagnoses.

### Chemistry Results

- Degenerative/developmental disorders: malformations of CNS, storage diseases...
- Nutritional: hypoglycemia, hypocalcemia, calcium-phosphore imbalances, hypomagnesimia, copper deficiency, thiamine/vitamin B1 deficiency, white muscle disease (vitamin E/Selenium deficiency)
- Neoplastic: brain or spinal cord tumors
- Infectious: viral, bacterial (listeriosis, clostridium, salmonella…), fungal (aspergillus, cryptococcus), parasitic (nervious coccidiosis, sarcocystis, coenuriasis…)
- Immflamatory/traumatic
- Idiopathic: cerebral oedema,
- Toxicologic: tetanus, botulism, lead and mercury poisoning, miscellaneous plant toxins, mycotoxins, organophosphate or other insecticide toxicity, salt poisons, urea/ammonia toxicosis
After 3 days with this standard treatment, IV fluids and feeding him with goat milk, neurologic symptoms stopped, although he was not able to stand and was still very weak, not being able to hold his head up. The following 2 weeks we kept administering IV fluids, since blood glucose levels were impossible to maintain without IV 50% glucose, despite the oral feeding. Injectable calcium-magnesium was given and also vitamin E-selenium. After one month from the initial symptoms and after intensive physiotherapy, our Oryx was able to stand when assisted. 2 months later when he was already able to walk assisted, he suffered a severe hypothermia when he was found almost drowning after a huge storm. Following standard treatment for hypothermia, he recovered but his physical recovery was affected.

We consulted a veterinary physiotherapist in order to provide the best care possible and now after 2 months of physical therapy he is again able to walk. In the present time, we are consulting a veterinary acupuncturist. Despite all our efforts, he is still not able to walk or stand on his own. He still has some muscle atrophy on the front legs and a several muscle contractions on his neck and vertebral column. We continue a combination of physiotherapy and acupuncture and we hope to see a fast improvement in the next months. The reason we continue to treat him even with a guarded prognosis, is the improvement we see every week. Also, he is completely used to us, showing no signs at all of stress. Even if he will be unable to be released in the wild, we still hope that he can be reintroduced in his group and could contribute to avoiding the complete extinction of his species.
## ORYX: PEDRO

**i-STAT, VetScan Chemistry Measurements, Large Animal Profile & Comprehensive Diagnostic Profile**

<table>
<thead>
<tr>
<th>Measurements</th>
<th>units</th>
<th>Date</th>
<th>ISIS REFERENCE VALUES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>29/07/14</td>
<td>04/08/14</td>
</tr>
<tr>
<td>ALB g/dl</td>
<td></td>
<td>2.7</td>
<td>3.1</td>
</tr>
<tr>
<td>ALP U/L</td>
<td></td>
<td>105</td>
<td>80</td>
</tr>
<tr>
<td>AST U/L</td>
<td></td>
<td>65</td>
<td>156</td>
</tr>
<tr>
<td>ALT</td>
<td></td>
<td>30</td>
<td>35</td>
</tr>
<tr>
<td>AMY</td>
<td></td>
<td>11</td>
<td>17</td>
</tr>
<tr>
<td>TBIL</td>
<td></td>
<td>0.6</td>
<td>1.2</td>
</tr>
<tr>
<td>CA mg/dl</td>
<td></td>
<td>11.5</td>
<td>11</td>
</tr>
<tr>
<td>GGT U/L</td>
<td></td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>TP g/dl</td>
<td></td>
<td>7.6</td>
<td>7.2</td>
</tr>
<tr>
<td>GLOB g/dl</td>
<td></td>
<td>4.9</td>
<td>4.1</td>
</tr>
<tr>
<td>BUN mg/dl</td>
<td></td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>CREA</td>
<td></td>
<td>1.1</td>
<td>1.1</td>
</tr>
<tr>
<td>GLU</td>
<td></td>
<td>118</td>
<td>106</td>
</tr>
<tr>
<td>CK U/L</td>
<td></td>
<td>827</td>
<td>2502</td>
</tr>
<tr>
<td>PHOS mg/dl</td>
<td></td>
<td>10.6</td>
<td>8.9</td>
</tr>
<tr>
<td>MG mg/dl</td>
<td></td>
<td>2</td>
<td>1.9</td>
</tr>
<tr>
<td>NA+ mmol/L</td>
<td></td>
<td>141</td>
<td>140</td>
</tr>
<tr>
<td>K+ mmol/L</td>
<td></td>
<td>6.7</td>
<td>4.9</td>
</tr>
<tr>
<td>Cl mmol/L</td>
<td></td>
<td>109</td>
<td>1,27</td>
</tr>
<tr>
<td>iCa mmol/L</td>
<td></td>
<td></td>
<td>30</td>
</tr>
<tr>
<td>TCO2 mmol/L</td>
<td></td>
<td></td>
<td>30</td>
</tr>
<tr>
<td>Ht %</td>
<td></td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>TP(refr) g/dl</td>
<td></td>
<td>7.2</td>
<td>6.5</td>
</tr>
<tr>
<td>GLUC g/dl</td>
<td></td>
<td>88</td>
<td>45/50</td>
</tr>
<tr>
<td>Rectal temp</td>
<td></td>
<td>38</td>
<td></td>
</tr>
</tbody>
</table>

**Main symptoms**

- Weak
- Weak, muscle weakness & atrophy, able to stand when assisted
- Weak, not able to stand
- Weak, blood glucose keeps low
- Neurologic symptoms
- Storm
- Soaked in water, hypothermia
- Weak, blood glucose keeps low
- Weak, not able to stand
- Storm
- Soaked in water, hypothermia

**MANUAL**

- Rectal temp
- TP(refr)
- GLUC
- Ht %

**SPAIN**

**LOCATION**
On-Site Diagnostic Testing, with
10 Profiles to Choose From

The VetScan VS2 is a state-of-the-art chemistry, electrolyte, immunoassay and blood gas analyzer that delivers uncompromising accuracy from just 2 drops of whole blood, serum, or plasma. The VetScan is amazingly simple and intuitive, featuring an advanced user interface, expanded printing capabilities and precision reference quality results in 12 minutes.
Blood Chemistry Results So Trusted
to hospitals and isolation units around the world selected the Abaxis Chemistry Analyzer for the treatment of Ebola patients. It’s accurate and portable, requires a small sample size, and contains built in intelligent Quality Control (iQC).

The Abaxis Piccolo Chemistry Analyzer, the sister chemistry analyzer to the VetScan VS2, is currently in use around the world in isolation units for monitoring the metabolic balance in the body and the condition of major organ systems while treating Ebola patients. The ability to accurately perform critical chemistry and electrolyte testing patient side, without the need to transport blood (replacing the central lab), also is helping to reduce the spread of the Ebola Virus. Successful patient outcomes are in part dependent upon maintaining proper electrolyte balance and proper organ system monitoring. Government agencies, hospitals, and field units are using the Abaxis Chemistry Analyzer for expert results.

Front line Diagnostics in human and animal health, only one Company stands out.

Front line agencies trust Abaxis, your Veterinary hospital can too.