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2010
EQUINE
EDITION

**WORLD
EQUESTRIAN
GAMES**

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VETSCAN EQUIPMENT

ABAXIS ANNOUNCES
**AUTOMATED
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The 2010 World Equestrian Games used VetScan
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DATELINE 12.01.10

Welcome to VetCom Publications' **Special Equine Edition**. VetCom Publications offers the reader clinical case studies, practice tips, field updates from afar as well as educational opportunities through Abaxis University. In every issue we include a forum for veterinarian to manufacturer communication and so much more.

Abaxis the Official Veterinary Laboratory Equipment Supplier of the 2010 Alltech FEI World Equestrian Games - Kentucky Horse Park, Kentucky

Abaxis was privileged to participate in the World Equestrian Games which is comprised of the world championships for eight equestrian sports. The Games are held every four years, two years prior to the Olympic Games, and are governed by the Fédération Equestre Internationale (FEI). The FEI is the international governing body of equestrian sport recognized by the International Olympic Committee. It is the organization which establishes rules and regulations for the conduct of international equestrian events. Today the FEI has over 130 member countries.

Given that Abaxis was selected to be the exclusive laboratory equipment provider, we deployed Brian Renn, our Abaxis Regional Account Manager. He and a host of not only Abaxis volunteers, but other volunteers from across the country managed the multitude of tests at various sites over the course of 3 weeks. In the end, VetScan equipment ran over 546 chemistry panels and 672 CBC's in addition to 250 i-STAT® cartridges.

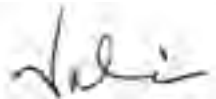
Let The Games Begin.....

From the World Equestrian Games to you, contributing authors share a testament to our products' ease of use, portability, affordability, accuracy and reliability during this critical and exciting time.

Also in this Special Equine Edition, Abaxis announces the highly anticipated VetScan Fibrinogen Test - **The First Automated Fibrinogen Test with quantitative results in less than 15 minutes**. See us at AAEP, booth #2317.

I look forward to seeing you at the AAEP or hearing directly from you prior to or after our Fibrinogen launch.

At Your Service,



Valerie Goodwin-Adams
Director of Marketing
Editor - VetCom Publications
Abaxis, Inc.

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A photograph of a rider on a brown horse at an equestrian event. The rider is wearing a red shirt, black helmet, and a yellow vest with 'FBI' and 'meydan 26' on it. The horse is wearing a red halter and red leg wraps. In the background, there are spectators, a white fence, and a sign with the number '2'.

The 2010 Alltech FEI
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EQUESTRIAN
★ **GAMES** ★

trusts Abaxis VetScan
equipment during
the Games



Alltech FEI
World Equestrian Games™
Kentucky 2010

Hagyard Equine Medical Institutes
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WEG Quarantine Unit
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Photo courtesy of Brian Renn

80 COUNTRIES, 800-1000 HORSES

VETERINARY SCHOOLS, VETERINARY STUDENTS AND DVM'S FROM ALL OVER THE WORLD USED ABAXIS LABORATORY EQUIPMENT

My quarantine team and I used the VetScan VS2 Chemistry analyzer and the VetScan HM5 Hematology analyzer at the airport at the World Equestrian Games (WEG) in September and early October of 2010. The Abaxis VetScan lab equipment was invaluable to us in the quarantine area at the airport. They were fast, efficient, accurate and easy to use. I think the best way to explain their value would be to explain how the quarantine operated.

All of the horses competing in the 2010 Alltech World Equestrian Games entering the United States entered through the Cincinnati Airport located in northern Kentucky. Upon arrival they were all placed in a private temporary quarantine, sanctioned by the USDA and the Kentucky Department of Agriculture, lasting 42 hours and located on the airport grounds before shipping to the Kentucky Horse Park. During quarantine, blood was drawn and the horses were monitored for signs of infectious disease. As with



Team Belgium. Photo courtesy of Brian Renn

many horses shipping long distances, some of the horses in quarantine exhibited signs of mild respiratory illness, as seen by an elevated temperature, some with nasal discharge and some with a cough. As is the case with most of these horses, these mild “shipping fevers” will resolve with fluids, some requiring anti-inflammatories and antibiotics.

In our WEG situation these horses are under a strict timeline in which they must recover from shipping and be able to then compete at the best of their ability. Therefore, to say that the Abaxis VetScan equipment was useful was an understatement. In order to make treatment decisions quickly and accurately we needed blood results that could be trusted and available immediately. The Abaxis VetScan VS2 Chemistry analyzer and VetScan HM5 Hematology analyzer gave us that ability.

Over 480 WEG competition horses entered through CVG airport and with that over 100 VetScan profiles were used at the airport quarantine area alone. I think I speak for everyone when I say the quarantine was a success. It could not have run as smoothly as it did without the use of the Abaxis VetScan laboratory equipment.

– Jennifer Feiner, VMD



ALLTECH WORLD EQUESTRIAN GAMES USES VETSCAN LAB EQUIPMENT

Contributing Author: Kent Allen, DVM

It has been a pleasure using the Abaxis products, including the VetScan VS2 Chemistry analyzer, the VetScan HM5 Hematology analyzer, and the VetScan i-STAT®1 Handheld Blood Gas analyzer, during the World Equestrian Games in the veterinary clinic. These instruments are compact enough to fit in almost any space and are very straightforward to use. We had a significant number of volunteer staffers and students utilizing them and training them to use the equipment was self-explanatory. The instruments provided quick turn-around, allowing us to make up-to-the-minute decisions on our critical cases during the Games. We most appreciated these instruments when we needed to assess patients throughout the night after their strenuous competitions.



Dr. Allen has served as the United States Equestrian Team (USET) veterinarian on several international teams and as vice-chairman of the International Equestrian Federation (FEI) Veterinary Committee twice. He chairs the United States Equestrian Federation (USEF) Veterinary and Drug and Medications Committees for the last twelve years. He served as Veterinary Services Coordinator for the 1996 Olympic Games in Atlanta, Georgia, and was the highest ranked veterinary official at the 1999 Pan American Games and the 2000 Sydney Olympic Games. In 2010 he served as the Veterinary Services Manager for the Alltech FEI World Equestrian Games in Lexington Kentucky coordinating all aspects of veterinary care for the equine athletes. He is Certified in Equine Locomotor Pathology by the International Society for Equine Locomotor Pathology. He lectures on sports medicine topics in the Equine athlete nationally and internationally. He has served multiple terms on the USEA Board of Governors and the USEF Board of Directors. He has donated countless hours of work on the NAYRC and has served in every veterinary capacity possible at that competition.

We were not only able to use the instruments to aid our compromised patients, but also to monitor many of the healthy athletes and catch problems before they became significant.

These horses travelled long distances to the WEG and needed the closest attention to ensure they would be at their best for this extraordinary event. We have received numerous compliments from veterinarians thanking us for having these services available, which would not have been possible without the generous contribution of these instruments by Abaxis, Inc.

We would also like to thank Brian Renn of Abaxis for his professional assistance with troubleshooting and training of staff during the World Equestrian Games.

FIBRINOGEN its use in Equine Medicine

Contributing Author: Terry C. Gerros, DVM, MS, Diplomate ACVIM

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Get the First Automated Fibrinogen Test That's Cost-Effective and **easy** to Use

Introducing the VetScan VSpro Fibrinogen Test. Because Automated Is Better.

Fibrinogen is an acute phase protein (APP). It is used clinically as an indicator of systemic inflammation, both acute and chronic. Early recognition of systemic inflammation is essential to formulate and initiate an effective treatment plan. Inflammation which is not recognized or is subclinical impairs growth and performance. Acute phase proteins are quickly released into the bloodstream in response to inflammation or injury. Their blood levels are directly related to the severity of the underlying condition. By definition, APP's are those proteins in which plasma concentrations increase or decrease by at least 25% after an inflammatory stimulus.



3. Return to baseline occurs within 1-2 weeks after the inflammatory process ceases. Plasma fibrinogen T1/2 is approximately 3 days.

Fibrinogen is a soluble glycoprotein synthesized by the liver. It is used to diagnose and monitor a variety of inflammatory conditions in the horse. Increased fibrinogen concentration is associated with a wide variety of inflammatory diseases and may be the only indicator of inflammation if the accompanying leukogram is normal.

Plasma fibrinogen may also be increased with dehydration and may be decreased with severe hepatic disease because of decreased production. In cases of DIC, fibrinogen may be decreased due to increased utilization (masking the hyperfibrinogenemia associated with the inflammatory process).

The most frequently measured APP's in equine medicine include fibrinogen, serum amyloid A and haptoglobin. APP's are also classified as positive (increasing during inflammation) or negative (decreasing during inflammation). Albumin is the negative APP in most species because it is down-regulated in favor of increased hepatic synthesis of positive APP's. Fibrinogen is commonly used as the positive APP in equine medicine because of these factors:

1. Always present in plasma of healthy horses, with consistent baseline values,
2. Plasma concentration increases up to 10X in response to inflammation or injury within 24-72 hours,



PLASMA PROTEIN:FIBRINOGEN (PP:F) RATIO

Useful in the interpretation of fibrinogen concentration when hyperproteinemia is present. This ratio is calculated as:

$$\text{PP:F ratio} = (\text{plasma TP mg/dl} - \text{fibrinogen mg/dl}) / \text{fibrinogen mg/dl}$$

Normal = 15-20 Dehydration = >20 Inflammation = <15

If the ratio is between 10-15, clinical impression and other diagnostic aids should be utilized to determine if the ratio is significant. Ratios <10 are abnormal and support active inflammation.

The degree of hyperfibrinogenemia approximates the severity of disease and can be used, in-conjunction with the clinical findings and other laboratory data, for determining a treatment protocol and possibly prognosis for the primary disease process. Along with a CBC, serial fibrinogen concentrations may be useful in determining treatment efficacy. Fibrinogen levels may be used alone in determining resolution of the inflammatory process when the leukogram is unchanged or has returned to normal.

Normal Hyperfibrinogenemia

There are certain situations when hyperfibrinogenemia is normal in the horse. Fibrinogen may be increased in foals up to 6 months of age and during pregnancy in mares. In foals, fibrinogen can exceed normal adult levels and may be attributed to maturing hepatic function and not associated with subclinical disease.

In one study, fibrinogen concentration increased (>40%) in prepartum mares. These levels can further increase 10% in the immediate postpartum period, returning to normal by day 14 after foaling.

Clearly, measuring fibrinogen concentrations should be included when performing a CBC in the horse. Fibrinogen may be the only indicator

of inflammation in the subclinical horse when the leukogram is within normal limits.

Fibrinogen also provides information regarding treatment efficacy, prognosis and length of treatment, especially considering such conditions as strangles, pigeon fever, pleuropneumonia, omphalophlebitis, septic arthritis, endometritis, clostridial myonecrosis, cellulitis, and endocarditis, to list a few.



References:

Andrews DA, Reagan WJ, DeNicola DB. Plasma fibrinogen in recognizing equine inflammatory disease. *Compend Cont Educ* 1994;16:1349-1356.

Crisman MV, Scarratt WK, Zimmerman KL. Blood Proteins and Inflammation in the horse. *Vet Clin: Equine Practice* 2008; 24:2:285-297.

Hodgson, J. Protein, Hyperfibrinogenemia, in 2nd ed. *Blackwells' Five-Minute Veterinary Consultant: Equine* eds. Lavoie JP, Hinchcliff KW, 2008;636-637.

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A THOROUGHBRED MARE CASE STUDY

CASE OF EXERTIONAL RHABDOMYOLYSIS

Contributing Author: Greg Fox, DVM
Fox Stables – Lexington, KY

Favorite Fantasy is a 5 year old thoroughbred mare that has a better than average racing career until this year, earning \$191,026 in 35 starts. She had won or placed in only 12 of those starts. Her best performance came in the winter of 2008 when she placed 4th beaten by a nose for third in a Grade III stake. She has always been more delicate mentally than physically. Other than a chronic, but easily manageable sore back she has been very sound.

She was sent to a trainer in Louisiana for the winter and her first two starts were excellent performances, winning one and finishing second in the other. The trainer reported that suddenly she started “tying-up”. When she returned in early April 2010, she presented AST levels >2000, significant soreness in her back and had a poor hair coat. While she displayed some inclinations, she was not showing the classic signs of exertional rhabdomyolysis. In addition,

in my experience and based on some research reports, elevated CK values are not consistently elevated with exertional rhabdomyolysis.

Diagnostic tests used to diagnose and evaluate Favorite Fantasy include a full chemistry panel using the VetScan VS2 Chemistry analyzer with the Equine Profile Plus rotor and a CBC using the VetScan HM5 Hematology analyzer.

Blood chemistry and CBC results from 04/15/10

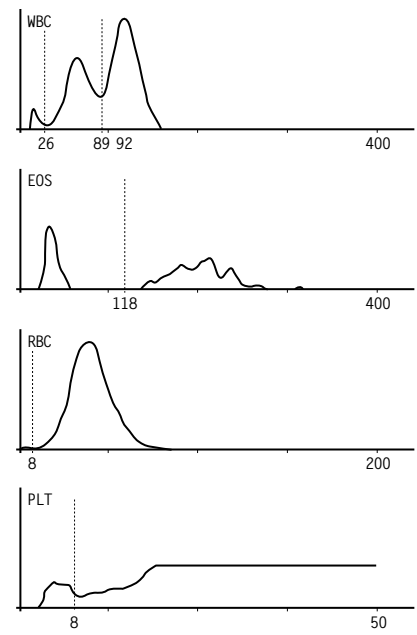
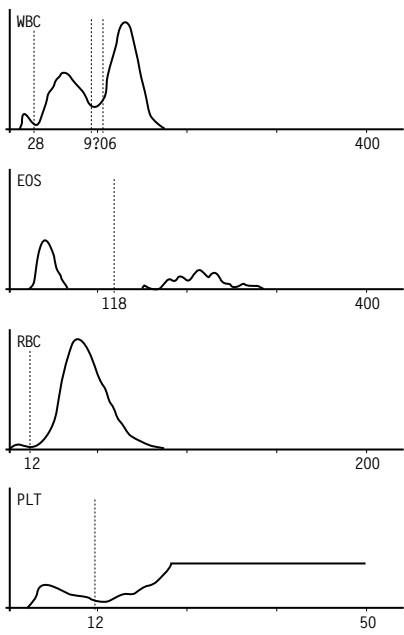
Analyte	Result	Range
Na+	138	126.0 - 146.0
K+	6.1	2.5 - 5.2
tCO2	31.0	20.0 - 33.0
CK	338.0	120.0 - 470.0
GLU	111.0	65.0 - 110.0
Ca	14.0	11.5 - 14.2
BUN	12.0	7.0 - 25.0
CRE	1.5	0.6 - 2.2
AST	>2000.00	175.0 - 340.0
TBIL	2.6	0.5 - 2.3
GGT	21.0	5.0 - 24.0
ALB	3.6	2.2 - 3.7
TP	6.7	5.7 - 8.0
GLOB	3.1	2.7 - 5.0

Test	Result	Range
WBC	10.59	5.4 - 14.3
LYM	3.68	1.5 - 7.7
MON	0.25	0.0 - 1.5
NEU	6.53	2.3 - 9.5
EOS	0.12	0.0 - 1.0
BAS	0.01	0.0 - 0.03
LY%	34.8	17.0 - 68.0
MO%	2.3	0.0 - 14.0
NE%	57.1	22.0 - 80.0
EO%	1.0	0.0 - 10.0
BA%	0.1	0.0 - 2.0
RBC	11.91	6.8 - 12.9
HGB	19.5	11.0 - 19.0
HCT	50.38	32.0 - 53.0
MCV	42.0	37.0 - 59.0
MCH	16.4	12.3 - 19.7
MCHC	38.8	31.0 - 39.0
RDWc	23.3	
PLT	68.0	100.0 - 400.0
PCT	0.04	
MPV	5.9	
PDWc	24.6	

Post exercise blood chemistry and CBC results from 05/20/10

Analyte	Result	Range
Na+	137	126.0 - 146.0
K+	4.6	2.5 - 5.2
tCO2	22.0	20.0 - 33.0
CK	283.0	120.0 - 470.0
GLU	135.0	65.0 - 110.0
Ca	13.1	11.5 - 14.2
BUN	13.0	7.0 - 25.0
CRE	1.7	0.6 - 2.2
AST	416	175.0 - 340.0
TBIL	2.5	0.5 - 2.3
GGT	21.0	5.0 - 24.0
ALB	3.5	2.2 - 3.7
TP	6.6	5.7 - 8.0
GLOB	3.1	2.7 - 5.0

Test	Result	Range
WBC	7.63	5.4 - 14.3
LYM	2.80	1.5 - 7.7
MON	0.39	0.0 - 1.5
NEU	4.36	2.3 - 9.5
EOS	0.08	0.0 - 1.0
BAS	0.01	0.0 - 0.03
LY%	36.7	17.0 - 68.0
MO%	5.1	0.0 - 14.0
NE%	57.1	22.0 - 80.0
EO%	1.0	0.0 - 10.0
BA%	0.1	0.0 - 2.0
RBC	9.20	6.8 - 12.9
HGB	14.2	11.0 - 19.0
HCT	40.87	32.0 - 53.0
MCV	44.0	37.0 - 59.0
MCH	15.4	12.3 - 19.7
MCHC	34.7	31.0 - 39.0
RDWc	24.3	
PLT	84.0	100.0 - 400.0
PCT	0.06	
MPV	7.3	
PDWc	34.2	



In addition to treating exertional rhabdomyolysis in regards to dietary changes by increasing fat content and lowering starch levels (with a combination of oats and timothy hay), I found that some horses are thyroid responsive with respect to exertional rhabdomyolysis. Therefore, thyroid supplementation was also added to her diet and I found a corresponding decrease in AST levels to 822 on April 27, 2010. She was also given a 30 day long acting progesterone injection to keep her from cycling. She was training well at that time and gaining weight, approximately 50 lbs. Despite the still elevated AST levels, I chose to rely on her physical appearance, which resulted in a poor performance on April 28th. She continued to train well following the race and her levels continued to drop.

- April 20th 2010 her AST level was >2000
- April 27th 2010 her AST level was 822
- May 11th 2010 her AST level was 559
- May 20th 2010 her AST level was 416

At slightly above the upper normal range of AST, Favorite Fantasy ran on May 24th and won. Although it was much easier company, her speed figure was one of her best.

Favorite Fantasy continues to be a diagnostic and therapeutic challenge. She has been unable to maintain her AST levels as close to the normal range and her recent race record reflects that. I am not convinced that this is a typical case as her CK levels have never been elevated but will maintain the current regimen in managing her unique case of exertional rhabdomyolysis. The consistent use of the VetScan VS2 Chemistry

analyzer dramatically helped the health management of Favorite Fantasy. The ability to monitor her chemistry and hematology levels quickly and accurately provides me with the ability to adjust her treatment protocol, exercise regimen and dietary protocol quickly and effectively.

The VS2 is very simple to operate provides reliable sensitive data. I have used the system intensively to monitor several horses that have shown unusually high muscle enzyme levels which has allowed me to customize their training intensity to accommodate their subtle differences in training recovery rates.



Hepatic Abscess in a Quarter Horse

Contributing Author:

Terry C. Gerros
DVM, MS,
Diplomate,
ACVIM



A two year old QH colt was presented for poor growth and unthrifty body condition. At presentation, the colt was short in stature, in poor body condition and lethargic. He had a temperature of 101.4°, heart rate of 52 beats per minute and was tachypneic (36 bpm). Auscultation of the thorax was within normal limits. There were no other abnormal findings from the physical exam.

Initial laboratory evaluation consisted of a CBC with fibrinogen, serum chemistry profile and urinalysis. The significant laboratory abnormalities included a neutrophilic leukocytosis (35,000/ul) and hyperfibrinogenemia (1200 mg/dl). The PCV was 33% and total protein concentration was 7.8 g/dl. The serum chemistry profile was normal except for a mildly elevated serum alkaline phosphatase. This isolated abnormality was not considered significant or predictive of any particular body system abnormality. The urinalysis was normal. At this time, the working diagnosis was that of an occult internal abscess.

Thoracic radiographs were obtained and an abdominal ultrasound performed. **The radiographs of the thorax were considered to be within normal limits. Abdominal ultrasound showed multiple, round oval mass lesions**

around the splenic and hepatic hilus. This finding was consistent with lymphadenopathy. There was also a single 7 cm mass outlined within the left side of liver. Ultrasound-guided aspiration of the mass resulted in removal of 200 cc of a purulent fluid. The fluid was cultured for bacterial growth. The abscess cavity was lavaged and sclerosed with a 1% formalin solution. The formalin solution was aspirated and ultrasound revealed a collapsed cavity. Both beta hemolytic *Staphylococcus aureus* and an unidentified gram negative anaerobic rod were cultured. Common antibiotic sensitivity was limited to oxytetracycline and rifampin. A long-term intravenous catheter was placed and antibiotic treatment initiated. Intravenous oxytetracycline and oral rifampin was initially given for 14 days. At that time the liver was reexamined and the abscess was found to be reduced in size by 50%.

Follow-up CBC and fibrinogen were evaluated. Though there remained a neutrophilic leukocytosis (20,200/ul) and hyperfibrinogenemia (600 mg/dl), the values were trending towards normal. Plasma protein was 7.2 g/dl.

Calculation of Plasma Protein:Fibrinogen (PP:F) ratio can be helpful in determining treatment efficacy and treatment length. Initially the PP:F ratio was evaluated, the ratio was 5, confirming inflammation. The value of the calculated ratio after two weeks of treatment was 11, suggesting that although inflammation was still present, it was under control.

The ability to measure fibrinogen concentration and calculating the PP:F ratio allows the practitioner to more closely evaluate treatment efficacy and to reduce the overall treatment period. In this particular case, it was recommended to continue treatment and additional 14 days as there was still evidence of residual abscess on ultrasound examination.

Follow up CBC and fibrinogen at the end of the second two week period were within normal limits. The PP:F ratio was calculated and found to be 18, which is within normal limits. Ultrasound of the liver at that time revealed no evidence of abscess. Also noted was a significant weight gain during the treatment period, further supporting a return to health.

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Over the years the Animal Health industry has told us how much they appreciate all of the valuable information and insight that they receive from their VetCom subscription.

That's always great for us to hear because we strive to ensure that each issue of VetCom is packed with case studies and real-world experiences from your peers, as well as updates on the latest news from Abaxis. But we'd like to make this a two-way street. So we encourage you to contact VetCom editors with your thoughts, questions, experiences and concerns. It's another channel to ensure that everyone here at Abaxis is surpassing the expectations of our customers and the marketplace.

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. We promise that we're listening.

Sincerely,
Valerie Goodwin-Adams
Editor in Chief
VetCom Publications

Craig Tockman, DVM
Director - Professional Services
Medical Editor - VetCom

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**Abaxis, Inc. - Animal Health
Worldwide Headquarters**

3240 Whipple Road
Union City, CA 94587
Tel 800 822 2947
Fax 510 441 6150

Abaxis Europe

Otto-Hesse-Strasse 19
T9, 3. OG Ost
D-64293 Darmstadt Germany
Tel +49 6151 350 790
Fax +49 6151 350 7911



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