

## **E.I.P.H. DISCUSSION TAKES CENTERSTAGE**

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By Steve Sherack

A high-profile panel of international scientists with cutting edge knowledge of Exercise Induced Pulmonary Hemorrhage (E.I.P.H.) and other critical Thoroughbred injuries gathered at the Four Seasons Hotel at Beverly Hills this past weekend.

A number of prominent owners and trainers from the Thoroughbred Owners of California (T.O.C.) were also in attendance.

The two-day, invite-only event was hosted by the T.O.C. and was co-chaired by Pegasus Training and Equine Rehabilitation Center founder and Thoroughbred owner Dr. Mark Dedomenico and Colorado State University's Dr. Wayne McIlwraith. Dedomenico, who played a major role in developing Coronary Bypass surgery, has written many major landmark papers on heart surgery. He paid all of the travel expenses to gather these world-renowned scientists to help determine the present status of knowledge concerning the research into E.I.P.H., racetrack surface injuries, traumatic joint injury, including catastrophic injuries, blood bio-markers that could signal impending injuries and the use of platelet rich plasma and stem cells in treating equine injuries.

The distinguished panel of experts issued the following consensus statement on E.I.P.H. and the four key research needs:

Exercise Induced Pulmonary Hemorrhage (E.I.P.H.) is a consequence of the high pulmonary vascular pressures achieved by elite athlete horses during strenuous exercise. A similar condition occurs in racing greyhounds and has been reported in some elite human athletes. In all of these situations, the heart is approaching its maximal functional capacity. E.I.P.H. has a detrimental effect on performance in Standardbreds and Thoroughbreds. The only treatment that has been shown to prevent the occurrence and decrease severity of E.I.P.H. in Thoroughbred racehorses is furosemide.

The result of furosemide administration is a decrease in pulmonary vascular pressures. On average, horses administered furosemide have better performance. This could be attributable to the reduction in E.I.P.H. or to other factors. Horses administered furosemide on a routine basis have not been recognized to experience detrimental effects. Furosemide does not mask detection or other agents when modern analytical methods are used.

### **RESEARCH NEEDS**

- Cardiac and vascular physiology contributing to E.I.P.H. in the USA and abroad
- Pharmacological agents and their efficacy
- The potential role of genetics on E.I.P.H.
- Effect of E.I.P.H. on well-being

Dr. Samantha Brooks, PhD, Cornell University;

Dr. Gordon Cohen, M.D., PhD, MBA, University of California at San Francisco;

Dr. Mark Dedomenico, M.D.;

Dr. David Frisbie, DVM, PhD, Colorado State University;

Dr. Chris Kawcak, DVM, PhD, Colorado State University;

Dr. Alan Guthrie, BVSc, PhD, University of Pretoria, South Africa;

Dr. Kenneth Hinchcliff, BVSc, MS, PhD, University of Melbourne;

Dr. Wayne McIlwraith, BVSc, PhD, DSc, FRCVS, Colorado State University;  
Dr. Paul Morley, DVM, PhD, Colorado State University;  
Dr. Ed Robinson, BVet, PhD, Michigan State University;  
Dr. Alice Stack, DVM, Michigan State University.

"Does anybody have ideas for studies that they want to do, but can't get funded?" Dedomenico asked of the impressive collection of minds, including the trio of Australia's Dr. Ken Hinchcliff, South Africa's Dr. Alan Guthrie and Colorado State University's Dr. Paul Morley, who joined forces in 2007 to conduct a South African study under racing conditions that proved that Lasix significantly reduced bleeding in horses' lungs.

"We need to start talking about that because sitting behind you are the people who could help us find the funding," added Dedomenico, calling on owners Mike Pegram, Gary West, Gary Barber, Thoroughbred Owners of California President Lou Raffetto and trainers Bob Baffert, John Sadler, Kathy Walsh and Mike Harrington.

Dedomenico continued, "We need to receive funding from the breeders and sales organizations, after all they created the product [equine athletes] and the product appears to have some defects, one being E.I.P.H. For the time being, Lasix is working to reduce the impact of E.I.P.H. The National Football League set aside \$100 million to research and correct the problem of brain concussions. They are not going to stop playing until they find the answer. And we should not stop the use of Lasix."

The Breeders' Cup's phase-out of Lasix began in 2012, banning the medication on raceday from all events restricted to 2-year-olds. The current plan calls for all Breeders' Cup runners to compete Lasix-free in 2013. Lasix was first introduced as a raceday medication in the U.S. in the early 1970s.

"If raceday Lasix is banned, I will quit buying horses of all ages and systematically begin liquidating all of my Thoroughbred holdings," West warned.

Gary and Mary West's pink-and-black silks have been carried to recent Grade I victories by Book Review (Giant's Causeway) and Power Broker (Pulpit). The couple also owned GI Wood Memorial S. victor Buddha (Unbridled's Song), GI Forego S. winner Mass Media (Touch Gold) and millionaire Dollar Bill (Peaks and Valleys).

West added that not using Lasix on raceday is "cruel and inhumane," and said that because most horses bleed, he believes that this is best described as knowingly "waterboarding your horse in their own blood."

"I know people on the East Coast who spend between \$30-\$40 million a year, and they'll be gone as well," West commented. "There's going to be \$100-\$200 million a year leave this business if they ban Lasix in November."

Pegram, a GI Kentucky Derby-winning owner and also the chair of the T.O.C., was next up to bat.

"I haven't heard one negative thing being said that Lasix is detrimental to the horse or that it does enhance performance because it lets a horse perform to his or her ability," Pegram commented. "I'm trying to find out what the other side of the argument is to the people that may not like the use of this medication."

Pegram has been represented by a slew of top runners, including dual Classic hero Real Quiet (Quiet

American), G1 Dubai World hero Captain Steve (Fly So Free), two-time champion Lookin at Lucky (Smart Strike), two-time GI Breeders' Cup Sprint winner Midnight Lute (Real Quiet), and the brilliant race mare Silverbulletday (Silver Deputy), a two-time champion and heroine of the GI Breeders' Cup Juvenile Fillies and GI Kentucky Oaks.

"After looking at those pictures earlier today of the lungs – one from a horse that bled and one that didn't - it looked like one was a smoker and the other wasn't," Pegram said. "Which one of the two would you want to buy after seeing that?"

Baffert, who has trained three GI Kentucky Derby winners throughout his Hall of Fame career, is pro-Lasix. The Arizona native won the Eclipse Award for Outstanding Trainer three consecutive years between 1997-99, and was a finalist in 2012.

"I give Lasix in low doses because I want to prevent bleeding," offered Baffert, who remained extremely active throughout the entire conference by also helping shed some valuable insight on racetrack surfaces and conformation flaws.

"Once they bleed through both nostrils, the chances are that it's going to be hard to get those horses back to the races," Baffert added. "You turn them out, then bring them back and they do it all over again. Today, while we have all these great minds in here explaining everything, we really don't know what makes them bleed, but we know for \$25 [with a Lasix shot] we can stop it."

Dr. McIlwraith added, "The current medication policy of the American Association of Equine practitioners is no raceday medication except Lasix. Lasix remained because there was scientific proof that it reduced E.I.P.H. That has been our stance all along. It is also the stance of the Racing Medication Testing Consortium, which AAEP initiated 12 years ago."

Dr. McIlwraith has a referral surgical practice in Southern California and also consults and does surgery in Seattle, Ireland, England and France. The University Distinguished Professor has published over 350 scientific papers.

"We need to base our policies on science," McIlwraith concluded.

Getting it Down to a Science...

The conference immediately hit the ground running with an insightful 45-minute overview by Michigan State University's Dr. Ed Robinson and Dr. Alice Stack on the vascular physiology and pathology behind E.I.P.H.

For more than 25 years, Dr. Robinson and his colleagues have been investigating the pathogenesis of equine respiratory diseases, particularly inflammatory airway disease and E.I.P.H. Dr. Stack, a board certified specialist with the American College of Veterinary Internal Medicine, is currently enrolled in a PhD program with the Equine Pulmonary Laboratory at MSU, and her research focuses on investigations into the underlying mechanisms of E.I.P.H.

"The horse is truly an amazing athlete," Dr. Robinson commented. "Horses have amazing oxygen consumption. When you add all of the numbers up, the racing horse is pumping probably in excess of 90 gallons of blood through its lung per minute. That means that its running its total blood volume through its lungs up to 10 times per minute."

Robinson continued, "To deliver oxygen during racing, the horse has very high pulmonary blood flow. This requires very high vascular pressures. Furosemide reduces these pressures. Venous

remodeling is a very important component of E.I.P.H., and we have to find out a way to prevent it. By opening these small veins we should be able to reduce the pressure in the capillaries sufficiently to reduce the severity of E.I.P.H.”

Dr. Hinchcliff offered an outline of the history of E.I.P.H. research and stressed the importance of the quality of evidence while conducting studies. Hinchcliff’s research is focused on exercise science, and the use of furosemide in horses. He is Dean of the Faculty of Veterinary Science at the University of Melbourne.

“We really do need clinically relevant studies that need to be appropriately sized and they need to address a small number of questions,” Hinchcliff said. “All of us in the latter stages of our careers are still drawn to this problem [E.I.P.H.] because it’s intellectually challenging and it’s something worthwhile doing.”

Hinchcliff continued, “We regard ourselves as the scientists in this situation and not the politicians. We have studiously tried to stay away from the discussion around and making recommendations regarding the use of furosemide. Our position has consistently been that we’ve identified a number of questions that need to be answered and we go out and attempt to answer those by using the best methodology that we can. We then put the results on the table for the administrators to make use of.”

Dr. Morley, a professor of Epidemiology and Infection Control in the Department of Clinical Sciences in the College of Veterinary Medicine and Biomedical Sciences at Colorado State, took a closer look at the results of some of the landmark studies with regard to the factors associated with E.I.P.H. Major focuses of Dr. Morley’s research include using analytical epidemiology to improve the understanding of diseases in animals and improving infection control and biosecurity to manage health risks that are important in veterinary medicine and public health.

Dr. Guthrie, Director of the Equine Research Centre, Faculty of Veterinary Science, University of Pretoria, South Africa, gave some brief background on how the aforementioned South African study came together.

“I remember Ken [Hinchcliff] calling me and saying that he had a mad idea, and wanted to know if we could look at doing the study in South Africa because the use of Lasix on raceday wasn’t allowed,” Guthrie said. “I told Ken that I’m going to have to make two phone calls and that I would get back to him in a day. The two people that I called were the Chief Executive Officer of our Jockey Club, Rob de Kock, and Graeme Hawkins, racing executive for the racing operator in our region in Johannesburg. Thirty minutes later I called Ken back and said that we were on.”

Guthrie has played an active role in coordinating South Africa’s efforts to facilitate rationalization of veterinary issues surrounding international trade in South African horses.

Dr. Samantha Brooks of Cornell University, a lifelong horsewoman, spent 45 minutes discussing the use of genetic studies to help address complex equine diseases. Her research program explores a variety of topics relevant to horse health ranging from gene expression studies to mapping of genetic disorders and health traits in the horse.

“If the industry wants to pursue genetics to tackle this very difficult problem of E.I.P.H, what might we need to consider?” Brooks asked. “Certainly, the first question is, do genes actually have anything to do with it? That’s an important one--so we should start there. There have been a couple of very good studies, including one out of South Africa, and there’s also some new data coming out that shows that there is some comparability to this condition.”

Brooks added, "If you could identify horses who are elite performers that have never had a problem with this condition, those might be the horses that you really want to understand the genetics on."

Dr. Gordon Cohen, U.C. San Francisco, one of the leading congenital heart surgeons and pediatric heart and lung transplant surgeons in the world, presented ideas from himself and Dr. Dedomenico. Cohen began the presentation by saying that maybe E.I.P.H. is not a lung problem, but a cardiac or heart problem.

"Mark and I have been talking about some different ideas and tried to do a little outside-the-box thinking," Cohen said. "We'd like to make the proposal that E.I.P.H. is a primary heart problem with blood backing into the lungs causing E.I.P.H. The current thought that E.I.P.H. in elite athlete horses is due to exercise induced pulmonary hypertension is in fact incorrect."

Drs. Cohen and Dedomenico suggested that we need to measure pressures in the right heart ventricle, pulmonary artery left heart atrium and left heart ventricle, and that it would have to be done when the horse is on a racetrack in a mock race and running at full speed.

"When I reviewed Dr. Dedomenico's past work, one of his medical papers was on "Pulsatile Flow Engineering" or the engineering of how blood pulsates through the heart and vessels of the body," Cohen continued. "This should help in finding the exact cause of E.I.P.H. With the exact cause you can look for ways to correct E.I.P.H."

After a break for lunch, Dr. McIlwraith, Dr. Kawcak and Dr. Frisbie gave a summary of the state of research presently being done on Racetrack surfaces and injuries; Traumatic joint injury and catastrophic injury including early diagnosis with imaging, research on predictive modeling; Blood bio-markers that could forecast impending injuries several weeks prior to the injury occurring; and Platelet Rich Plasma and Stem Cell therapies for equine injuries. All of these studies have started, but funding shortages are slowing the progression, according to the trio.

Where Do We Go From Here...

The T.O.C., scientists, owners and trainers all agreed that the industry needs to develop funding for these projects, and the T.O.C. is specifically looking to the breeders and sales companies for funding. Dr. Dedomenico commented that he thought several million dollars over the next few years would be needed in order to do the research to find the cause of E.I.P.H. He also said that studies, including one on genetics, could be started while he and Dr. Cohen were finding the cause of E.I.P.H. When asked if E.I.P.H. and the other critical issues could be fixed Dedomenico replied, "Absolutely. We just need to get started."

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