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The Truth about Equine Herpesvirus

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On April 23rd, 2012 Tennessee's annual Bucksnort trail ride opened to horse men and women from all across the nation. This was the 25th year for their horse boarding and riding program, however, this was the year many horse owners wished they had missed. An outbreak of the potentially deadly Equine herpesvirus spread to many of the unsuspecting horses at the event, striking many with illness and ending the lives of several others (Thompson, 2012). What has continued to baffle scientists are questions regarding; why would the Equine herpesvirus (EHV-1) affect the population of horses at the event differently? Provoking this question further, how exactly does the virus spread, what does it affect, what happens to the foal within a pregnant mare? Understanding the role EHV-1 plays in the multi-billion dollar horse community has brought to light a great deal of recent research from universities around the country. Current research has deemed a high level of importance in the field of genetic mapping, specifically, a great deal of progress has been made over the last few years with regard to completing polymerase chain reaction (PCR) assays, so much so that genetic screening via "PCR assays has become the diagnostic test of choice" (Pusteria, 2009). Unfortunately, even though the horse's owner can opt for a screening test, there are still many unanswered questions regarding the fundamentals of such a tragic disease.

Introduction

Equine herpesvirus is not only a potentially deadly virus but the range of illnesses it can cause is quite vast. EHV-1 has been known to cause abortions, neurological diseases, paralysis, and all-too-commonly, death (Nugent, 2012). The detections found through PCR reactions involve a variation of the amino acids within the affected animal's DNA, moreover, studies show that there is a significant variation of one single amino acid, exploited through PCR, the significance of this single, detectable, amino acid lies in the fact that equines with EHV-1 who show this alternative amino acid also show symptoms of neurologic disease. Conversely, equine species who code their genetic information correctly show only non-neurological symptoms. (Nugent, 2012) Though some advances are occurring, much of the horse world is still baffled by the "tricky" Equine herpesvirus, including members of the American Quarter Horse Journal who point out that the virus can cause abortions in mares, yet if the foal contracts it, they'll typically only experience symptoms such as fever, lethargy, and the occasional cough with symptoms becoming more and more mild with each exposure they have to the virus whereas those who are considered very old or those with compromised immune systems tend to be much more severely affected (Lenz, 2011).

Recent Progress

The American Quarter Horse Journal states that "There are no vaccines currently on the market that are labeled as an aid in preventing EHM, [Equine Herpesvirus Myeloencephalopathy], which is another term for the neurological aspect of the aforementioned Equine Herpesvirus, EHV-1 (Lenz, 2012). However, there are several commercialized and experimental vaccinations available to veterinarians working on behalf of the public. Many of these falls into one of two categories, either they are inert **(**containing a whole virus which has been killed), subunit proteins, or DNA. The remaining category includes administration of the live virus, similar to a variety of human vaccinations administered today (Paillot, 2012). Of the seventeen vaccines containing

EHV-1 antigen marketed in North America or Europe, fifteen are inactivated whole virus (inert versions) while only two contain an actual living virus (Pusteria, 2012). There is a great likelihood that the reason for this sharp disproportion of antidotes lies in the fact that, for one, many horse owners are still skeptical of giving their animals a living dose of a deadly virus, one of which has yet to show an absolute cure in common medicine.

When considering which treatment method to use, the recent progresses in veterinary medicine, namely advances with PCR, allow researchers to analyze the individual case and determine, firstly, if the horse is plagued by the virus at all. Most commonly, the virus causes a tremendous level of swelling in the lymph nodes which can be palpated under the horse's lower jaw. Secondly, if the veterinarian is able to determine that at the time the animal appears to be EHV-1 negative, then we can determine what preventative measures we can take to help him/her avoid a fatal reaction when/if they ever become exposed. If the horse is positive, we can run a new test named real-time PCR. A real-time PCR allows us to track the virus's progression in the body. Similarly, we can now run a standard PCR test to determine if the amino acid structure appears to predispose the animal to having neurological effects as the virus progresses. Lastly, if the animal is infected with the virus, the example in Tennessee shows now, more so than prior years, just how contagious this virus is. While keeping the Bucksnort trail ride tragedy in mind, veterinarians are now aware that even though EHV-1 cannot spread to humans, dogs, cats, or any other species known at this time, extended precautions should be taken when dealing with such a deadly virus.

With all of the advancements occurring following the breakthroughs under PCR-oriented research, there seem to be an equal number of dilemmas. Unfortunately, there is still no set method for study of this virus, and consequently, many qualified scientists seem to be gathering and interpreting their results without regard to attempting to establish a standard protocol amongst themselves. Though logical, this idea may not always be practical. There is substantial evidence that real-time PCR (RT-PCR) which allows the quantification of viral loads within the body can be one of, if not the most accurate method available for obtaining an accurate estimate at the level of virus being dealt with at a given point in time, however, as Dr. Pusteria notes in The Veterinary Journal, not everyone has access to this technology (Pusteria, 2012).

Discussion

Though it would be difficult to argue with the fact that not everyone has access to the same technology, however, there needs to be a common line of communication between researchers investigating the role, rhyme, and reason for EHV-1 epidemics such as the outbreak in Tennessee. This communication is not to find common resources amongst every research facility, rather it would be designed around finding differences among the nation's leading veterinary research facilities, from Cornell to Colorado State, University of California, Davis to the Equine Research Park's BSL2 facility at Oklahoma State University in Stillwater. By addressing the commonalities and discords among our nation's leading equine facilities, the required tools can finally be utilized to help address this tragic disease. Until the aforementioned tools are established in common practice, there will still be several questions remaining such as, how can a vaccine be developed for aged mares, how can abortions in pregnant mares who fall victim of the virus be avoided, and how great of a stronghold does the virus need in order to cause neurologic symptoms?

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