

Equine Science Update

Reports from the world of equine research

Spring 2010

Sarcoid treatment breakthrough

The battle against sarcoids is forging ahead with the news that researchers in Scotland have succeeded in killing equine sarcoid cells using a technique known as gene silencing. The researchers are now hoping to obtain funding for clinical trials using the new technique, which could result in a more effective, non-toxic treatment for sarcoids.

Sarcoids are skin tumours caused by infection with the Bovine Papilloma-virus (BPV). They are the most common type of tumour found in horses. It is estimated that 6-7% of horses in the UK are affected. Currently there is no universally effective treatment for sarcoids and if treatment fails the sarcoids will often come back worse than they were in the first place. Although the disease is rarely life threatening, many horses with sarcoids are euthanased because the condition is untreatable or because the horse is unsellable.

But research funded by The Horse Trust offers a potential ray of hope for owners of horses affected by sarcoids. The work was published in the journal *Virus Research*.

The research, which was led by Professor Lubna Nasir of the University of Glasgow, found that by inhibiting the activity of a particular viral protein within sarcoid cells, the amount of viral DNA in the cells reduced. This led to a reduction in the growth of the sarcoid cells and caused the cell to die by "Programmed cell-death" (PCD). The researchers believe that PCD occurs because the sarcoid cells become reliant on the virus.



An estimated 6-7% of horses in the UK are affected with sarcoids.

"This could potentially be a major breakthrough in the treatment of sarcoids," said Professor Lubna Nasir. "We are now seeking funding to use this technique in clinical trials on horses that have sarcoids."

The research team inhibited the activity of a viral protein called E2, which is needed by BPV to replicate. They used a novel approach termed 'gene silencing' to suppress the activity of the gene that codes the E2 protein. The research was carried out in the laboratory on fibroblast cells, which had been cultured from sarcoid tissue removed from animals during surgery.

As this research was carried out in vitro, the researchers will now need to see if they can replicate the results in vivo, by developing a way of targeting the sarcoid cells in horses.

"One of the challenges with gene silencing is administering it within clinical setting - as you need to get molecules into every cell. As sarcoids are on the surface of a horse, we think administration should be relatively

easy - potentially by injecting or applying a cream to the sarcoid," said Professor Nasir. "If we are able to successfully develop this technique it would be a non-toxic and easy to administer treatment for horses affected by this distressing condition."

Nasir's research could also have an impact on the treatment of lesions in cattle, which are also caused by BPV. It may also help with the treatment of Human Papillomavirus (HPV) infections in humans. HPV, which is similar to BPV, can lead to various cancers in humans including cervical and vaginal cancer.

For more details see:

Gobeil PA, Yuan Z, Gault EA, Morgan IM, Campo MS, Nasir L. Small interfering RNA targeting bovine papillomavirus type 1 E2 induces apoptosis in equine sarcoid transformed fibroblasts. *Virus Res.* 2009 145(1):162-165.

For more information on the work of the Horse Trust see:

<http://www.horsetrust.org.uk>

Genetic Test for 'Speed Gene' in Thoroughbred Horses

Researchers have identified a gene that can predict the type of work that is most appropriate for an individual Thoroughbred racehorse. They found that different variants of the MSTN gene that encodes for myostatin are strongly associated with the best race distance among elite racehorses.

The work, led by Dr Emmeline Hill at University College Dublin, was published in the Public Library of Science Journal, PLoS ONE.

The researchers studied the sequence variation in the MSTN gene and investigated associations between those variations and horse's physical characteristics and suitability for different types of racing.

One hundred and forty two samples were chosen for testing from a large DNA sample repository that had been collected from Thoroughbred training, breeding and sales yards in Ireland and New Zealand between 1998 and 2009. The results were related to the records of racing performance and the performance of stallions' progeny.

The researchers found that the best racing distance (BRD - defined as the distance of the highest grade race won by an individual) was highly significantly associated with a variant of the MSTN gene.

The MSTN gene is responsible for muscle mass development. At a specific point in the gene, the code can contain either the letter C or the letter T. As each individual has two copies of the gene—one inherited from the dam, one from the sire—there are three possible combinations of the letters: C:C, C:T or T:T.

C:C horses were suited to fast, short-distance races; C:T horses competed favourably in middle-distance races; and T:T horses had greater stamina.

These findings were independently validated in a re-sampled group of 62 unrelated elite (Group and Listed race winners) Thoroughbreds and in a cohort of 37 elite racehorses.

The research was funded by Science Foundation Ireland.

Following the success of the research programme, Dr Hill and Mr Jim Bolger, the renowned Irish racehorse trainer and breeder, co-founded a company, Equinome, in 2009 to commercialise the test.

According to Dr Hill, "Breeding techniques for Thoroughbred horses have remained relatively unchanged for centuries. Breeders currently rely on combining successful bloodlines together, hoping that the resulting foal will contain that winning combination of genes. Until now, whether those winning genes have or have not been inherited could only be surmised by observing the racing and breeding success of a horse over an extended period of years after its birth."

She concluded, "Using the Equinome Speed Gene test, a world first in equine genetics, it will now be possible to definitively know a horse's genetic type within weeks of a sample being taken, thus reducing much of the uncertainty that has been typically involved in selection, training and breeding decisions."

"Racehorse owners and trainers around the world will be able to identify if a horse is ideally suited to



Dr Emmeline Hill, co-founder Equinome the NovaUCD-based biotech company

racing over short, middle or middle-to-long distances. With this information, they can then optimise their purchasing and training decisions and better target suitable races for their horses. Breeders, stallion managers and bloodstock agents will also be able to use the test to make more precise selection and breeding decisions to maximise the genetic potential and commercial value of their horses."

Dr Hill launched Equinome and the Equinome Speed Gene test at the Irish Thoroughbred Breeders Association Expo 2010 in a seminar entitled Cracking the code: The Speed Gene revealed.

For more details see:

Hill EW, Gu J, Eivers SS, Fonseca RG, McGivney BA, et al. (2010) A Sequence Polymorphism in MSTN Predicts Sprinting Ability and Racing Stamina in Thoroughbred Horses. PLoS ONE 5(1): e8645. doi:10.1371/journal.pone.0008645

<http://www.plosone.org/article/info:doi/10.1371/journal.pone.0008645>

<http://www.equinome.com>

Test to prevent unnecessary foal deaths

A new diagnostic test gives breeders the chance to eradicate foal Immunodeficiency syndrome in Fell and Dales ponies.

The DNA test which will save foals from unnecessary pain and suffering was launched in February by UK scientists.

Foal Immunodeficiency Syndrome (FIS), a genetic disorder which is known to affect Fell and Dales ponies, causes foals to become anaemic and prone to opportunistic infections. Sadly, any foal born with the syndrome will not survive.

The new diagnostic DNA test, which costs £40, is the result of ten years of research by the Animal Health Trust (AHT) and the University of Liverpool. The test will not only identify foals which have the fatal condition but will highlight adult ponies who are carriers of the genetic trait which causes the syndrome. Affected foals will be prevented by avoiding breeding a carrier mare with a carrier stallion.

Owners and breeders who wish to find out the genetic status of their ponies can arrange for a simple pulled mane or tail hair sample to be taken by a vet and submitted to the AHT. The Fell Pony or Dales Pony Societies will supply sample bags for submission on request.

A fast-track system to identify foals suffering with the condition will report results within three working days.

The team who has developed the DNA test was led by the AHT's Dr June Swinburne and Professor Stuart Carter of the University of Liverpool with research student Laura Fox-Clipsham. They believe that by using the test, owners and breeders



Fell pony owners can now avoid breeding affected foals by testing breeding stock. Affected foals (below) will not survive.

will eventually be able to eradicate this awful condition.

Dr. June Swinburne, said: "The DNA test gives owners and breeders the power to overcome this devastating illness. It enables them to make informed decisions about which ponies to breed. We have already had samples submitted by HM The Queen from her own breeding stock of Fell ponies. I'd urge any breeders of Fell or Dales ponies to submit samples in order to arm themselves with the facts they need to prevent the birth of affected foals and thereby avoid this distressing condition."

Professor Carter, said: "The research, and ultimately the DNA test, has only been possible thanks to funding from The Horse Trust and the support of the Fell Pony Society and the Dales Pony Society who have supplied DNA samples. We consider that the efforts of all involved in enabling this research have led to a major advance in animal welfare."



For more information on testing, owners should contact the Fell or Dales Pony Societies.

Alternatively visit the AHT website:

http://www.aht.org.uk/genetics_fis.html

or email FIStesting@aht.org.uk

How common are wobblers?

Cervical vertebral stenotic myelopathy (CVSM) is an important disease of Thoroughbred horses in which compression of the spinal cord in the neck leads to incoordinated gait. Affected horses are often described as “wobblers”.

Two types of the condition have been recognised. In the first type (dynamic stenosis), compression occurs only when the horse flexes or extends the neck. It is caused by malformation of the vertebrae and tends to affect the third and fourth (C3-C4) or fourth and fifth (C4-C5) cervical vertebrae. This type is more commonly seen in younger animals (yearlings).

In the second type, (static stenosis) the spinal cord is compressed by proliferative bone resulting from osteoarthritis. This form occurs most commonly between C5-C6 and C6-C7, and is seen in older animals.

But how common is CVSM? Research published recently in the *Veterinary Record*, looked at the prevalence of the condition.

The study, from the University of Glasgow, was based on records from four breeding establishments - three European Thoroughbred stud farms (936 foals) and one farm in USA (353 foals) - over a 7 year period.

During that time there were 13 cases of Type 1 CVSM, (dynamic stenosis); 5 horses with Type 2 CVSM (static stenosis) and 5 horses in which the Type could not be determined. Overall, 1.3% of the animals were found to be affected.

The average age at which signs of the condition became apparent differed. Horses affected with dynamic stenosis were noticed at a younger age than were those with static stenosis. Type 1 (dynamic stenosis) was diagnosed typically in yearlings (Mean 433days old - about 1 year 2 months.) Horses affected with the stenotic compression were diagnosed later - (mean 1188d - about 3 years 3 months)

The researchers also found that male horses were significantly more likely to be affected (17 male to 6 female), which agreed with previous studies.

“CVSM is an important disease of Thoroughbred horses and leads to wastage in the thoroughbred industry through the inability to race and the loss of affected horses” the report's authors conclude.

They suggest that “further investigations of the prevalence of CVSM in populations of thoroughbreds and other breeds and determination of risk factors for the disease are warranted.”

For more details see:

Prevalence of cervical vertebral stenotic myelopathy in a population of thoroughbred horses.

Oswald J, Love S, Parkin TDH, Hughes KJ.

Vet Rec (2010) 166, 82-83

Ivermectin for foal deworming warning

Ivermectin should not be the drug of choice for controlling *Parascaris equorum* (large roundworm) in foals a recent study warns.

Dr Eva Osterman-Lind and Dr Dan Cristensson of the Department of Virology, Immunobiology and Parasitology, at the National Veterinary Institute, Uppsala, Sweden, investigated the occurrence of *Parascaris equorum* infection on nine stud farms in Sweden and assessed the efficacy of three commonly used dewormers on fecal egg output.

A faecal egg count reduction test (FECRT) was used to assess the efficacy of the three anthelmintics (ivermectin, fenbendazole and pyrantel) against *P. equorum* in groups of weaned foals (median age 6.5 months). The foals had been dewormed already two or three times over the summer. Faecal samples were examined for ascarid eggs on the day of deworming and 14 days later.

Ivermectin had very little, or no, effect on the output of ascarid eggs. On three studs all foals included in the study still had *P. equorum* eggs in the feces 14 days after ivermectin treatment. On only one farm where ivermectin was used did the post-treatment egg count fall by more than 90% compared with pre-treatment levels.

In contrast, the FECRT 14 days after treatment was 100% in the

Atypical Myopathy risk

Ivermectin for foal deworming warning. Continued...

fenbendazole treated group, and more than 90% in the small group of foals treated with pyrantel.

“The most striking result from this study was that in five studs out of six, ivermectin failed to suppress the faecal output of *P. equorum* eggs” Osterman-Lind and Cristensson report.

“Ivermectin resistance is now a widespread problem in Swedish stud farms.”

They advise that instead of ivermectin, fenbendazole or pyrantel are now the drugs of choice for use against *P. equorum*.

“It is important, however, that the anthelmintic efficacy is monitored routinely by FECRT ” they emphasise. “In the long-term it is also necessary to incorporate non-chemo-therapeutic methods to a greater extent to control parasite infections on stud farms.”

For more details see:

Anthelmintic efficacy on *Parascaris equorum* in foals on Swedish studs. Eva Osterman Lind, Dan Christensson
Acta Veterinaria Scandinavica (2009) 51, 45
doi: 10.1186/1751-0147-51-45

“There seems to be an increased risk of cases of Atypical Myopathy during the spring, when the disease has occurred during the previous fall” warns Dr Domonique Votion, of the University of Liege.

In the last few months of 2009, Western Europe experienced the largest ever series of cases of the disease, according to the Atypical Myopathy Alert Group.

No less than 371 cases were notified to the AMAG. Of those horses, 265 died, giving a survival rate of just 22%. Most cases were reported in France (124) Germany (92), and Belgium (64)

Thirty-five cases were identified in the UK.

Horses with Atypical Myopathy suffer from severe, generalised weakness. They are often unable to get to their feet, or only do so with difficulty. If they are still able to walk, they do so with a stiff gait - especially of the hindquarters. Muscle tremors and generalised or patchy sweating may be seen.

Affected animals have elevated heart rates. They often have increased respiratory rates, with difficulty on expiration. The rectal temperature is usually below normal. Dark brown colouration of the urine is characteristic.

Despite the severity of the signs, horses often still seem keen to eat and will try to grasp hay that is held close to their mouth.

Often the first sign of disease is stiffness, especially of the hind-quarters. However, it is not unusual for severely affected cases to be found dead on the pasture with no previous sign of illness.

For more details about Atypical Myopathy and the Atypical Myopathy Alert Group see:

<http://www.myopathieatypique.be>

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Urine DNA profiling

Researchers are close to finalising a DNA profiling technique that will confirm the identity of racehorses that have tested positive to drugs, a breakthrough that will help demonstrate the integrity of the industry and increase public confidence.

A study funded by the Australian Government's Rural Industries Research and Development Corporation (RIRDC) has shown that urine samples from horses can be used to confirm the identity of a horse using DNA profiling. This has proved difficult in the past as urine contains only small levels of DNA. But researchers have moved closer to a reliable test that could be used by horse drug testing laboratories.

Such a test would dispel any doubt about sample substitution and confirm that a sample did in fact come from a particular horse, helping to either confirm the identity of horses returning positive drug samples, or exonerating horse and trainer.

DNA profiling is used routinely to confirm identity and parentage in horses around the world. The process is usually based on hair, but other samples such as blood and semen are sometimes used. Urine is not often used. It contains only a small amount of cellular material, and the DNA that is present is rapidly degraded. Urine also contains substances, such as urea, calcium carbonate, and calcium oxalate, which may interfere with the amplification process.

DNA profiling in horses for checking parentage routinely looks for 12 "microsatellite markers" - specific portions of the animal's DNA. If all 12 markers can be obtained the profile provides

confirmation of identity with a confidence level of greater than 1 in 100 billion. That means that the chance of two unrelated horses having identical DNA profiles using this set of markers is 1 in 10^{11} (i.e. 1 in 100 billion). Even if only eight markers are found the chances of two unrelated individuals having the same DNA profiles is still greater than 1 in 100 million.

The report "DNA Profiling of Horse Urine Samples to Confirm Donor Identity" resulted from studies carried out by Paula Hawthorne and colleagues at the University of Queensland. The research team tested various techniques for DNA profiling on seven urine samples and compared the results with those from hair samples taken from the same horses.

They found that storage time and temperature had a significant effect on the success of the DNA profiling. Urine could be stored at 4°C for no more than two days (or frozen at -20°C or -80°C) before processing. Samples stored at 4°C for a week or more yielded no profiles.

The most successful technique, a commercially available test, allowed

them to identify all twelve microsatellites, in four urine samples - all from male animals. As only seven samples were examined overall, it was not possible to tell whether that was a coincidence, or whether it really is more difficult to extract DNA from mare's urine.

All DNA profiles from the urine samples matched the DNA profile from the respective hair sample from the same horse

There is still more work to do - for example, the researchers point out that drugs in the urine may interfere with DNA profiling. So once the best method of DNA profiling has been established, further tests will be required to assess whether the results are affected by drugs likely to be found in the urine.

However, the authors of the report suggest that once the optimum method has been finalised it should not take long to integrate it into existing procedures of racing drug-testing laboratories.

The full report is available for purchase or free download. See: <https://rirdc.infoservices.com.au/items/09-076>

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Rapid ringworm diagnosis

Scientists in South Korea have described a rapid method for diagnosing dermatophytosis.

Dermatophytosis, (“ringworm”) is an infection caused by fungi that attack the skin and associated keratinised structures such as hair and nails.

Fungal culture is the “gold standard” for identification of the species of dermatophyte involved, based on the colony characteristics and microscopic appearance. It is accurate but time consuming. Samples may have to be cultured for up to three weeks before the organism can be identified.

It’s not necessary to know the species of dermatophyte before starting treatment, indeed, to prevent the spread of infection, treatment is usually started pending the results of laboratory investigations.

However there are occasions when it may be useful to know the identity of the dermatophyte involved, as it may help to identify the source of the outbreak. For example *Trichophyton mentagrophytes* can be found in soil and carried by rodents.

Researchers at the Colleges of Veterinary Medicine at Seoul National University and Konkuk University compared a rapid molecular method for diagnosing dermatophyte infection with conventional fungal culture.

Under the direction of Dr Cheol Yong Hwang, of the Department of Veterinary Internal Medicine at the Seoul National University College of Veterinary Medicine, the researchers examined samples taken from horses with suspected ringworm housed in Korean Racehorse Authority stables.

They collected hair samples from lesions on affected horses and from unaffected (control) horses and examined them by both PCR analysis and standard fungal culture. The PCR examination of the fungal DNA looked at the chitin synthase 1 (CHS-1) gene, which has specific characteristics in dermatophytes.

DNA analysis confirmed that of 57 suspected ringworm cases, 38 were indeed dermatophyte infections. PCR analysis of the CHS-1 gene of the fungal DNA produced fragments approximately 450bp in size - characteristic of dermatophyte fungi. These 38 samples also gave positive results on fungal culture.

Rapid confirmation of dermatophyte infection allowed the researchers to treat the affected cases with topical antifungal baths (ketoconazole twice weekly for 4 weeks.) This prevented any further spread of the infection.

Three of the positive samples were chosen at random for further testing, using gene sequencing. The results of this investigation confirmed that the dermatophyte involved was *Trichophyton mentagrophytes*.

The other 19 samples were negative both on PCR and standard culture fungal culture, as were all control samples.

The researchers conclude that the PCR assay is superior to traditional fungal culture for detecting fungal infection, “ in terms of sensitivity, specificity and particularly rapidity.”

For more details see:

A rapid molecular method for diagnosing epidemic dermatophytosis in a racehorse facility.

Chung T.H, Park G.B, Lim C.Y, Park H.M., Choi G.C, Youn H.Y, Chae J.S, and Hwang C.Y.

Equine Veterinary Journal

Tick-borne disease in Danish horses

Tick-borne infections are common in Danish horses according to a recent report. Results of a survey published in *Acta Veterinaria Scandinavica* showed that many Danish horses had antibodies to *Borrelia burgdorferi sensu lato* (the group of *Borrelia* species known to cause Lyme disease) and *Anaplasma phagocytophilum* (the cause of equine granulocytic anaplasmosis).

In northern Europe these micro-organisms are transmitted by the hard-bodied tick *Ixodes ricinus* (known as the sheep tick or castor bean tick).

Not all horses that come into contact with the infection will develop signs. In endemic areas, it has been estimated that although 30-40% horses may be seropositive for *Borrelia burgdorferi sensu lato* (BB), only 5-10% will show signs of disease. Similarly, up to 50% of animals may be seropositive for *Anaplasma phagocytophilum* (AP) in endemic areas. However, clinical signs are rarely recognised and most horses recover without treatment - so the condition infection usually goes un-noticed.

The study, overseen by Dr Anders M Bojesen of the Department of Veterinary Disease Biology, Faculty of Life Sciences, University of Copenhagen, Denmark aimed to value the seroprevalence of *B. burgdorferi s. l.* and *A. Phagocytophilum* in Danish horses.

In total, 390 horses of various breeds were sampled, from all

regions of Denmark. Only healthy horses were included in the survey. Horses with signs or recent history of untreated infectious disease were excluded.

Lead researcher, Marie Hansen collected and tested the samples. She used a commercially available test (SNAP® 4DX®), which, although intended for testing canine blood samples, has been shown to be useful for detecting *B. burgdorferi s. l.* and *A. phagocytophilum* antibodies in horse serum.

Previous studies with the test suggest that it is likely to detect antibodies for up to five months after infection with *A. phagocytophilum* and for up to nine months after infection with *B. burgdorferi s. l.*

The researchers found that overall, 29.0% horses were seropositive for *B. burgdorferi s. l.* and 22.3% were seropositive for *A. Phagocytophilum*. This was a higher proportion than had been found in previous studies in neighbouring countries. They explain: "Whether the differences in Denmark versus Sweden and Germany are due to an increase in the number of infected ticks since the latter investigations were performed, or whether the prevalence in Denmark in fact is higher will however remain unknown until data from prevalence studies with a comparable design and method from all countries in the region are performed."

There was no significant correlation between risk factors investigated -

including breed, gender, age, use and housing and the occurrence of antibodies against *B. burgdorferi s. l.*

However they did find that older horses were more likely to have been infected with *A. phagocytophilum*. Compared with horses aged between 1-4 years old, those aged 11-20 years were 2.3 times more likely to be seropositive for *A. phagocytophilum*, and horses over 21 years old were 3.3 times more likely to be seropositive.

Horses seropositive for *B. burgdorferi s. l.* were likely to be seropositive for *A. phagocytophilum* and vice versa.

The researchers conclude "these findings warrant further attention to these infections in horses particularly with regard to improved means for detection of active infections, which may contribute to a better understanding of these diseases and their impact on horse behaviour and welfare."

The full report is available

Seroprevalence of *Borrelia burgdorferi sensu lato* and *Anaplasma phagocytophilum* in Danish horses. Hansen MGB, Christoffersen M, Thuesen LR, Petersen MR, Bojesen AM.

Acta Vet Scandinavica (2010) 52, 3
doi: 10.1186/1751-0147-52-3

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Exercise and in-foal mares

Moderate exercise in the last trimester of pregnancy is unlikely to cause problems for mares or their unborn foals, research suggests.

A research team from the University of Maine and the Equine Science Center, Rutgers University, New Jersey compared the response of pregnant and non-pregnant mares to a graded exercise test. A full report of the study has been published in *Comparative Exercise Physiology*.

They evaluated the effect of exercise on various parameters including maternal heart rate, plasma cortisol and plasma lactate and foetal heart rate.

Six unfit standardbred mares were assessed when nine months pregnant and again eight months later after weaning. The exercise test was carried out on a treadmill inclined at 6%. The speed increased in steps of one minute each at 4m/s, 6m/s and 7m/s.

An ECG monitor attached to the mares recorded both mare and foetal heart rate. It was not possible to record the foetal heart rate during exercise because of noise on the ECG signal, but it was recorded immediately after the end of the exercise test.

The mares' heart rates during exercise were recorded with a micro-manometer catheter, which detected the changes in blood pressure with each beat.

The results revealed some interesting differences between the mares' responses to exercise depending on whether they were pregnant or not.

At each stage of the graduated exercise test, mares had lower heart rates when pregnant than after weaning. Plasma lactate concentrations rose less in response to exercise when mares were pregnant than when they were not. The researchers speculate that this might be due to greater cardiovascular efficiency during pregnancy.

Resting plasma cortisol levels were lower during pregnancy than when the mares were not pregnant.

The researchers were surprised to find that pregnant mares showed no increase in cortisol levels during exercise. In contrast, when they were not in-foal, the mares showed a normal increase in plasma cortisol during and after the exercise test.

Exercise had no effect on foetal heart rate. This suggests that the unborn foal is not stressed by the mare undertaking moderate exercise.

The researchers point out that the foals from the mares involved in the study were born without problems and were healthy, with normal body weights.

They conclude: "these data suggest that pregnant mares benefit from greater cardiovascular efficiency during pregnancy. They should be able to perform limited moderate exercise without any major deleterious effects on their unborn foals or themselves during late gestation."

For more details:

Maternal and foetal heart rates during exercise in horses.

Lehnhard RA, Manso Filho HC, Causey RC, Watford M, McKeever KH

Comparative Exercise Physiology (2009) 6, 43-48.

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Oxytocin promotes placental expulsion

Retention of the foetal membranes (placenta) is a common post-foaling complication. It is of particular concern in heavy draft breeds, which seem especially likely to develop laminitis if expulsion of the membranes is delayed.

It also affects fertility. Retention of the placenta for more than an hour has been associated with reduced pregnancy rate in the subsequent pregnancy.

So what can be done to encourage the separation and expulsion of the placenta? A Japanese study, in a small group of horses, found that hourly injections of oxytocin after foaling was an effective way of inducing placental expulsion. The work was reported in the *Journal of Veterinary Medicine and Science*.

Dr Mitsuo Ishii and colleagues monitored four draft -type mares after foaling to assess the effect of hourly injections of oxytocin on placental expulsion. All births appeared normal, producing live foals.

The scientists gave 50iu of oxytocin by intramuscular injection at hourly intervals. They measured the plasma concentrations of oxytocin and prostaglandin F₂ alpha metabolite (PGFM), and kept a record of when the mare was hand milked, and when the foal stood up and sucked.

Suckling (and hand milking) tended to produce an increase in the oxytocin concentration in the blood.

All four mares expelled the placenta after between 1 and 3 injections.



Retention of the foetal membranes is a particular problem of draft breeds.
Photo courtesy Dr Mitsuo Ishii

Two mares did not cleanse until more than 4 hours after foaling. But in one of those, the oxytocin administration only started 3 hours after foaling. That mare had low levels of oxytocin (and PGFM) immediately after foaling (unlike the other mares), which was thought to be responsible for the retained placenta.

Although expulsion was delayed in this case, the clinicians felt that the oxytocin treatment had been effective and questioned whether expulsion would have occurred more quickly had the injections started earlier after foaling.

Another mare retained the placenta until just after four hours post-foaling. She showed a decline in oxytocin and PGFM followed by a gradual rise in oxytocin, a pattern similar to the two mares that cleansed more promptly.

The clinicians could not explain why the placenta was retained in this case. It was finally expelled when oxytocin levels reached much higher

levels than in the other mares. This was preceded by a peak in PGFM that coincided with signs of colic. The abdominal discomfort resolved quickly without the need for treatment.

The authors suggest that intramuscular injection of 50iu of oxytocin at hourly intervals after foaling is effective for producing placental expulsion.

For more details see:

Effective oxytocin treatment on placental expulsion after foaling in heavy draft mares.

Ishii M, Kobayashi S, Acosta TJ, Miki W, Matsui M, Yamanoi T, Miyake Y-I, Miyamoto A.
J Vet Med Sci (2009) 71, 293 - 297.

Effect of stretching

Over use of passive stretching techniques may actually be detrimental, a study suggests.

Passive stretching exercises are often used to encourage efficient movement and help limit injury, in both human and equine athletes,

Researchers at Myerscough College found that although passive stretches appeared to have some effect on horse movement, they did not produce consistent improvement. Indeed stretches on a daily basis resulted in reduced range of movement at the stifle and hock.

Natasha Rose and colleagues at Myerscough College near Preston, UK, investigated the effects of two different passive stretching regimes on stride length and range of motion in horses trotted in hand.

Six mares and twelve geldings were used for the study. They were divided into three groups containing six horses each. One group received a 6-day a week stretching regime; the second were given passive stretches 3 days a week. The third (control) group received 10 minutes of human contact daily but no stretching.

Treatment was given for a period of 8 weeks. The same person, a qualified equine body worker, performed all the stretching exercises.

The research team used video analysis to measure stride length and range of motion of the limb joints. All horses were trotted up in hand at a constant speed by the same experienced handler. Measurements were taken initially and at two-week intervals throughout the eight weeks of the study.



Stretching three times a week produced some increase in range of movement. Photos courtesy Alison Northrop.

Individual horses varied in their acceptance of the procedure. The therapist noted that some horses responded better than others did to the stretches.

The researchers found no detectable differences in stride length between the treatment groups. They suggest that monitoring the response in horses trotting in hand may not be a fair test of the benefits of stretching exercises. After all, a horse might not put in the effort to produce a longer stride without being encouraged to do so by a rider.

They did find differences between the treatment groups in the range of movement of certain joints. The overall range of movement in the stifle was significantly lower in horses on the six day/week stretching regime, than in either the control horses or the 3 day/week stretching regime group. The hock showed a similar result.

Shoulders treated with the 3day/week stretching regime showed

a higher range of movement than in either of the other two groups. "These results suggest that stretching every day may not be appropriate for the horse" the researchers conclude.

"Stretching three days a week provided some benefit in terms of range of movement, and may be a safer option for the industry to consider."

For more details see:

Effects of a stretching regime on stride length and range of motion in equine trot.
NS Rose, AJ Northrop, CV Brigden, JH Martin
The Veterinary Journal (2009) 181, 53 - 55

New equine respiratory condition described

Researchers in Denmark have identified a new cause of respiratory disease in horses. They found the bacterium *Stenotrophomonas maltophilia* in samples collected from horses with chronic lower airway disease.

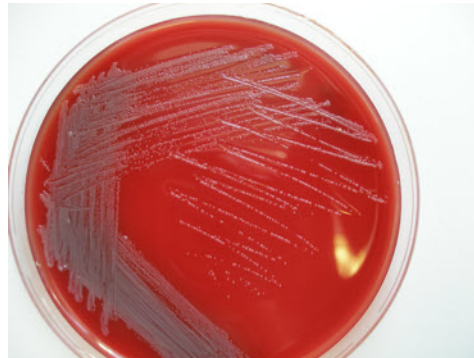
Stenotrophomonas maltophilia, a Gram-negative bacterium, has been found increasingly in human medicine, especially in patients with impaired immune systems. Until recently the organism has been recorded only rarely in animals.

According to the researchers "this pathogen has not previously been associated with lower airway disease in the horse."

In a paper to be published in the *Veterinary Journal*, Lotte Winther, a PhD student in the Department of Large Animal Sciences at the University of Copenhagen, and colleagues present data from seven horses with respiratory disease associated with *S. maltophilia* infection. The horses were treated at three equine referral hospitals in Denmark in 2007.

The report documents the clinical findings, laboratory diagnosis and response to treatment.

All cases had a history of chronic coughing. Endoscopic examination revealed copious mucopurulent exudate in the lower trachea. Culture of the tracheal exudate produced grey, slow-growing colonies, which were identified as *S. maltophilia* by both culture and DNA testing.



S. Maltophilia produces grey slow-growing colonies.
Photo courtesy Dr Lotte Winther.

All isolates had a similar antibiotic susceptibility pattern. They were resistant to many antibiotics used to treat respiratory infections in horses, including all penicillins, cephalosporins, aminoglycosides and rifampicin.

"The results from susceptibility testing and clinical response to treatment suggest prolonged administration of tetracyclines (greater than 10 to 14 days) is an effective treatment, especially for adult horses," advise the researchers.

The findings suggest that *S. maltophilia* can act as a respiratory pathogen. The researchers advise that the organism be included in the differential diagnosis of horses with respiratory disease associated with copious mucopurulent exudate.

They stress that many antibiotics commonly used to treat equine respiratory infections are not effective against *S. maltophilia*.

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Association of *Stenotrophomonas maltophilia* infection with lower airway disease in the horse: A retrospective case series. Winther L, Andersen RM, Baptiste KE, Aalbæk B, Guardabassi L. *Vet J.* 2009 Sep 14. <http://dx.doi.org/10.1016/j.tvjl.2009.08.026>

Equine Science Update is published by Mark Andrews Cream Cottage, Low Church Road Middle Rasen, LN8 3TY UK

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Please see the website for details of current subscription rates.

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