By Christine Barakat and Mick McCluskey, BVSc, MACVSc

WHIRLS AND HAIR WHORLS

New research suggests there's a surprisingly simple way of predicting whether a spooking horse will turn to the right or left: Check out his facial whorls.

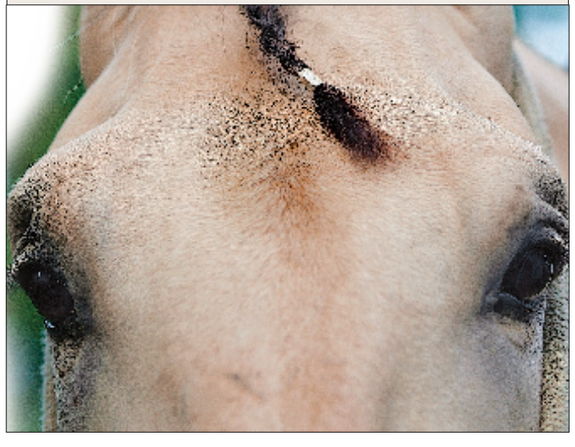
The equivalent of "cowlicks" in people, whorls are swirling patterns of hair; they are commonly seen on the forehead but can appear anywhere on a horse's coat. The location and direction of whorls in humans are linked to early fetal brain development. In fact, abnormal whorls are common in children with developmental disorders.

In a recent pilot study, Colorado State University researchers set out to determine whether the orientation of a whorl—clockwise or counterclockwise—indicates a horse's propensity to favor his right or left side. CSU researchers categorized facial whorls on 19 riding horses based on height, location and orientation.

Facing the horses straight on, the researchers then exposed them to a frightening stimulus—the sudden opening of an umbrella. They found that horses with counterclockwise whorls were more likely to spin left when spooking, while those with clockwise whorls turned to the right.

The researchers conclude that "facial hair whorls may be used as a noninvasive method to predict turning response in horses."

Reference: "Behavioral laterality and facial hair whorls in horses," ***Journal of Equine Veterinary Science,*** **September 2016**



ARND BRONKHORST

EVIDENCE SUGGESTS EQUINE INFLUENZA VIRUS IS ZOONOTIC

Duke University researchers recently sought to answer a long-standing question about the equine influenza virus (EIV): Can it infect people? Their answer is "yes."

Working with graduate students from China and Mongolia, Gregory Gray, MD, MPH, FIDSA, of Duke's Division of Infectious Diseases, headed a team that reviewed 2,206 scientific journal articles related to equine influenza outbreaks that mentioned both humans and horses.

The earliest study of significance that the team found was published in the Ukraine in 1959. Based on bloodwork done on affected horses, the Ukrainian researchers determined that an influenza outbreak among race horses may have been associated with a human flu outbreak that occurred at the same time.

Studies conducted in the mid-1960s at the National Institutes of Health showed that 12 to 20 percent of people who were experimentally inoculated with a H3N8 equine influenza virus developed clinical symptoms, such as a fever or cough.

"Now, that's a low percentage," says Gray, "and these were people in a hospital setting with high number of viruses sprayed up their noses, so we aren't clear how frequently people have symptoms from equine influenza virus infection in a more natural setting, but these studies—and others like it—show that humans can be infected with at least one type of equine influenza virus."

More recent studies provided evidence of previous equine influenza virus infection in people exposed to horses, but questions remain. "In an active study in Mongolia we continue to look for convincing proof that humans play a role in sustaining the transmission of these viruses in horses by serving as silent vectors," says Gray. "That means they are harboring the virus themselves and passing it along to other horses. This isn't a case of the virus being on their hands and passed through contact, but humans that are infected and shedding it in their own nasal secretions to infect horses. We haven't found such evidence, but it's biologically believable based on the historical evidence we've looked at."

TIM FLEMING/ALAMY.COM

Biosecurity measures and hygiene practices common in the Western world minimize the threat of EIV passing between people and horses. Elsewhere, however, the risk is greater.

Gray notes that the biosecurity measures and hygiene practices common in the Western world minimize the threat of the EIV passing between people and horses. Elsewhere, however, the risk is greater. "In a place like Mongolia or China, where one caretaker may be looking after a large herd of working horses, a sick horse or human may go unnoticed. That's where you have some potential of a problem." He adds that if the equine influenza virus were to change or if a different strain were to emerge, the scenario could change drastically.

"Modern H3N8 strains of influenza in horses are mild and fairly stable, but there are some strains —such as H7N7—that circulated 30 or 40 years ago and have disappeared," says Gray. "If they were to come back, the human population wouldn't haven't the partial resistance we do have to the H3N8 strain and there would likely be a greater probability that it would infect humans. That's when you can develop an outbreak situation like we've seen with a number of humans becoming sick with various type of avian influenza viruses."

Fortunately, says Gray, "there are veterinarians dedicated to this study in various parts of the world, closely monitoring for outbreaks in horses and the emergence of new strains. If that happens we don't know how big of a problem it will be, but we will likely soon become aware of it and start taking steps to contain it."

As for what individual horse owners can do to protect themselves and their horses against influenza, Gray recommends following the vaccination advice of veterinarians and doctors: "If your doctor suggests an influenza vaccine, get it. In most years, the human version will give you some protection from equine variants because they both contain some similar components. And by the same token, if your veterinarian recommends influenza vaccines for your horses, take that advice."

Reference: "A review of evidence that equine influenza viruses are zoonotic," ***Pathogens,*** **July 2016**

DIET, MORE THAN WEIGHT, CRUCIAL IN INSULIN RESISTANCE

It's common knowledge that obese horses are more likely to develop insulin resistance, but a new study from Australia suggests that the root of the problem may lie with an individual's diet rather than his weight.

"We know that insulin resistance is associated with the risk of laminitis[0] in ponies and certain breeds of horses, and so is obesity. Together, this syndrome is known as equine[0] metabolic syndrome (EMS)," explains Simon Bailey, BVMS, PhD, of the University of Melbourne. "However, we didn't know what caused insulin resistance. From other species it has been suggested that obesity might be the cause, but we speculated that it may be the nonstructural carbohydrates (sugars and starches) in the diet that might be more important. Previous studies had made horses obese using high-grain diets, but we wanted to separate the two factors." Insulin is a hormone that enables the body to utilize glucose from carbohydrates.

Bailey's team devised

DUSTY PERIN

These findings suggest that a horse's risk of equine metabolic syndrome-related laminitis will decrease when dietary changes are made, even before the changes lead to significant weight loss.

an experiment using Andalusians and ponies—breeds susceptible to EMS and laminitis—and Standardbreds, which are not prone to those conditions. The horses, 33 in all, were divided into three groups. One group was fed a high-starch, grain-rich diet, while the second group received a ration that provided the same amount of calories but through fats. The third group, which served as controls, was given only hay and a protein/vitamin/mineral balancer ration.

The horses were kept on the diets for 20 weeks, long enough for those on the high-calorie rations to become obese. The researchers tested each horse's insulin sensitivity at the start of the study and again at the end to determine whether insulin resistance had developed.

The results showed that every horse on the calorie-dense diets gained weight, but those on the high-grain rations were much less sensitive to insulin than were those on the high-fat diets. In fact, there was no difference in the insulin regulation among horses fed high-fat diets and those in the control group, which had not become obese. "[This confirms] that, in horses, obesity itself does not cause insulin resistance, but sustained carbohydrate absorption from the diet and the prolonged insulin response is the main cause of insulin dysregulation in otherwise healthy horses," explains Bailey.

These findings suggest that a horse's risk of EMS-related laminitis will decrease when dietary changes are made, even before such changes lead to significant weight loss. "Cutting down the starches and sugars will not only reduce the insulin dysregulation (and therefore risk of EMS and laminitis) but will also be the most important factor in driving weight loss," says Bailey. "Weight loss and insulin sensitivity would probably change at similar rates, although you would be preventing the insulin peaks straight away, so that would reduce the risk of high insulin causing laminitis."

Bailey stresses that obesity is always unhealthy for horses. "Even though obesity does not directly appear to cause the insulin dysregulation that leads to laminitis, usually it is an indicator that insulin levels may be high because insulin promotes obesity," he says. "Therefore, aiming for a moderate body condition is going to be the best advice for long-term management." Bailey adds that this study underscores the influence of genetics on insulin sensitivity.

"Comparing breeds, we saw marked breed differences between the responses. Even though the Standardbreds became slightly more insulin resistant on the high-grain diet, the ponies and Andalusians were relatively insulin resistant even at a moderate body condition score and became even more insulin resistant on the high-grain diet (but not on the high-fat diet)," he says.

Taking these findings into consideration, says Bailey, "the general advice for owners of EMS-prone horses and ponies would be to avoid high-grain concentrate feeds and spring pasture which may produce the sorts of high insulin levels that drive insulin resistance and increase the risk of laminitis. When animals are in work, then using some oil or a proprietary low-glycemic supplementary feed may be the best way to supplement calories."

Reference: "Effect of increased adiposity on insulin sensitivity and adipokine concentrations in different equine breeds adapted to cereal-rich or fat-rich meals," *The Veterinary Journal*, May 2016

NIACIN DEFICIENCY RULED OUT AS GRASS SICKNESS CAUSE

As the search for the cause of equine grass sickness (EGS) continues, Scottish researchers have ruled out niacin deficiency as a contributor to the mysterious and deadly gastrointestinal disorder.

Characterized by neurological degeneration that causes paralysis of the digestive tract, EGS is a rare condition that occurs primarily in Britain but is also seen in northern Europe. Horses with acute EGS develop severe colic and typically die within 48 hours of onset; other cases unfold more slowly and horses may waste away for weeks before dying or being euthanized. There is no known treatment and the disease has a mortality rate of 95 percent.

A neurotoxin, such as botulism, is the suspected cause of EGS but no definitive evidence has been found. An alternative theory proposed that a deficiency of niacin, a B vitamin important to nerve function, could be involved, and toxic fungi found on pastures might interfere with the absorption of the nutrient.

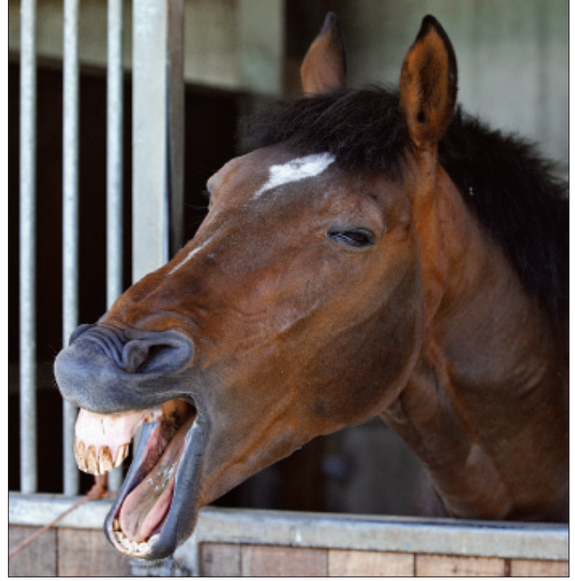
However, when researchers at the University of Edinburgh compared the blood niacin levels of horses with EGS to those of control horses, they found no significant difference. They conclude that niacin deficiency does not play a role in EGS.

Reference: "Neurodegeneration in equine grass sickness in not attributable to niacin deficiency," *Equine Veterinary Journal,* August 2016

NOTHING BORING ABOUT YAWNING

The next time your horse yawns, pay attention—he could be signaling a significant change in emotions.

"Yawning is commonly considered to be the effect of boredom or drowsiness,"



BOB LANGRISH

says Aleksandra Gorecka-Bruzda, PhD, of the Polish Academy of Sciences. "However, equine behavior research has suggested that yawning can also be closely related to frustration-provoked behavior in stall-kept horses, especially in arousal-provoking situations, such as before feeding."

To explore the topic and learn how environmental factors may influence equine yawning, Gorecka-Bruzda teamed up with researchers at University of Rennes in France, to observe 16 domesticated horses living in a stable herd with extended turnout times and 19 Przewalski horses living on a preserve. During multiple daily five-minute observation periods, the researchers tracked and categorized each horse's social interactions and counted the number of times he yawned. The Przewalski horses were observed for 10 hours, while the domesticated horses were observed for four hours.

The researchers found no difference in yawning frequency between the two groups, indicating that domestication alone has little influence on the behavior. There was, however, much less yawning in the domesticated herd in semi-feral conditions than in a comparable group of stall-kept riding school horses observed in a previous study. This, the researchers say, may be attributed to the options offered to the domesticated horses in the current study—primarily ample turnout time and unrestricted feeding.

"In the most recent study, the domestic horses lived in 'good' naturalized conditions and in this context they yawned little," says Martine Hausberger, PhD. "This shows clearly that the very high frequency of yawning observed by earlier research was not related to domestication but to the restricted conditions the horses were kept in." The frequency of yawning varied by individual, but stallions tended to yawn more than geldings or mares.

The researchers note that the Przewalski horses had more social interactions overall, which may have influenced the data, but both species showed a correlation between the frequency of yawning and that of social interactions. In the Przewalski horses, interactions preceding yawns tended to be agonistic, such as a threat to bite or a chase; in contrast, interactions among domesticated horses were positive or neutral, such as sniffing each other. "It can be proposed that, among other things, yawning can be related to the increase in arousal, in response to whatever positive or negative trigger," says Gorecka-Bruzda.

"When a horse yawns a lot, the owner should not conclude that he is relaxed and well, especially if the yawn appears at high occurrence," says Hausberger. "In some cases, it can indeed be related with drowsiness, but high frequencies of yawning should attract the attention of the owner, who should then observe the horse and the situation for signs of potential welfare problems."

Reference: "Investigating determinants of yawning in the domestic (*Equus caballus*) and Przewalski (*Equus ferus przewalski*) horses," *The Science of Nature,* October 2016