LAY ARTICLE: **Please Pass the Sugar**

Prepared for: **Southern California Equine Foundation**

Prepared by: **Dr. Noah D. Cohen, Department of Large Animal Medicine & Surgery**
College of Veterinary Medicine, Texas A&M University

One of my first memories of animals is going with my father, a veterinarian, to a horse barn. My mother had thought to give me some sugar to offer the horse as a treat. Almost 40 years later, I am again giving sugar to horses. The purpose this time is to investigate the use of table sugar as a way to detect stomach ulcers in horses.

Ulceration of the stomach is common in horses, particularly among racing horses where estimates of the prevalence of the condition exceed 90% in some populations of horses in training. Ulceration of the stomach adversely impacts the health and performance of racing horses. Currently, the only reliable way to tell if a horse has stomach ulceration is to visualize the lining of the stomach using an endoscope. Endoscopes that permit visualization of a horse's stomach must be 10 feet long or more. Because such equipment is bulky and very expensive, it is not widely available. There is great need in equine medicine for an inexpensive, simple test for stomach ulcers. Table sugar may be the answer.

Ordinarily, when a horse eats table sugar (sucrose), it exits the stomach and is very rapidly degraded in the small intestine to its breakdown products, fructose and glucose. The only way for sucrose to gain access to the blood is across defects such as ulcers in the lining of the horse's stomach. Once absorbed into the blood, sucrose is eliminated in the urine where it is concentrated.   This concentration effect renders urine the most useful body fluid for detecting sucrose.

Sucrose (table sugar) testing has been used successfully to detect stomach ulcers in some experimental animals and people. It had not, however, been evaluated in horses until a study funded by the Southern California Equine Foundation/Dolly Green Research Foundation and conducted at Texas A&M University. Because the anatomy of a horse's stomach is different from that of humans and other animals that have been studied, it was uncertain whether the test would work. The test procedure involves collecting a urine sample from the horse before and then 2 hours after administration of sugar. Investigators at Texas A&M initially found the test to be *unsuccessful* when administered to fasting horses that either had ulcers (induced by intermittently fasting and feeding horses but without causing any outward signs of disease) or were treated with Gastrogard® to treat/prevent ulceration. In a second set of experiments, however, horses were given the table sugar by stomach tube and then allowed to eat 2 pounds of sweetfeed. This protocol improved the results: 5 of 6 horses had higher values of sucrose with ulcers as compared to without. Using a cut-off concentration to define a positive test result, 4 of 6 horses were positive when they had ulcers and 4 of 6 were negative when they did not have ulcers.

These results indicate that the table sugar test ultimately may be useful for testing horses; however, further modification and testing is needed. It will be necessary to improve on the ability of the test to discriminate between horses with and without experimental ulcers. The investigators at Texas A&M are confident that they will accomplish this goal. Then, it will be necessary to try the test on horses that have naturally occurring disease. It also will be valuable to investigate whether blood samples can be collected instead of urine. Collecting blood from horses before and after giving sugar would be technically easier than collecting urine. Unfortunately, there are substances in blood that interfere with the testing. Experiments will need to be done to see if these substances can be removed; because blood can be tested for sucrose in people, investigators at Texas A&M believe it will be possible to work out methods to test horse blood as well.