

# 2013 RECIPIENT OF THE RIDE AND TIE ASSOCIATION JIM STEERE MEMORIAL VETERINARY SCHOLARSHIP PROGRAM MELINDA N. FAUBEL, DVM CANDIDATE, UC DAVIS

Melinda Faubel is a Ride & Tie member and is the recipient of the 2013 Ride & Tie Scholarship for \$1,000.

She beat out 6 other skilled writers for the scholarship this year.



*Introduction by Melinda:*

*I am entering my third year of vet school, with a large animal interest focus and a passion for equine exercise physiology and endurance sports. Last year my veterinary school mentor, Dr. Michelle Jay-Russell and her horse Stashi were looking for a ride and tie partner and I did my first ride in the Fall of 2012. I've been an endurance rider since 2006 and especially enjoy the challenge of 100 mile rides, however after completing the Cool Ride and Tie event in 2012 I declared ride and tie the "most fun I've ever had on horseback". Thus, I am honored to have my attached essay, "A Hot Topic" considered for the Ride and Tie Association Veterinary Student Scholarship.*

*Sincerely,*

*Melinda N. Faubel*

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## A HOT TOPIC

by Melinda Faubel

**O**ur equine partners share more with us than just a mutual love of the outdoors and speed. Humans and horses can also cool efficiently during prolonged exercise by utilizing an intricate system that is both very similar and very different between our species. By understanding the physiology behind how our bodies handle heat, we will make our partnerships, training, and competitions more successful.

It may surprise you that cooling in hot weather requires energy, just like staying warm in cold weather. For every species there is a temperature range where no extra energy has to be spent to cool or warm the body. This is called the thermal neutral zone (TNZ). It isn't a coincidence that we consider mid-70's a comfortable "room temperature". Horses have a very different version of room temperature. For horses living in temperate climates the equine TNZ is somewhere around 30-50°F (depending on the time of year). We regularly com-

pete in temperatures above this, and during exercise, the TNZ is even lower than this because structures, such as muscles, are generating heat.

The most significant way to get rid of heat is to move it from the body core to the surface of the animal, where it can dissipate into the environment. The more surface area available, the more heat that can be eliminated. Unfortunately as body size increases there is less surface area relative to body mass, thus horses - being larger than humans - are less efficient at getting rid of heat through their skin. Fortunately, several nifty adaptations allow our equine partners to dissipate about 65% of their heat load through their skin. First, horses like humans can sweat! The presence of sweat on the skin makes the movement of heat from the body to the environment more efficient. Another advantage is the horses' simple sweat glands that do not conserve sodium. The extra salt in horse sweat, and the presence of a

very special molecule called latherin, alters the evaporation point of horse sweat and may lead to better evaporative cooling. Latherin is most famous for its ability to create foam and lather on the skin of a sweaty horse. However, because latherin is something called a "surfactant protein" it has another very important function as a component of horse sweat. Have you ever noticed that the coat on your horse seems to repel moisture and water "beads" off of your horse? Adding a surfactant, like latherin, reduces surface tension, which forces the hair to get wet, instead of repelling moisture. Latherin allows the liquid sweat to move from the skin to the normally water repellent coat, to the air, where it cools the horse by evaporating.

There are several factors, such as age and fitness level, that will determine how much heat your horse will actually generate during exercise, and how well the heat is gotten rid of. Increasing age comes with several physiological

changes, such as a decrease in plasma volume. Lower plasma volume has been cited as one reason why older horses have a higher body temperature and heart rate during exercise. While you may not be able to do anything about your horse's age, you can make sure they are well conditioned. Horses that have better overall fitness will generate less heat during exercise because fit muscles produce less heat than unfit muscles doing the same task.

Spending two or three weeks acclimating the horse (and human!) to the heat is another way to increase the efficiency of innate cooling mechanisms. There is evidence that horses and humans experience similar changes in response to heat conditioning. Heat acclimation starts to occur as early as 3-5 days after regular exposure to and exercise in heat, with most adaptations complete within 14 days. Exercising in the heat is key - a horse standing in pasture, or a rider sitting in a lawn chair sipping lemonade is not heat conditioning!

During the heat acclimatization process several changes occur within the body. Changes in the cardiovascular system such as a decrease in heart rate and core temperatures during exercise, and an increase in plasma volume are complete within the first week. Within 10-14 days there are alterations in when, what, and how much the horse sweats. In the heat acclimated horse, sweating rates increase during exercise, however sweating stops faster after exercise is done, so the overall sweat losses are lower. The composition of the sweat changes after heat acclimatization too. In one study, calculated sweat ion losses were 26% lower after acclimation, which was mostly due to the 10% decrease in sodium concentration in the sweat.

How long will this heat acclimatization last? Unfortunately, no one has looked at the heat acclimatization "rate of decay" in horses, however human studies report it as one to "several" weeks. In physically fit people, heat adaptations decay at a slower rate. It is safe to assume that at the start of each



Melinda Faubel and Tess Derbyfield

hot season, all members of the ride and tie team will need to train in the hot temperatures and be reacclimatized.

Understanding and taking advantage of the major mechanisms that the body uses to cool itself can make a huge difference at your next hot ride and tie. Heat conditioning for at least two weeks prior to the ride will provide substantial benefit to both human and equine. On the day of the ride, supporting evaporative cooling through sweating and applying water, as well as taking advantage of shade and moving air will make sure your ride and tie team crosses the finish line feeling great. 🐾

*The \$1,000 Ride and Tie Association Jim Steere Memorial Scholarship is available to any student enrolled in a veterinary program in the United States.*

*The scholarship is awarded to the veterinary student who submits the best short article that is useful for publication in the Ride & Tie Newsletter. The 700-1,000 word article may be technical or scientific, or may relate to experience with horses and/or competition. Veterinary students from Washington State University, Colorado State University and U.C. Davis have been recipients.*

*For more information go to our website at [www.rideandtie.org](http://www.rideandtie.org), send an e-mail to [scholarship@rideandtie.org](mailto:scholarship@rideandtie.org) or call 509-521-6249.*