**Title:**
Short- and intermediate-term efficacy of telmisartan for the treatment of persistent canine renal proteinuria

**Investigators:**
Mandy Coleman, DVM, DACVIM (Cardiology faculty)
Bianca Lourenco, DVM, MSc, DACVIM (Internal medicine faculty)
Scott Brown, DVM, PhD, DACVIM (Internal medicine faculty)
Chad Schmiedt, DVM, DACVS (Surgery faculty)
Kate Creevy, DVM, DACVIM (internal medicine faculty; Texas A&M)

If interested, please have your primary veterinarian request additional information by contacting Dr. Mandy Coleman at mericksn@uga.edu or by calling the small animal referral coordinator at 706-542-5362.

**Study description:**
The purpose of this study is to determine the potential benefit of a new medication, telmisartan, for the treatment of abnormally high protein levels in the urine (a condition known as proteinuria), compared to the current standard of care, enalapril. In addition, the investigators wish to assess whether the combination of telmisartan and enalapril will lead to a clinically significant reduction in, or normalization of, proteinuria in dogs that have persistent urinary protein loss on “ceiling doses” of either medication alone. Dogs must have persistent pathologic renal proteinuria due to chronic kidney disease to be eligible for participation in this study. In addition, the following conditions must be met:

**Inclusion criteria:**
1. Urinary protein:creatinine ratio, a quantitative measure of urinary protein loss, $\geq 1.0$ for non-azotemic or $\geq 0.5$ for azotemic patients in each of two urine samples collected $\geq 2$ weeks apart.
2. Abdominal ultrasound findings suggesting absence of renal neoplasia or acute kidney injury.
3. Absence of renal neoplasia (cancer)

**Exclusion criteria:**
1. Evidence of hemorrhage, inflammation or bacteria on urine analysis
2. Positive urine culture at the time of identification of proteinuria
3. Positive heartworm antigen test within 3 months of identification of proteinuria
4. Historical, physical examination or clinical pathologic findings suggestive of acute kidney injury
5. Infectious kidney disease or lower urinary tract infection
6. Moderate-to-severe hyperkalemia (serum K $> 6.5$ mmol/L)
7. Animals currently receiving or history of having received oral angiotensin converting enzyme inhibitors (ACEi) and/or corticosteroids at supraphysiologic dosages in the 2 weeks preceding examination
8. Concurrent illness associated with proteinuria, such as systemic lupus erythematosus, ehrlichiosis, and neoplasia (dogs previously treated for neoplasia and considered to be in remission, e.g. dogs with previously removed solid tumors, may still be considered for enrollment)

Potential candidates will undergo a screening evaluation to determine eligibility for the study. The screening will consist of a full physical examination (performed by one of the study investigators), fundic (eye) examination, blood pressure measurement, bloodwork, urine analysis, urine culture, determination of urinary protein:creatinine ratio, and an abdominal ultrasound. Clients are responsible for the costs of the screening evaluation; however, if their dog is a suitable candidate and enrolled in the study then the client is financially responsible for only the cost of the initial referral exam and bloodwork, with the study covering remaining costs (estimated value to client = $500).

Dogs that are eligible for the study will be randomized to receive telmisartan OR enalapril by mouth once or twice daily for 4 months. Owners will be required to bring their dog to the Veterinary Teaching Hospital for follow up visits at least 3 times, at 1 week, 1 month and 4 months after the initial visit. If a dog’s blood pressure is not well-controlled at his/her 1-week visit, then weekly visits for a short period will be required. Similarly, if a dog’s abnormal urinary protein loss is not well controlled at his/her 1-month visit, then monthly visits (at 2 and 3 months after the initial visit) will be required until this occurs. At all visits, blood (1-2 teaspoons) and urine (voided sample) collection and blood pressure measurement will be performed.

Dogs should be started or maintained on a commercially available diet formulated to be low in phosphorus and protein, for at least 14 days prior to enrollment. Dogs requiring a different prescription diet due to a concurrent disease may still be eligible for inclusion, so long that during the study period, diet remains constant. Treatment with fish oil will be allowed (and suggested), provided that the dog has been receiving this supplement for > 14 days at the time of enrollment.

All costs pertaining to study rechecks including recheck examination fees, blood pressure measurements, and follow-up labwork are paid for by the study. In addition, blood pressure medications and study medications will be paid for by the study. The study will not cover the costs of veterinary care for conditions unrelated to the study.

**Duration of study:**
Each dog will be enrolled in the study for 4 months. 27 dogs will be enrolled for each treatment group (54 dogs total).

Enrollment is ongoing.
Potential benefits to veterinary medicine:
Abnormally high protein levels in the urine can be both an early indicator and a serious complicating condition of kidney disease in dogs. Currently, use of the standard-of-care drug enalapril can help improve outcomes. However, this intervention is only partially effective at reducing proteinuria. This study will evaluate an alternative drug, telmisartan, and its ability to reduce urinary protein loss in dogs with proteinuria. If successful, a new drug that safely and effectively reduces proteinuria may decrease morbidity and mortality in dogs with kidney disease.