Proteinuria has been long established as a marker of kidney disease in dogs, but not long ago proteinuria was viewed to be primarily a marker of canine glomerular disease and likely not significant unless the urine protein/creatinine ratio (UP/C) was greater than 3.0 or associated with hypoalbuminemia. More recently, we have gained valuable insights to the implications of persistent proteinuria in both dogs and cats. Proteinuria is still the hallmark of canine glomerular disease; however, we also understand that proteinuria is often a component of chronic kidney disease (CKD) in both dogs and cats. Today we appreciate that persistent proteinuria, even at relatively low levels, is a risk factor for CKD progression in both species and that proteinuria can arise from tubular as well as glomerular lesions. We also have new technology (species-specific albumin immunoassays) that facilitates detection of low-level canine and feline albuminuria (microalbuminuria), which has increased our diagnostic capability and stimulated a discussion about what level of proteinuria/albuminuria is normal. Normal UP/C values for dogs and cats are now thought to be ≤0.2. The importance of proteinuria as an integral part of renal disease is evidenced by its inclusion in a recent American College of Veterinary Internal Medicine (ACVIM) Small Animal consensus statement.1

Proteinuria is a general term that describes the excessive presence of any type of protein in the urine. In most dogs and cats, both in health and disease, albumin is the primary urine protein. Proteinuria/albuminuria is not always caused by renal disease, however; it can arise from numerous causes (e.g., physiologic/benign, prerenal, and postrenal causes). Therefore, when proteinuria is detected, localization of its source is a primary diagnostic consideration. Subsequently, when proteinuria of renal origin is suspected, the next diagnostic considerations should include longitudinal monitoring and documentation of persistence followed by quantitation of its magnitude.

This issue of Topics in Companion Animal Medicine begins with a chapter that reviews the measurement and interpretation of canine and feline proteinuria. This first chapter also provides new insights and recommendations (e.g., new data demonstrating that the traditional dipstick and sulfosalicylic acid screening tests are of limited value in cats and indications for microalbuminuria testing). Recommendations are also provided for monitoring and quantitating renal proteinuria. Finally, this chapter discusses some of the potential implications of persistent, renal proteinuria/albuminuria including risk of kidney disease progression.

The second chapter provides a detailed summary of canine glomerular disease. Primary canine glomerular disease is not only common but also thought to be a leading cause of CKD. Much canine glomerular disease is associated with the presence of immune complexes in glomerular capillary walls; however, other examples of glomerular disease include structural abnormalities (e.g., hereditary nephritis), hemodynamic abnormalities (e.g., intraglomerular hypertension), and glomerular amyloid deposition. Many of the glomerular diseases that occur in dogs are thought to be associated with systemic disease processes (e.g., neoplastic, infectious, and noninfectious inflammatory diseases), and, importantly, primary management of glomerular disease in dogs includes identification and treatment of these predisposing systemic diseases. This chapter also outlines secondary treatment objectives: the management of the proteinuria and management of azotemic CKD, if present.

Most dogs with glomerular disease do not exhibit clinical signs until the glomerular disease progresses and the loss of nephrons results in azotemia superimposed on an inability to concentrate urine (e.g., mid-IRIS stage II CKD and beyond). In a relatively small subset of dogs with glomerular disease, the nephrotic syndrome occurs as a consequence of high magnitude, persistent proteinuria. This syndrome is characterized by hypoalbuminemia, hypercholesterolemia, and development of edema and/or ascites. In addition, dogs with nephrotic syndrome frequently have systemic hypertension and are predisposed toward hypercoagulability and thromboembolic events. The third chapter in this issue discusses the pathophysiology of the nephrotic syndrome and reviews a recently published case-controlled comparison of clinicopathologic findings and outcome in dogs with nephrotic syndrome versus nonnephrotic glomerular disease.

Renal proteinuria of suspected glomerular origin is one of the most important indications for renal biopsy in veterinary medicine. Pathologic findings from animals with glomerular disease are frequently helpful in guiding treatment decisions and formulating prognosis. The final chapter of this issue outlines the steps that should be taken when considering a renal biopsy. The primary purpose of the renal biopsy is to obtain information that will allow the clinician to manage the patient’s renal disease more successfully than would have been possible without the biopsy. To increase this likelihood, the renal tissue needs to be fixed and preserved for light microscopic and electron microscopic evaluation as well as immunostaining. Furthermore, biopsies need to be evaluated by experienced nephropathologists. Without the benefit of renal histology, treatment decisions are often empiric and treatment failures are frequently incorrectly categorized. For example, with glomerular amyloidosis or irreversible glomerulosclerosis, a positive response to treatment would not be expected. However, without benefit of such a histologic
diagnosis, the treatment failure may be inappropriately assigned to the choice of medication or its dose.

We hope you enjoy this issue of *Topics in Companion Animal Medicine* and find it informative. Our goal is to provide you with a better understanding of proteinuria and proteinuric renal disease that enables you to more effectively manage your patients.

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Reference
