Beyond Blood Sugar: Early Diabetes Detection in Cats

The type of diabetes cats develop is believed to be similar to type 2 diabetes in humans (i.e., islet amyloid develops but not antibodies against beta cells). However, most cats require insulin therapy by the time they are presented for diabetes, implying that they are diagnosed belatedly in the disease process, after significant structural beta cell impairment has already occurred. Early detection of beta-cell dysfunction via specific insulin/proinsulin assays appears to be essential to stopping the progression of diabetes, but feline-specific assays do not exist. Current assays performed by veterinary laboratories use insulin from other species as standards and for antibody production. The varying results from different laboratories thus make it difficult to reliably diagnose betacell secretory changes in feline diabetes. The purpose of this study was to clone, express, and purify feline proinsulin to help facilitate development of feline-specific assays and therapies for feline diabetes. The authors subsequently describe the successful cloning and expression of feline proinsulin. They speculate that this peptide may be used diagnostically as the standard for a feline-specific proinsulin assay to identify cats with beta-cell dysfunction before overt diabetes occurs. In addition, feline proinsulin could be used to produce recombinant feline insulin, providing an unlimited species-specific source for diabetic cats. Feline proinsulin could also be used to produce C-peptide, a by-product of insulin production, for therapeutic use—this substance has recently been shown to have many physiological roles and might be important in preventing diabetic complications.

COMMENTARY: This is a timely article. While it reports on basic science research rather than medicine, the article is relevant to the practicing veterinarian because proinsulin has important diagnostic implications for the diagnosis of early type 2 diabetes mellitus. Increases in serum concentrations of proinsulin and its by-product, C-reactive protein, are early indicators of beta-cell dysfunction in human type 2 diabetes mellitus. This article describes the structure of feline proinsulin, which is the foundation for proinsulin assays in the cat that may eventually allow veterinarians to diagnose feline type 2 diabetes mellitus prior to beta-cell exhaustion.—Deborah S. Greco, DVM, PhD, Diplomate ACVIM