The incretin effect is the difference in insulin secretory response from an oral load compared with an IV load; PO administration results in a much higher plasma insulin concentration. Glucagon-like peptide-1 (GLP-1) is a glucose-lowering, intestinal-derived factor that enhances glucose-stimulated insulin secretion from pancreatic islet beta-cells. Therapeutic utility of GLP-1 is limited because of rapid degradation, thus enhanced preparations that resist degradation and are longer-acting are being examined. Studies suggest that liraglutide, an enhanced incretin preparation, improves blood glucose control by increasing insulin secretion, delaying gastric emptying, and suppressing prandial glucagon secretion.

To confirm the presence of the incretin effect in dogs, an oral glucose tolerance test (OGTT) and IV glucose tolerance test (IGTT) were performed. Healthy dogs (n = 5) were evaluated with and without liraglutide using an OGTT, and serum glucose, serum insulin, and plasma GLP-1 levels were measured. Finally, dogs with type-I diabetes mellitus (T1DM, n = 4) were fed routinely, given insulin, and compared with and without liraglutide administration via glucose curve. Liraglutide acted to stabilize glucose levels, maintaining them between 77 and 137 mg/mL. This represents a significant reduction of 13.8% in glucose total area under the curve (AUC) for 0–120 minutes as compared with baseline control in healthy dogs. All T1DM dogs responded favorably to liraglutide treatment, with a significant reduction of 46% in glucose (AUC) for 0–120 minutes and a significant reduction of 66.5% in serum glucose as compared with controls treated with insulin alone.

Commentary
Regardless of whether liraglutide can reduce insulin requirements, if better glycemic control is achievable with addition of liraglutide, this might lead to reduction of long-term effects of diabetes in canine patients (e.g., cataracts and diabetic neuropathy). The study demonstrated superior glycemic control with liraglutide in a small population of dogs with T1DM. The next step would be to determine if results are consistent with a larger population of diabetic dogs and if insulin requirements are reduced with this medication. The most interesting data would be whether long-term adverse effects of diabetes mellitus could be avoided with the better glycemic control achieved with this medication.—Jennifer Ginn, DVM, DACVIM

Source