Insulin is produced by the pancreas and aids in glycemic control. When a meal is ingested, the blood glucose level rises and the pancreas releases insulin to keep blood sugar at a steady level. Insulin helps to properly store and utilize the glucose. Diabetes is a condition in which the pancreas beta cells do not produce insulin (Type I), or the body is resistant to the insulin (Type II). In diabetes, the blood sugar level is too high. Insulin is given to decrease blood sugar; and in these patients, it must be given by injection. While oral hypoglycemics (such as Glipizide) may be used, they are often ineffective in pet patients.

Insulin Types
There are several types of insulin. Short-acting insulin (such as Humulin-R), also known as regular insulin, is typically used in cases of diabetic ketoacidosis for more immediate control of blood sugar due to its rapid effect. Intermediate- or longer-acting insulin (such as Humulin-N), is most often used in dogs for maintenance control. “Peakless” insulin, such as glargine (Lantus) is most often used in cats and is the recommended choice in this species.

Diabetic Regulation
The majority of pets need insulin injections twice a day. Most pets receive insulin in the morning and evening, preferably 12 hours apart. When the insulin is given, the blood sugar starts to go down. The lowest point that the blood sugar reaches after the insulin is given (before it starts to increase again) is called the nadir. The nadir helps to determine if the animal is on the proper dose of insulin.

Glucose Curve
A glucose curve can be performed to identify the nadir so that the insulin may be adjusted if needed. To run a glucose curve, the blood sugar is typically checked in the morning prior to feeding and giving insulin. This is the starting point. Then after feeding and giving insulin, the blood sugar is checked every 1-2 hours until the nadir is passed or up to 12 hours. If the nadir is too high, the clinician will likely increase the insulin dosage.

Fructosamine
Another method of monitoring that is useful, especially in fractious or nervous pets, is a fructosamine level. The fructosamine represents an average blood sugar over the prior two weeks and is a measure of protein-bound glucose during that time period. Stress can cause a release of catecholamines which then cause a falsely elevated blood glucose level. This makes it hard to interpret a glucose curve in stressed or excited patients.
Dosing and Proper Handling
Insulin must be handled with care, and there are a few key factors to know about insulin storage and administration. Insulin should never be shaken (the exception to this is Vetsulin, according to the package insert it may be shaken to mix thoroughly). It should be refrigerated and gently rolled between fingertips prior to drawing up and administering. It is dosed in “units”. The insulin syringes should always correspond to the insulin concentration (i.e. U-100 insulin syringes should be used with U-100 insulin). Some pet insulin brands are U-40 (or 40 U/mL) and require U-40 insulin syringes (e.g. PZI and Vetsulin/Caninsulin). Insulin is typically given subcutaneously, but it may be given via an IV infusion or intramuscularly in dehydrated or critical patients.

Hypoglycemia
If the insulin dose is too high, or in the case of an insulin overdose, the blood sugar can drop to a dangerous level. Symptoms of this include vomiting, ataxia, weakness, tremoring, dazed mentation, seizures, or death. An owner should always be instructed to look for any abnormal behaviors, to give their pet Karo™ syrup should these symptoms occur, and to bring the pet into the hospital immediately for care.

If an owner is unsure whether the insulin injection went in, or if they notice the fur is wet where they gave the injection, they should NEVER re-dose the insulin. It is best to wait until the next regularly scheduled dose.

Most pet owners, with proper instruction and guidance, are able to give their pets insulin injections at home. Client communication and assistance with these owners is an important responsibility of veterinary technicians.