CAPSULES
notes and applications from Bioanalytical Systems, Inc.

Monitoring Glucose in Diabetic Pets with the Capillary Filtrate Collector™

Purpose

The Capillary Filtrate Collector™* provides a new approach to monitoring glucose in diabetic pets. It can be used by the veterinarian as an aid to glucose regulation in an animal, or it can be used by the client with phone consultations with the veterinarian.

Existing Methods

Regulation of a newly diagnosed or poorly controlled diabetic animal usually requires several days hospitalization with numerous blood glucose determinations. Clients can monitor glucose levels in their pets only by collection of urine samples. This is inconvenient, unpleasant and often difficult.

Capillary Filtrate Collector

The Capillary Filtrate Collector (F1) is a device consisting of an ultrafiltration probe (UF-3-12) attached to one end of a cannula, and a needle hub attached to the other end. The membrane portion of the device is implanted under the skin with a needle-like introducer. The cannula is held in place by a suture. The needle is inserted into a Vacutainer™. The fluid from the subcutaneous tissue is drawn into the Vacutainer. The animal wears a jacket with a zipper pocket. The hub and the external tubing are kept in the pocket, making it simple for the veterinarian or the client to obtain a sample (F2).

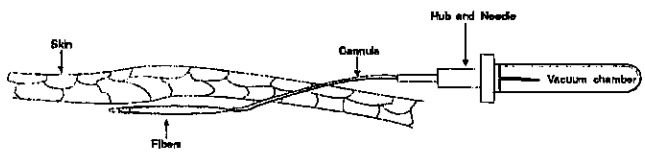

Figure 1. The Capillary Filtrate Collector is a device which can be implanted subcutaneously for the collection of glucose samples.

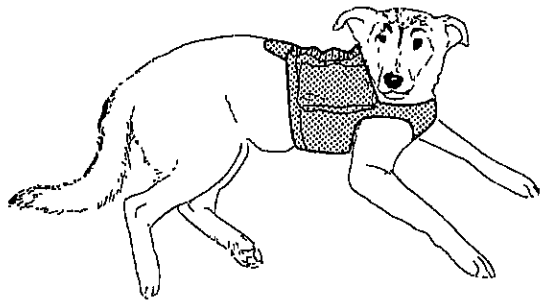

Figure 2. Animals with implanted Capillary Filtrate Collectors wear the external portion of the device comfortably in the side pocket of a jacket.

The glucose concentration in this ultrafiltrate fluid tracks the glucose concentration in the blood. The subcutaneous extracellular fluid (ECF) is in rapid communication with the blood capillaries. A small hydrophilic molecule like glucose can easily be filtered from the ECF using conventional dialysis membranes. F3 shows that the glucose level of the ultrafiltrate parallels that of the blood. The ultrafiltrate glucose levels lag about 30 minutes behind the blood glucose levels, due to the time necessary for the fluid to move down the cannula and into the collecting tube. Glucose can be analyzed with many of the glucose strips marketed for home blood glucose monitoring by human diabetics. It can also be analyzed using clinical laboratory analyzers or the BAS 480 Glucose Analyzer.

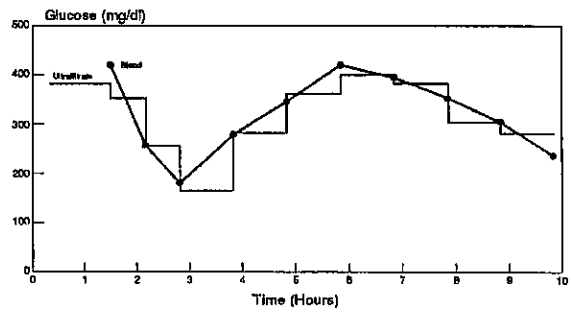

Figure 3. Blood and ultrafiltrate glucose in the dog. Blood glucose values are instantaneous, while ultrafiltrate values represent the glucose in the samples accumulated during the collection periods.

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Advantages

One of the major advantages is that one can obtain as many samples as desired without stressing the animal. Sample collection is painless and easy for both pet and technician. It is also possible to send an animal home earlier and have the client take samples and bring them in for analysis. Alternatively the client can be taught to use the color analysis strips and report the glucose levels to the veterinarian. This allows for regulation of the pet in its normal environment instead of the artificial environment of the animal hospital.

References

1. E. Janle-Swain, J.F. VanVleet, and S.R. Ash, ASAIO 10(1987) 336-340.

* The Capillary Filtrate Collector and UF probe are protected by US Patent Nos. 4,777,953, 4,854,322, and 5,002,054. Additional international patents are pending.