Technology Summary

Severe hypoglycemia is an imminent risk for people with type 1 diabetes. For these individuals something as simple as missing a meal, miscalculating an insulin dose or exercising too much can lead to severe low blood sugar, which can cause a seizure, coma or death. If loss of consciousness occurs, the patients are unable to eat or drink anything to bring their sugar levels back into a safe range, thus a glucagon injection is needed. While glucagon allows the liver to release a large store of emergency glucose, the current method of preparation and injection of the drug is not efficient nor is it self-explanatory to those who are not familiar with this treatment.

Immediately before injection, the powdered glucagon must be mixed with a sterile diluting fluid to dissolve the powder. Glucagon must be mixed just before injection due to the fact that it is not stable in liquid form and loses effectiveness within a matter of hours. Thus, current glucagon kits include a separate vial of glucagon powder and syringe filled with the diluting solution. Before administering the glucagon, the diluting solution must be injected into the vial of glucagon powder, mixed thoroughly, and then the solution can be withdrawn from the vial and immediately injected into the patient. This process adds on unnecessary time to the treatment process and introduces many opportunities for confusion and error.

Researchers at VCU have designed and developed a dual chambered syringe which, not only enables separate storage of the powder and liquid, but also allows for timely mixing of the two substances just prior to the administration of the solution during an emergency situation. This design eliminates the multi-step process of preparing then administering the life-saving glucagon treatment; increasing efficiency, and providing a self-explanatory application process to simplify and expedite the treatment of a hypoglycemic episode. This type of syringe could also be used for any pharmaceutical where the powdered form of a drug needed to be stored dryly until it was diluted right before the time of injection.

Technology Status

Device has been fully designed and a prototype created and tested. Patent Pending: U.S. and Foreign rights available.

This technology is available for licensing to industry for further development and commercialization.

Applications

• Universal syringe for combination drug therapies
• Administering glucagon in diabetic emergencies

Advantages

• Single-step mixing and injection
• Quicker response to medical emergencies
• Easy to use

Inventors

Hooman Tafreshi, Ph.D.
John Corbett
Zachary Cullingsworth
Chris Ducic
Ryan Meekins

Contact

Afsar Q. Mir, MS
Technology Manager
miraq@vcu.edu
Direct 804-827-2213

VCU Innovation Gateway • BioTech One, Suite 3000 • 800 E Leigh St • PO Box 980568 • Richmond, Virginia 23219
Phone (804) 828-5188 • http://www.research.vcu.edu/ott