



# Implantable Microvalve Device for Controlled Insulin Delivery in Type 1 Diabetes Patients

**Technology ID**

z02003

**Category**

Life Sciences/Medical Devices

**IP Status:** Issued US Patent; **Application #:** 10/494,119

## Implantable Device Senses Blood Glucose

A microvalve has been designed that can deliver insulin into the bloodstream of diabetic patients when the microvalve senses a change in blood glucose level. Envisioned is an implantable device that controls insulin delivery with a glucose sensitive microvalve. The microvalve is made of a polymer microgel that binds to glucose. Depending on the concentration of glucose in the blood, the microgel will swell or shrink, thereby opening and shutting the valve. This microvalve is embedded on a microfluidics chip connected to an insulin reservoir by a catheter. When the valve is open, insulin will be delivered into the blood stream leading to a lowering of the blood glucose level.

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## Microfluidics Approach to Control Blood Glucose in Type 1 Diabetes

The benefit for this microfluidics approach to treating diabetes is the controlled release of insulin in response to blood glucose levels. This would allow diabetics to loosen their diet constraints and reduce the need for daily insulin injections and medications. This device will be most effective for treating type 1 diabetes in which patients have diminished insulin production. This microvalve device lies at the interface between drug delivery, polymer science, and microfluidics, and could act as an "artificial pancreas", delivering insulin and counteracting rises in blood glucose associated with type 1 diabetes.

**FEATURES OF MICROFLUIDIC MICROVALVE TO DELIVER CONTROLLED INSULIN TO REGULATE BLOOD GLUCOSE:**

- Microvalve responds to changes in blood glucose level
- Microfluidics approach automatically controls insulin release
- Fully implantable device reduces the need for daily treatment
- Simple device features no electronic components, extended device lifetime with less frequent replacement
- Insulin reservoir can be placed inside or outside the body
- Combined sensing and infusion integrated approach

**Product Details** A microfluidic technology design of a microvalve for insulin delivery.

**Fulfillment Details** Licensee will receive rights to practice the intellectual property (patent application) for the purposes of developing and manufacturing a commercial product.

**Phase of Development** Technology reduced to practice using an insulin model.

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