



## Microneedle-Based Device for Steady, Autonomous Delivery of Liquid Drugs Like Insulin

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**WARF: P100100US01**

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**The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a bladder and microneedle device for delivery of a steady infusion of liquid pharmaceuticals.**

### Overview

Oral ingestion of pharmaceuticals currently is considered the safest, most convenient and most economical method of drug administration. However, oral delivery of many pharmaceuticals is not possible because the molecules of the drugs are either too large or electrically charged to reach the bloodstream via the small intestine. Other drugs cannot withstand the environment of the digestive tract. The alternative— injection of pharmaceuticals—holds drawbacks as patients may not adhere to the correct dosage regimen or may require continuous monitoring and multiple injections, as is the case in diabetics monitoring insulin levels.

Historically, efforts to develop steady-stream infusion systems have focused on syringe-based systems, which limit the ability to customize delivery profiles, the potential for self-administration and other advanced device functions. An infusion system that provides a steady stream of pharmaceuticals to an individual when needed would be an improvement on current pharmaceutical delivery methods.

### The Invention

UW–Madison researchers have developed a liquid-drug delivery device to autonomously and painlessly release pharmaceuticals through a bladder and microneedle system. The device consists of a bladder of a thick, rigid plastic along with a thin barrier film that is designed to have a microneedle fastened into its rigid side for drug delivery. A valve arrangement controls the flow of the drug solution from the chamber enclosed by the thin film and rigid plastic to the microneedle. The drug will be dispensed when the thin barrier film is displaced by a pressure source.

Advantages over traditional syringe-based systems include advanced functionalities such as custom delivery profiles, multiple-drug delivery and drug reconstitution. The system also has the potential to allow self-administration with minimal training, ultimately designed for ease-of-use to accommodate the general population. Furthermore, the device is simple to utilize and inexpensive to manufacture.

### Applications

- Steady, autonomous delivery of liquid pharmaceuticals
- Self-administration of drugs that would otherwise be injected via syringe-based systems

### Key Benefits

- Overcomes patient reluctance to adhere to typical injection-based dosage regimens
- Advanced device functionalities: custom delivery profiles, drug reconstitution and multiple-drug delivery
- Self-administration of pharmaceuticals

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- Conducive to low-cost, high throughput manufacturing fabrication and assembly
- Primary drug container designed to fit standard aseptic fill lines.

## Additional Information

### For More Information About the Inventors

- [David Beebe](#)

### Related Technologies

- [For more information about an alternative, microfluidic drug delivery system, see WARF reference number P04240US.](#)
- [For more information about a drug delivery device using pressure exerted by a hydrogel, see WARF reference number P09034US.](#)

### Tech Fields

- [Medical Devices : Other medical devices](#)

For current licensing status, please contact Jeanine Burmania at [jeanine@warf.org](mailto:jeanine@warf.org) or 608-960-9846

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