

## Osmotische Mikropumpen für die Medikamentendosierung

Workshop  
„Kleine Volumenströme in der Medizintechnik“

FH Lübeck, 05.06.2013

Helge Adleff | ACUROS GmbH | Gottschedstr. 4 | 13357 Berlin | Germany  
Tel.: +49 30 46064500 | info@acuros.de | www.acuros.de

### Company Profile



#### Company

Young High-Tech Company in the Fields of  
Scientific Instruments and Medical Devices

Spin-off from Humboldt-University Berlin, Germany.  
Founded 2006 by an Interdisciplinary Team of Scientists

Products Based on Proprietary Technology of  
Pulse-Free Micropumps

#### Managing Team

Managing Director: Helge Adleff

Biologist, Scientific Experience at University of Freiburg, Humboldt-University Berlin,  
Saarland University, Cooperation with Fraunhofer Institute for Biomedical Engineering

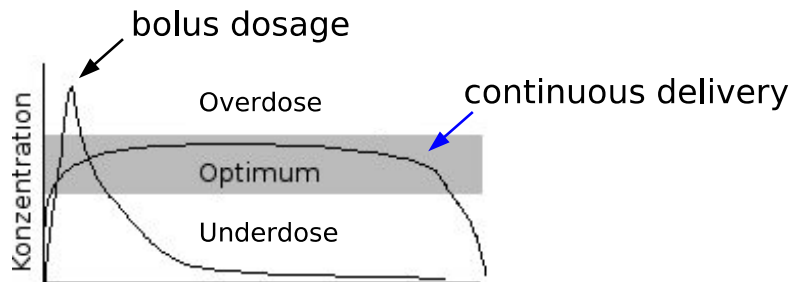
R&D Manager: Thilo Guschauski

Graduate Engineer, Specialist in Precision Machinery and Biomedical Technology

**Drug Delivery:** every drug must be delivered to the patient in an appropriate way

**Parenteral Drugs:** iv or subcutaneous delivery

**Continuous Delivery:** keep drug level at its optimum



**Medical Need:** Continuous Drug Delivery Device for Small Volume Parenterals

**Applications:** Biologics, Proteins, RNAs, Cancer Drugs, Analgetics, Hormones, ...

**Acuros' Disposable Infusion Pump:**

small, lightweight, easy to use

**Continuous Delivery:**

precise continuous flow  
custom factory preset rates

**Disposable Device:**

osmotic actuation  
no battery  
no mechanic components  
no electronic components  
completely disposable after single use

**Compliant and Affordable:**

standard syringe/cartridge for primary packaging  
designed for mass production  
capable for any liquid formulation  
capable for viscous fluids  
adaptable to many different applications

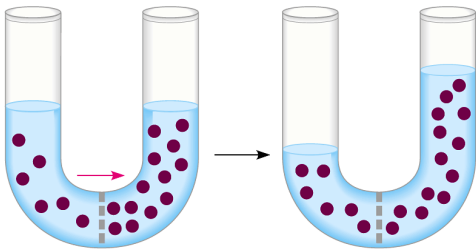


**Osmotic Actuation:**

concentration gradient drives flow through membrane  
no power supply required

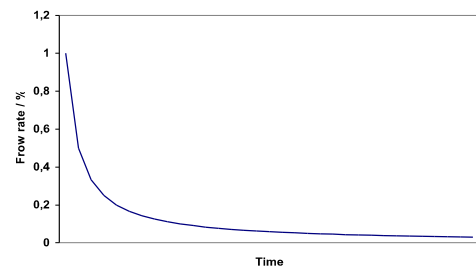
**Common Osmotic Pumps:**

- + pulse free flow
- + high pressure capability
- decreasing flow rate
- not adjustable



Copyright © Pearson Education, Inc., publishing as Benjamin Cummings.

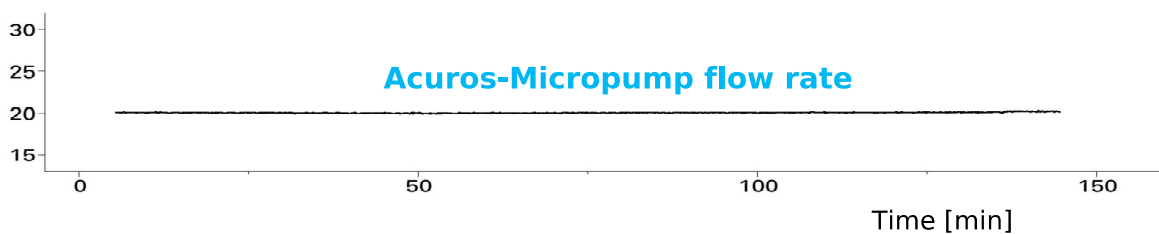
common osmotic flow rate

**Acuros Osmotic Pumps:**

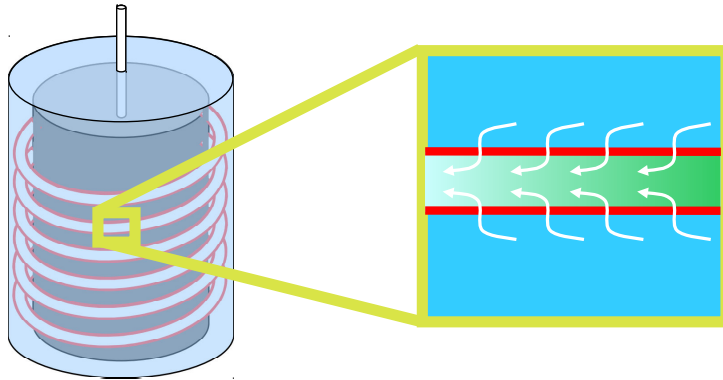
- + pulse free flow
- + high pressure capability
- + compensate dilution of osmolytes
- + no decrease in flow rate
- + controllable flow
- + no power supply

**Strong IP Rights:**

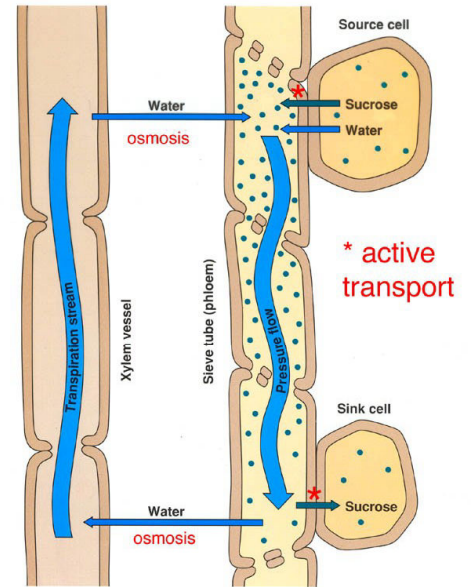
International patents



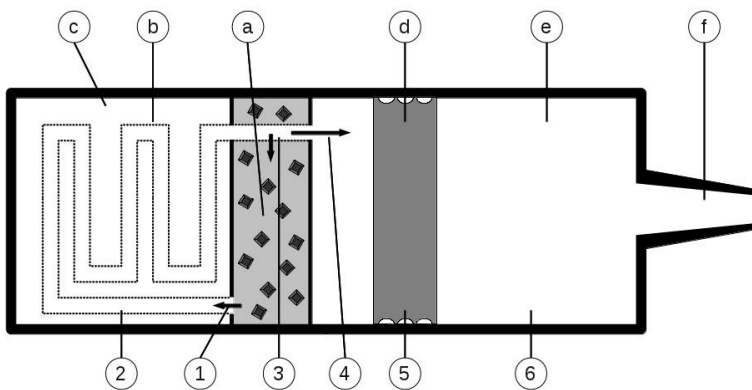
Bionic Concept of Osmoregulation



„Liquid Handling“ in Plants



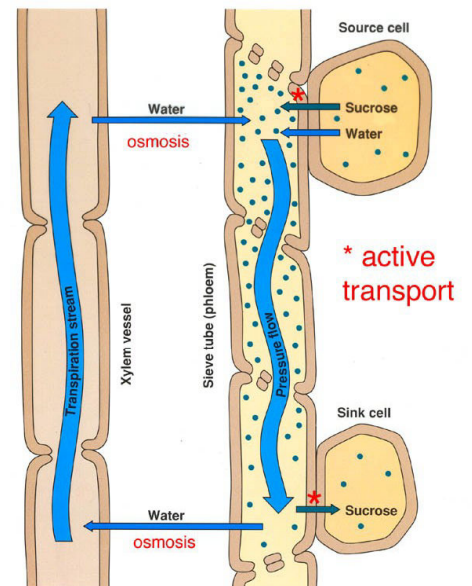
Bionic Concept of Osmoregulation



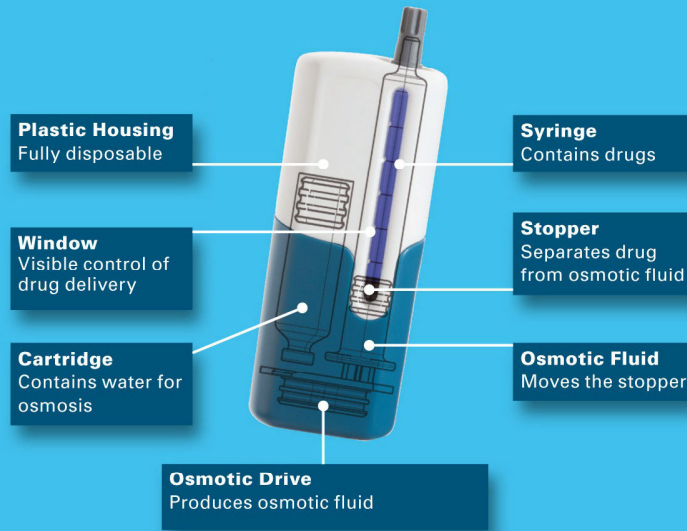
- 1 nL/min Saturated Solution into Flow Channel
- 2 Dilution of Solution by Osmosis
- 3 nL/min Water into Saturated Suspension
- 4  $\mu$ L/min Diluted Solution Delivered
- 5 Plunger Moved by Diluted Solution
- 6 Drug Displaced by Moving Plunger

- a Saturated Saline Suspension
- b Flow Channel with Semipermeable Membrane
- c Water Reservoir
- d Movable Plunger
- e Drug Reservoir
- f Drug Outlet

„Liquid Handling“ in Plants



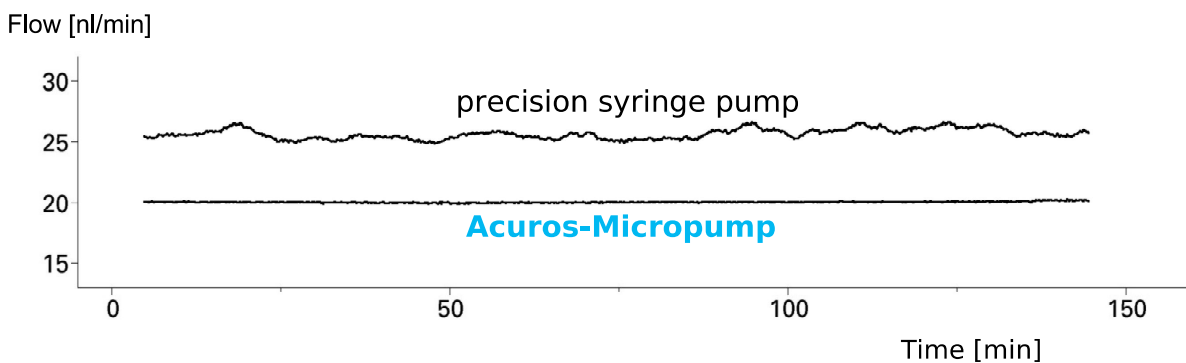
### Acuros Disposable Drug Delivery Pump:



### Product

#### Precision Micropump

- pulse free micro flows starting from 10 nl/min
- continuous flow up to several month
- virtually back pressure independent flow rate
- max back pressure 3 bar (43 psi)
- tempering of pumped liquid



- Patented Technology
- Working Prototypes Available for Technology Evaluation
- Customizing Design and Technology for Specific Applications
- Technology Available for Licensing and Joint Development Agreements



**Thank you for your interest!**

ACUROS GmbH | Gottschedstr. 4 | 13357 Berlin | Germany  
Tel.: +49 30 46064500 | [info@acuros.de](mailto:info@acuros.de) | [www.acuros.de](http://www.acuros.de)