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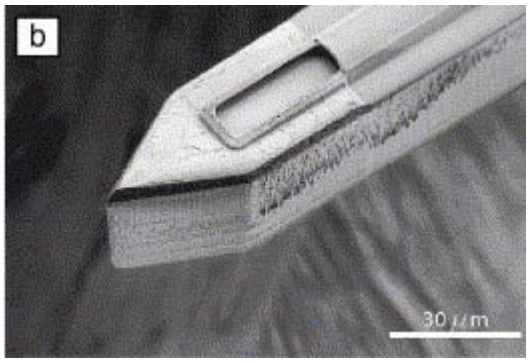
**Technology Brief**
**Microfabricated Catheter for Drug Delivery to the Brain and Other Neural Tissue**
**CRF D-4005**

**INVENTION SUMMARY:** The Microfabricated Catheter is a device that can be used in convection enhanced delivery (CED) of drugs to treat disorders of the brain and other neural tissue. Instead of relying on diffusion to transport drugs throughout tissue, CED uses direct infusion of drugs under pressure into tissue so that convective transport can increase drug penetration distance. The direct infusion of drugs under pressure also enables drugs to cross the blood-brain barrier. In addition to serving as a drug delivery system, the Microfabricated Catheter can be equipped with recording/stimulating electrodes, flow meters, sensors, or MEMS devices to serve as a probe to measure local tissue characteristics such as temperature, pressure, pH, and ion-specific concentrations.




Insertable pointed tip of the Microfabricated Catheter

**POTENTIAL COMMERCIAL APPLICATIONS:** The Microfabricated Catheter can be used as a drug delivery device for neurological drugs. It can also be used as a tool for academic research and pharmaceutical drug discovery.

**ADVANTAGES:** Unlike the stainless steel needles that are traditionally used in CED, the Microfabricated Catheter has a smaller cross-sectional area, which reduces the trauma to tissue when it is inserted into the brain. The small size of the Microfabricated Catheter also reduces reflux along the outside of the inserted part, allowing for higher rates of drug delivery and preventing blockage of the channel during insertion into the brain. Additionally, the Microfabricated Catheter is designed so that multiple parylene channels, each conducting a distinct fluid, can be integrated into the silicon shaft. Not only do these channels allow for simultaneous or sequential delivery of multiple compounds, they can also be used to increase flow rate since they create multiple pathways for the compound to exit the system.

**TECHNICAL MERITS:**

- The Microfabricated Catheter contains a silicon shaft that provides rigidity for penetrating deep into tissue. The device also contains one or more parylene channels to conduct drug-containing fluid along the shaft under pressure. The orientation of the outlet channels above the tip prevents channel blockage during insertion into tissue. The Microfabricated Catheter contains an insertable microprobe with a cross-section of 100 X 100 µm.
- The Microfabricated Catheter achieved flow rates of 2.0 µL/min without backflow whereas a 32 ga needle could achieve flow rates of at most 0.5 µL/min without backflow.
- This device allows for a CED protocol that infuses fluid at constant pressure, rather than constant flow rate. Infusion at constant pressure is advantageous because pressure is easier to manipulate than flow rate and because pressure profile in the tissue does not depend on the properties of the tissue material.

**INVENTORS:** William Olbricht, *et al.*, Chemical and Biomolecular Engineering

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**PATENT STATUS:** PCT Priority Application Number 60/889,555.

**LICENSE STATUS:** Exclusive or non-exclusive licenses will be considered.

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