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# Sealed Nanostraw Microdevices For Oral Drug Delivery

Tech ID: 28795 / UC Case 2016-111-0

## INVENTION NOVELTY

This invention is a nanostraw device that is built upon microdevice technology for oral drug delivery. It is the first example of a microdevice for oral drug delivery, with the drug sealed in by a semi-permeable membrane for (1) in-solution drug loading, and tunable drug release, (2) increased bioadhesion for prolonged drug exposure, and (3) protection of drug from outside biomolecules.

## VALUE PROPOSITION

Oral drug administration is by far the preferred route in most drug administration methods. However, many drugs, ranging from small molecule therapeutics to peptide- and protein-based therapeutics have low oral uptakes due to low permeability, insolubility and degradation of the drugs in the gastrointestinal tract. The nanostraw devices are designed to improve oral uptake of such drugs.

## TECHNOLOGY DESCRIPTION

The drug is sealed within the device by a semi-permeable membrane. This allows for in-solution drug loading, and sustained, tunable release. It also protects the loaded drug from metabolic and proteolytic enzymes in the gastrointestinal tract. Oral drug uptake is made difficult by drug insolubility, issues with drug stability and poor permeability of drug delivery systems. The nanostraws solve these issues via (1) prolonging drug retention time in the gastrointestinal tract, and allowing more time for drug to dissolve; (2) limiting diffusion of metabolic and proteolytic enzymes into drug reservoir; (3) releasing drug proximally to gastrointestinal tissue at high concentrations and potentially disrupting cell-cell junctions and/or penetrating membranes.

## LOOKING FOR PARTNERS

To develop & commercialize the technology as an oral drug delivery system.

## STAGE OF DEVELOPMENT

Pre-clinical

## RELATED MATERIALS

### CONTACT

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### INVENTORS

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### OTHER INFORMATION

#### KEYWORDS

Nanotechnology,  
  
Nanomaterials, Oral drug  
  
delivery, Microdevice

#### CATEGORIZED AS

- ▶ **Medical**
  - ▶ **Delivery Systems**
- ▶ **Nanotechnology**
  - ▶ **NanoBio**

#### RELATED CASES

2016-111-0

► [Fox CB, Cao Y, Nemeth CL, Chirra HD, Chevalier RW, Xu AM, Melosh NA, Desai TA. Fabrication of Sealed Nanostraw Microdevices for Oral Drug Delivery \(2016\). ACS Nano. 10\(6\):5873-81](#)

DATA AVAILABILITY

Under CDA / NDA

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	<a href="#">11,020,345</a>	06/01/2021	2016-111

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- [Nanowire-Coated Planar Microdevices For Transmucosal Drug Delivery](#)
- [PRO- RESOLVING MEDIATORS AND DEVICES FOR THERAPEUTIC MODULATION OF BLOOD VESSEL HEALING](#)

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