

Miniaturized, Flexible and Laser-patterned Electroosmotic Micropumps for Implantable and Controlled Drug Delivery

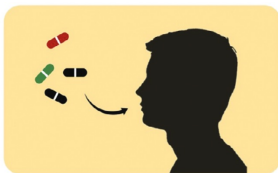
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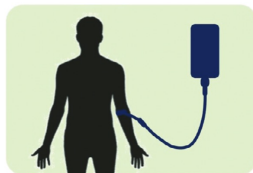
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Treatments of Neurological Disorders

CONVENTIONAL



ORAL ADMINISTRATION

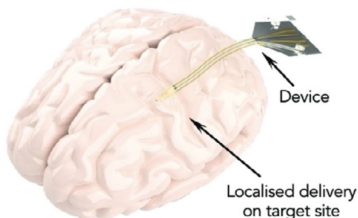


INTRAVENOUS INJECTIONS

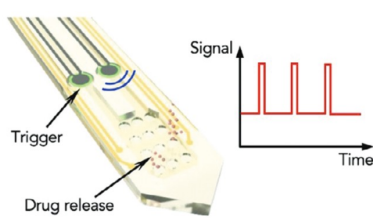


RESECTIVE SURGERY

ELECTRONIC DRUG DELIVERY

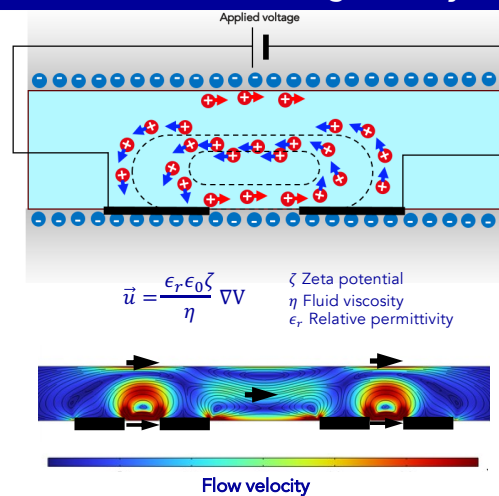


SPATIAL RESOLUTION

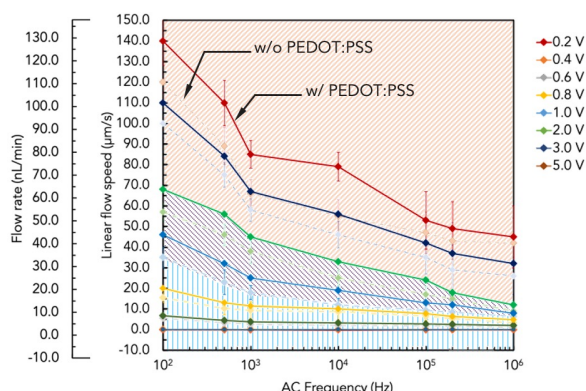
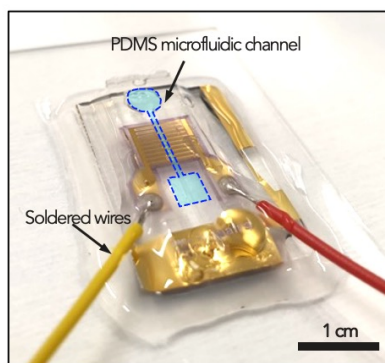
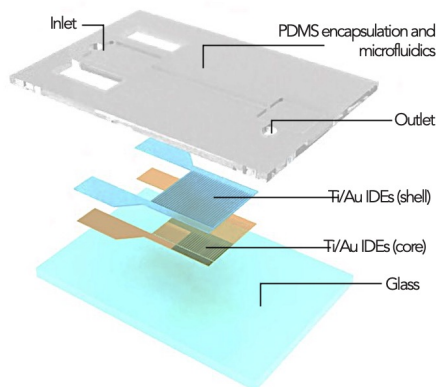


TEMPORAL RESOLUTION

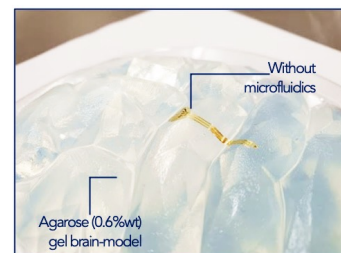
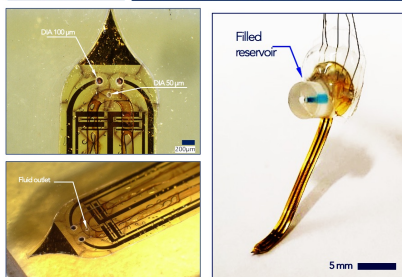
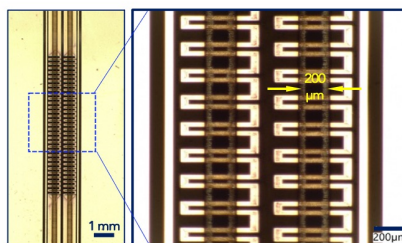
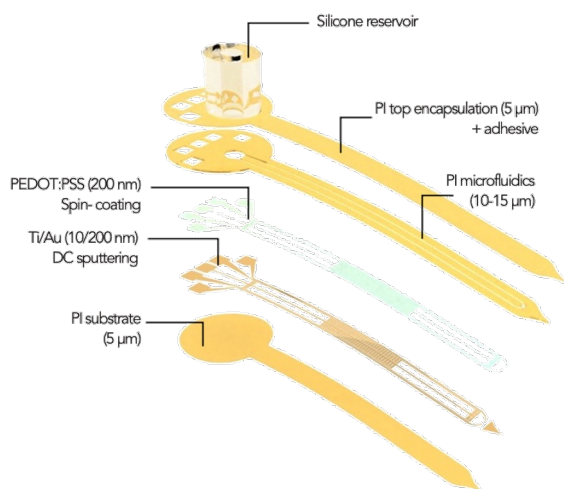
Electroosmotic drug delivery



Planar Electroosmotic pumps patterned by Femtosecond Laser ablation



Implantable Flexible Electroosmotic micropumps as Pharmacological Neural Interfaces



References and Acknowledgements

- [1] Mariello et al. *Advanced Materials Technologies*, **2024**, 2400797.
- [2] Mariello et al. *Advanced Healthcare Materials*, **2023**, 2302969.
- [3] Boys et al. *Advanced Materials*, **2023**, 35, 2207847.
- [4] Stavrinidou, Proctor, Ed. Book, AIP Publishing LLC, **2022**.
- [5] Stori et al. *MRS communications*, **2022**, 12 (5), 654-661.
- [6] Chen et al. *Advanced Science*, **2021**, 8 (12), 2003995.
- [7] Chen et al. *Scientific Reports*, **2020**, 10 (1), 7185.
- [8] Proctor et al. *Advanced Biosystems*, **2019**, 3 (2), 1800270.
- [9] Proctor et al. *Science advances*, **2018**, 4 (8), eaau1291.
- [10] Uguz et al. *Advanced Materials*, **2017**, 29 (27), 1701217.