

# Stick injection "microneedle pump"

## Flow-Generating Microneedles Enable Fast Injection of Drugs and Vaccines

### Overview

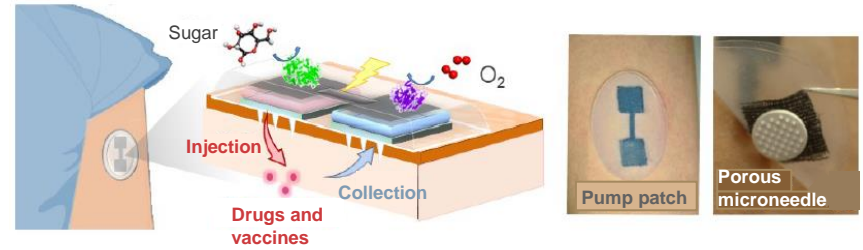
Microneedles with lots of painless needles are expected to spread rapidly in the beauty field and be used more for self-medication and simple vaccine administration, which are the cornerstones of remote medical treatment. However, conventional methods of applying (or encapsulating) a drug or vaccine to a microneedle and eluting them after skin prick have limited injection volume and speed. The inventors have developed a porous microneedle (PMN), which imparts an electrical "flow" (electroosmotic flow) that allows for high volume and high speed injection with an electric "microneedle pump" and rapid collection of subcutaneous tissue fluid.

### Product Application

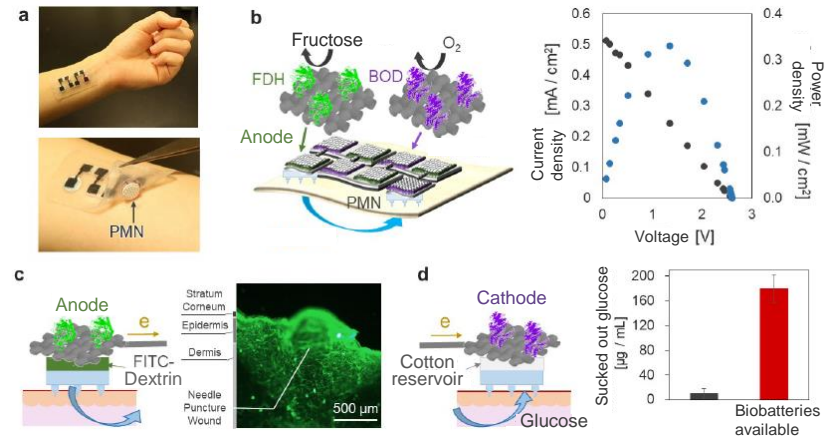
- DDS for transdermal administration of drugs and cosmetic ingredients
- Body fluid sampling

### IP Data

IP No. : WO2020/179850, JP2020-195309  
 Inventor : NISHIZAWA Matsuhiko, YOSHIDA Shotaro, ABE Hiroya and others  
 Admin No. : T18-477\_T20-579



### Transdermal Electroosmotic Flow with a Bioelectric PMN Patch



(a) Photograph of the microneedle pump, (b) Structure and Output Characteristics of Fructose/O<sub>2</sub> Biobatteries, (c) Injection of dextrin into porcine skin slices (d) Glucose extraction

### Related Works

- [1] Nat. Commun., 12, 658 (2021)  
 [2] Adv. NanoBiomed Res. 2021, 2100066

### Contact

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