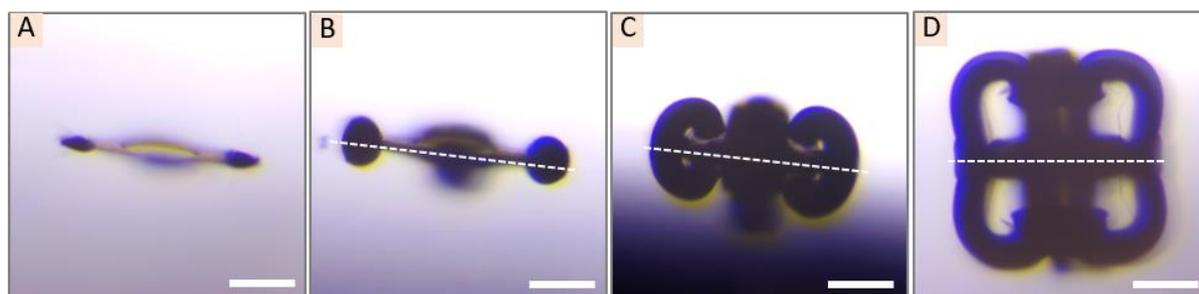


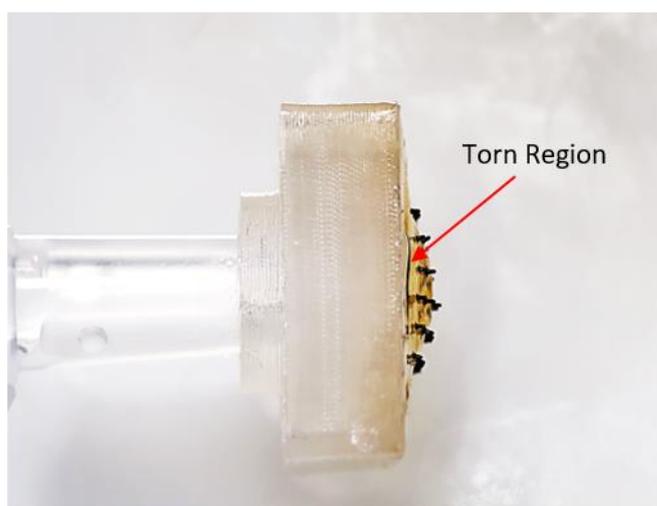
## Supporting Information

### Hollow Microneedle Array Fabrication with Rational Design to Prevent Skin Clogging in Transdermal Drug Delivery

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**Figure S1.** The evolution of the CNT microstructure with time. Optical microscope images of CNT microstructures after (A) 30 s, (B) 1 min, (C) 2min, (D) 3 min growth. The regions below white dashed lines are reflections of the CNT microstructures from SiO<sub>2</sub> surface. Scale bars are 50  $\mu\text{m}$ .



**Figure S2.** The optical microscope image of the torn region of the PI base after 12 liquid flow tests with the rate,  $>3.0 \text{ mL min}^{-1}$ .



**Figure S3.** The optical microscope image of the pierced skin with 0.15 N force per MN.