

Supplementary Materials: Micro-pillar Integrated Dissolving Microneedles for Enhanced Transdermal Drug Delivery

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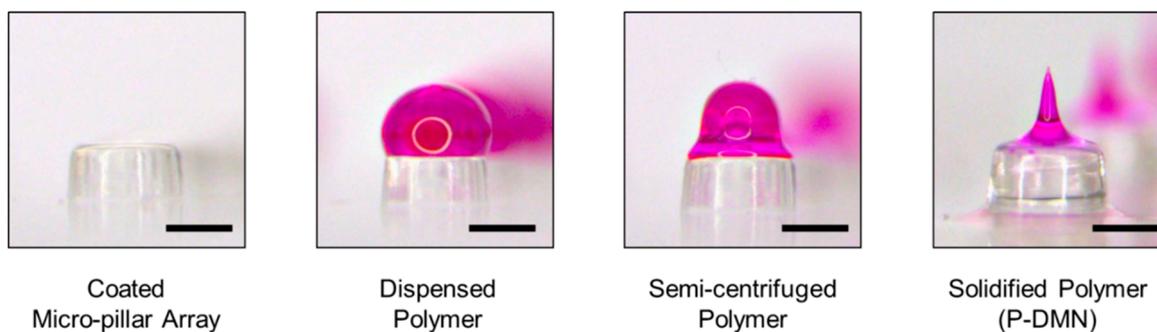


Figure S1. Bright-field microscopy images of micro-pillar integrated dissolving microneedle (P-DMN) fabrication. The micro-pillar array is first coated with a layer of carboxymethylcellulose (CMC). The drug surrogate-encapsulated polymer is then dispensed over the pillar and centrifuged by applying 400 g for 1 min. Upon solidification of the polymer, a complete array of P-DMNs was fabricated. Scale bars are 300 μm .

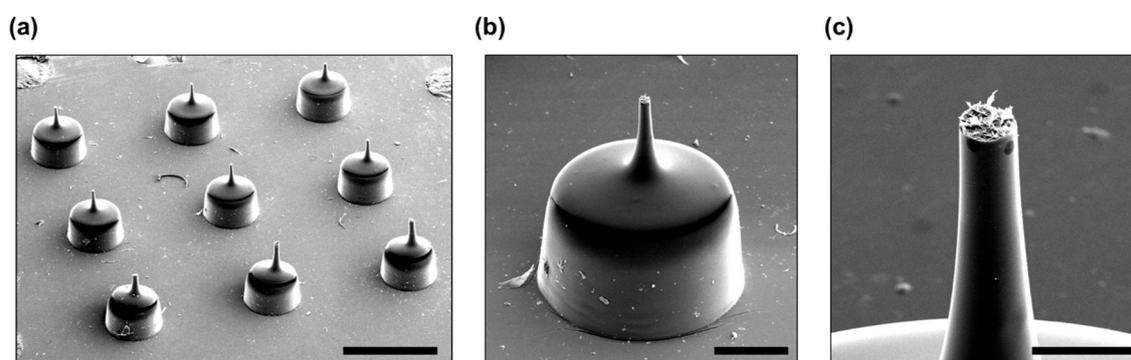


Figure S2. Scanning Electron Microscopy (SEM) images of micro-pillar integrated dissolving microneedles (P-DMNs). (a) SEM image of P-DMNs confirmed uniformity of the fabrication throughout the array. (b) A single P-DMN. (c) Tip portion of P-DMN. Scale bars are 1 mm, 200 μm , and 50 μm , in (a), (b), and (c), respectively.

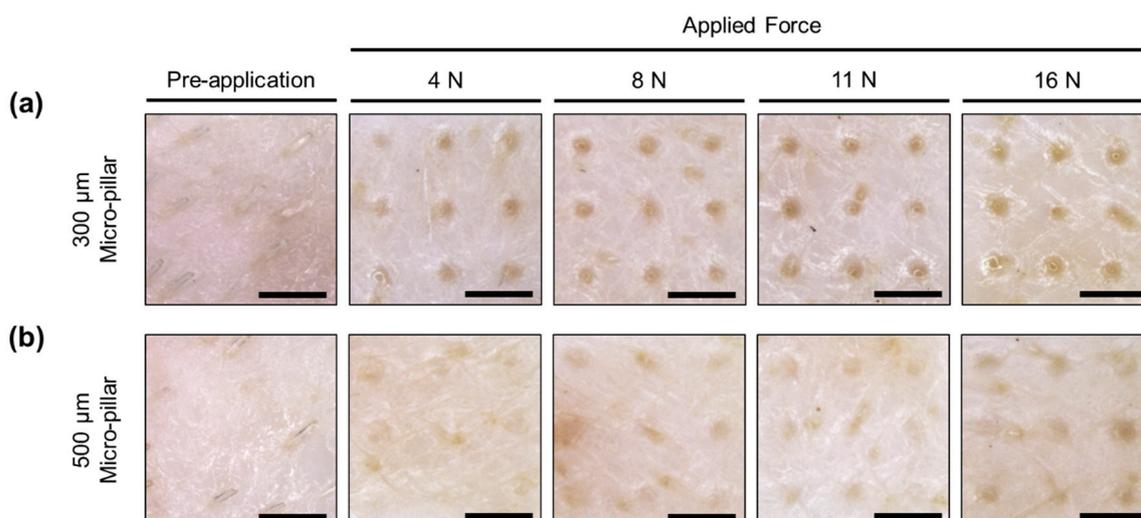


Figure S3. Evaluation of skin surface damage caused by micro-pillars. **(a)** Comparison of skin damage caused by an array of 300 μm micro-pillars showed that upon applying only 4 N, the skin surface was damaged. Increasing the application force up to 16 N further increased the impact of skin damage. **(b)** Because of the wider diameter of the 500 μm micro-pillars, the skin surface was not damaged up to 11 N. Scale bars in (a) and (c) are 1.5 mm.