

## Supporting information

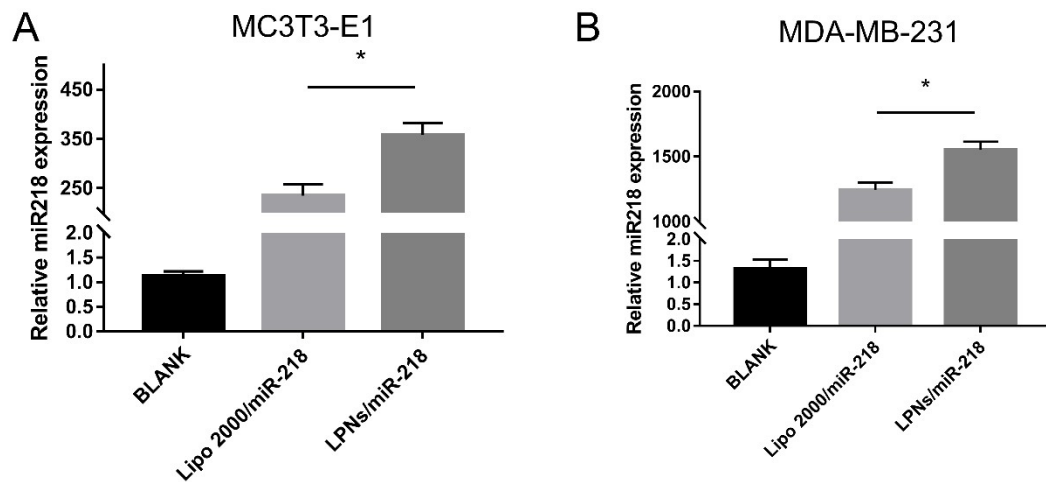
### **A Lipid-polymer hybrid nanoparticle (LPN) loaded dissolving microneedle patch for promoting hair regrowth by transdermal miR-218 delivery**

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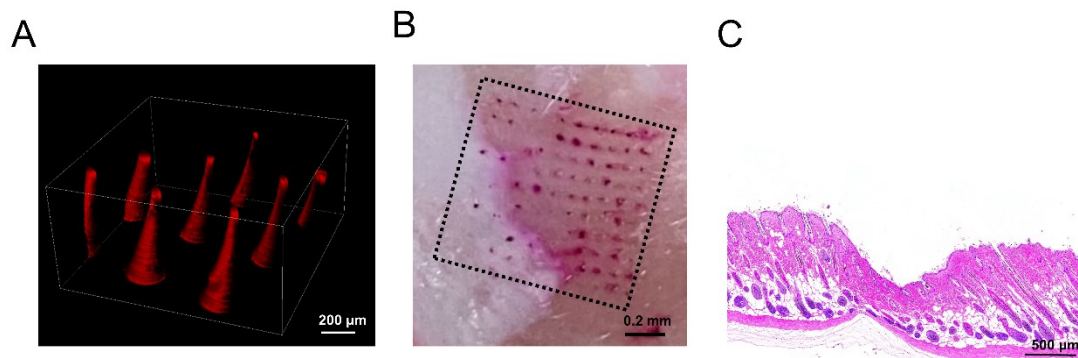
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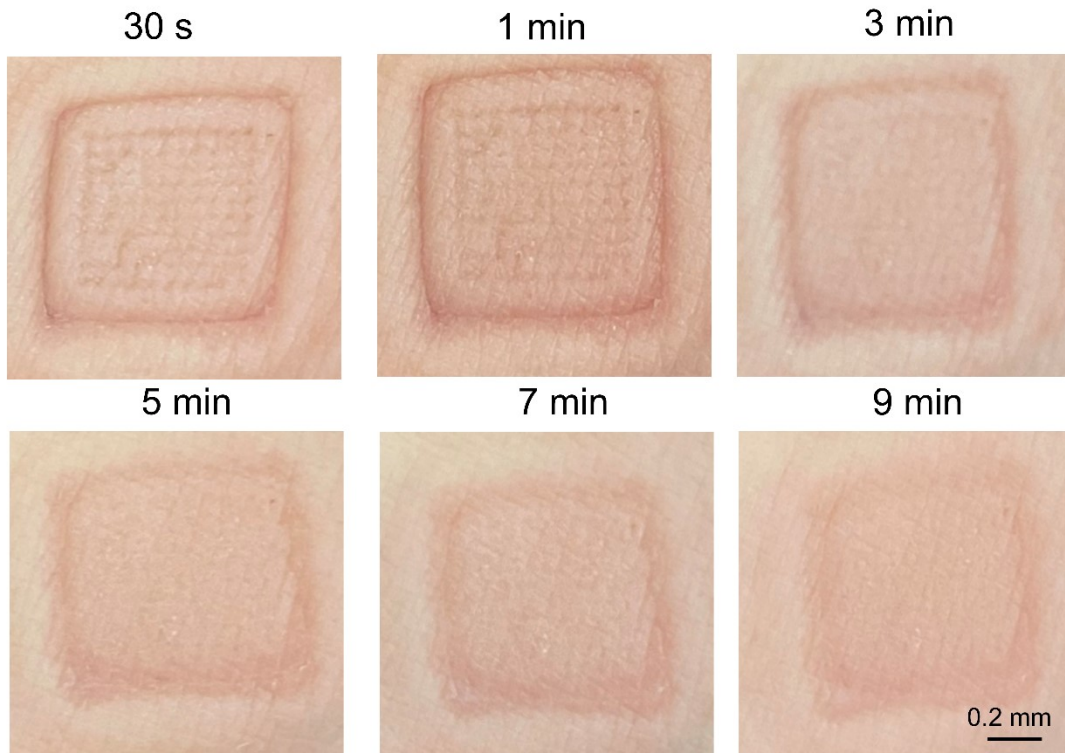
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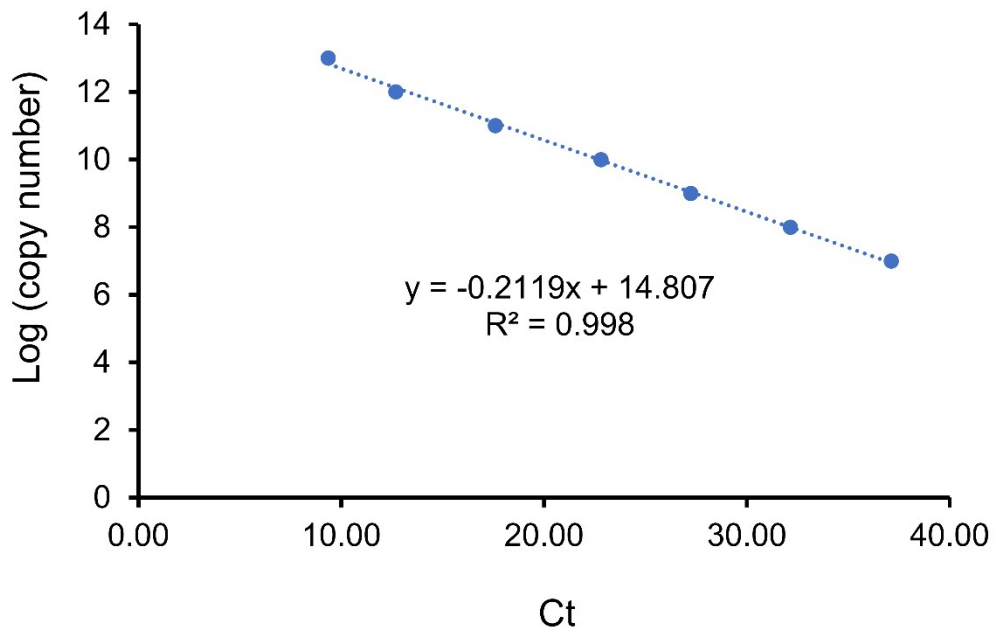
**Figure. S1.** The mature miR-218 expression level in MC3T3-E1 (A) and MDA-MB-231 (B) cells after transfection for 24 h, \* $P < 0.05$  vs Lipo2000/miR-218,  $n = 5$ . Data were shown as the mean  $\pm$  SD and the statistical significance was calculated by one-way ANOVA followed by Dunnett's test.



**Figure. S2.** (A) Confocal image of MN patch loaded with Rhodamine B in the tips (Scale bars=200  $\mu\text{m}$ ), and (B) *in vitro* skin insert test under MN loaded Rhodamine B after 15 min (Scale bars=0.2 mm). (C) H&E image of skin after MN implantation (Scale bars=500  $\mu\text{m}$ )



**Figure. S3.** The mice skin recovery images after 30 s constant pressure of MN (Scale bar = 0.2 mm).



**Figure. S4.** The miR-218 standard curve of copy number and Ct value over the range of 0.069-690000 ng/mL by qRT-PCR.