Supporting Information

Efficient Delivery of Nanoparticles to Deep Skin Layers using

Dissolvable Microneedles with an Extended-Length Design

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Figure S1. *In vitro* skin insertion capability and insertion depth. Porcine cadaver skins and their corresponding histological sections after microneedle (MN) insertion and staining with blue tissue marking dye. The arrows in sections show the MN insertion sites.



Figure S2. H&E-stained histological sections of rat skin. The thicknesses of the stratum corneum, viable epidermis, and dermis were approximately 10, 40 µm, and 1.6 mm, respectively.

MATERIALS AND MATHODS

Ethics Statement. All animal protocols and experiments were reviewed and approved by the Institutional Animal Care and Use Committee at National Cheng Kung University, Tainan, Taiwan.

Transepidermal Water Loss (TEWL) Measurement. TEWL readings were monitored continuously till they recovered to base values indicating recovery of skin barrier function. At least three readings were taken at every time point. Control rats received hair trimming only. The experiment was repeated using five rats per group.

Statistical Analysis. The differences between two groups were analyzed using the onetailed Student's *t* test by using statistical software (SPSS, Chicago, Ill, USA). Data are presented as the mean \pm standard deviation, and a difference with *P* < 0.05 was considered statistically significant.