SUPPORTING INFORMATION

Innovative transdermal delivery of insulin using gelatin methacrylate-based Microneedle Patches in Mice and Mini-pigs

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(a)

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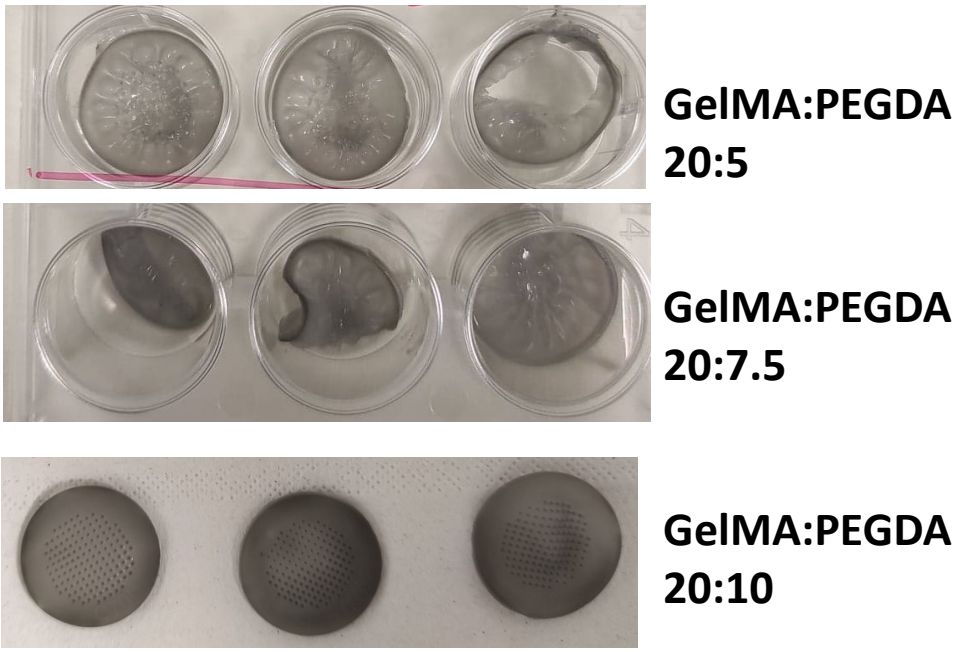

(b)

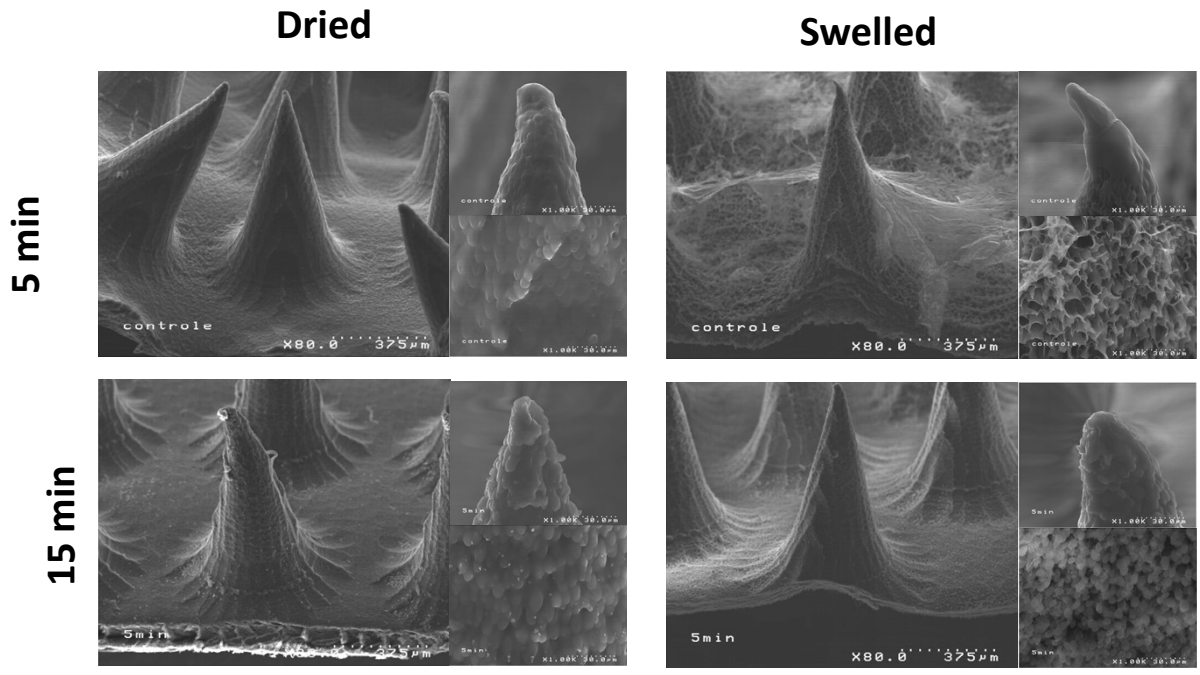

Figure S1. (a) Effect of GelMA:PEGDA ratio on the morphology of MoS_2-MNs array. (b) SEM images of GelMA:PEGDA (20:10) hydrogels formed upon 10 and 15 min UV crosslinking in the dried and swollen states.

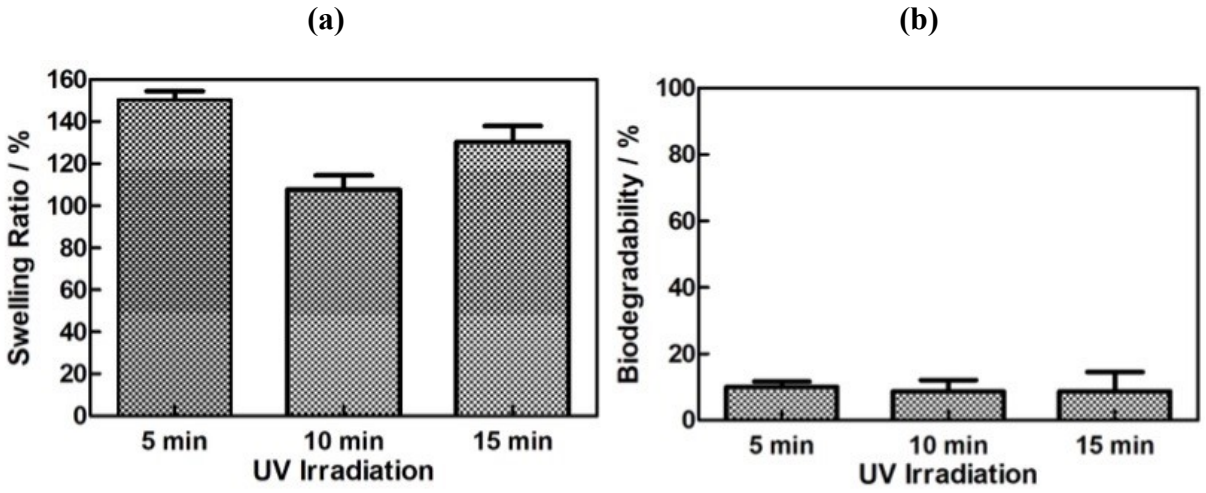

Figure S2. (**a**) Swelling ratio and (**b**) biodegradability of MoS_2-MNs fabricated using 5-, 10- and 15-min UV crosslinking after 24 h in PBS at 32 °C.

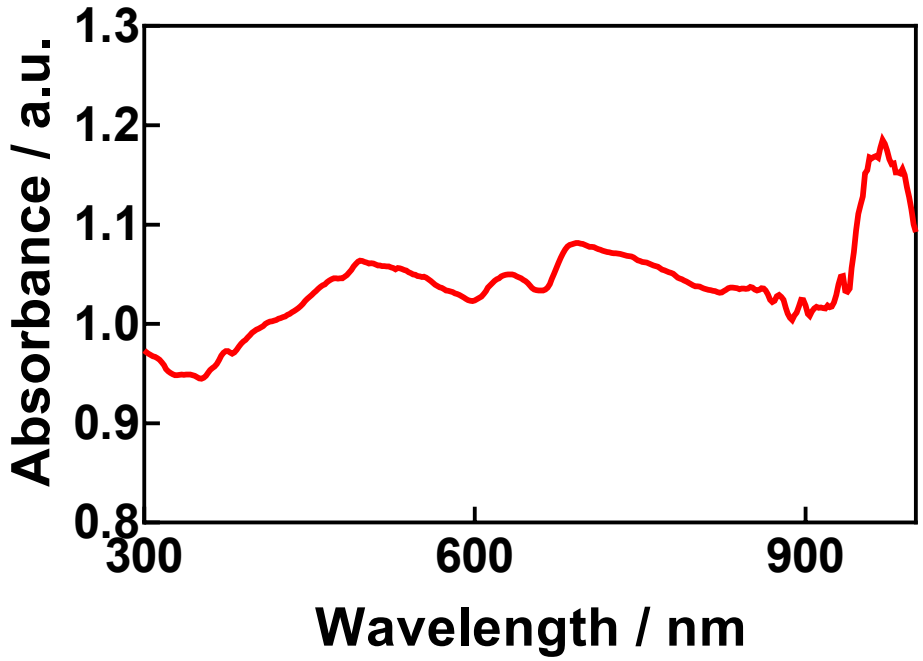

Figure S3. UV-vis spectrum of MoS_2 (100 μg $mL^{-1)}$ dispersion in water.

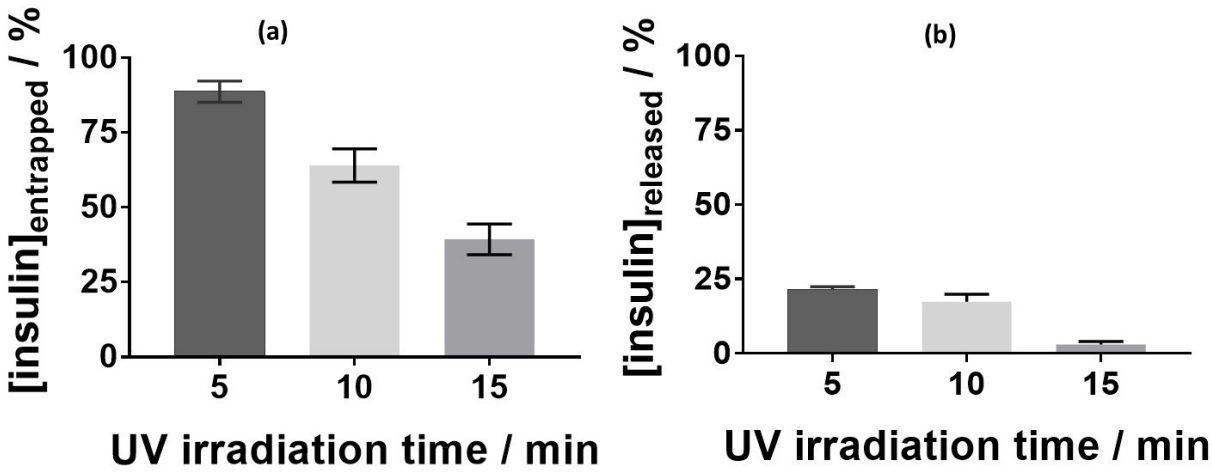

Figure S4. **Insulin entrapment efficiency and passive release behavior of GelMA:PEGDA microneedle patch without MoS_2.** (**a**) Entrapment efficiency of insulin (100 μg mL^{-1} in PBS) upon deposition of 2.0 mL of the insulin solution for 8 h at 4 °C onto the MNs. The concentration of insulin loaded into the MNs was determined by measuring insulin remaining in solution using HPLC. (**b**) Passive release of insulin into water kept at 37 °C from MNs without MoS_2.