Supporting Information

A dissolving and glucose-responsive insulin releasing microneedle patch for type 1 diabetes therapy

Yujie Zhang [a], Mingxin Wu [a], Di Tan [a], Quan Liu [a], Re Xia [a],
Min Chen [b], Yuangang Liu [c], Longjian Xue [a], and Yifeng Lei [a,*]

[a] The Institute of Technological Science & School of Power and Mechanical Engineering, Wuhan University, 430072, Wuhan, China

[*] E-mail: yifenglei@whu.edu.cn (Y.F. Lei)

[b] Department of Internal Medicine & Geriatrics, Wuhan University Zhongnan Hospital, Wuhan 430071, China

[c] College of Chemical Engineering, Huaqiao University, Xiamen 361021, China

Table S1. Description of gold nanocarriers and MN patches in present study

AuNCs	Solution color	PBA molecule	Nanocarrier name	MN patch name
CR_9-AuNCs	Yellow-green	COOH-FPBA	CR_9-AuNC-FPBA-Ins	MN-FPBA
BSA-AuNCs	Brown	NH_2-PBA	BSA-AuNC-PBA-Ins	MN-BSA

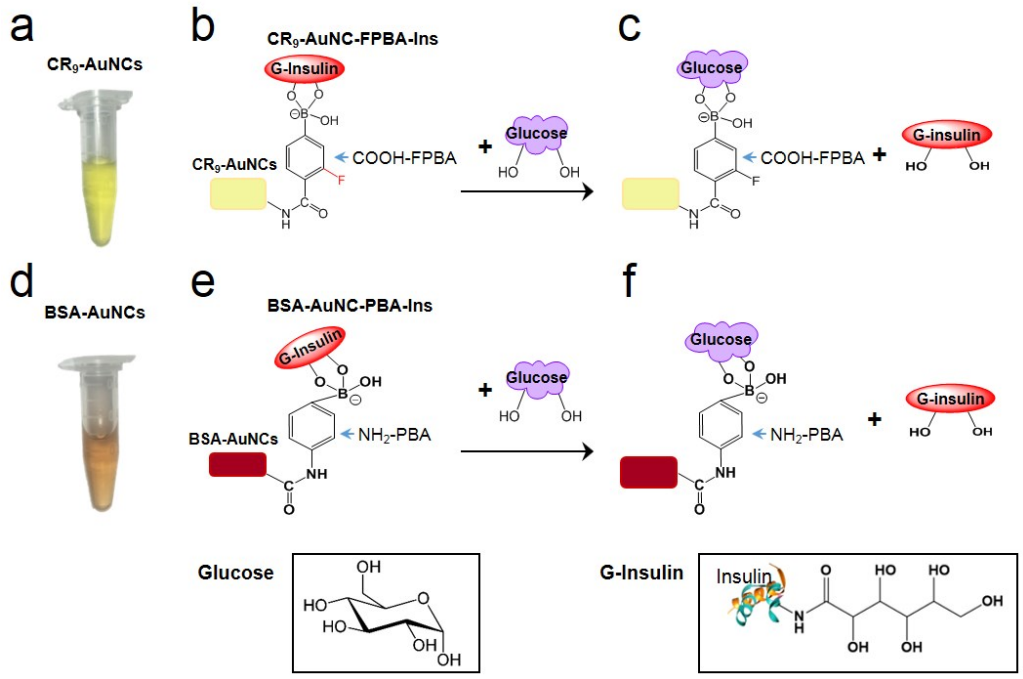

Figure S1. The gold nanocarriers used in this study. (a) Appearance of solution of CR_9-AuNCs. (b-c) Glucose-responsive drug releasing mechanism of CR_9-AuNCs-FPBA-Ins nanocarriers. (d) Appearance of solution of BSA-AuNCs. (e-f) Drug releasing mechanism of BSA-AuNCs-PBA-Ins nanocarriers.

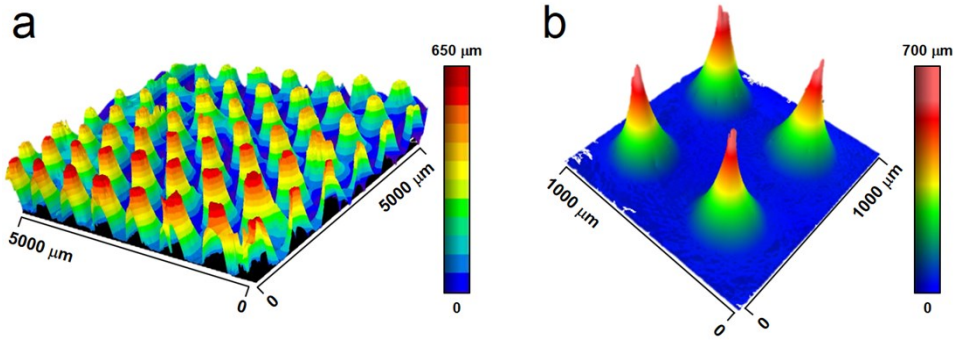

Figure S2. 3D profiler images of the fabricated MN patches.

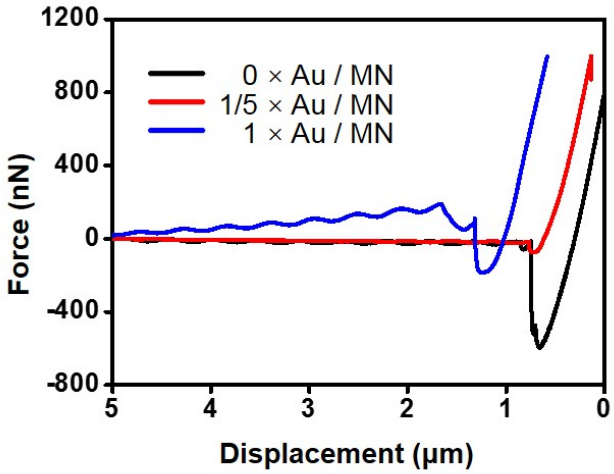

Figure S3. Force-displacement curve of the MN during AFM indentation measurement.

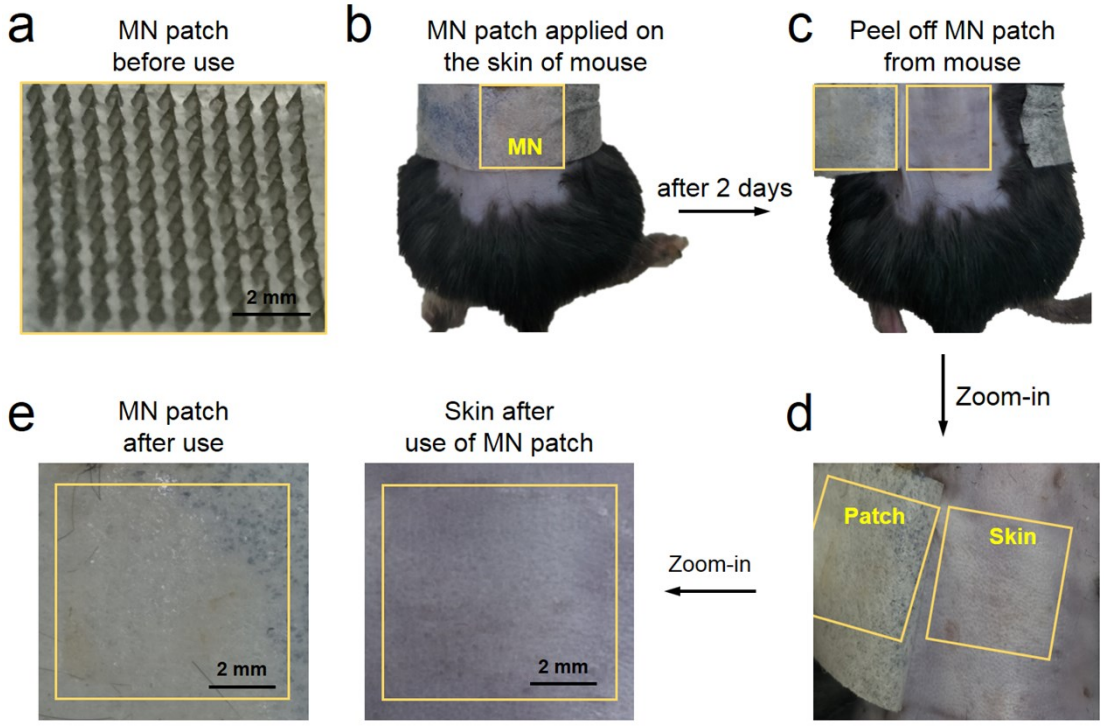

Figure S4. Comparison of MN patch before and after application on the skin of mice. (a) Photograph of a fabricated MN patch. (b) Image of a MN patch applied on the dorsal skin of mice. The yellow box indicates the place of MN patch. (c) Peeling off the MN patch from the skin of mouse. (d-e) Zoomed-in images of the residual MN path and the skin after application for 2 days.

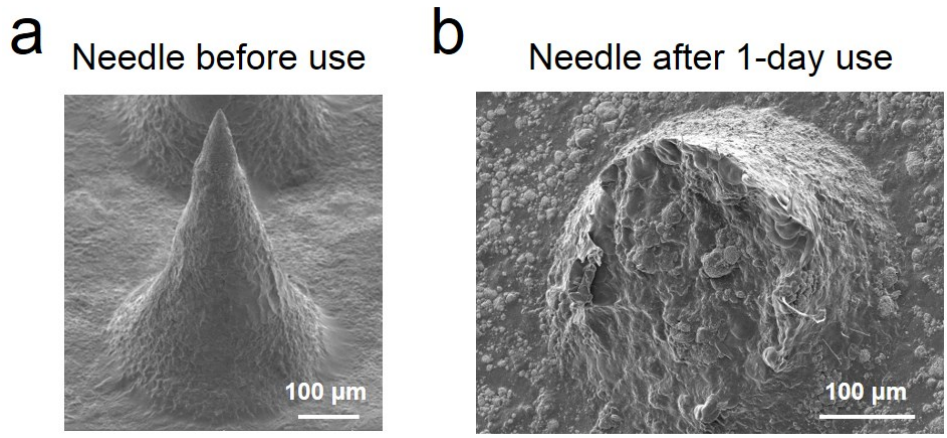

Figure S5. SEM images of a needle before use (a), and after 1-day use on the skin of mouse (b).

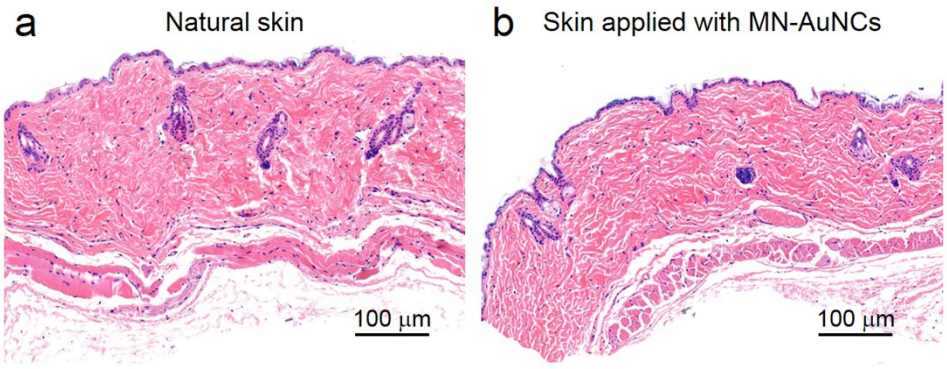

Figure S6. Images of H&E staining of the natural skin of mouse (a), and the mouse skin after 2-day application of MN-AuNCs patch (b).