Supporting Information

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

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

<table>
<thead>
<tr>
<th>AuNCs</th>
<th>Solution color</th>
<th>PBA molecule</th>
<th>Nanocarrier name</th>
<th>MN patch name</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR₉-AuNCs</td>
<td>Yellow-green</td>
<td>COOH-FPBA</td>
<td>CR₉-AuNC-FPBA-Ins</td>
<td>MN-FPBA</td>
</tr>
<tr>
<td>BSA-AuNCs</td>
<td>Brown</td>
<td>NH₂-PBA</td>
<td>BSA-AuNC-PBA-Ins</td>
<td>MN-BSA</td>
</tr>
</tbody>
</table>

Figure S1. The gold nanocarriers used in this study. (a) Appearance of solution of CR₉-AuNCs. (b-c) Glucose-responsive drug releasing mechanism of CR₉-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).