Supplementary

Bio-inspired lubricant drug delivery particle for treatment of osteoarthritis

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Author contributions

Y.J.Z. conceived the conceptualization and designed the experiment; L.Y. carried out the experiments; L.Y., Y.X.L. and X.S. analyzed data and wrote the paper; D.N. and T.T.K contributed to scientific discussion of the article.
**Fig. S1.** SEM images: (a) The whole view of SCCBs; (b) The surface of SCCBs; (c) The surface of pNIPAM inverse opal particles; (d) The surface of inverse opal particles with HA. The scale bars are 50 μm in (a) and 500 nm in (b-d).

**Fig. S2.** (a-d) The reflection spectra of (a) template SCCBs, (b) pNIPAM hybrid SCCBs, (c) inverse opal particles, and (d) inverse opal particles with HA&DS.
Fig. S3. (a-b) The images of reflection peaks (a) and the peak position of the particles during temperature changes (b).

Fig. S4. (a) The HA before (right) and after (left) UV irradiation; (b) Synthesis process of modified HA by methacrylic anhydride.

Fig. S5. The fluorescent images of FITC particles after 0-7 days drug releasing. The scale bars are 50 μm.
**Fig. S6.** (a-b) The different HA particles loaded with DS under different stimulating temperature cycle: (a) 1% HA particles loaded with DS in the temperature cycle; (b) 4% HA particles loaded with DS in the temperature cycle.

**Fig. S7.** (a) The results of MTT assay on day 0, day 1, day 2 and day 3; (b) The microscope images of the human primary chondrocytes on day 3. The scale bar is 100 μm.
Fig. S8. (a-b) The relative mRNA expression of (a) collagen II and (b) aggrecan in chondrocytes after treated with 200 μM H$_2$O$_2$ for different times; (c-d) The relative mRNA expression of (c) collagen II and (d) aggrecan in chondrocytes after treated with 200 μM H$_2$O$_2$ and particles for 24 h.

Fig. S9. (a-b) The morphology (a) and statistical size distribution histogram (b) of the SCCBs. The scale bar is 200 μm.
Fig. S10. The more areas of tibia plateau in different groups.

Table. S1. Primer sequences used for RT-qPCR.

<table>
<thead>
<tr>
<th>Gene</th>
<th>Forward (5’-3’)</th>
<th>Reverse (5’-3’)</th>
<th>Tm(°C)</th>
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<tr>
<td>Aggreca n</td>
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<td>ATGCCCAAGACTACCAGTGG</td>
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<tr>
<td>β-actin</td>
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