

Supporting Information

Polydopamine/Puerarin nanoparticles incorporated hybrid hydrogels for enhanced wound healing

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The authors declare no competing financial interest.

Preparation of polydopamine nanoparticles

PDA NPs were synthesized according to a previously reported method. 0.5 mL of ammonia aqueous solution (25%) was added to a mixture of 4 mL of ethanol and 9 mL of deionized (DI) water in a water bath at 40 °C under mildly magnetic stirring. 50 mg dopamine hydrochloride dissolved in 1 mL of DI water was then injected into the reaction solution. The reaction proceeded for 5 hours, and then the product was collected via centrifugation at 12000 rpm for 20 min and subsequently washed with DI water three times. The final product was suspended in DI water for use, and its concentration was determined via weighing after lyophilization. The PDA-NPs were obtained after drying.

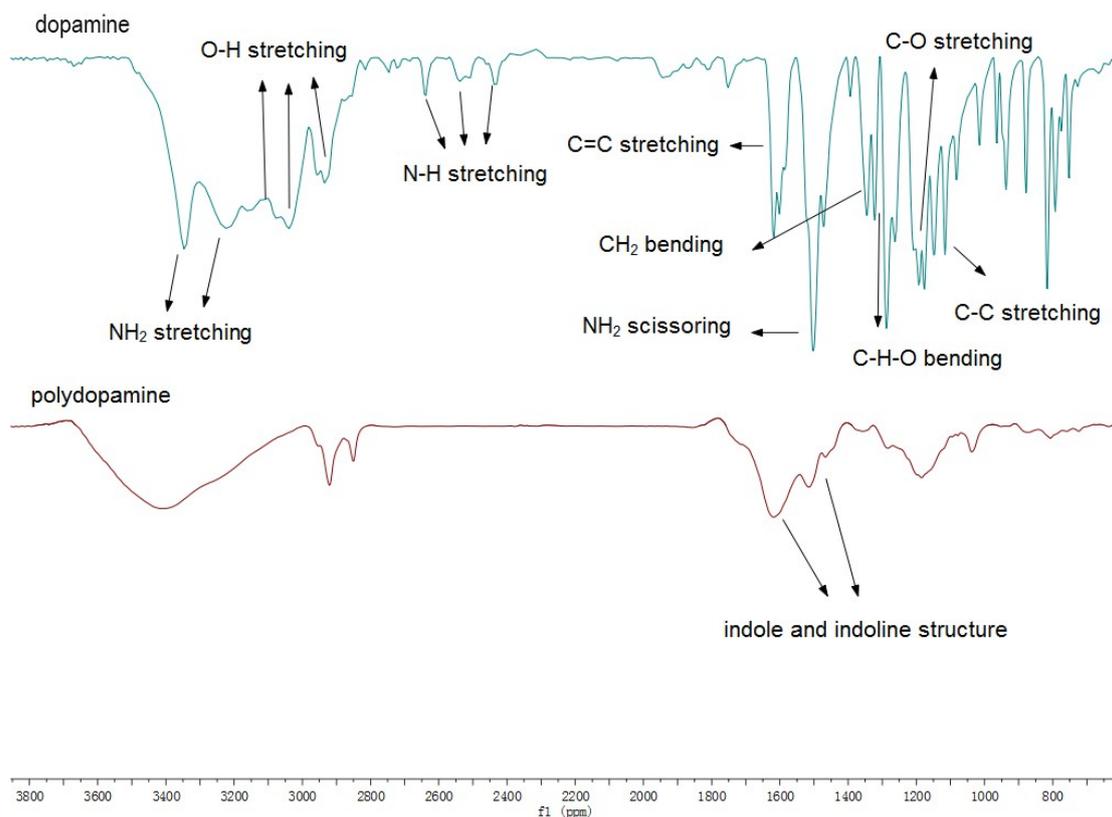


Figure S1. FT-IR spectra of dopamine (blue) and polydopamine (red).

Preparation of polydopamine/puerarin nanoparticles

Puerarin (20 mg) were mixed with 9 mL of $1.0 \text{ mg}\cdot\text{mL}^{-1}$ PDA NPs suspended in a mixture of water and ethanol (9:1, v/v). The mixed solution was incubated for 4 hours at room temperature under magnetic stirring. The undissolved Puerarin was first removed by centrifugation at a relatively low speed (3000 rpm) for 5 min, and then the supernatant was collected and centrifuged at a high speed of 12000 rpm for 10 min to precipitate PUE loaded PDA NPs (PDA-PUE). The obtained PDA-PUE was then washed three times with DI water. The drug loading capacity of PDA NPs was determined by a UV-vis spectrometer. The absorption at 250 nm for PUE was used to determine the amount of drug loaded on PDA NPs. The drug loading ratio was calculated according to the formula: drug loading ratio = drug mass \times 100% / (drug mass + PDA NPs mass).

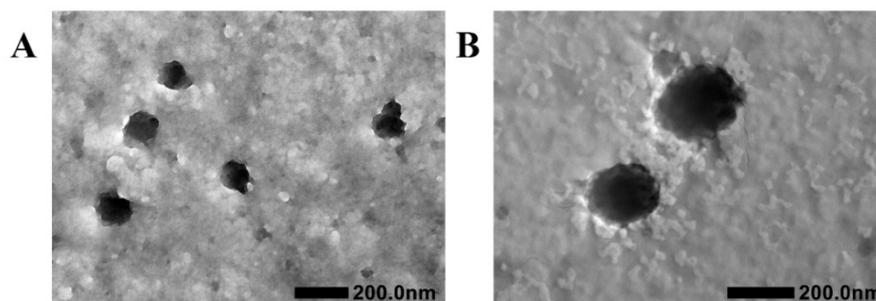


Figure S2. TEM images of PDA NPs (A) and PDA/PUE NPs (B).

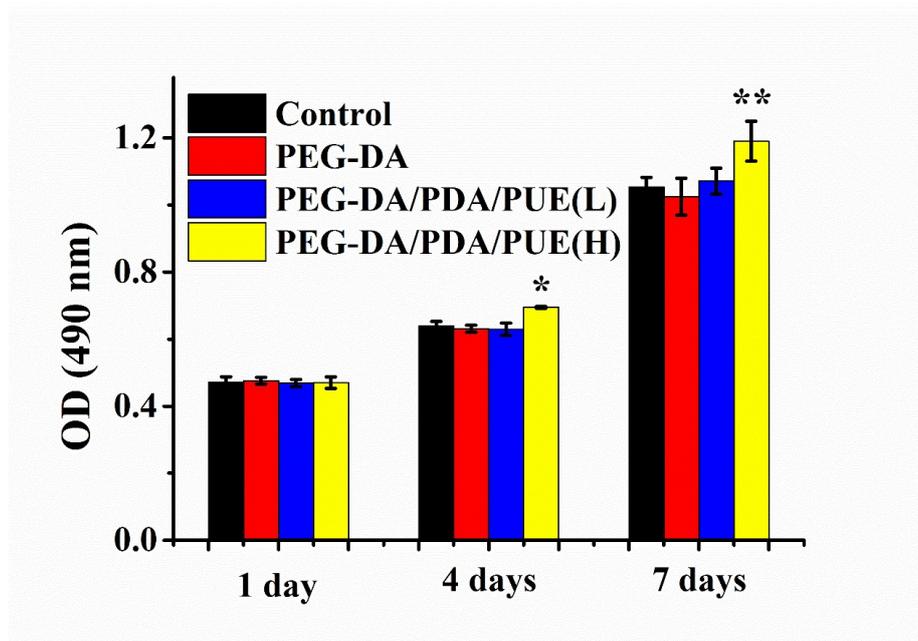


Figure S3. The proliferation of dental pulp stem cells measured by MTT assays on days 1, 4 and 7. * $p \leq 0.05$ and ** $p \leq 0.01$; Mean \pm SD, n=4.

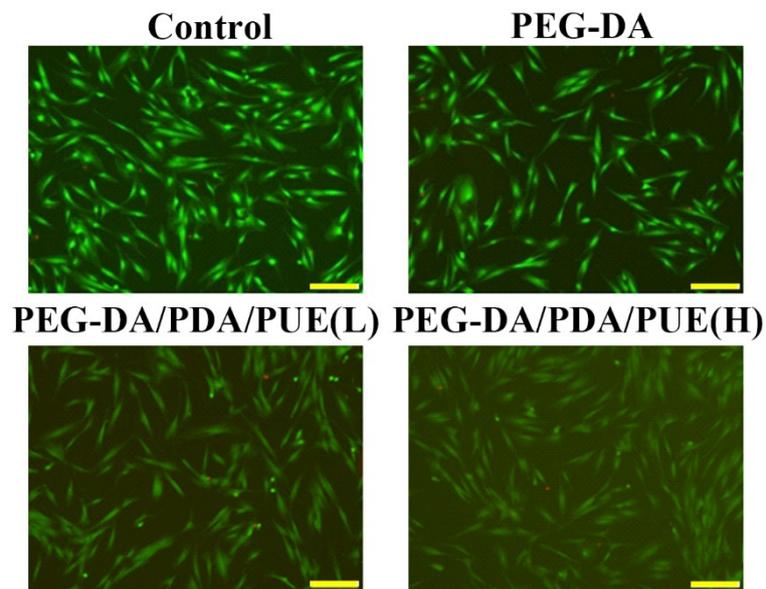


Figure S4. Live/dead cell staining of dental pulp stem cells cultured with or without (control) the hydrogels.

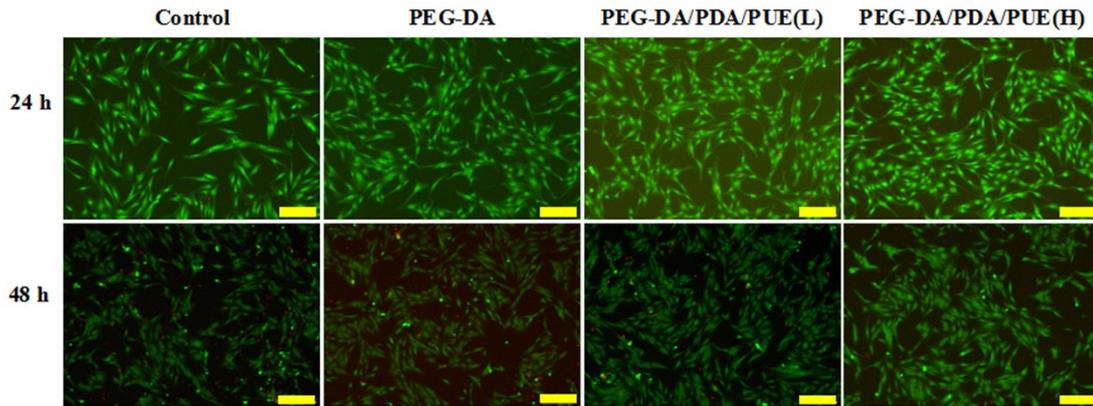


Figure S5. Images of live/dead cell staining after 100 μM H_2O_2 treated dental pulp stem cells. Scale bar: 100 μm .

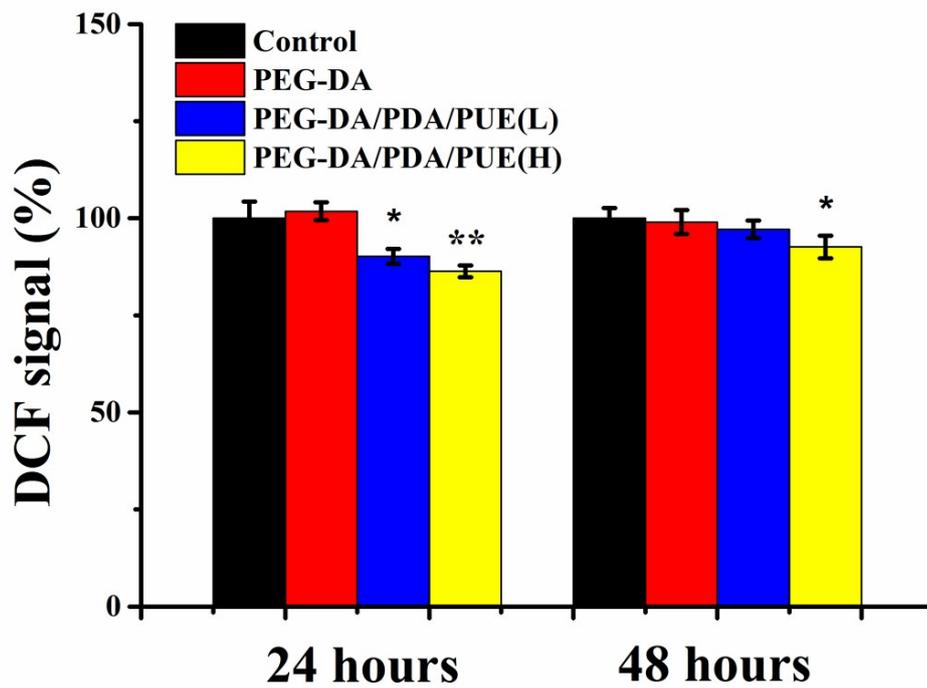


Figure S6. The fluorescent signal of DCF detected by flow cytometer. * $p \leq 0.05$ and ** $p \leq 0.01$; Mean \pm SD, $n=4$.

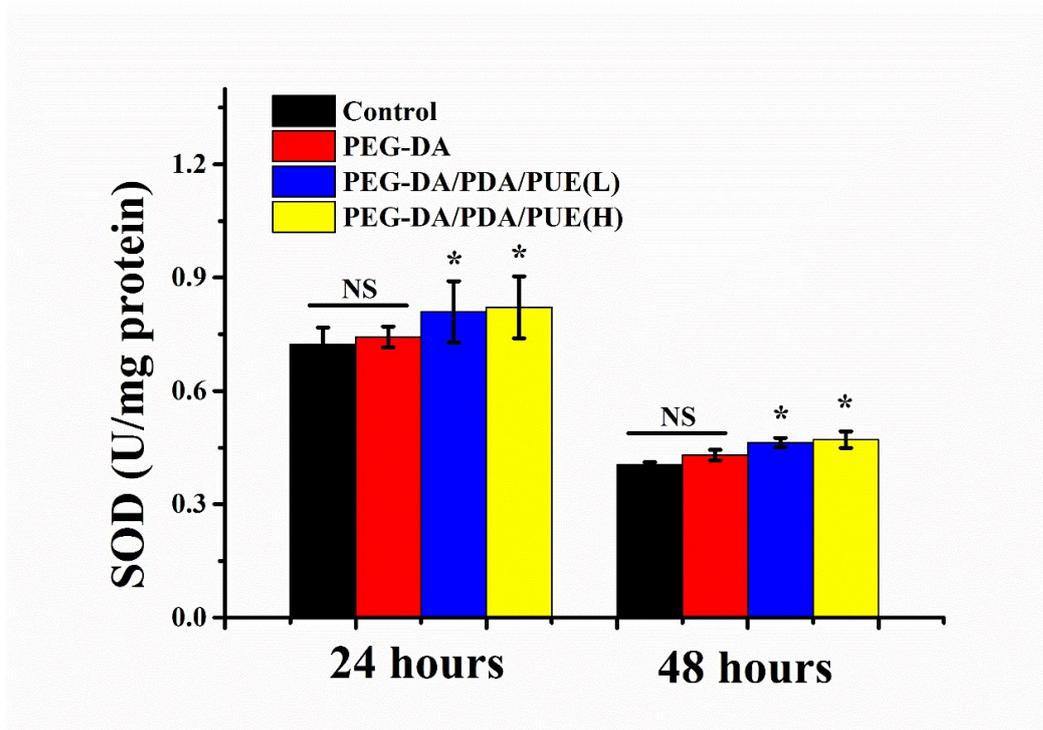


Figure S7. The change of SOD level for each treatment. * $p \leq 0.05$; Mean \pm SD, n=4.

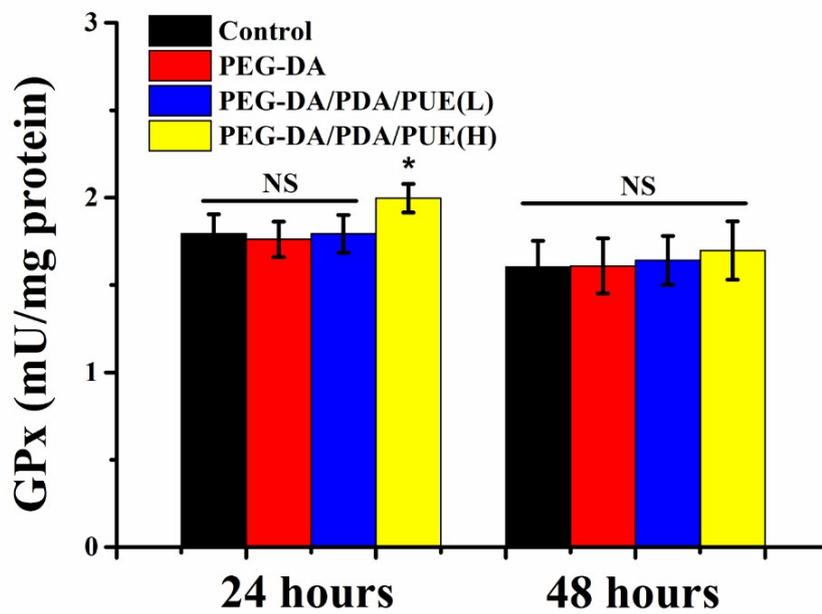


Figure S8. The change of GSH level for each treatment. * $p \leq 0.05$; Mean \pm SD, n=4.

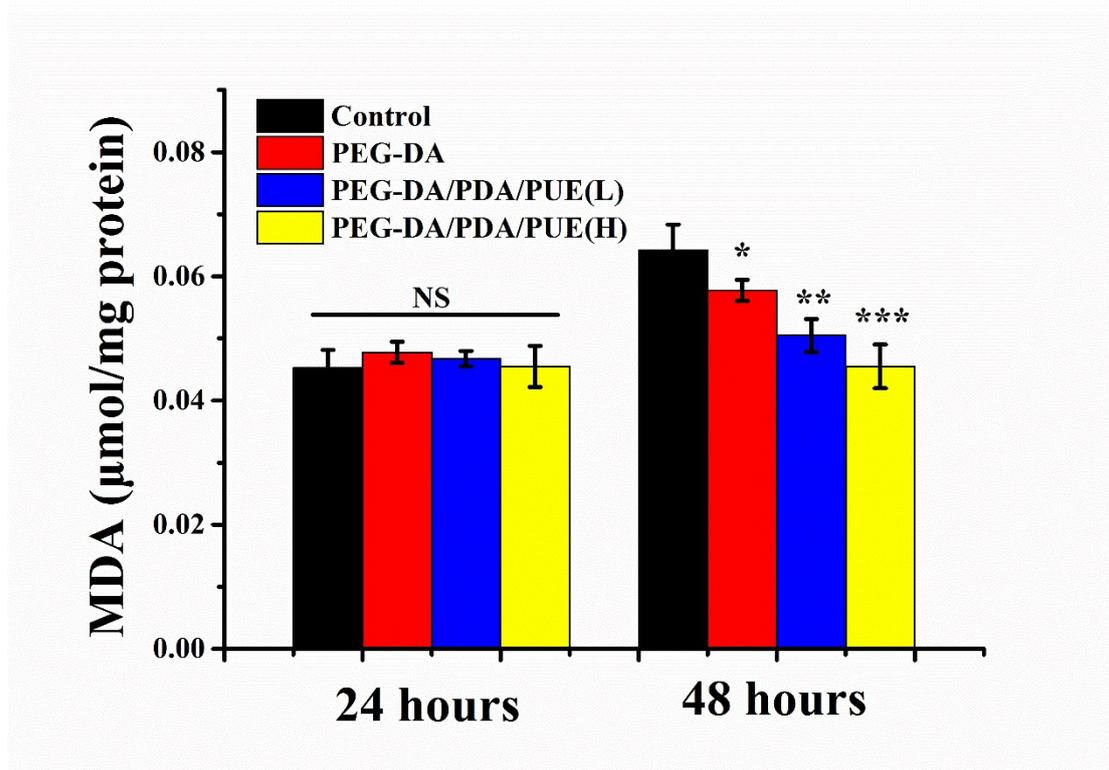


Figure S9. The change of MDA content for each treatment. * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$; Mean \pm SD, n=4.

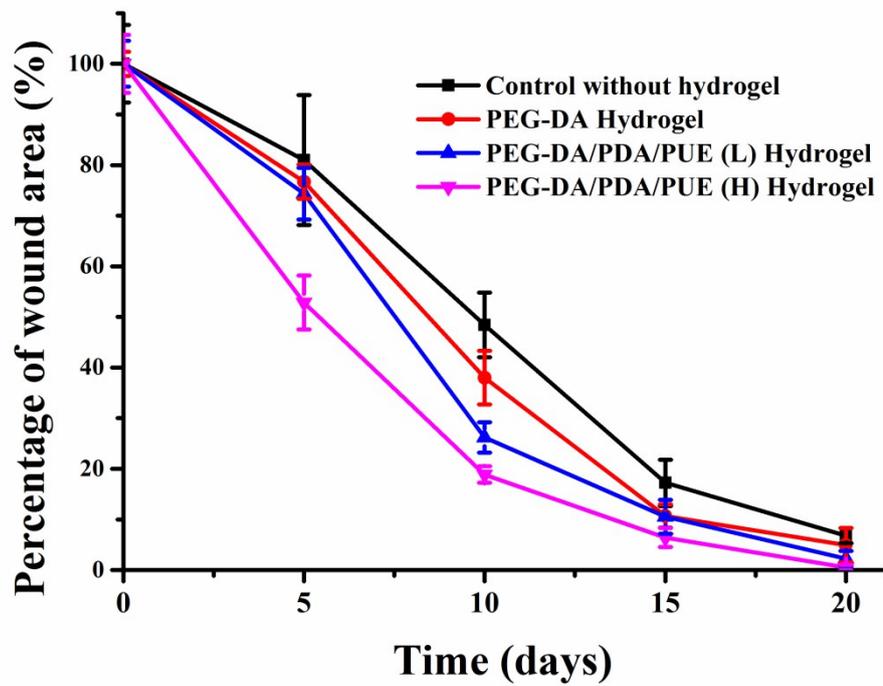


Figure S10. Wound contraction for each treatment. Mean \pm SD, n=5.