Supplementary Information
ZnO quantum dots-embedded collagen/polyanion composite hydrogels with integrated functions of degradation tracking/inhibition and gene delivery

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Physical and mechanical characterization

Optical properties. The visible light transmission of the flat hydrogels entrapping ZnO QDs (thickness 400 μm, soaked in normal saline) was measured at wavelength 500 nm using a Synergy HT Multi-Mode Microplate Reader (BioTek, USA) at room temperature.

Equilibrium water content (EWC). Hydrogels were fully equilibrated in normal saline, surface-dried with filter papers, and then immediately weighed on a microbalance to measure the wet weight. These same hydrogels were freeze-dried under a vacuum to constant weight. Equilibrated water content was defined as:

\[ m_{eq} = \frac{(m_{\text{wet}} - m_{\text{dry}})}{m_{\text{wet}}} \times 100\% \]

where \( m_{\text{wet}} \) and \( m_{\text{dry}} \) denote wet weight and dry weight of hydrogels, respectively. The average values of three measurements were taken for each sample.

Mechanical properties. Tensile strength, elastic modulus, and elongation at break of hydrogels were measured on WDW-05 electromechanical tester (Time Group Inc, China) at room temperature. Flat hydrogels were fully equilibrated in normal saline and cut into rectangular pieces with 20 mm × 2 mm × 0.40 mm dimensions. Gauge length and crosshead speed were set as 10 mm and 100 mm min\(^{-1}\), respectively. At least three specimens were tested for each hydrogel sample.

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