Supplementary Information

Hyaluronic acid-coated gold nanoparticles as a controlled drug delivery system for poorly water-soluble drugs

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Absorption frequency (cm ⁻¹)	Functional groups	Compounds	
3,440	O-H stretching	hydroxyl	
2,925	C-H stretching	alkane	
1,655	C=O stretching	amide	
1,610	C=O stretching	carboxylic acid	
1,560 and 1,315	N-H bending	amide	
1,400	C-O stretching	aromatic carboxylic acid	
1,150	C-O-C stretching	O-bridge	
1,075	C-O stretching	exocyclic	
1,042	C-OH stretching	hydroxyl	
1,031	C-OH stretching	hydroxyl	
1,020	C-N stretching	amide	

 Table S1. FT-IR absorption frequenceis of HA.



Fig. S1. UV-vis spectrum of the various concentration of SSZ (0.005 mg/mL to 0.2 mg/mL) with after reaction condition (supernatant).



Fig. S2. (a), (b) Synthesized AuNP-HA-SSZ with various reducing reagents, NaBH₄, Sodium citrate, and ascorbic acid. (c) UV-vis spectrum of the synthesized AuNP-HA-SSZ with various reducing reagents. The described ont-pot synthesis method was used to synthesize the particles.

Samples	Kurtosis	Skewness		
AuNP-SSZ	4.81	2.388		
AuNP-HA(0)-SSZ	-1.42	0.442		
AuNP-HA(2 kGy)-SSZ	-1.47	0.438		
AuNP-HA(20 kGy)-SSZ	-1.18	0.630		
AuNP-HA(50 kGy)-SSZ	-1.86	0.593		

Table S2.	The values	of kurtosis	and skewness	from the	TEM images	of AuNP-HA-SSZ.
					0	



Fig. S3. (a) The photocopy of the AuNP-SSZ and AuNP-HA(0, 2, 20, and 50 kGy)-SSZ, (b) Hydrodynamic diameters of the particles by Dynamic light scattering (DLS) analysis of the AuNP-SSZ and AuNP-HA-SSZ.



Fig. S4. Stability of the AuNP-SSZ and the AuNP-HA-SSZs. (a) Hydrodynamic diameters of the particles by dynamic light scattering (DLS) analysis in pH 4, 7, and 10. (b) Hydrodynamic diameters of the particles by DLS analysis in the temperature of 4°C, 25°C, and 40°C. (c) UV-vis sepctra of the particles in pH 4, 7, and 10. (d) UV-vis sepctra of the particles in the temperature of 4°C, 25°C, and 40°C. All samples were incubated for 24 h at the given condition.



Fig. S5. Long-term release patterns of the SSZ from the AuNP-SSZ and AuNP-HA-SSZs in (a) DW, (b) PBS, and (c) Simulated intestinal solution.



Fig. S6. Cytotoxicity test of e-beam-irradiated HA (0, 2, 20, and 50 kGy) with concentrations of 0 (control), 0.4, 4, 40, and 400 μ g/mL. The experiments were conducted by triplicates and data were reported by mean value with standard deviation.