

Supplementary Materials: Development of Targeted Drug Delivery System for the Treatment of SARS-CoV-2 Using Aptamer-Conjugated Gold Nanoparticles

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Table S1. Aptamers sequence used in this work.

Aptamer sequence (5' → 3')
ATCCAGAGTGACGCAGCACCGACCTTGTGCTTTGGGAG- TGCTGGTCCAAGGGCGTTAATGGACACGGTGGCTTAGT

Table S2. Characterization results of e-beam-irradiated HAs. (Molecular weights were determined by MALS system and viscosity (10 mg/mL, 22.5 °C)).

e-beam Dose (kGy)	Molecular weight (Da)	Viscosity (cP)
0	$9.761 \times 10^5 \pm 10.1\%$	5140
2	$5.544 \times 10^4 \pm 5.7\%$	333
5	$4.078 \times 10^4 \pm 5.1\%$	114
10	$2.111 \times 10^4 \pm 9.0\%$	95
20	$1.174 \times 10^4 \pm 8.0\%$	19
50	$3.927 \times 10^3 \pm 15.9\%$	5

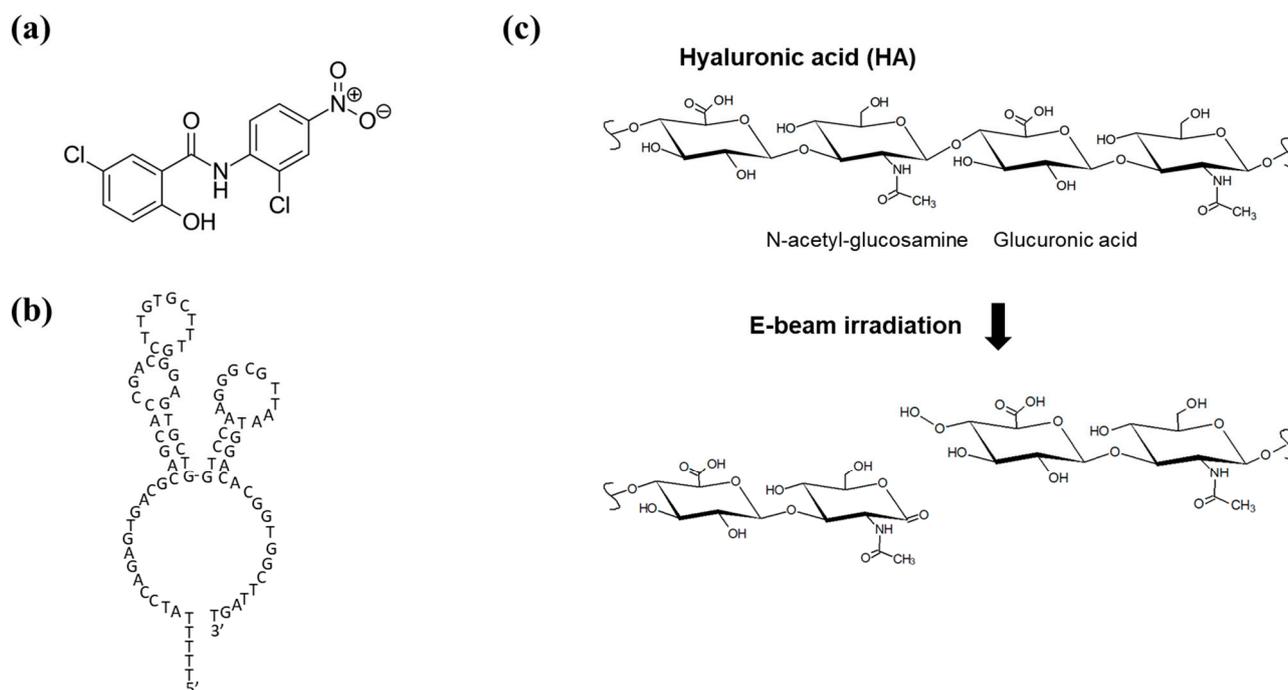


Figure S1. (a) Chemical structure of niclosamide, (b) Sequence and secondary structure of SARS-CoV-2 spike protein targeting aptamer, and (c) Chemical structure of hyaluronic acid and its degradation profile after e-beam irradiation.

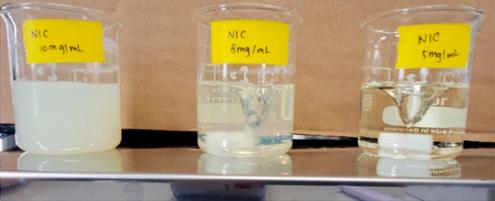
EtOH Solvent Ratio	NIC Concentration (mg/mL)			EtOH Solvent Ratio	NIC Concentration (mg/mL)		
	10	8	5		10	8	5
100%				95.24%			
97.09%				92.60%			
96.15%				91.74%			

Figure S2. Solubility and dispersion stability of AuNP-HA-NIC nanoparticles synthesized in different ethanol concentrations (100%, 97.09%, 96.15%, 95.24%, 92.60%, and 91.74%). The images illustrate the optimal conditions for synthesizing nanoparticles in 97% ethanol solvent without NIC precipitation, confirming stable and well-dispersed nanoparticles.

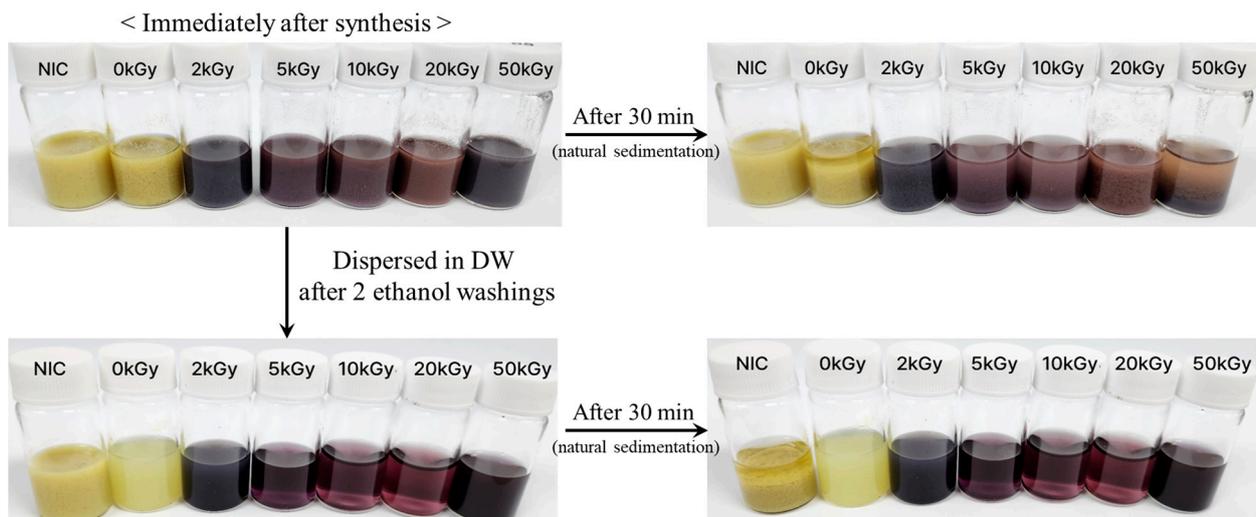


Figure S3. Images demonstrating the dispersion and color change of NIC-incorporated HA-coated AuNPs (AuNP-HA-NIC) synthesized with different e-beam irradiation doses (0, 2, 5, 10, 20, and 50 kGy) in 97% EtOH and DW.