Supplementary materials

High Drug Capacity Doxorubicin-Loaded Iron Oxide Nanocomposites for Cancer Therapy

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The dynamic light scattering (DLS) measurements were carried out on a Malvern Zetasizer Nano device (Malvern Instruments, Worcestershire, UK) in deionized water (~300 μg/mL concentration).

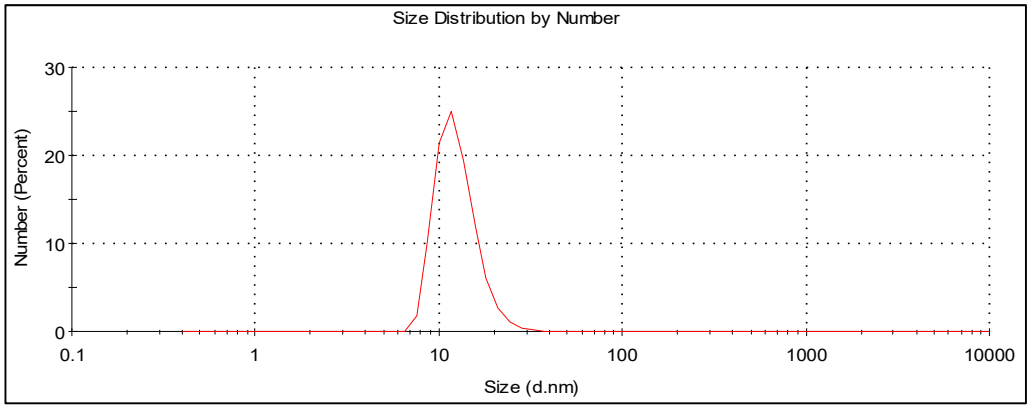

Figure S1. DLS size distribution data for MNP without coating. The particle size by DLS is 15.6 ± 2.2 nm (PDI = 0.296 ± 0.003).

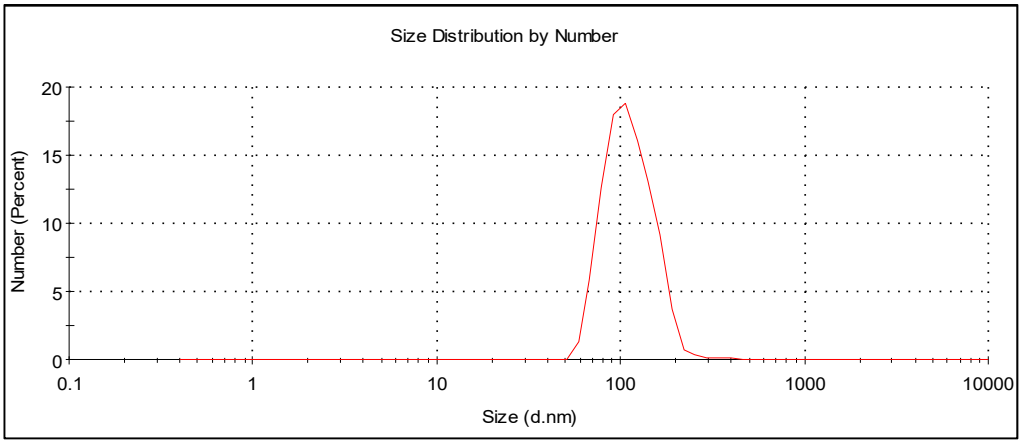

Figure S2. DLS size distribution (Number) of MNP_Tw20. The particle size was 258 ± 4 nm (PDI = 0.44 ± 0.01).

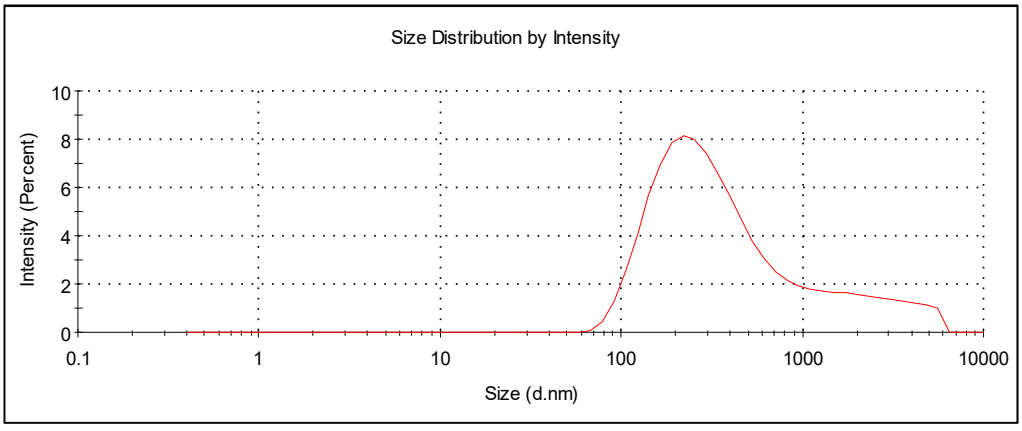

Figure S3. DLS size distribution (Intensity) of MNP_Tw20. The particle size was 711 ± 53 nm.

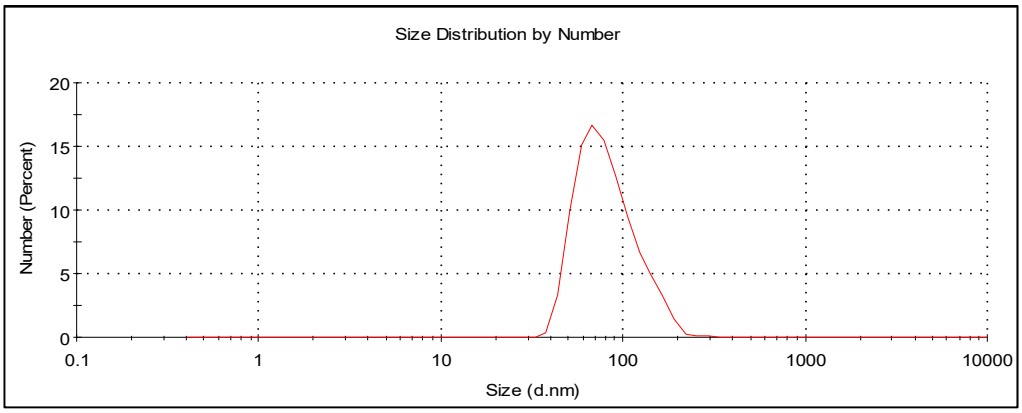

Figure S4. DLS size distribution (Number) of MNP_Tw80. The particle size was 233 ± 2 nm (PDI = 0.256 ± 0.007).

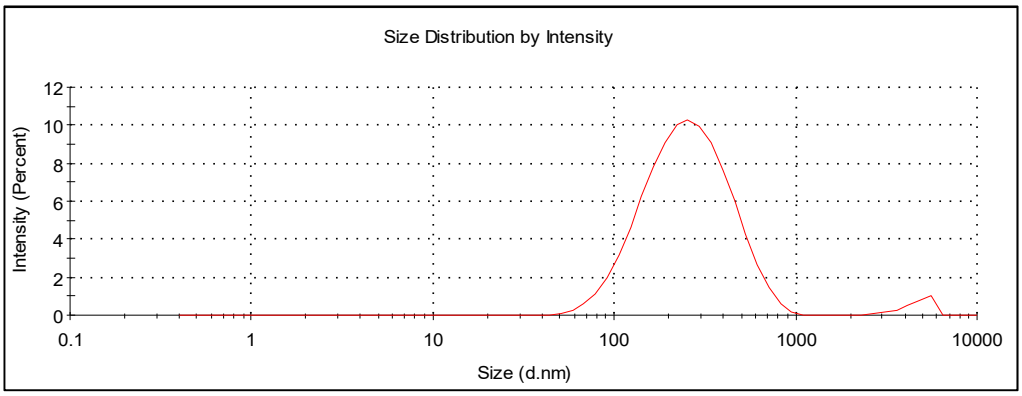

Figure S5. DLS size distribution (Intensity) of MNP_Tw80. The intensity particle was 403 ± 48 nm.

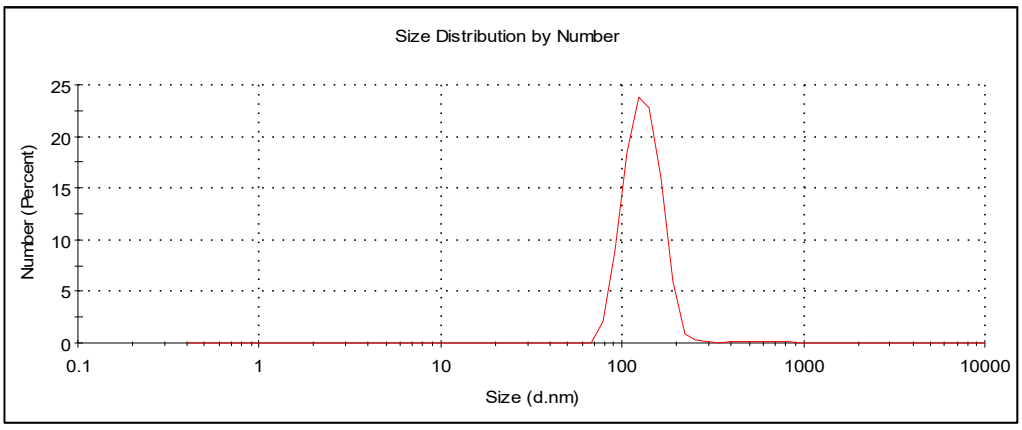

Figure S6. DLS size distribution (Number) of MNP_PEG 2000. The particle size was 196 ± 15 nm (PDI = 0.50 ± 0.03).

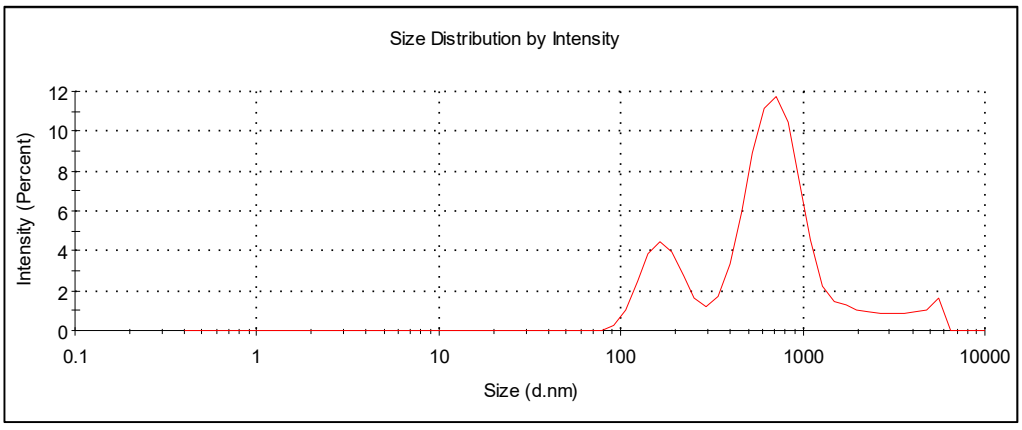

Figure S7. DLS size distribution (Intensity) of MNP_PEG 2000. The intensity particle was 711 ± 112 nm.

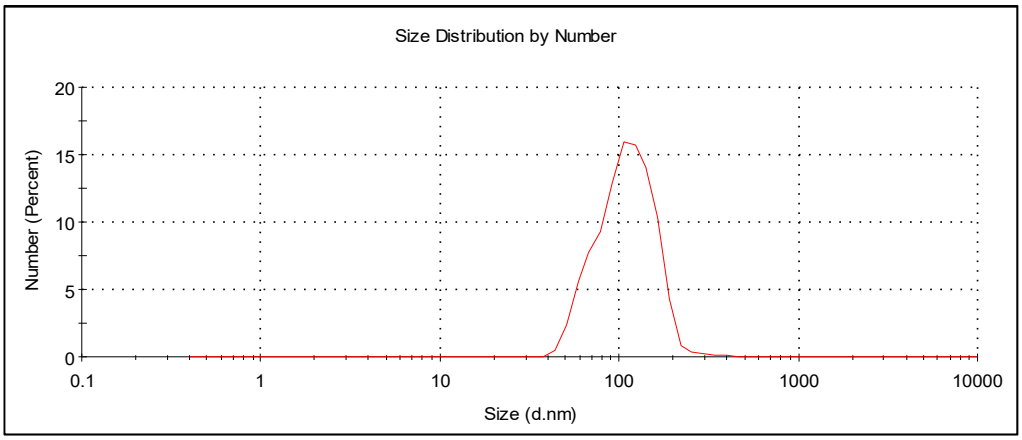

Figure S8. DLS size distribution (Number) of MNP_OA. The particle size was 112 ± 19 nm (PDI = 0.172 ± 0.009).

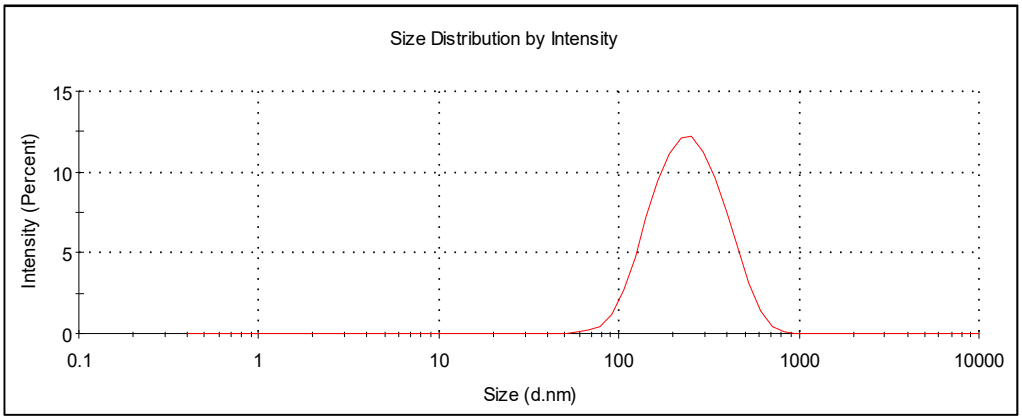

Figure S9. DLS size distribution (Intensity) of MNP_OA. The intensity particle was 264 ± 9 nm.

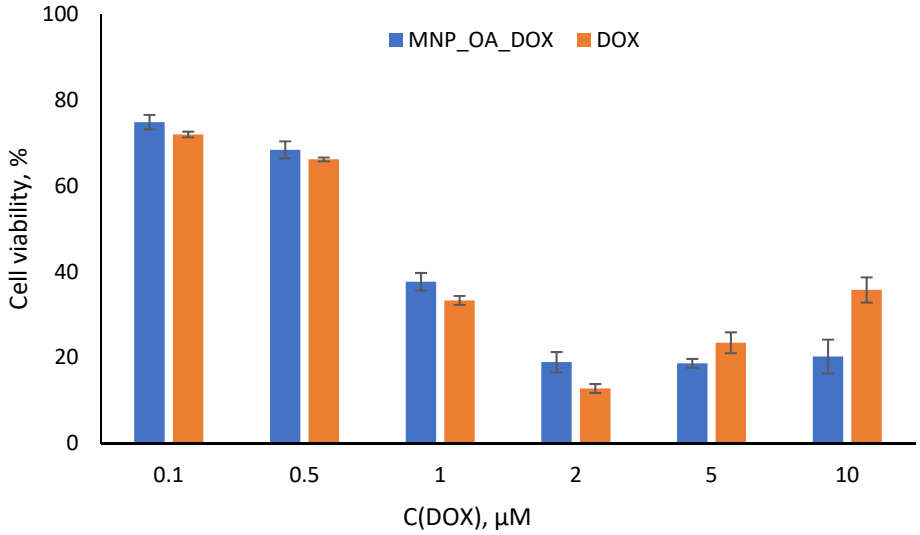

Figure S10. Cell viability studies of MNP_OA_DOX using MTT assay. A549 cell line was incubated for 48 h with MNPs loaded at various concentrations of MNP_OA_DOX and DOX.

Table S1. Hydrodynamic diameter (nm) for MNP_OA for 48 h under various buffer conditions

Conditions	0.1 h	1 h	24 h	48 h
Deionized water (Milli-Q)	132 ± 4	121 ± 9	127 ± 5	111 ± 10
Cell medium DMEM	106 ± 12	112 ± 14	120 ± 13	107 ± 7
Acetic buffer pH 5	135 ± 16	119 ± 13	164 ± 12	128 ± 10
Acetic buffer pH 3	116 ± 15	137 ± 29	128 ± 7	136 ± 9

Table S2. PDI for MNP_OA for 48 h under various buffer conditions

Conditions	0.1 h	1 h	24 h	48 h
Deionized water (Milli-Q)	0.189 ± 0.009	0.329 ± 0.035	0.166 ± 0.015	0.154 ± 0.012
Cell medium DMEM	0.321 ± 0.021	0.300 ± 0.031	0.311 ± 0.025	0.265 ± 0.003
Acetic buffer pH 5	0.298 ± 0.022	0.301 ± 0.011	0.2868 ± 0.024	0.254 ± 0.004
Acetic buffer pH 3	0.328 ± 0.023	0.336 ± 0.029	0.332 ± 0.033	0.288 ± 0.012

Table S3. Hydrodynamic diameter (nm) for MNP_OA_DOX for 48 h under various buffer conditions

Conditions	0.1 h	1 h	24 h	48 h
Deionized water (Milli-Q)	201 ± 51	150 ± 16	218 ± 29	223 ± 11
Cell medium DMEM	249 ± 31	225 ± 29	239 ± 38	266 ± 26
Acetic buffer pH 5	178 ± 30	176 ± 19	165 ± 12	168 ± 16
Acetic buffer pH 3	161 ± 8	123 ± 32	115 ± 10	171 ± 5

Table S4. PDI for MNP_OA_DOX for 48 h under various buffer conditions

Conditions	0.1 h	1 h	24 h	48 h
Deionized water (Milli-Q)	0.216 ± 0.030	0.377 ± 0.026	0.347 ± 0.044	0.267 ± 0.006
Cell medium DMEM	0.269 ± 0.045	0.291 ± 0.019	0.302 ± 0.048	0.277 ± 0.038
Acetic buffer pH 5	0.384 ± 0.038	0.307 ± 0.008	0.453 ± 0.021	0.237 ± 0.001
Acetic buffer pH 3	0.284 ± 0.029	0.266 ± 0.018	0.349 ± 0.008	0.363 ± 0.002

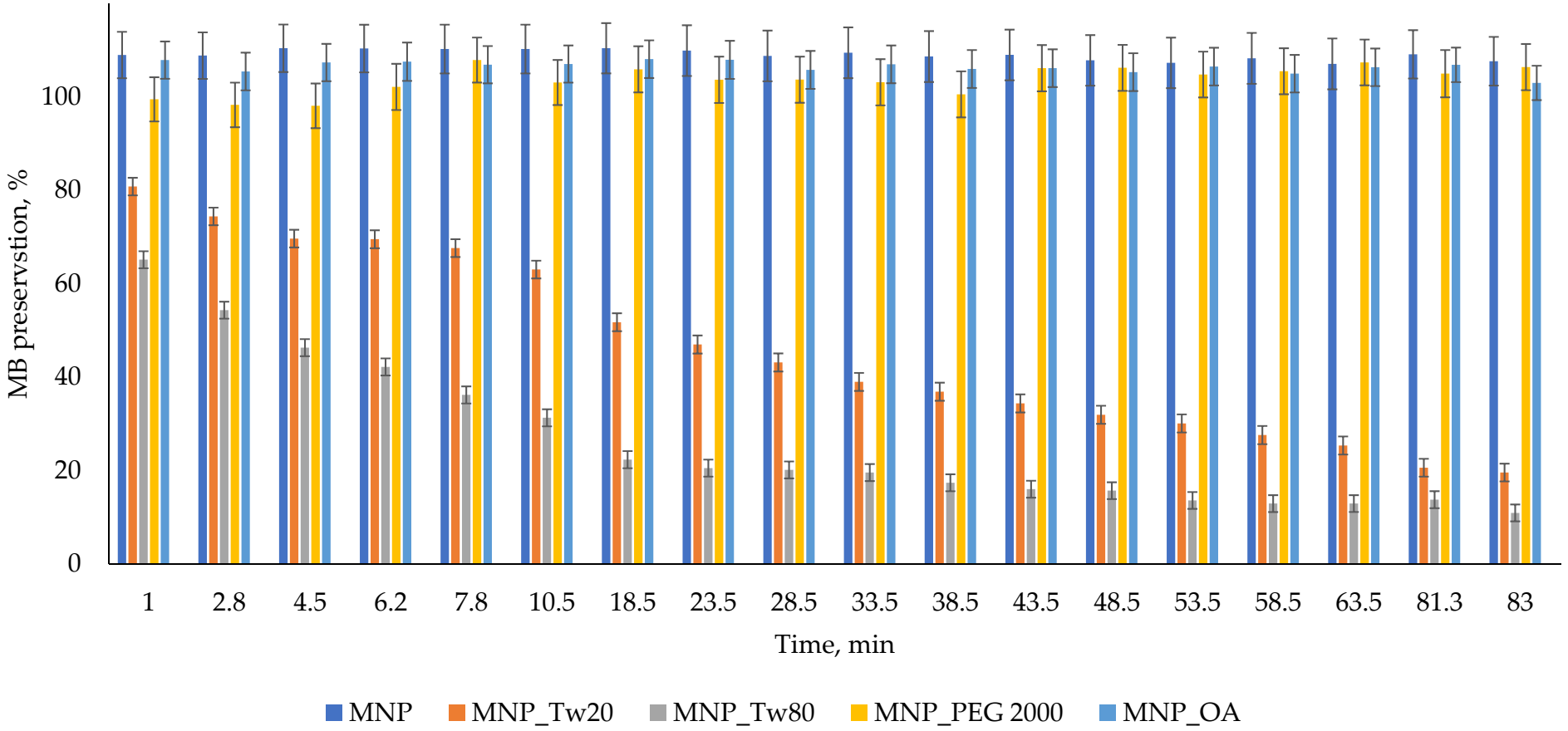

Figure S11. Methylene blue (MB) discoloration assay using H_2O_2 as an oxidizing agent. The MB preservation % was calculated from the absorbance decrease at 665 nm using a Clariostar plate reader (BMG Labtech, Germany). This graph shows the degradation of MB for all types of nanoparticles at a concentration of 75 µg/ml over the entire period. The percentage of dye binding was subtracted from the percentage of degradation of MB in the reaction with MNP and H_2O_2.