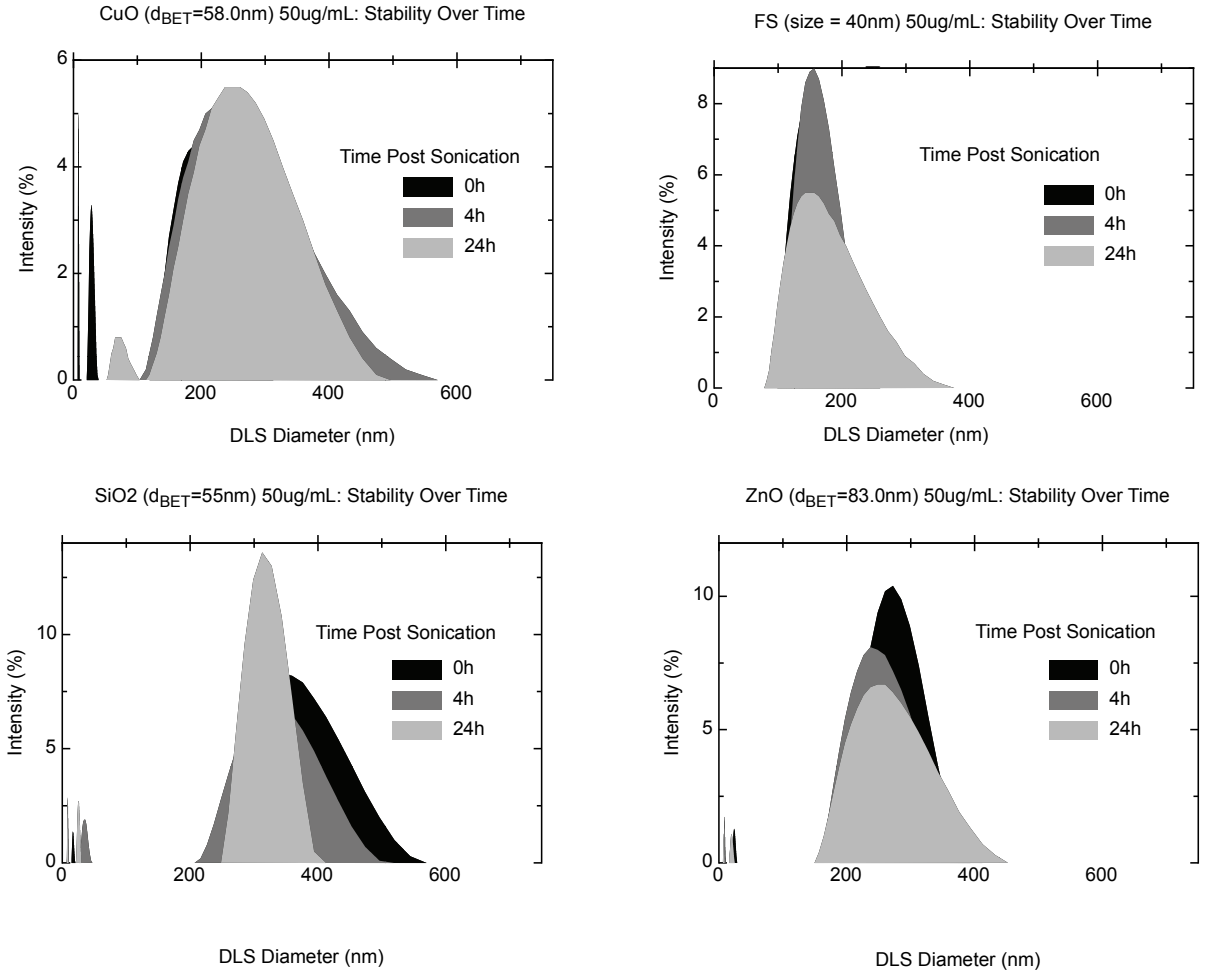
Supplement materials

Engineered nanoparticles impair wound healing of the human cornea

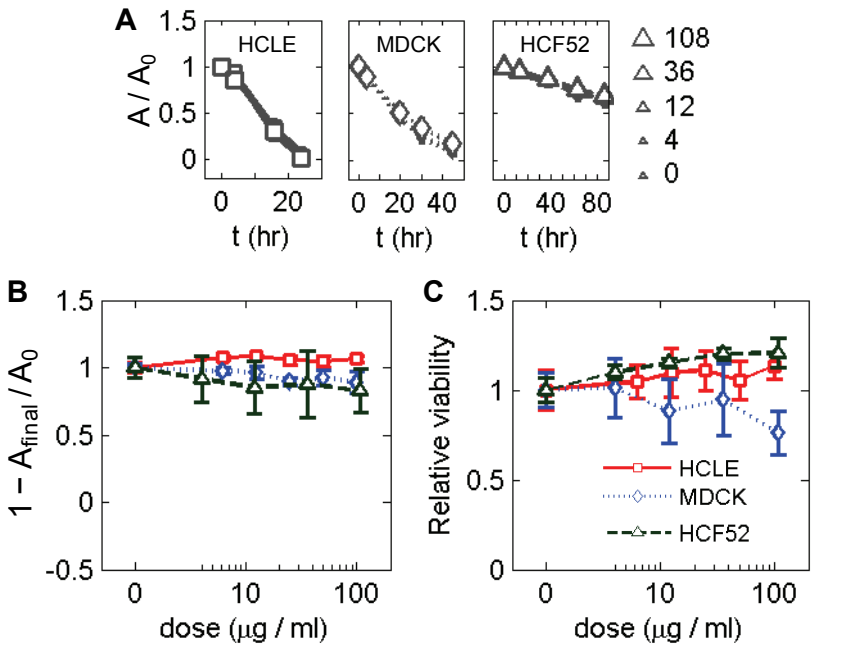
By Zhou et al.

Supplement Table 1. The dry powder properties for 4 ENPs. SSA: (specific surface area) by nitrogen adsorption/Brunauer-Emmett-Teller (BET) method. d_{BET} : particle diameter determined from SSA and particle density, ρ, as described in methods. d_{XRD} : particle diameter by X-ray diffraction.

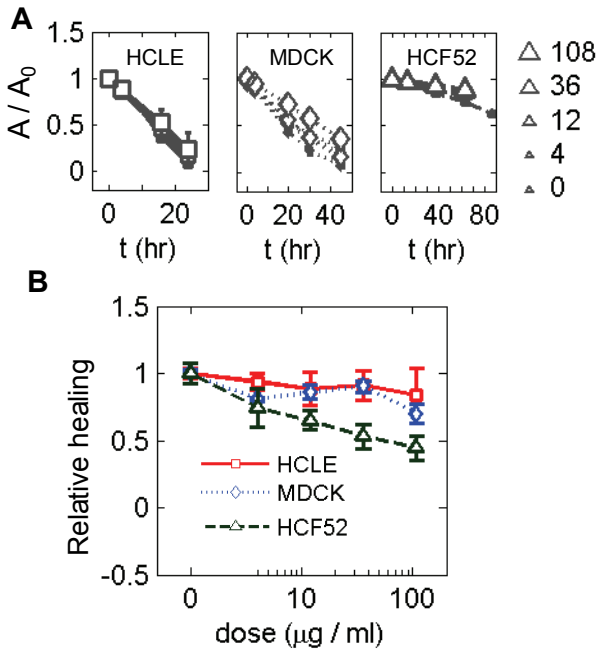
Material	SSA (m^2/g)	d_{BET} (nm)	d_{XRD} (nm)	ρ (g/cm^3)
EVONIK SiO_2	50	55	NA	2.2
Sigma Aldrich CuO	17.3	58.0	22	6.31
Alfa Aesar ZnO	13	83	66.8	5.606
EVONIK TiO_2	50	21	33	4.23



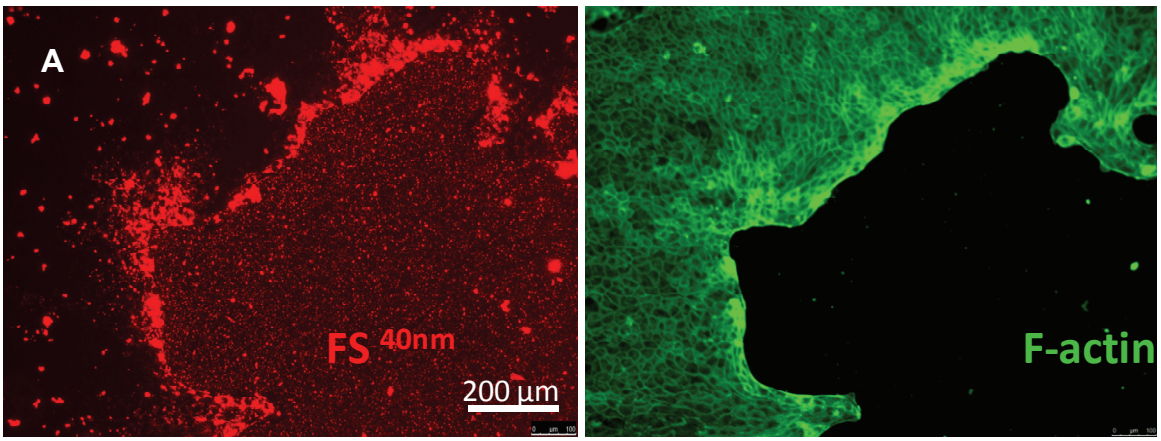
Supplement Fig. 1 Suspensions of CuO, SiO2, ZnO, and FS^{40nm} ENPs exhibited stable particle size over time.

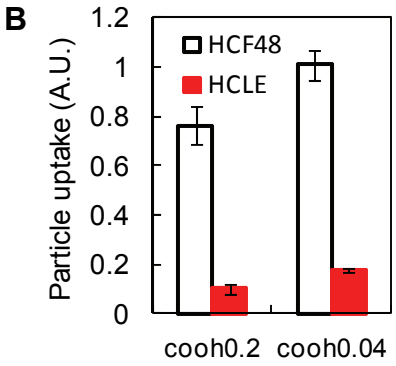


Supplement Fig. 2. SiO_2 ENPs exerted little impact on the wound healing rate (A, B) or the viability (C) of HCLE, MDCK and HCF52 cells. Mean ± 1.96 s.e.m. with n ≥ 6 wells from 2 experiments.

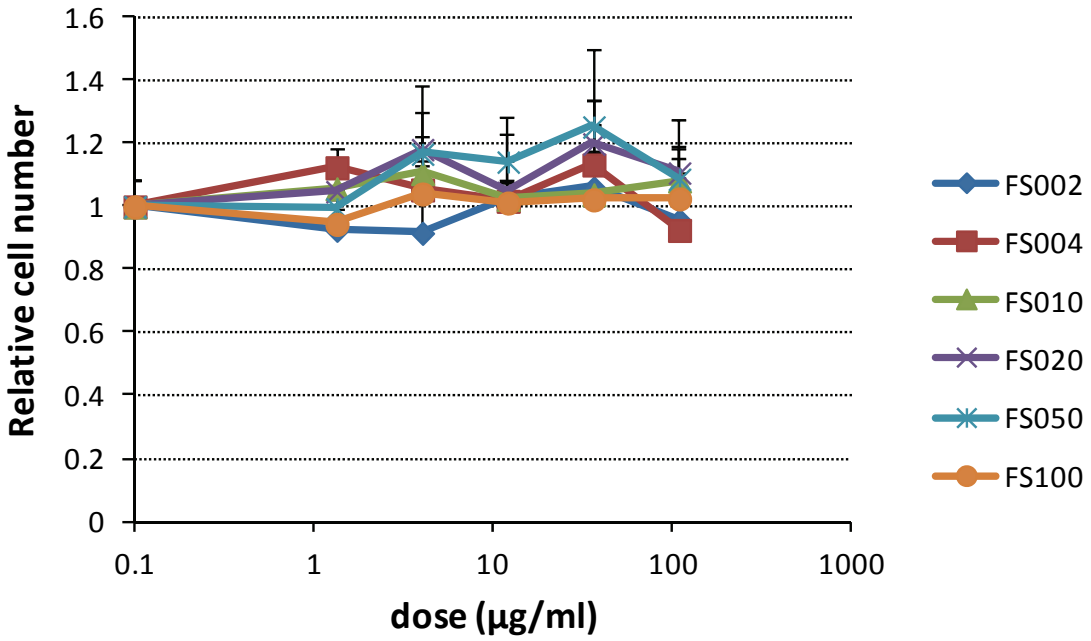


Supplement Fig. 3. Non-fluorescent, carboxylated polystyrene ENPs did not alter the wound healing rate of HCLE or MDCK cells but dose-dependently slowed down that of HCF52 cells. Mean ± 1.96 s.e.m. with n ≥ 6 wells from 2 experiments.

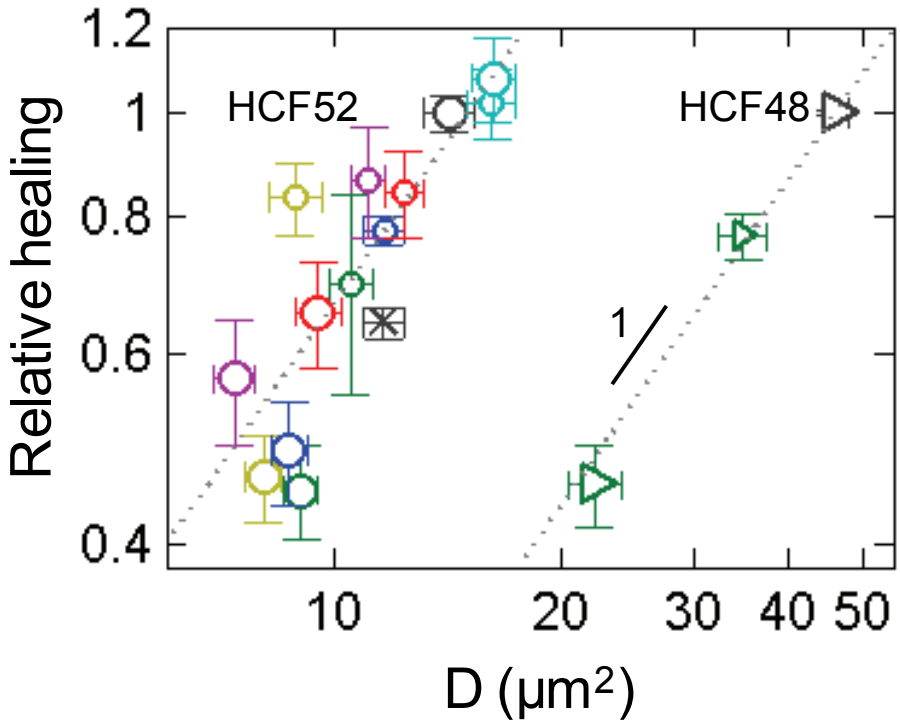




Supplement Fig. 4. (A) MDCK cells only took up FS^{40nm} at the wound edge. There was minimal particle deposition on the interior cells. Left: fluorescent particles; right: F-actin staing. (B) Particle uptake is higher for HCF48 cells than for HCLE cells. Confluent cells were treated for one day with 12 µg/ml of FS of two sizes, and then subjected to fixation before fluorescent particles are quantified using a plate reader. Compare these data with Fig. 3E, where cells were prepared identically except for receiving fixation/permeabilization. Mean ± 1.96 s.e.m.; non-overlapping error bars indicate statistically significant difference ($P < 0.05$); n = 6-12 wells from 2 experiments.



Supplement Fig. 5. Carboxylated Fluospheres do not impede cell proliferation. HCF cells were plated in a 96 well plate at 1600/w, treated with 4/3 to 108 µg/ml for two days, and counted using the cyquant assay following manufacturer's instruction. Mean ± SD; n = 4 wells from 2 experiments.



Supplement Fig. 6. The wound healing rate relative to control is proportional to cell speed, *D*. The fitted lines have a power-law slope of about 1 in a log-log plot. For HCF52, y = (0.066±0.005) * x and for HCF48, y = (0.022±0.002) * x; 95% confidence interval is reported here.