

Supplementary Information for

Enhancement of cell membrane permeability by using charged nanoparticles and a weak external electric field

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A. Supplementary Tables

Table S1 NP concentration per unit area of membrane and surface coverage of NP on the membrane surface. The concentration and surface coverage were estimated if all the NPs adhered to the inner surface of the aqueous droplet in the well. The surface coverage was estimated by assuming that the inner surface of the aqueous droplet was covered with NPs in a close-packed single layer.

NP concentration [particles/ μL]	NP concentration [mg-NP/ μm^2 -aqueous droplet]	Surface coverage of NPs [%]
1.0×10^9	3.8×10^{-11}	502
1.0×10^8	3.8×10^{-12}	50.2
1.0×10^6	3.8×10^{-14}	0.502

Table S2 (a) NP concentrations used in this study and (b) safe doses reported in cytotoxicity tests. Safe dose data were extracted from literatures using the same amine-PSL-NPs (Sigma Aldrich, L0780) as in this study. The NP concentration and safe dose were standardized by mass of NPs per unit surface area of aqueous droplet or cell.

a			
NP concentration [mg-NP/ μm^2 -aqueous droplet]			
Present study	3.8×10^{-14} to 3.8×10^{-11}		

b			
Reference	Safe dose [mg-NP/ μm^2 -cell]	Cell type	Note
1	6.3×10^{-11}	Hela cell	·Cell concentration was estimated to be 5×10^4 cells/mL ·Cell surface area was assumed to be $1600 \mu\text{m}^2$ ⁴
1	9.0×10^{-11}	3T3 fibroblast cell	·Cell concentration was estimated to be 5×10^4 cells/mL ·Cell surface area was assumed to be $1110 \mu\text{m}^2$ ⁵
2, 3	1.2×10^{-9}	Yeast	·Cell surface area was assumed to be $134 \mu\text{m}^2$ ⁶

B. Supplementary References

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