Electronic Supporting Information

Facile and scalable fabrication of exosome-mimicking nanovesicles through PEGylated lipid detergent-aided cell extrusion

Jeong Yi Kang [a], Bo Kyeong Yoon [c], Hwira Baek [a], Yuri Ko [a], Suk Ho Bhang [a], Joshua A. Jackman [b,*], Jin Woong Kim [a,*]

[a] School of Chemical Engineering, Sungkyunkwan University, Suwon 16149, Republic of Korea.

[b] School of Chemical Engineering and Translational Nanobioscience Research Center, Sungkyunkwan University, Suwon 16419, Republic of Korea.

[c] School of Healthcare and Biomedical Engineering, Chonnam National University, Yeosu 59626, Republic of Korea

*Corresponding Author

Prof. Joshua A. Jackman; Tel: +82 31 290 7243; E-mail: jjackman@skku.edu

Prof. Jin Woong Kim; Tel: +82 31 290 7346; E-mail: jinwoongkim@skku.edu

Supplementary information

Cytotoxicity measurements: Cell viability was measured using an EZ-Cytox kit (EZ-3000, Dogen, Korea). Human HaCaT cells were dispersed in 100 µL of Dulbecco's modified Eagle medium (DMEM) (4 mM of L-glutamine, 4500 mg/mL of glucose, 90% sodium pyruvate, 10% heat-inactivated fetal bovine serum, and 1% penicillin–streptomycin) in a 96-well plate. HaCaT cells were then incubated overnight at 37 °C under 5% CO_2 in an incubator. After removing the cell media, the exosome-mimicking nanovesicles (ENVs) were added to each well at different compound concentrations. Then, 100 µL of EZ-Cytox and the DMEM mixture were added to the wells. The plate was incubated for an additional 24 h, and the absorbance was measured at 450 nm using a microplate reader (Spark, Tecan, Switzerland).

Supplementary data

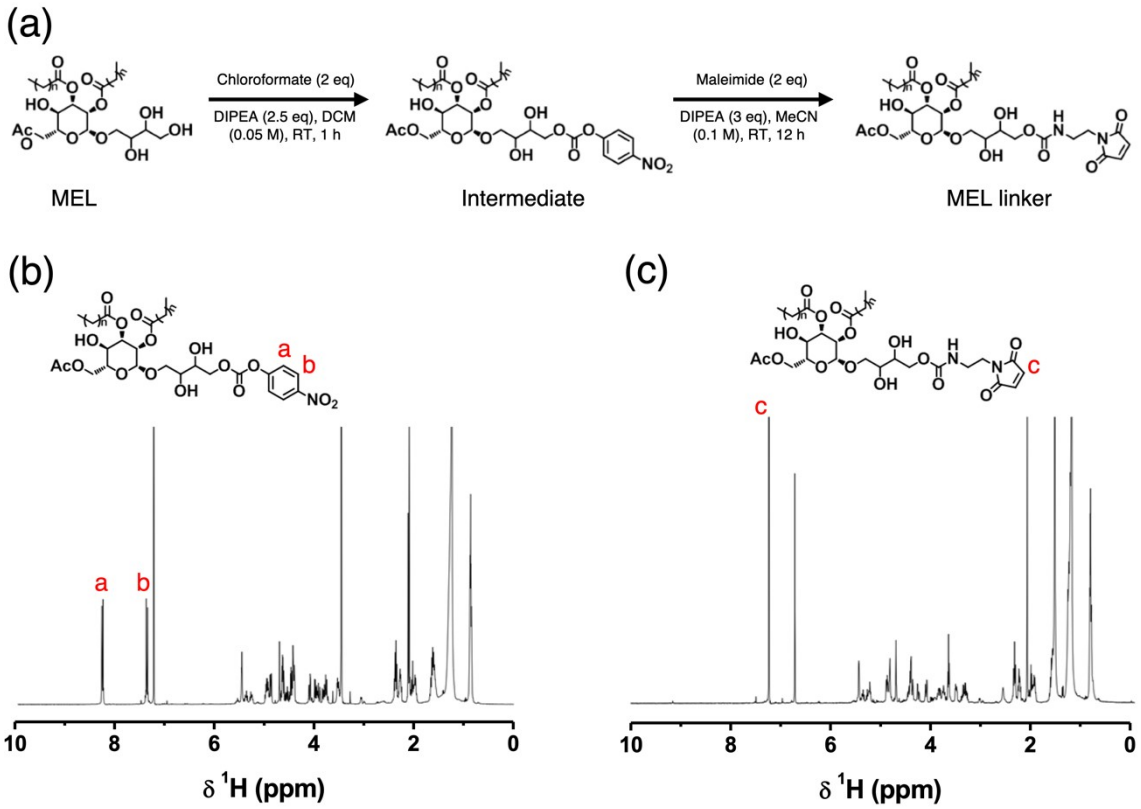

Fig. S1 (a) Synthesis of a mannosylerythritol lipid (MEL)-based polyethylene glycol (PEG) linker. ^{1}H NMR spectra (b) before and (c) after incorporation of maleimide linker to MEL.

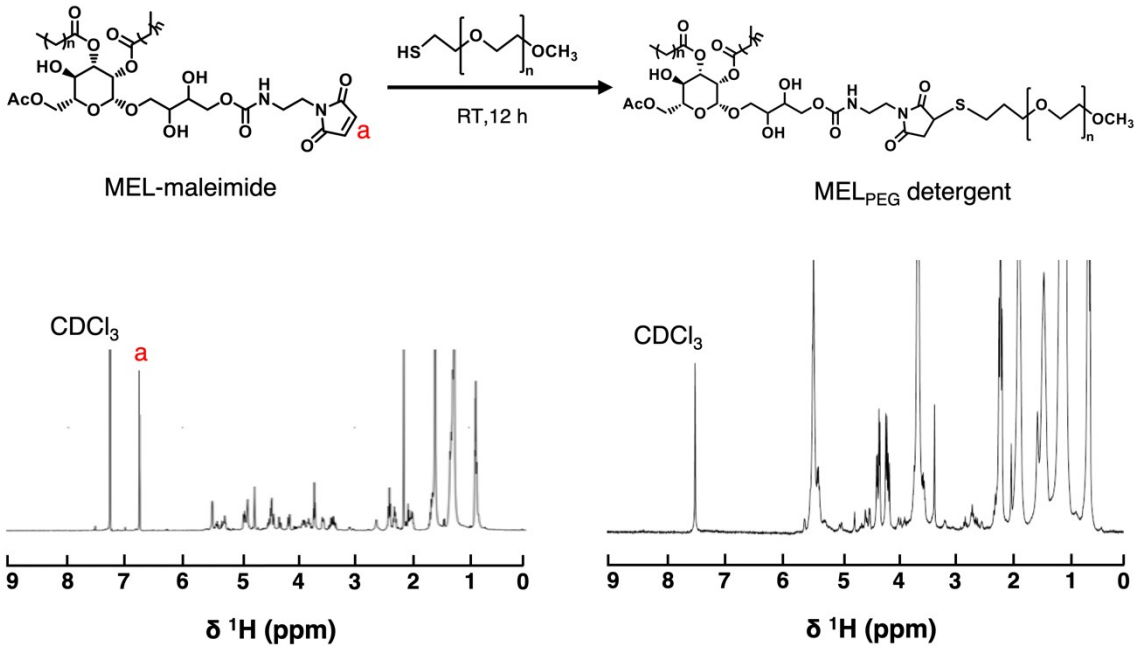

Fig. S2 Chemical structure and analysis of ^{1}H NMR spectra of (a) MEL linker and (b) MEL$_{PEG112}$. The NMR solvent system was conditioned with the mixture of dimethylsulfoxide (DMSO) and D_2O at a ratio of 5:3 (v/v).

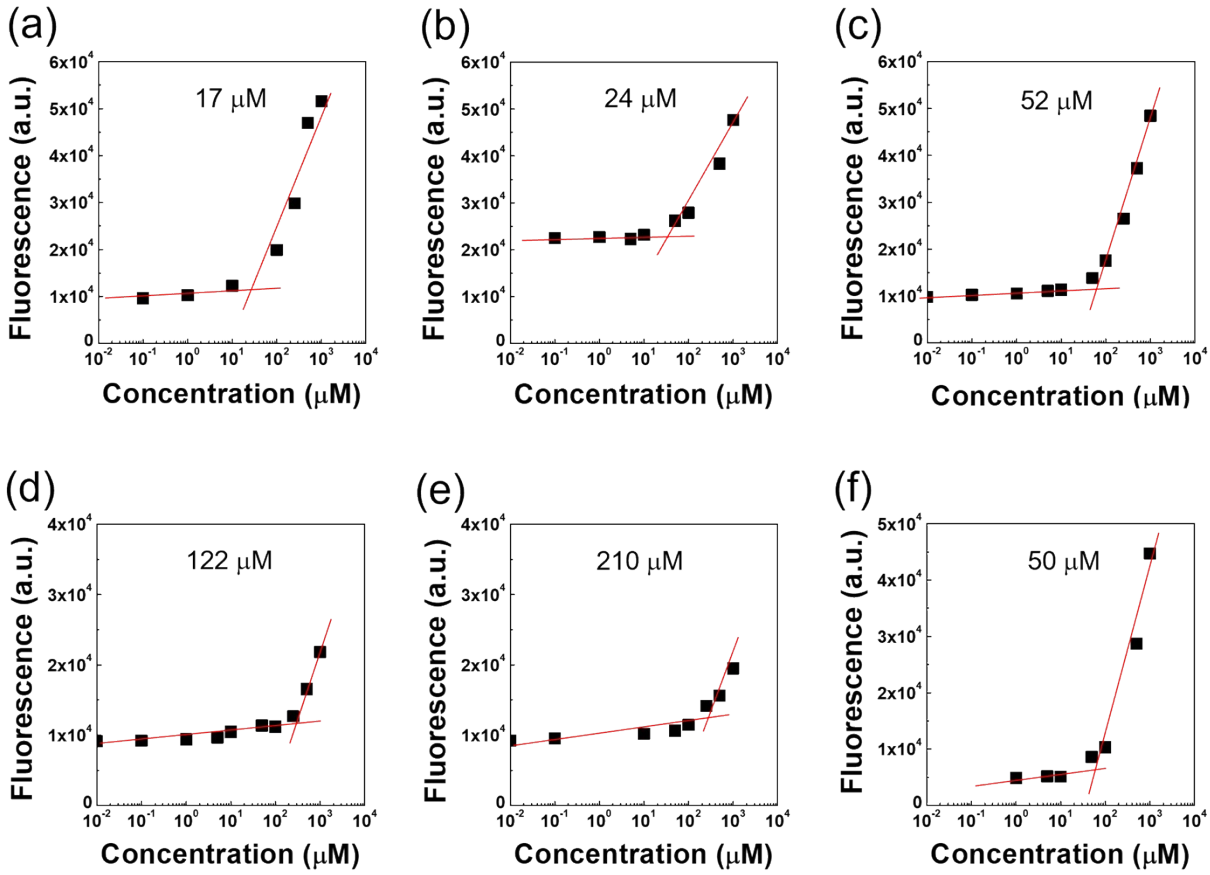

Fig. S3 Determination of critical micelle concentration (CMC) in water for (a) Tween 80, (b) MEL, (c) MEL_{PEG28}, (d) MEL_{PEG56}, and (e) MEL_{PEG112}, and in Tris buffer for (f) MEL_{PEG112}.

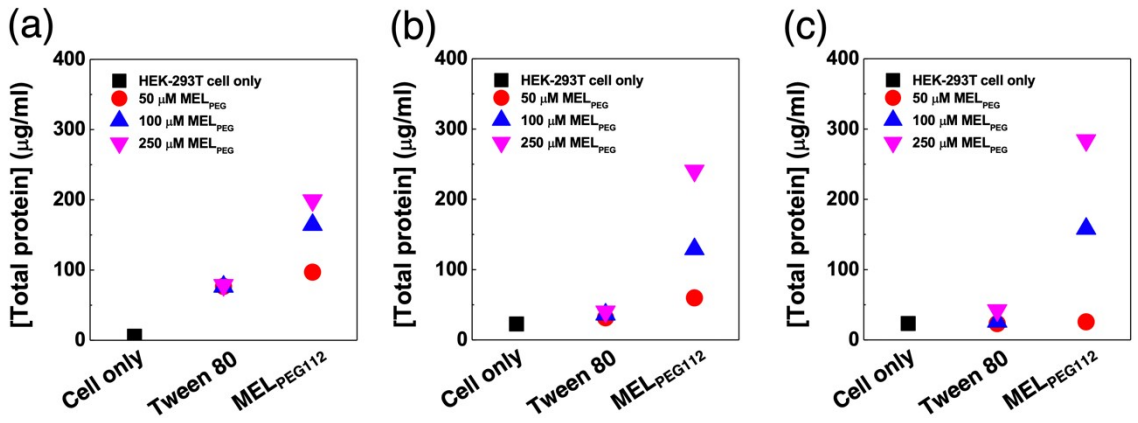

Fig. S4 Total protein concentration of ENVs derived from HEK-293T at different cell densities: (a) 50,000 cells/mL, (b) 100,000 cells/mL, and (c) 250,000 cells/mL.

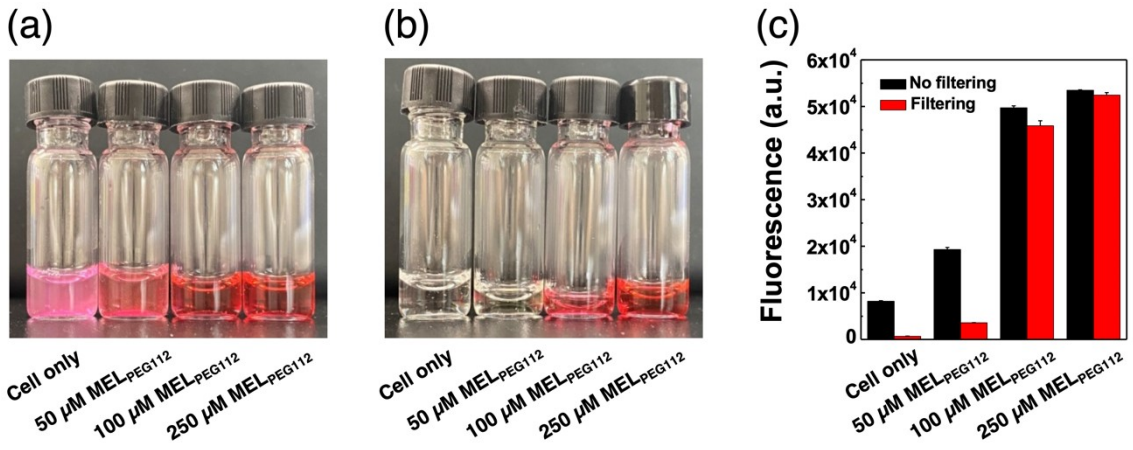

Fig. S5 Cy3-conjugated ENVs with different concentrations of MEL_{PEG112} (a) before and (b) after syringe filtration. (c) Fluorescence intensity of ENVs before and after syringe filtration.