

Electronic supplementary information

PEGylation of silver nanoparticles by physisorption of cyclic poly(ethylene glycol) for enhanced dispersion stability, antimicrobial activity, and cytotoxicity

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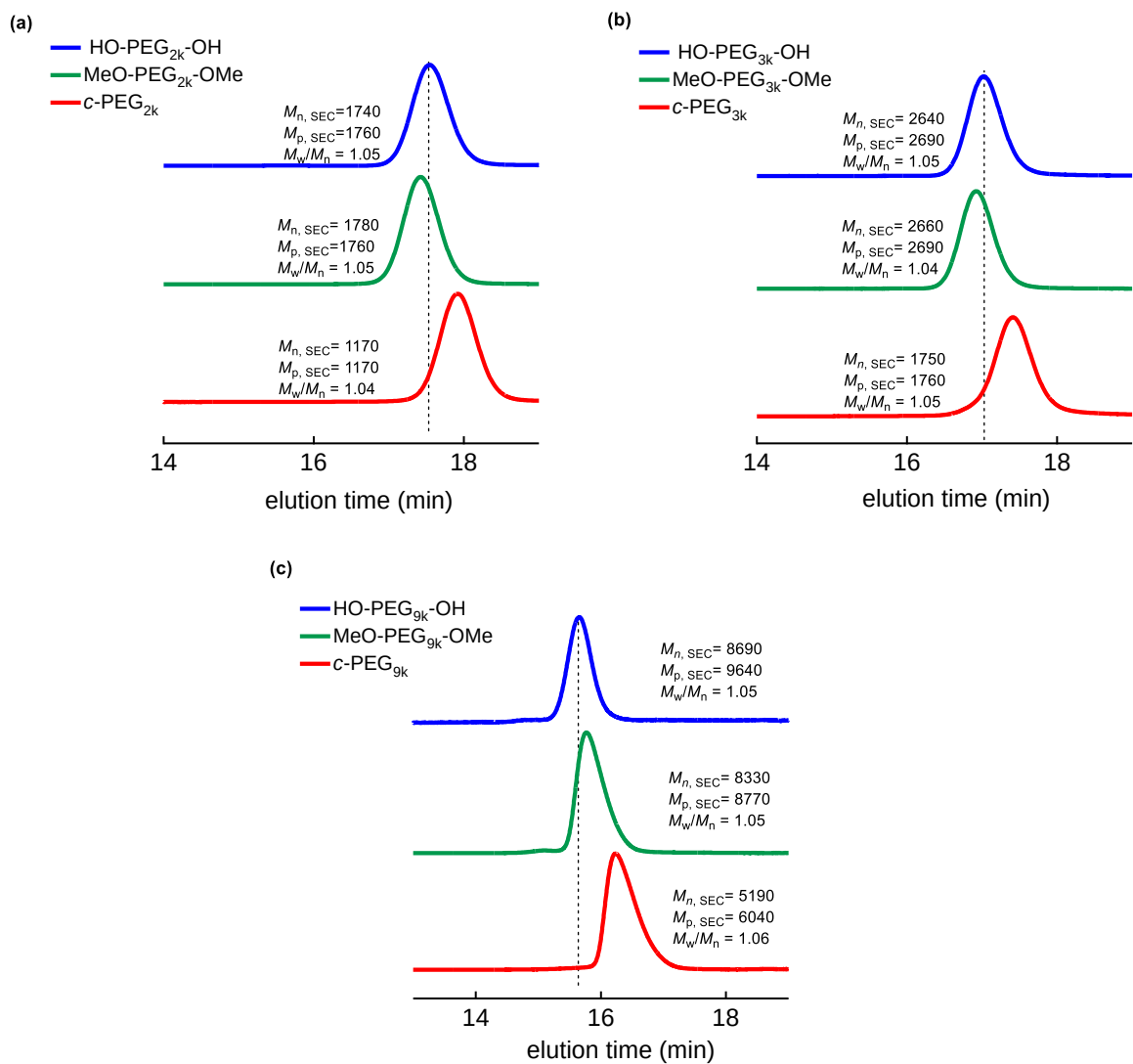


Fig. S1 SEC traces of HO-PEG-OH (blue), MeO-PEG-OMe (green) and c-PEG (red) with a molecular weight of (a) 2, (b) 3, and (c) 9 kDa.

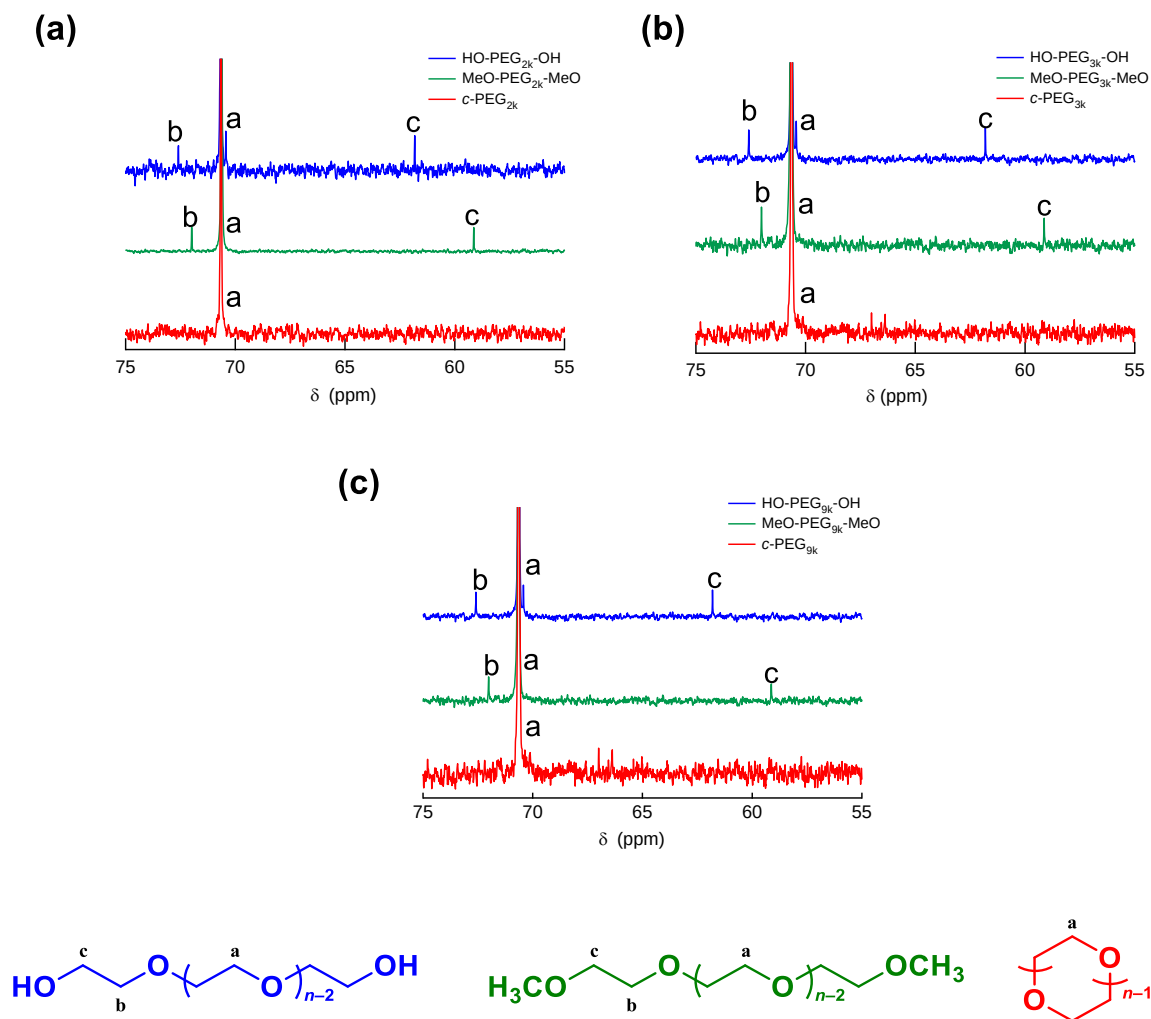


Fig. S2 ^{13}C NMR spectra of HO-PEG-OH (blue), MeO-PEG-OMe (green), and c-PEG (red) with a molecular weight of (a) 2, (b) 3, and (c) 9 kDa.

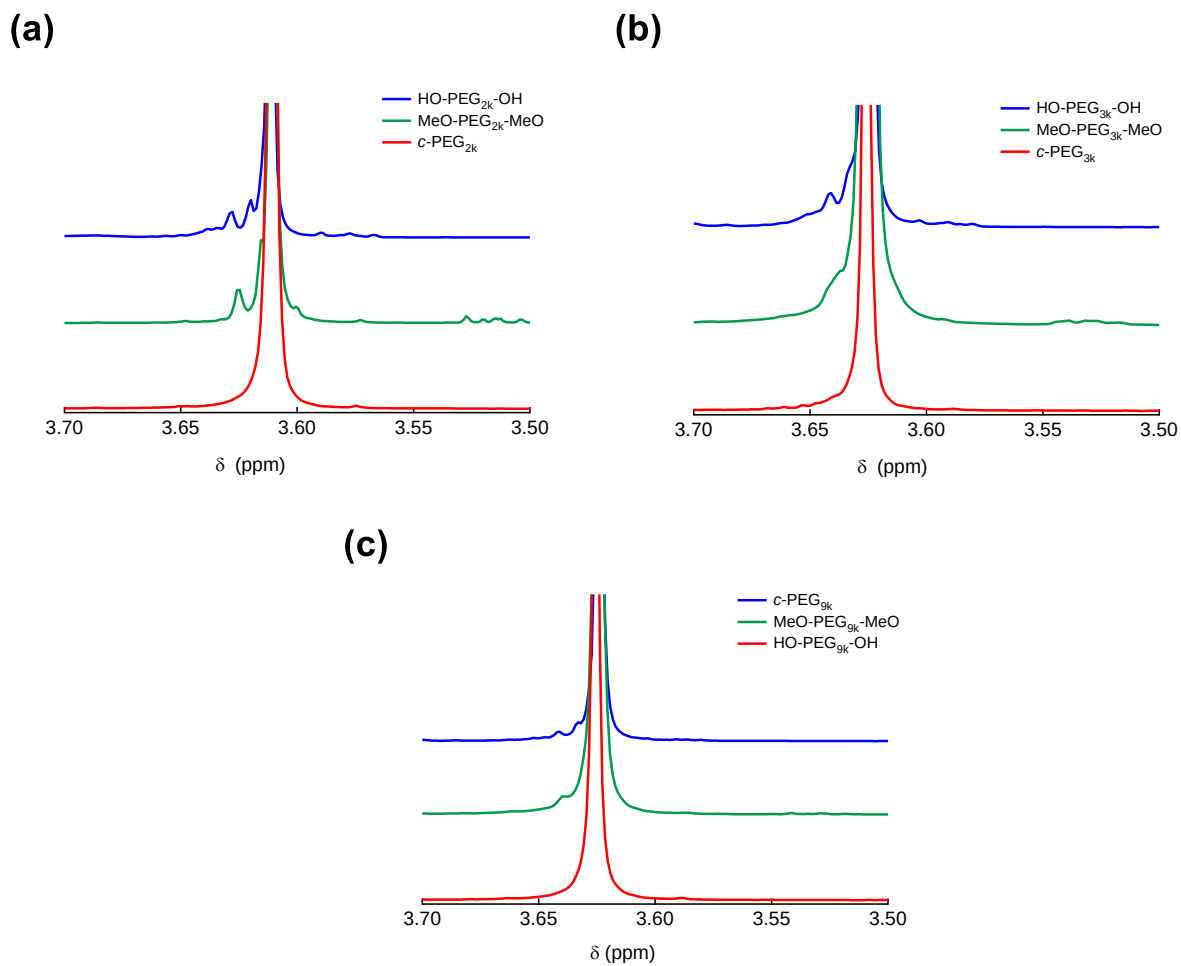
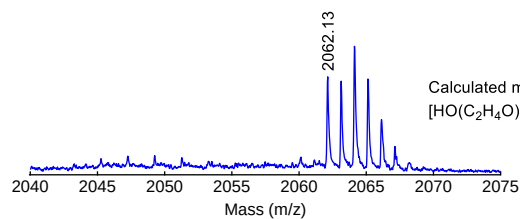
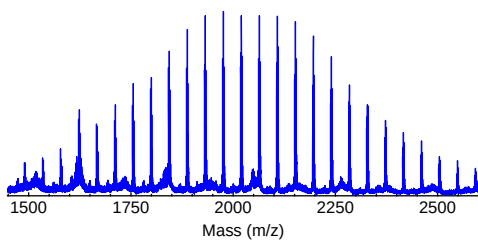
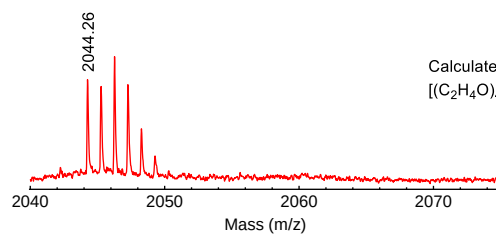
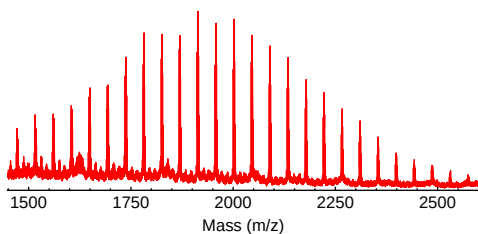


Fig. S3 ^1H NMR spectra of HO-PEG-OH (blue), MeO-PEG-OMe (green), and *c*-PEG (red) with a molecular weight of (a) 2, (b) 3, and (c) 9 kDa.

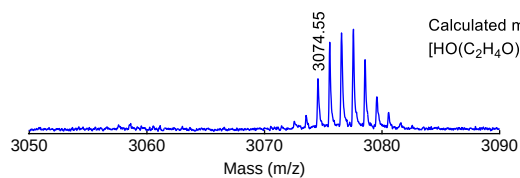
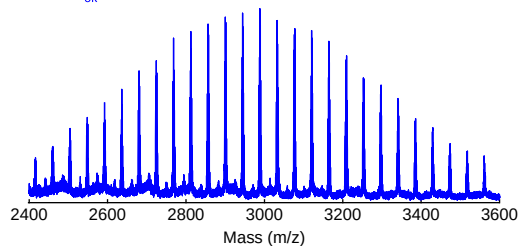
HO-PEG_{2k}-OH



c-PEG_{2k}



HO-PEG_{3k}-OH



c-PEG_{3k}

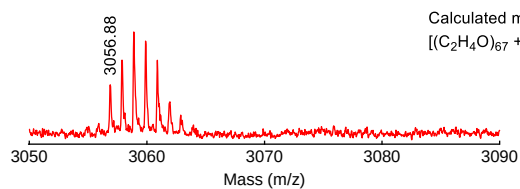
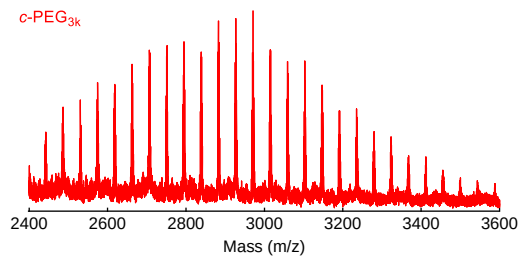


Fig. S4 MALDI-TOF mass spectra of HO-PEG-OH (blue) and *c*-PEG (red) with a molecular weight of (a) 2 and (b) 3kDa.

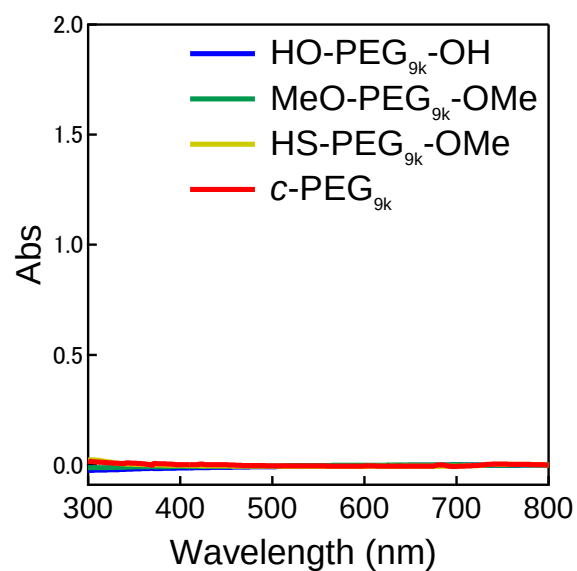


Fig. S5 UV-Vis spectra of HO-PEG_{9k}-OH (blue), MeO-PEG_{9k}-OMe (green), HS-PEG_{9k}-OMe (yellow), and *c*-PEG_{9k} (red).

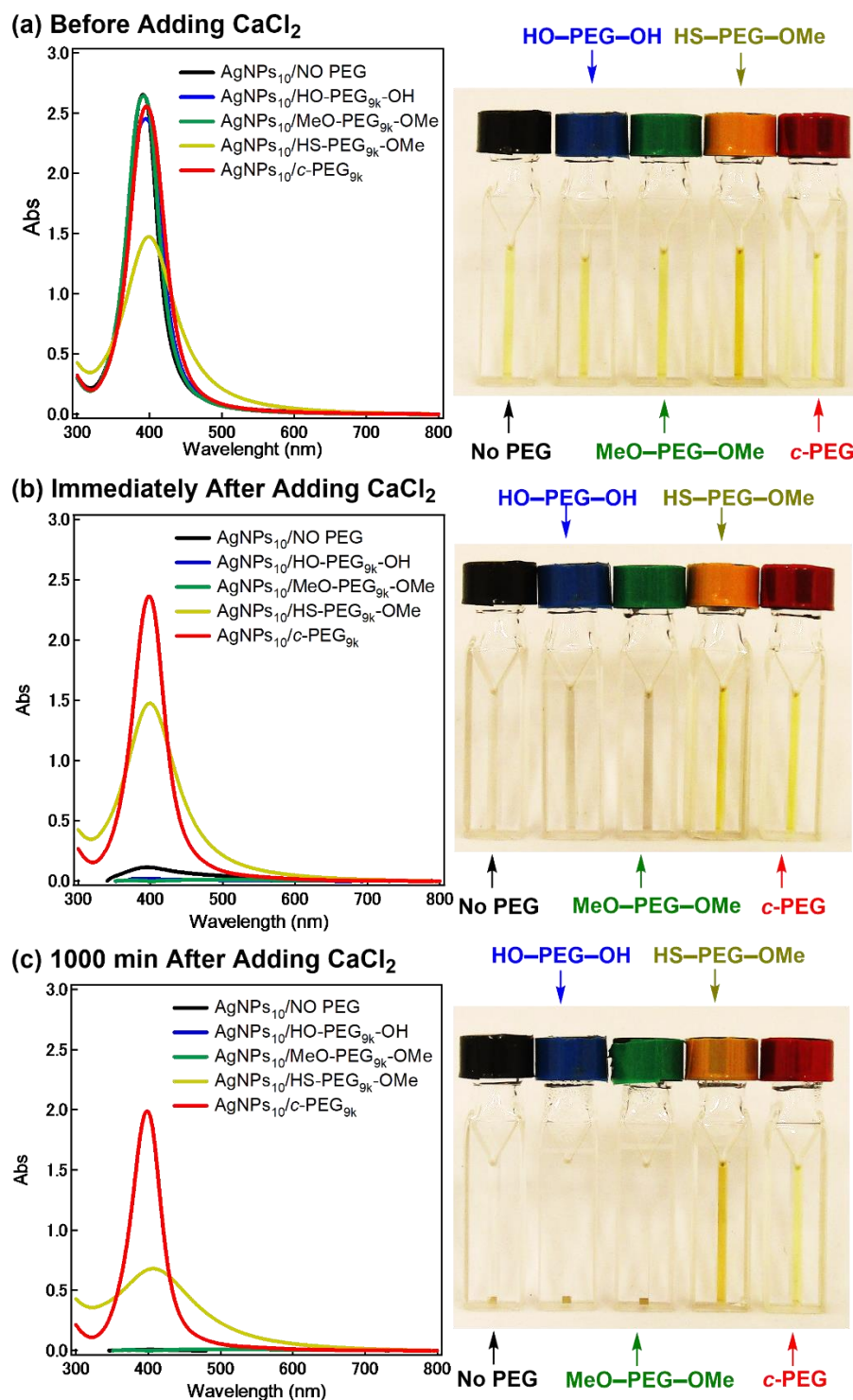


Fig. S6 Stability test of AgNPs/PEG against CaCl_2 . UV-Vis spectra and photographs of $\text{AgNPs}_{10}/\text{No PEG}$ (black), $\text{AgNPs}_{10}/\text{HO-PEG}_{9k}\text{-OH}$ (blue), $\text{AgNPs}_{10}/\text{MeO-PEG}_{9k}\text{-OMe}$ (green), $\text{AgNPs}_{10}/\text{HS-PEG}_{9k}\text{-OMe}$ (yellow/orange), and $\text{AgNPs}_{10}/\text{c-PEG}_{9k}$ (red) with a PEG concentration of 0.25 wt% (a) before (b) immediately after and (c) 1000 min after the addition of a concentrated CaCl_2 solution. The resulting dispersions had 10 mM of CaCl_2 .

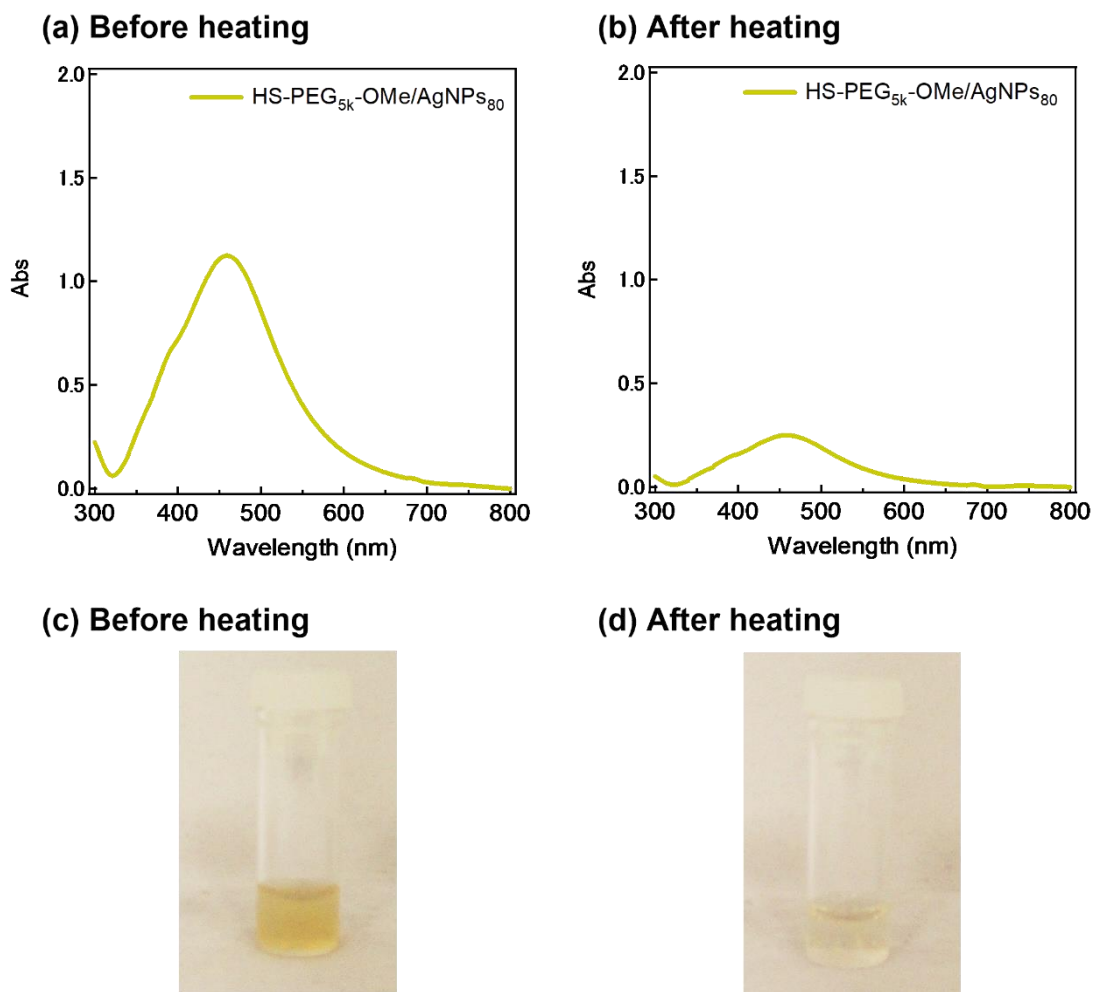


Fig. S7 Stability test of commercial AgNPs₈₀/HS-PEG_{5k}-OMe against heating. UV-Vis spectra of AgNPs₈₀/HS-PEG_{5k}-OMe (a) before heating and (b) after heating at 95 °C for 4 h. Photographs of AgNPs₈₀/HS-PEG_{5k}-OMe (c) before heating and (d) after heating at 95 °C for 4 h.

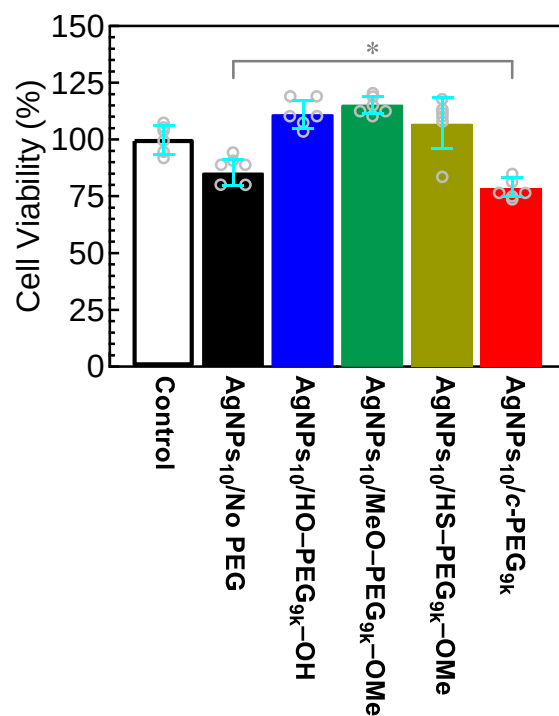


Fig. S8 Cell viability for AgNPs₁₀/No PEG, AgNPs₁₀/HO-PEG_{9k}-OH, AgNPs₁₀/MeO-PEG_{9k}-OMe, AgNPs₁₀/HS-PEG_{9k}-OMe, and AgNPs₁₀/c-PEG_{9k}. Data represent mean ± s.e. from measurements of six wells. * $p < 0.05$.

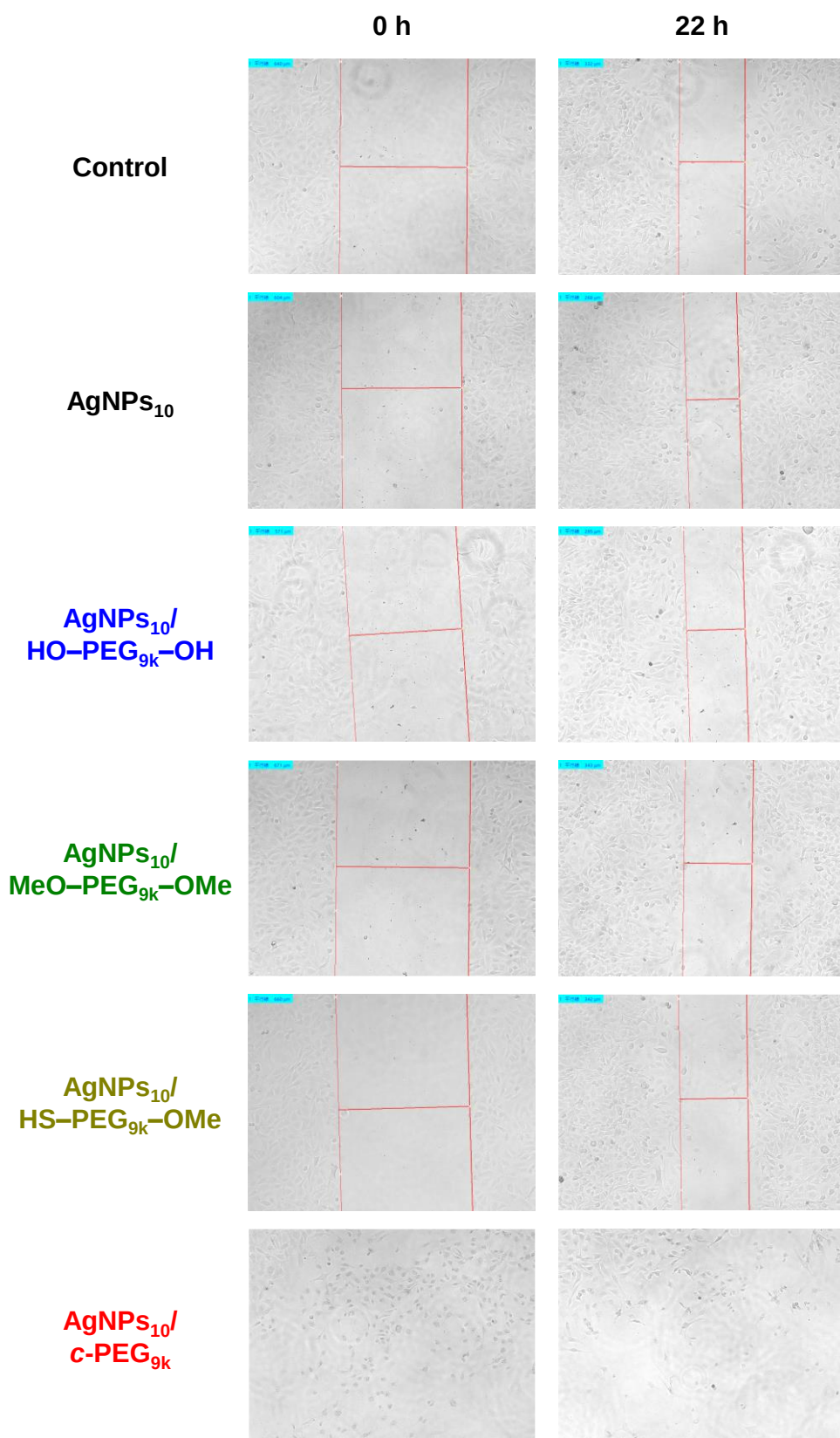


Fig. S9 Scratch assay test for AgNPs₁₀/No PEG, AgNPs₁₀/HO-PEG_{9k}-OH, AgNPs₁₀/MeO-PEG_{9k}-OMe, AgNPs₁₀/HS-PEG_{9k}-OMe, and AgNPs₁₀/c-PEG_{9k}. The pictures were taken at 0 and 22 h after scratching. Migration of the cells into the scratched area was observed in all the specimens except for AgNPs₁₀/c-PEG_{9k}. Most of the cells in AgNPs₁₀/c-PEG_{9k} were stripped from the plate upon scratching.