Electronic Supplementary Material (ESI)

Table S-1. Information of Ag NP based on the one provided by the manufacture.

	5 nm	20 nm	20 nm (PVP)	50 nm
Surface coating	Citrate	Citrate	Polyvinylpyrrolidone (40 kDa)	Citrate
Diameter (TEM)	4.7 ± 1 nm	19 ± 3 nm	20 ± 3 nm	48 ± 5 nm
Hydrodynamic diameter (DLS)	Not reported	25 nm	41 nm	48 nm
Particle number (5 μg mL^{-1})	9.5×10^{12}	1.5×10^{11}	1.3×10^{11}	7.5×10^{9}
Zeta potential	Not reported	-43 mV	-32 mV	-47 mV

Table S-2. Operational parameters of the ICP-MS instruments.

	For imaging
	TOFWERK
Mass spectrometer	Time of flight
RF plasma source power	1400 W
Plasma gas flow rate	15 L min^{-1} Ar
Auxiliary gas flow rate	0.9 L min^{-1} Ar
Material of cone	Nickel
Mass resolution ($m/\Delta m$)	6,000($m/\Delta m$, *Full width half maximum: FWHM*)
Spectral averaging time	20 ms
Make-up gas flow rate	1.1 L min^{-1} Ar
Carrier gas flow rate (LA)	0.60 L min^{-1} He

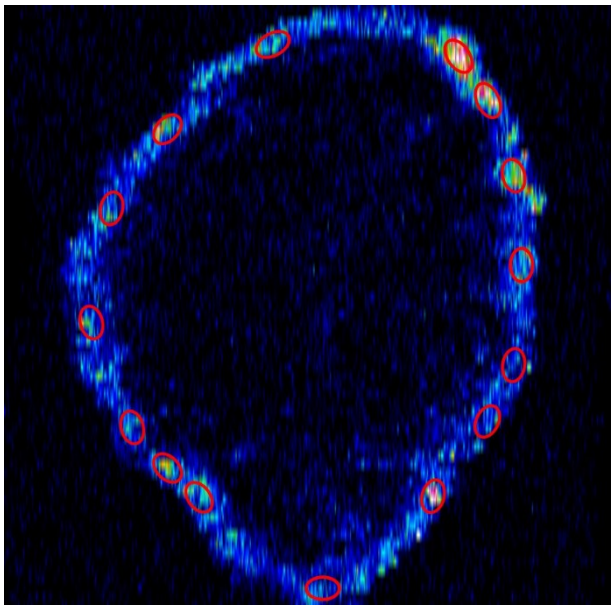

Figure S-1. Schematic illustration of 15 areas of interest with red circles on the Ag image of the sample treated with Ag NP (ø 5 nm, citrate) for 48 hours, which is shown as an example.

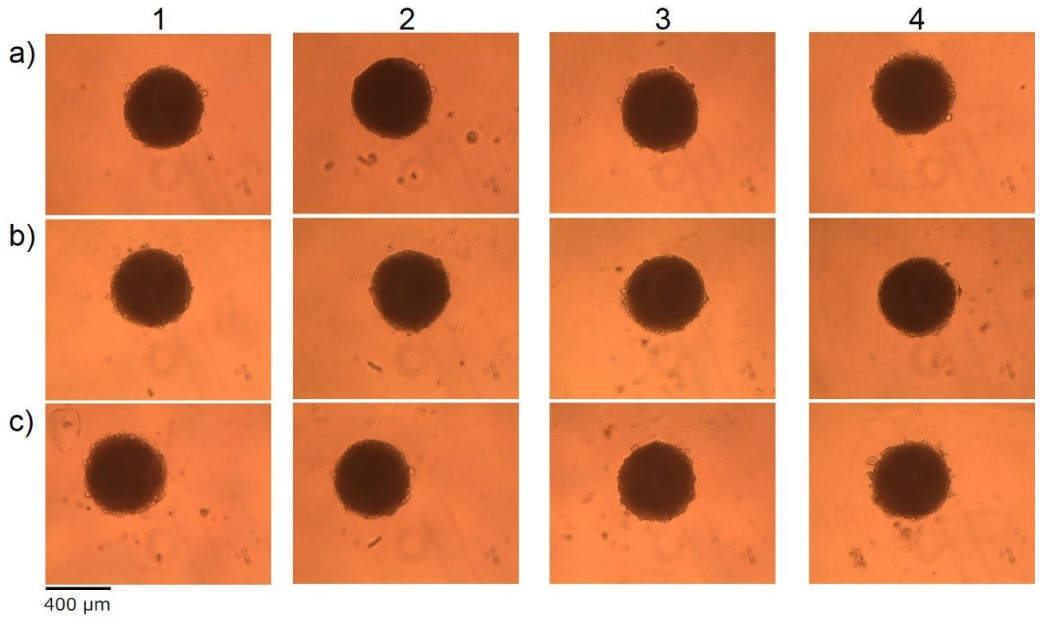

Figure S-2. Optical photos of MCS treated with each Ag NP (1: Ag NP (ø 5 nm, citrate), 2: Ag NP (ø 20 nm, citrate), 3: Ag NP (ø 20 nm, PVP), 4: Ag NP (ø 50 nm, citrate). a), b) and c) show the results after 0.5, 24 and 48 hours, respectively.

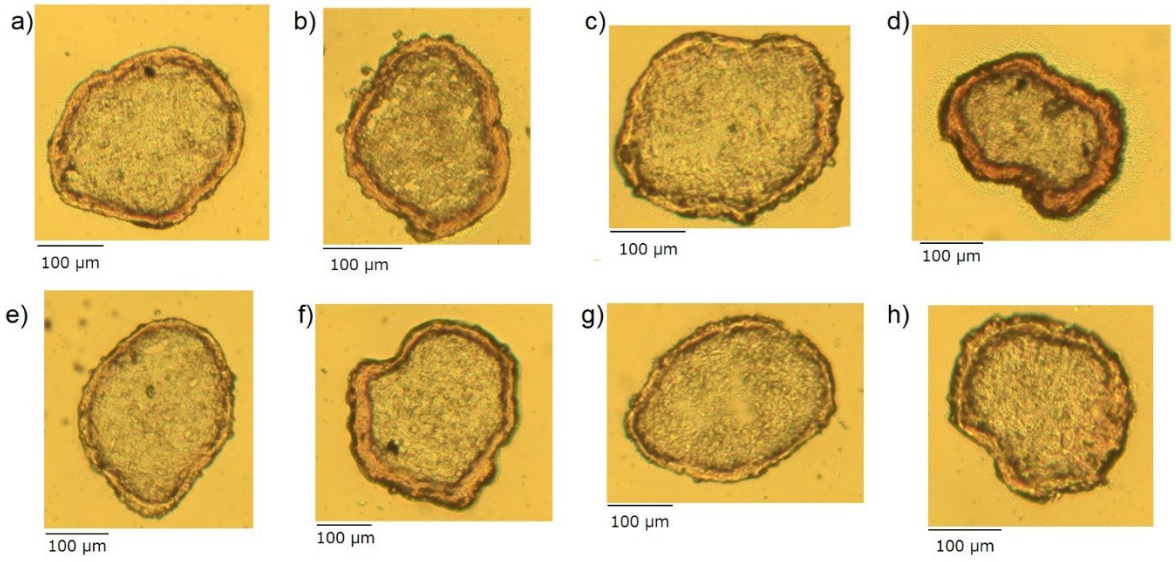

Figure S-3. Optical photographs in thin sections of fibroblast MCSs. Samples incubated for 24 h with Ag NPs with diameters of 5 nm (citrate) (a), 20 nm (citrate) (b), 20 nm (PVP) (c), and 50 nm (citrate) (d). Samples incubated for 48 h with Ag NPs with diameters of 5 nm (citrate) (e), 20 nm (citrate) (f), 20 nm (PVP) (g), and 50 nm (citrate) (h).

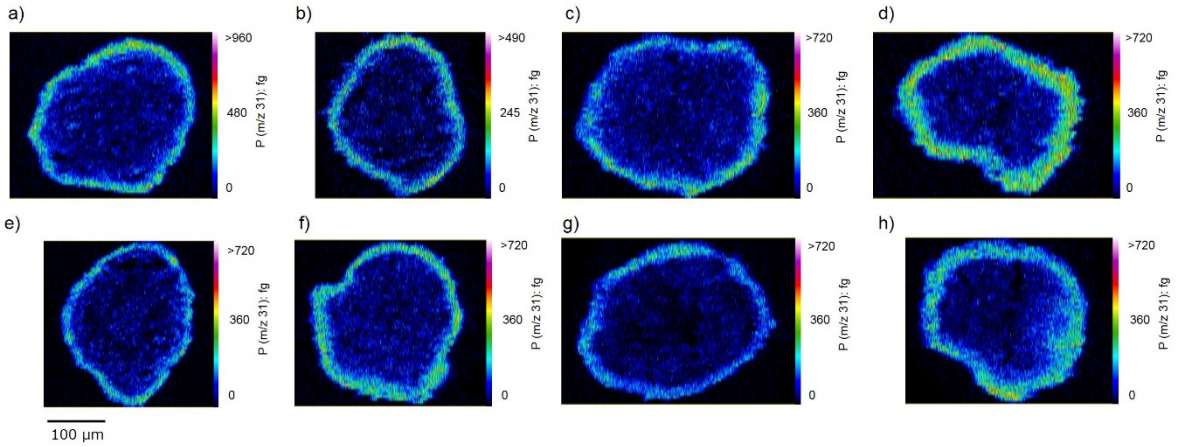

Figure S-4. Images of the P concentrations in thin sections of fibroblast MCSs. Samples incubated for 24 h with Ag NPs with diameters of 5 nm (citrate) (a), 20 nm (citrate) (b), 20 nm (PVP) (c), and 50 nm (citrate) (d). Samples incubated for 48 h with Ag NPs with diameters of 5 nm (citrate) (e), 20 nm (citrate) (f), 20 nm (PVP) (g), and 50 nm (citrate) (h).

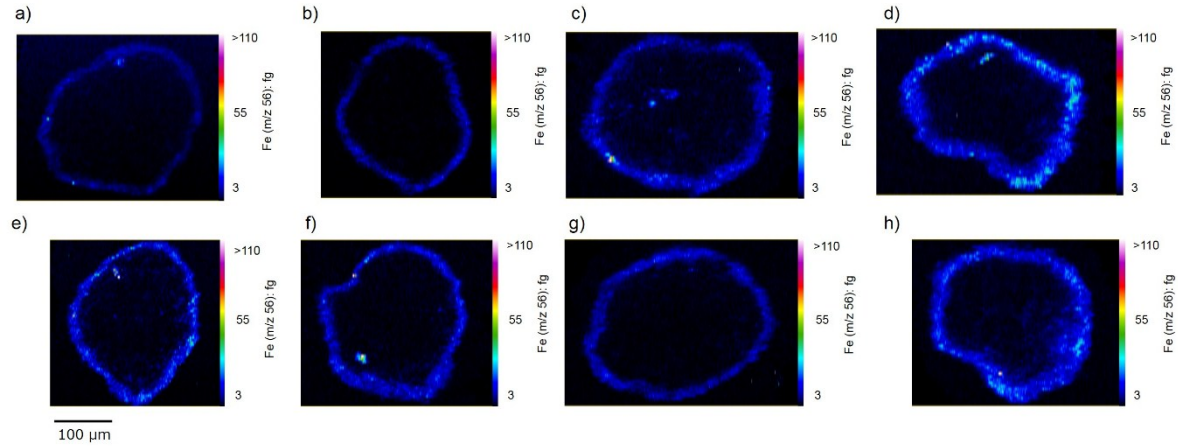

Figure S-5. Images of the Fe concentrations in thin sections of fibroblast MCSs. Samples incubated for 24 h with Ag NPs with diameters of 5 nm (citrate) (a), 20 nm (citrate) (b), 20 nm (PVP) (c), and 50 nm (citrate) (d). Samples incubated for 48 h with Ag NPs with diameters of 5 nm (citrate) (e), 20 nm (citrate) (f), 20 nm (PVP) (g), and 50 nm (citrate) (h).

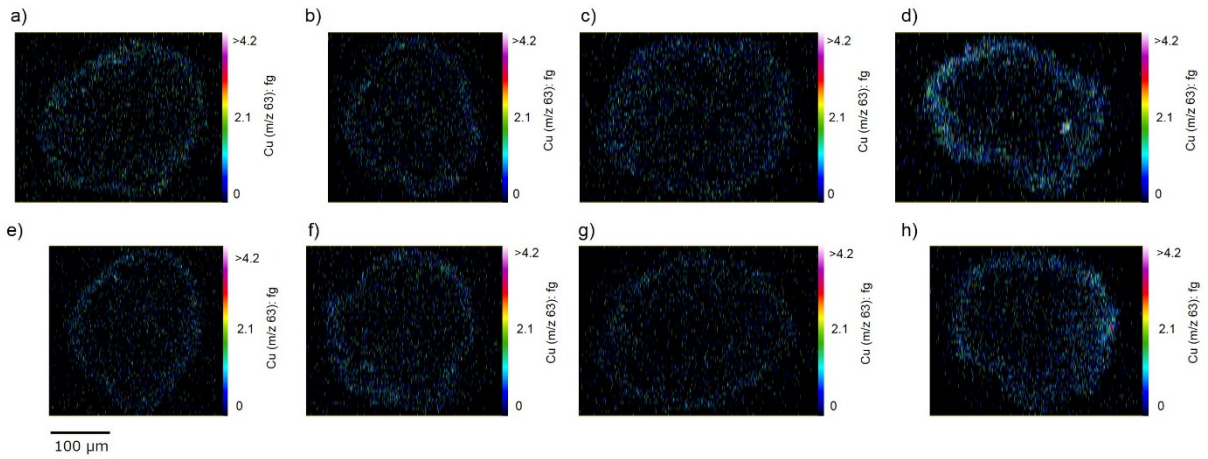

Figure S-6. Images of the Cu concentrations in thin sections of fibroblast MCSs. Samples incubated for 24 h with Ag NPs with diameters of 5 nm (citrate) (a), 20 nm (citrate) (b), 20 nm (PVP) (c), and 50 nm (citrate) (d). Samples incubated for 48 h with Ag NPs with diameters of 5 nm (citrate) (e), 20 nm (citrate) (f), 20 nm (PVP) (g), and 50 nm (citrate) (h).

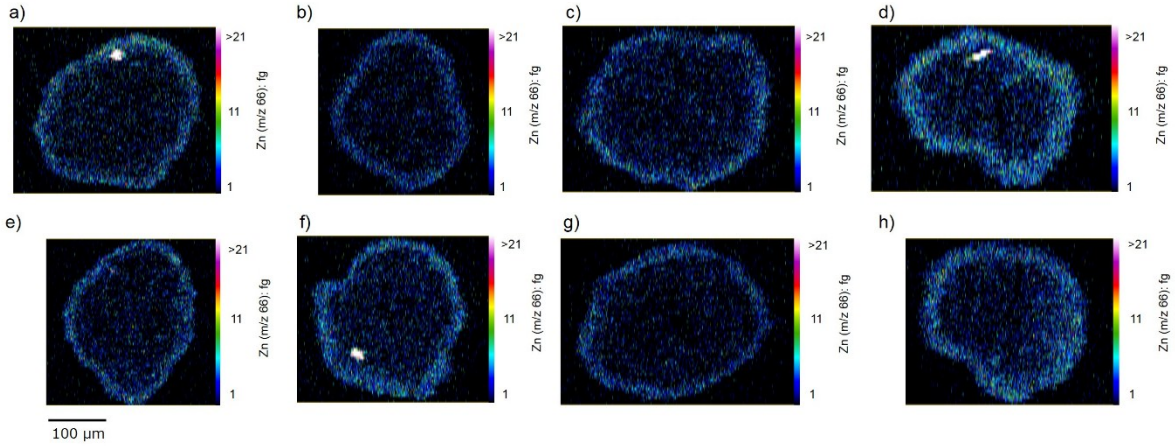

Figure S-7. Images of the Zn concentrations in thin sections of fibroblast MCSs. Samples incubated for 24 h with Ag NPs with diameters of 5 nm (citrate) (a), 20 nm (citrate) (b), 20 nm (PVP) (c), and 50 nm (citrate) (d). Samples incubated for 48 h with Ag NPs with diameters of 5 nm (citrate) (e), 20 nm (citrate) (f), 20 nm (PVP) (g), and 50 nm (citrate) (h).

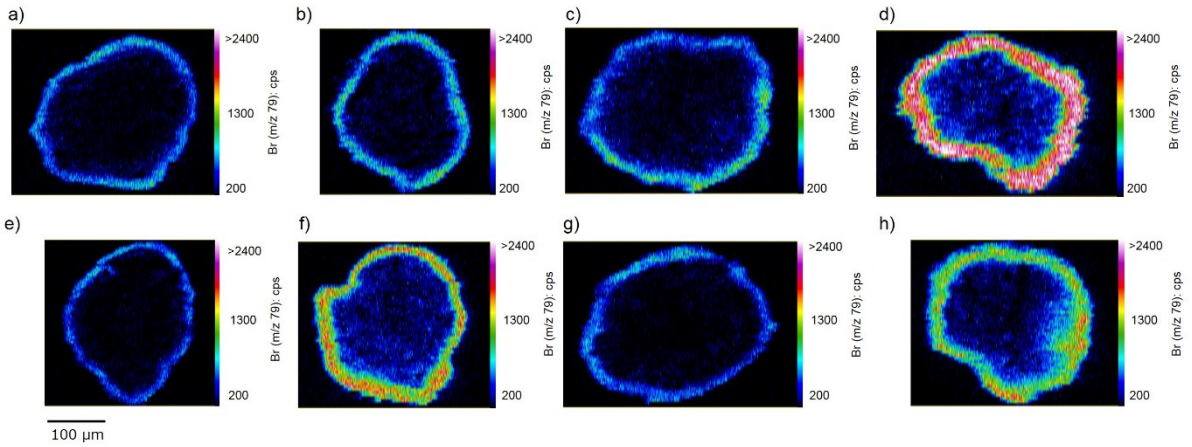

Figure S-8. Images of the ^{79}Br signals in thin sections of fibroblast MCSs. Samples incubated for 24 h with Ag NPs with diameters of 5 nm (citrate) (a), 20 nm (citrate) (b), 20 nm (PVP) (c), and 50 nm (citrate) (d). Samples incubated for 48 h with Ag NPs with diameters of 5 nm (citrate) (e), 20 nm (citrate) (f), 20 nm (PVP) (g), and 50 nm (citrate) (h).

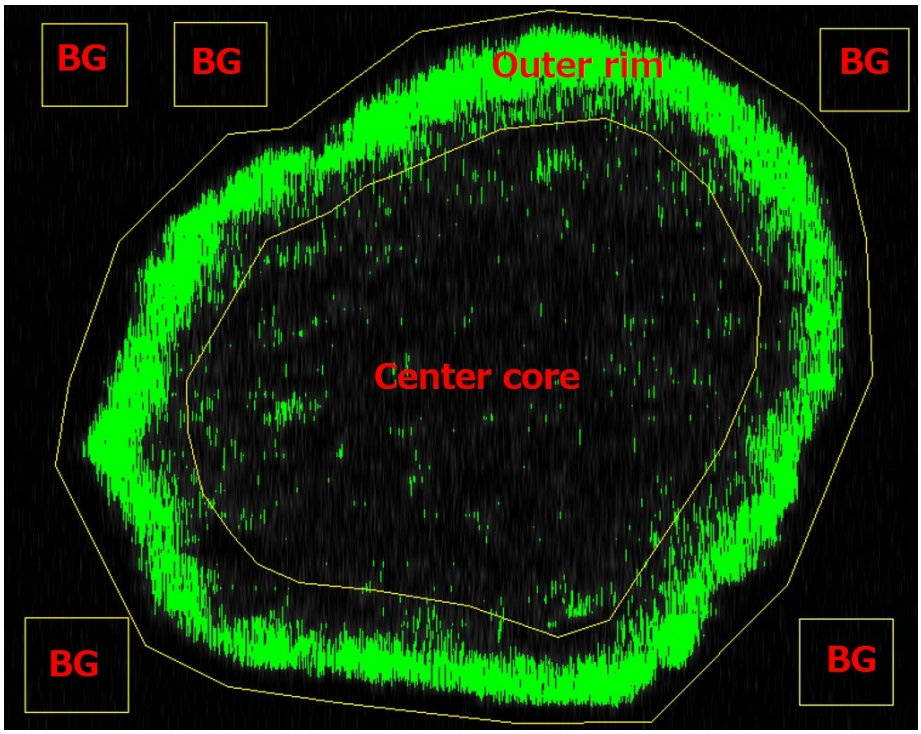

Figure S-9. Schematic illustration of each region to estimate signals of interest in the center region. Yellow lines were drawn by a use of drawing mode in ImageJ. As an example, a phosphorous image of a sample treated with Ag NPs (ø 5 nm, citrate) for 24 hours was used. Green color is showing phosphorous signals more than a threshold set. BG: background.

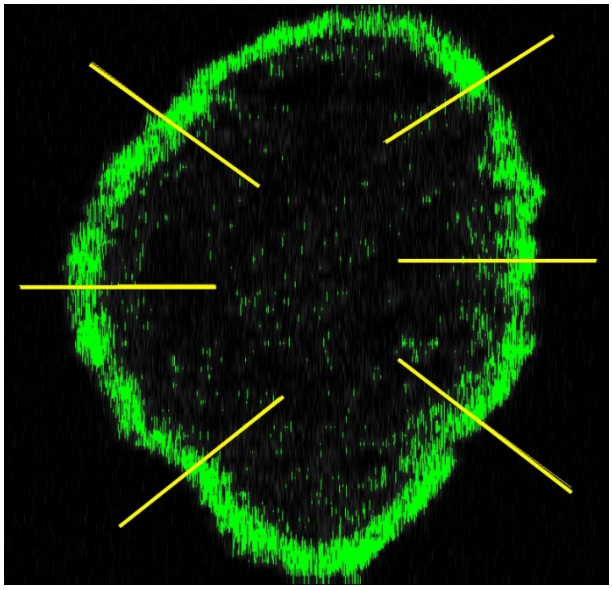

Figure S-10. Schematic illustration for line scans with using ImageJ among elemental images.

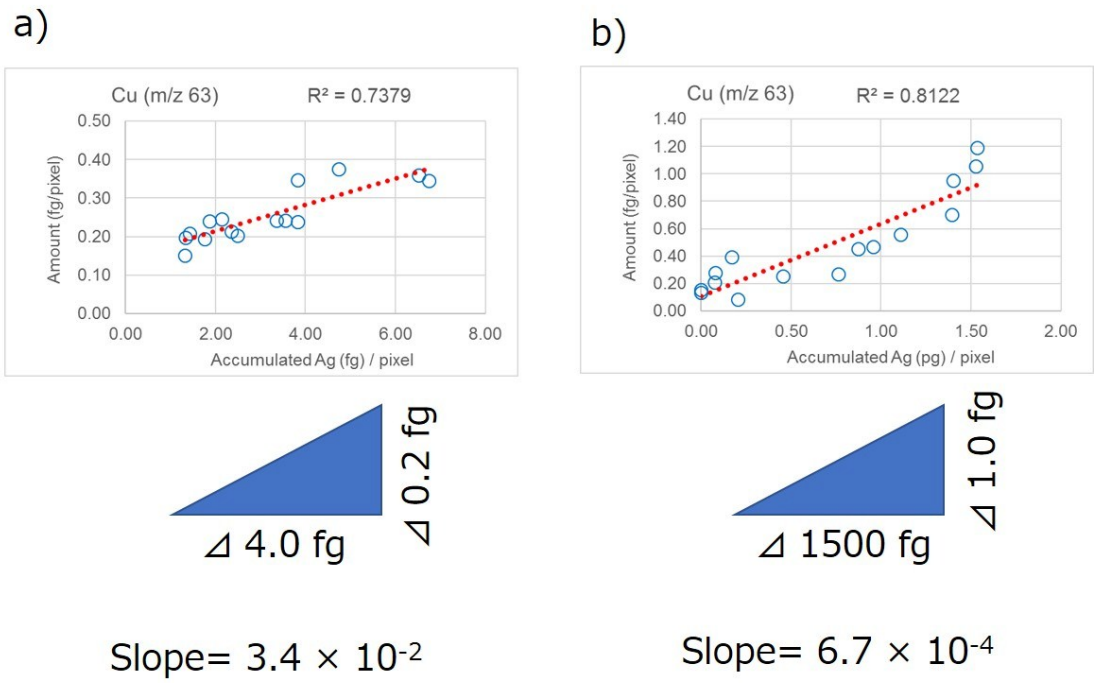

Figure S-11. Scatter plots of Cu (m/z 63) amounts (fg) as average values within pixels where varying amounts of Ag accumulated on sections treated with small Ag NPs (ø 5 nm, citrate) and large Ag NPs (ø 50 nm, citrate) for 48 h. Red dashed lines show linear trendlines. A coefficient of determination (R^2) is shown in each plot on the upper right.