Supporting Information

Protein adsorption and cellular uptake of AuNPs capped with alkyl acids of different length

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Characterization of MA-AuNPs and AuNPs-protein complexes

The hydrodynamic diameters of MA-AuNPs in NaCl solutions with different concentrations, and in 10 % FBS/DMEM with different pH values (pH 5 and 7) were measured by DLS (Table S1). The hydrodynamic diameters of the MA-AuNPs increased along with the increase of ion concentrations. When the concentration of NaCl increased to 30 mM, the diameter of 3MA-AuNPs was 98.6±3.5 nm, whereas those of the 11MA-AuNPs and 16MA-AuNPs were 31.9±1.1 nm and 36.4±4.9 nm, respectively. These results show that the MA-AuNPs are partially aggregated in 10 mM and 30 mM NaCl solutions, and the longer alky grafted AuNPs (11MA-AuNPs and 16MA) are more stable than 3MA-AuNPs in 30 mM NaCl solution. In 50 mM NaCl solution, the diameters of all the MA-AuNPs were above 1000 nm, suggesting that all the MA-AuNPs were severely aggregated. Considering the acidic environment in lysosomes (pH=5), the hydrodynamic diameters of MA-AuNPs in 10% FBS/DMEM (pH 5) were checked (Table S1). The diameter of 3MA-AuNPs (170.4±1.2 nm) was nearly 2 times larger than those of the 11MA-AuNPs (88.4±0.8) and 16MA-AuNPs (94.5±0.9) in 10 % FBS/DMEM (pH 5). However, the hydrodynamic diameters of all the three MA-AuNPs (70-80 nm) had little difference in 10 % FBS/DMEM (pH 7). These results reveal that longer alkyl grafting enhances the colloidal stability of AuNPs in acidic environment in vitro, and in salt solution at lower concentration.

Table S1 DLS Characterization of MA-modified AuNPs with different chain length in different mediums after the particles were incubated for 24 h, respectively.

Nanoparticles	Diameter in medium (nm, DLS)					
	Water	10 mM NaCl	30 mM NaCl	50 mM NaCl	10% FBS/DMEM (pH 5)	10% FBS/DMEM (pH 7)
3MA-AuNPs	15.4±0.8	37.6±0.7	98.6±3.5	>1000	170.4±1.2	70.5±0.8
11MA-AuNPs	13.8±1.4	30.8±0.7	31.9±1.1	>1000	88.4±0.8	73.4±3.8
16MA-AuNPs	10.8±0.2	33.7±0.8	36.4±4.9	>1000	94.5±0.9	80.2±4.7