Electronic Supplementary Material

Intracellular *in situ* labeling of TiO_2 nanoparticles for fluorescence microscopy detection

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Table S1 Zeta potentials and dynamic light scattering of NPs. Bare TiO_2 nanoparticles and azide-coated nanoparticles were diluted 1:200 in water and their hydrodynamic diameters and zeta potentials measured. Due to aggregation and the non-spherical shape of aggregates, sizing data obtained were deemed not reliable and cryo TEM images were used for nanoparticle sizing

Nanoparticle:dispersant	Zeta potential (mV)	Hydrodynamic diameter (nm)
Bare NPs:dH_2O (1:200)	−34.07 ± 0.91	364.7 ± 18
NP-azide:dH_2O (1:200)	−31.30 ± 0.78	387.9 ± 79

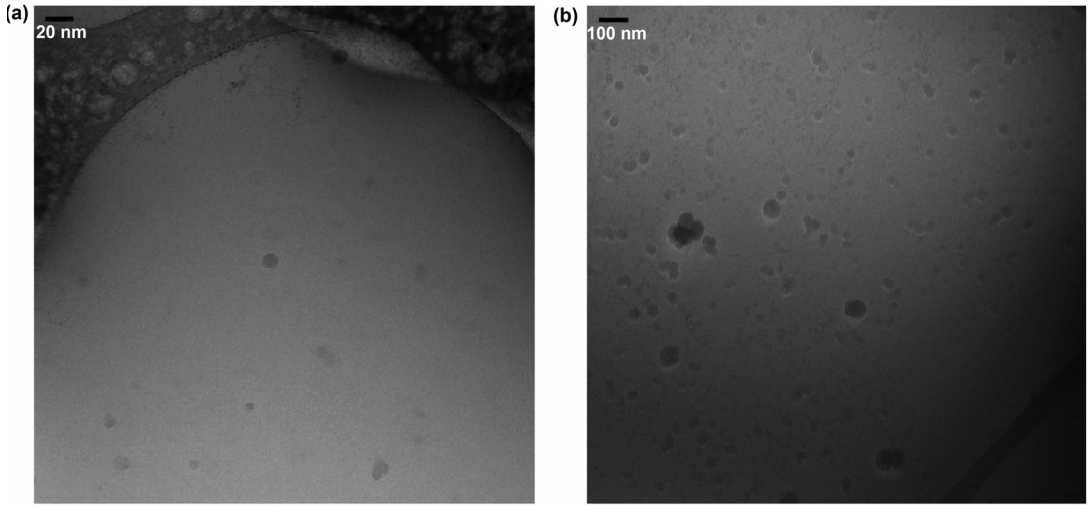

Figure S1 Cryo-TEM images of bare and dopamine-azide coated TiO_2 nanoparticles. Bare TiO_2 nanoparticles and azide-coated nanoparticles were diluted 1:50 in distilled H_2O, plunge frozen in liquid ethane and imaged. Compared to uncoated nanoparticles (a), azide-coated (b) nanoparticles and aggregate sizes appear slightly increased.

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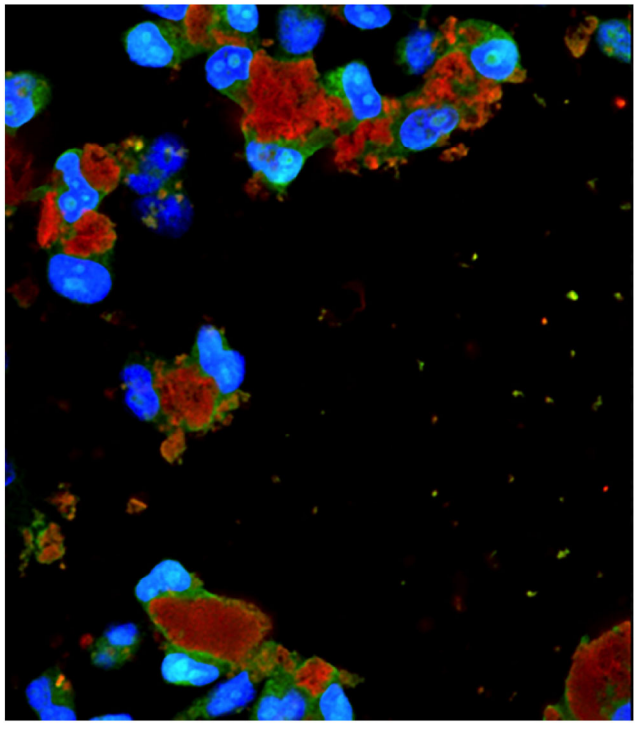

Figure S2 Cells treated with nanoparticles simultaneously coated with ARS and dopamine-azide and stained *in situ* by Click reaction with Alexa Fluor 488 alkyne. High nanoparticle concentration in this experiment (20 fold higher than e.g., in Fig. 4) leads to formation of substantial aggregates. This thickness of nanoparticle deposits was not compatible with proportional Click labeling, therefore, only those areas of nanoparticle aggregates that are relatively thin show an obvious red (ARS) and green (Alexa Fluor 488) fluorescence overlap. Importantly, this early experiment has also shown that a Click reaction with Alexa Fluor 488 alkyne may result in weak staining of nucleoli. In our subsequent experiments we have decreased nanoparticle concentration and refined Click reaction (1,500 × dilution of Alexa Fluor 488 alkyne) to develop the protocol detailed in the Experimental section.