

Peptide-decorated nanoparticles
for cellular targeting

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Exploiting the molecular recognition of receptors presented on the cell surface have extensively opened up diagnostic and therapeutic application of nanoparticles. A targeted nanoparticle is required to report confirmation of specific interactions and ultimate fate in physiological environment for further verification. We have demonstrated tracking of homing peptide-decorated biodegradable silicon nanoparticles through intrinsic photoluminescence during the course of cellular targeting and uptake. The photoluminescence emission lifetime is on the order of microseconds, which is significantly longer than tissue autofluorescence, thus allows clear discrimination of the nanoparticles for the noisy cellular background. Utilizing the time-resolved analysis of luminescent emission, we further investigated the multivalent strategy of nanoparticles for enhanced cell targeting. The result presents a promising potential of the biodegradable silicon nanoparticles toward advanced cell targeting systems that simultaneously enable tracking the intracellular behavior and the tissue microenvironment monitoring.