

Abstract Submitted
for the NEF13 Meeting of
The American Physical Society

pHLIP Peptide Targets Nanogold Particles to Tumors JENNIFER DANIELS, LAN YAO, ANNA MOSHNIKOVA, SERGEY KUZNETSOV, AFTAB AHMED, University of Rhode Island, DONALD ENGELMAN, Yale University, YANA RESHETNYAK, OLEG ANDREEV, University of Rhode Island — Progress in nanomedicine depends on the development of nanomaterials and targeted delivery methods. In this work, we describe a method for the preferential targeting of gold nanoparticles to a tumor in a mouse model. The method is based on the use of the pH Low Insertion Peptide (pHLIP), which targets various imaging agents to acidic tumors. We compare tumor targeting by nonfunctionalized nanogold particles with nanogold–pHLIP conjugates, where nanogold is covalently attached to the N terminus of pHLIP. Our most important finding is that both intratumoral and i.v. administration demonstrated a significant enhancement of tumor uptake of gold nanoparticles conjugated with pHLIP. Statistically significant reduction of gold accumulation was observed in acidic tumors and kidney when pH-insensitive K-pHLIP was used as a vehicle, suggesting an important role of pH in the pHLIP-mediated targeting of gold nanoparticles. The pHLIP technology can substantially improve the delivery of gold nanoparticles to tumors by providing specificity of targeting, enhancing local concentration in tumors, and distributing nanoparticles throughout the entire tumor mass where they remain for an extended period (several days), which is beneficial for radiation oncology and imaging.

Jennifer Daniels
University of Rhode Island

Date submitted: 16 Sep 2013

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