Tracking of nanodrug delivery vehicles and their fate in cancer

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This talk will highlight development of actively targeted nanoparticles and tracking their biodistribution in the context of cancer in vivo using optoacoustic imaging. As a major requirement for successful translation of nanomedicine into clinical practice involves identifying biodistribution, efficacy, and ultimately the fate of the nanoparticle, we test the utility of active targeting vs non-targeted particles in the context of orthotopic xenograft pancreatic or ovarian tumors in vivo using multispectral optoacoustic tomography. We have developed actively tumor targeted 25nm mesoporous silica nanoparticles that have preferential uptake in the context of pancreatic and ovarian cancers as evidenced by optoacoustic imaging based upon tissue pH of 6.8. The pH-sensitivity of the targeted nanoparticles resulted in a particle that is suitable for simultaneous in vivo tumor imaging and drug delivery.

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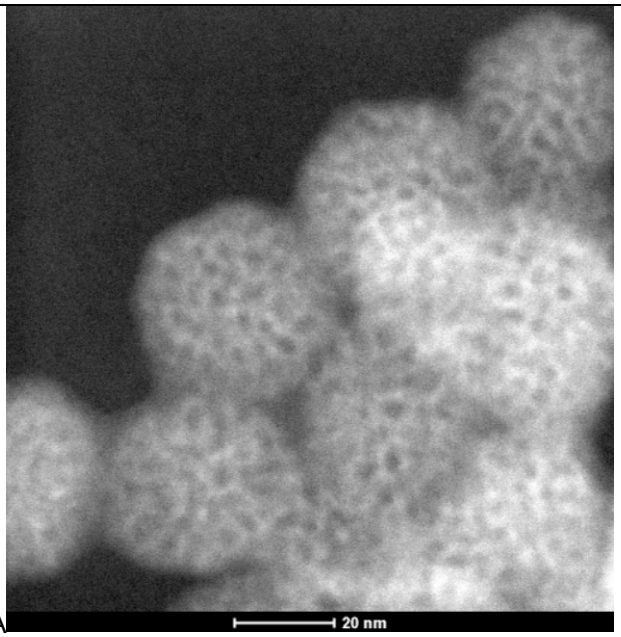
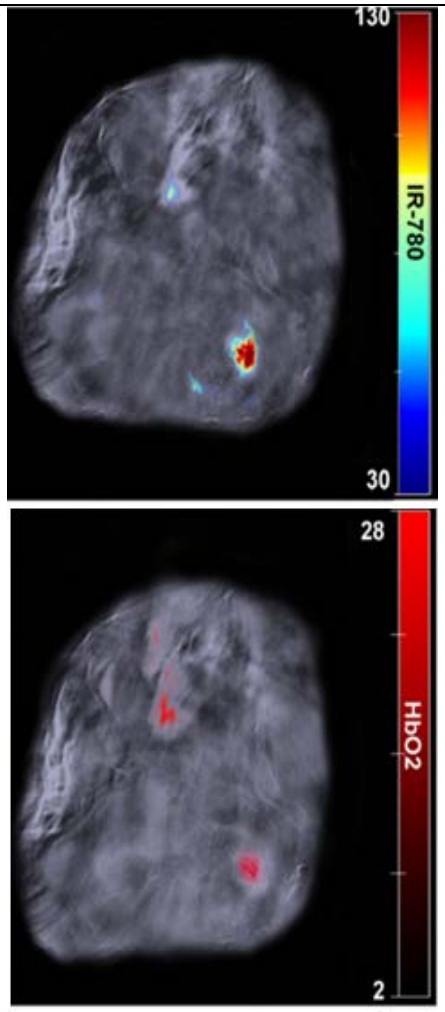


SEM image of V7-RUBY nanoparticles demonstrates that particles are 25 ± 3.1 in diameter



MSOT image indicates localization of V7-RUBY containing IR-780 dye within the orthotopic ES-2 ovarian tumor (rainbow color scale). Secondary confirmation of ovarian tumor was demonstrated using oxy-hemoglobin (red color scale).