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# Studies of nanoparticle targeting in cancer cells

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## Abstract

TiO2 nanoparticles can be used for both imaging and treatment of cancer: (1) a variety of different molecules can be placed on the surface of the nanoparticle for therapy, targeting, or imaging and (2) TiO2 itself can be activated with radiant energies higher than the band gap generating the release of OH. radicals that can damage DNA and other biomolecules. We have explored the uptake of TiO2 nanoparticles through a variety of endocytic pathways and have also explored cellular and intracellular targeting of the nanoparticles with ligands that bind to surface receptors, nuclear proteins, and others. A variety of approaches were used to image the nanoparticles including the use of the newly developed bionanoprobe at the Advanced Photon Source at Argonne National Laboratory.