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Gold nanoparticle incorporation in the cancer cells : imaging and treatment SUNGSOOK AHN, SUNG YONG JUNG, EUN SEOK SEO, JEONGEUN RYU, SANG JOON LEE, POSTECH, POSTECH TEAM — Surface modified gold nanoparticles ($\sim$ 20 nm) are selectively incorporated in the various cancer cells. Depending on the attached molecules on the gold nanoparticle surface, incorporation efficiency of the gold nanoparticles in the cancer cells are differentiated. Two-photon fluorescence microscopy, energy dispersive X-ray spectroscopy (EDS) and second ion mass spectroscopy (SIMS) are utilized to quantify the gold nanoparticles incorporated in the cancer cells. Static images of the cancer cell are obtained by scanning electron microscopy (SEM) and zone-plate X-ray nanoscopy. On the other hand, dynamic flow images are captured by dynamic X-ray imaging. To enhance the selective incorporation into the cancer cells, specially designed aptamer is introduced on the gold nanoparticles, which changes the mechanisms of gold nanoparticle incorporation through the cancer cell membrane. Anti-cancer drugs are also incorporated, by which sustained drug delivery mechanisms are investigated. This study would contribute to the basic understanding on the nanoparticle-mediated disease treatment and advanced imaging technology.

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