Abstract: Cancer disease is the greatest challenge in public health care and costs nearly 1 trillion dollars each year. It is accounted for 13% of all worldwide deaths in 2007 and projected 12 million deaths in 2030. Early detection and effective targeted treatment are the keys for saving millions of lives and billions of dollars each year. Driven by the need, we developed a design of gold nanocage attached SWCNTs as a novel hybrid material for targeted imaging and photothermal destruction of human prostate cancer cells.