Smart Carbon Nanotube Photothermal Therapy Platform

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Near-infrared (NIR) photothermal therapy using biocompatible single-walled carbon nanotubes (SWNTs) is advantageous because as-produced SWNTs, without additional size control, both efficiently absorb NIR light and demonstrate high photothermal conversion efficiency. In addition, covalent attachment of receptor molecules to SWNTs can be used to specifically target infected cells; however, this technique interrupts SWNT optical properties and inevitably lowers photothermal conversion efficiency and thus remains major hurdle for SWNT applications.

To overcome this limitation, a smart targeting photothermal therapy platform, based on phenoxylated dextran-functionalized SWNTs, is developed for treatment of inflammatory disease.

This talk will focus on our detailed experimental demonstration that this biocompatible nano-platform is able to selectively target inflammatory cells over normal cells without any additional receptor molecules through dextran-scavenger receptor binding process.