

Functionalized Nano-graphene Oxide as Multi-modal Clinic for Effective Drug Delivery

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ABSTRACT

Nano-materials based drug delivery modalities to specific organs and tissues has become one of the critical endeavors in pharmaceutical research. Recently, two-dimensional graphene has elicited considerable research interest because of its potential application in drug delivery systems. Here we report, the drug delivery applications of PEGylated nano-graphene oxide (nGO-PEG), complexed with a multiphoton active and anti-cancerous diarylheptanoid drug curcumin. Specifically, graphene-derivatives were used as nanovectors for the delivery of the

hydrophobic anticancer drug curcumin due to its high surface area and easy surface functionalization. nGO was synthesized by modified Hummer's method and confirmed by XRD analysis. The formation of nGO, nGO-PEG and nGO-PEG-Curcumin complex were monitored through UV-vis, IR spectroscopy. MTT assay and AO/EB staining found that nGO-PEG-Curcumin complex afforded highly potent cancer cell killing *in vitro* with a human breast cancer cell line MCF7.

KEYWORDS: Pharmacology; Drug Delivery; Nano-Graphene; Cancer; Controlled Release.