

Graphene Based Theranostics for Tumor Targeted Drug/Gene Delivery and Imaging

Researchers at the University of South Florida have developed a novel theranostic platform for simultaneous tumor targeted drug and gene delivery, and post therapy monitoring.

The standard of anticancer treatment, chemotherapy, is often discontinued due to intolerable toxicity or the development of drug resistance. Combining chemotherapy with gene therapy is more effective at killing cancer cells, but is also more likely to damage healthy tissues. Additionally, therapeutic effectiveness and disease progression can often be difficult to determine and track over time due to diagnostic limitations.

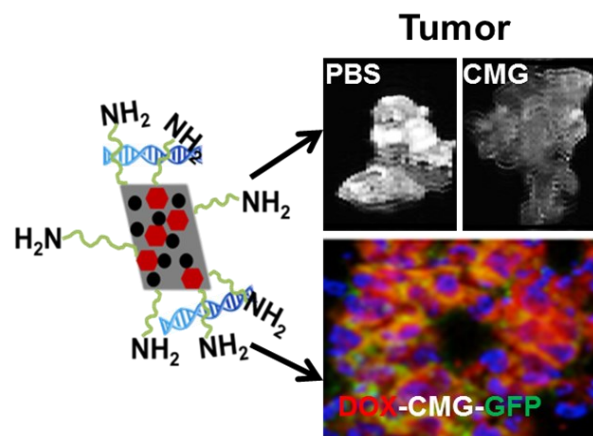
Targeted delivery of therapeutic agents to the cancer is an important factor for improving combinational therapies, by decreasing dosages and damage to healthy tissues. If targeted delivery agents can be combined with agents like superparamagnetic iron oxide (SPIO) or a MRI contrast agent, imaging sensitivity can be increased sufficiently to allow for determination of therapeutic effectiveness and disease progression.

A research team at the University of South Florida has developed a chitosan functionalized magnetic graphene nanoparticle (CMG) platform for simultaneous gene and/or drug delivery, and enhanced imaging of tumor cells. CMGs provide a robust and safe theranostic platform, which integrates targeted delivery of both gene therapies and chemotherapeutic drug(s), and enhanced imaging of tumors. This provides a treatment for cancers that will reduce the overall toxicity to healthy tissues, increase dosage efficiency, and provide for greater diagnostics of therapy and disease progressions.

ADVANTAGES:

- Lower toxicity to health tissues
- Greater targeting efficiency
- Enhanced diagnostic capability

Multifunctional System for the Treatment and Diagnosis of Cancer



Chitosan Functionalized Magnetic Graphene (CMG) Nanoparticles Provide a Robust and Safe Theranostic Platform Targeted to Tumors