

# Graphene oxide nanocomposites for drug delivery in cancer cells

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This research regards the design, the synthesis and the characterization of nanostructured biocompatible materials based on graphene oxide (GO) complexed with two different kind of anthraquinones (Doxorubicin and Aloe Emodin) to be used in the field of nanomedicine. While Doxorubicin (DOX) is a well-known synthetic anticancer drug used in therapy, Aloe Emodin (AE) is a potential natural antineoplastic agent whose activity is widely demonstrated in literature. The aim of this work is to evaluate the possibility to improve the transport and the delivery of these drugs, with a controlled release mediated by GO. The complexes GO/DOX and GO/AE, as well as GO, were synthesized at the Laboratory of Electrochemistry and Organic Syntheses (LEOS), Dept. of Basic and Applied Sciences for Engineering, Sapienza University of Rome. Morphological and chemical analyses were performed using Scanning electron microscopy (SEM), Atomic force microscopy (AFM), Fourier-transform infrared spectroscopy (FT-IR), Raman and UV-Visible spectroscopy techniques. Finally, at National Center for Drug Research and Evaluation, Italian National Institute of Health, the cytotoxicity and *in vitro* release studies were carried out on human breast cancer cells (MDA-MB-231).