Supporting Information

Graphene Oxide-Nanocarriers for Fluorescent Sensing of Calcium Ion
Accumulation and Direct Assessment of Ion-Induced Enzymatic Activities in Cells

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Additional Experimental Details:

Size separation of GO:

In efforts to maximize GO surface densities exfoliated GO sheets were size separated using centrifugation. Various submicron-sized GO sheets were selected for by collecting supernatants after centrifugation 3 times at 7000 xg, and 16000 xg. The colloidal submicron GO product was used to confirm successful GO synthesis and product characterization using UV-vis spectroscopy and AFM as shown below. Beer’s law was used to calculate GO’s absorption coefficient, which we report as ~41.1134 mg/mL.
Scheme S1. Synthesis scheme outlining the procedure used to make hydroxylated-GO, carboxylated-GO, hydroxylated-PEGylated-GO, and carboxylated-PEGylated-GO.
**Figure S1.** AFM images of GO (A), GO-OH (B), and GO-OH-PEG (C). The profile graphs below each image correspond with the white line in the image. These GO-nanocarriers were immobilized onto APTES functionalized glass slides and scanned using AFM contact mode on an AIST-NT AFM instrument.
Figure S2. HeLa cells exposed to GO-COOH-PEG-fluorescein (top row), and GO-OH-PEG-fluorescein (bottom row). HeLa cell nuclei stained with DAPI (blue). Propidium iodide (red) and fluorescein labeled GO-nanocarriers (green) (scale = 50 µm) reveals only weak membrane permeabilization after 48 hours.
Figure S3. Experiment showing inhibition of calpain activity using molecular inhibitor calpeptin. In each image HeLa cells were given the GO-nanosensor several hours prior to calpain activation (scale = 50 µm). Top row shows control without glutamate. HeLa cells in the middle and bottom rows were given row 100 µM glutamate. The bottom row was given 50 µM calpeptin 1 hour prior to addition of glutamate activation of calpain.
Figure S4. Absorbance spectra of GO nanomaterials and GO derivatives. Absorbance spectra of camptothecin (CPT) alone and in solution with GO-PEG-CPT is also provided to compliment the toxicity studies presented in the base text.