Researchers looking to use nanographene oxide to destroy tumors

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(Phys.org) —A combined team of researchers from Portugal and Spain has found that it might be possible to use nanographene oxide to help improve the tumor killing capability of chemo, radiotherapy or laser treatments in cancer patients. In their paper to be published in the journal *Nanotechnology*, the team describes tests they've conducted with nanographene materials and how they might be used in medical applications.

Scientists have learned over the years that the cells in cancerous tumors are more sensitive to heat than normal cells in the body (it makes them more porous). To take advantage of this property, researchers have developed techniques for heating such cells before applying other techniques meant to kill them—heating tumors before using chemo or radiotherapy makes them more vulnerable (the drugs can more easily enter the tumor cells due to the enlarged pores) and thus easier to kill. In this new effort, the research team has been experimenting with nanographene oxides, which they say, might conceivably be used as a means for more accurately directing heat to tumor cells prior to using other tumor killing techniques.

In their lab, the researchers have been firing lasers at live cells and irradiating them to test for culture temperatures variances under different conditions. To improve the results, they've been soaking the cells in graphene oxide first—the cells absorb the foreign material. In analyzing the results, the researchers have found that doing so causes cell necrosis (death) and a subsequent increase in the release of cytokine

(substances secreted by immune system cells) to the surrounding environment. They also noted that the increased temperature of the cells treated with the nanographene oxide performed better when increasing the power of the laser than when increasing exposure time, which is preferential because it means less damage is caused to surrounding healthy tissue. They also suggest that if their technique were to be used in live patients, it might be possible to customize the type of cell death that results—in effect tailoring the response of immune cells.

Unfortunately, it's still not known if soaking a real tumor in nanographene oxide before applying other measures might have other undesirable side effects. Thus, a lot of testing will have to be conducted before they can be tried in human patients. But if the preliminary results pan out, nanographene oxide and/or other similar materials might one day be used to help conventional treatments work better.

More information: via Nanotechweb