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In Vitro Evaluation of Adjuvant Therapy With Hyperthermia Induced by Irradiation (Nir) of AuNPs and Icg in Tumor Cells

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Hyperthermia (HT) is a novel alternative to cancer treatment based on the increase of temperature between 40-43°C inducing selective death in tumor cells, facing cancer treatment limitations such as drug resistance. HT employs nanomaterials such as gold nanoparticles (AuNPs) with the capacity to absorb light at a wavelength of 600-800nm by near-infrared region (NIR) producing heat, allowing efficient penetration of light into the tumor without damaging near tissue and improving cellular absorption. This work aimed to evaluate the effect on cell viability of HT combined with 5-FU on SW620-GFP colon cancer cells (CRC) and liposome-encapsulated indocyanine green (ICG) on glioblastoma U-87 cells (GBM). Cellular cytotoxicity was evaluated using the MTT assay. An IC50 of 5-FU at 76μM was obtained from the treatment of SW620-GFP cells administered together with a 1:10 dilution of AuNPs, reaching a cytotoxicity of 65%; treatment of U-87 cells by the liposome conjugate (L) together with ICG and AuNPs were applied at a 2:1 dilution, reaching a cytotoxicity of 97%. Both treatments irradiated at two watts of power for ten minutes induced a temperature of 43°C. Treatments without irradiation showed a cytotoxicity level of 59% in SW620-GFP cells whereas U-87 cells reached 49% of cytotoxicity. Results showed that HT irradiated with NIR light enhanced with AuNPs increases cell toxicity in CRC and GBM cells, improving the use of individual therapies. Likewise, the L-ICG-AuNPs + NIR method decreased cell viability the most, compared to chemo-photothermal treatment. The synergistic effect of in vivo tumor models remains to be demonstrated.

Biography:

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Graduated in Biology at the University of Guadalajara. Working as a thesis student at Research Center in Technology and Design Assistance of Jalisco State (CIATEJ) on a project focus on the cytotoxicity activity of Liposome conjugated with ICG and gold nanoparticles in human cancer cell lines. Co-author in the article “Panorama del Cáncer de Colon en México” published in “Horizontes Transdisciplinarios”.

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