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IR-780 BASED-NANOPARTICLE CYTOTOXIC EFFECT ON MURINE BREAST CANCER CELLS (EHRLICH)

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Objectives: The aim of this study was to evaluate the cells viability of the murine breast cancer cells (Ehrlich) after treatment with magnetic nanocarriers (MALBIR). **Methodology:** Ehrlich's ascites carcinoma cells were aspirated from the peritoneal cavity of the animals and washed with 1x PBS solution, and then maintained in a humidified atmosphere for 24h at 37°C in 5% CO_2. RPMI-1640 medium was supplemented with 10% FBS, 1% penicillin/streptomycin and 0.3% amphotericin. The MALBIR was used as treatment for 24h, which consist of ferrite-based magnetic nanoparticles, bovine albumin proteins and IR-780 iodide molecules, forming an aggregate nanostructure with a diameter around 100nm. Because IR-780 is cytotoxic, all concentration used (0.0; 0.437; 0.875; 1.75; 3.5; 7; 14) were based in quantity of the IR-780 ($\mu g.mL^{-1}$) present in nanocarrier. The MALBIR cytotoxic effects were evaluated using the MTT assay with Ehrlich tumor cells as described by Mosman (1983). The results as presented as mean ± SD obtained from three independent experiments each done in four replicates. Statistical significance was considered at $p<0.05$ performed by one-way ANOVA with Tukey post test. The IC50 (IR-780 concentration in nanocarrier that results in a 50% reduction in cellular viability) was acquired by dose-response curves (nonlinear regression curves from sigmoidal dose-response) using GraphPad Prism 5 for Windows. **Results:** The IR-780 present in MALBIR has a statistical significantly effect inducing cell death in a dose dependent manner on Ehrlich cells. At concentrations of 3.5, 7 and 14$\mu g.mL^{-1}$ obtained a significantly different result from negative control with $p<0.001$. By nonlinear regression curve was estimated an IC50 value on Ehlich cells of 14.2 ± 1.7$\mu g.mL^{-1}$. Similar results had previously been found for Sarcoma-180 tumor cell line and L-929 normal cell line treated with this same nanocarrier. **Conclusions:** In summary, MALBIR treatment has significant cytotoxic activity on Ehrlich cells line when compared to the reference negative control. Thus, these results suggest that the MALBIR treatment may share a distinct and important dose-dependent biological property. Additional studies are needed to compare normal cell line, determine the molecular mechanisms and to evaluate the potential *in vivo* anticancer activity of the MALBIR. Nevertheless, the nanocarrier shows potential for synergetic effect between the chemotherapeutic agent IR-780 and the nanoparticles, if magnetic hyperthermia treatment is also performed, that could decrease even further the IC50 of the nanoparticle.