Treatment with Resveratrol-Loaded Nanocapsules Reduces *in vitro* and *in vivo* Glioma Growth

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Glioblastoma multiforme is a devastating cerebral tumor that submits to a poor prognostic. Therefore improvements in the treatments are necessary to increase the survival of the patients. Resveratrol has been described to inhibit carcinogenesis at multiple stages. Biodegradable nanoparticles are emerging as promissory drug delivery system for specific tissues. The objective of the current study was to evaluate the antiproliferative effect of *trans*-resveratrol-loaded nanocapsules (RSV-NC) against C6 glioma cell line and in a rat implanted glioma model. The C6 cells were cultured in DMEM medium supplemented with 5% fetal bovine serum in standard conditions. The MTT assay was performed to measure cell viability. The cell cycle analysis was determined by flow cytometry with PI stained. Glioma implantation was performed and the rats were treated with 5 mg/Kg/day of resveratrol in solution (RSV) and with RSV-NC for 10 days. Our results showed that RSV-NC decreased the viability of glioma cells *in vitro* (64.4%±7.67 at the highest concentration). This is preceded by an arrest of the cell cycle progression in S phase with 25 µM (76.3%±7.3) and in G1 phase with 50 µM (77.55%±0.9). We have also observed a reduction in some malignant histopathological features and significant decrease in the tumor size *in vivo* (87%±27.5). These effects were more pronounced in the treatment with RSV-NC than RSV. Furthermore, RSV-NC treatment was not toxic to organotypic cultures, a model of healthy neural cells. The present results suggest that this formulation can be a potential chemotherapeutic agent to brain tumors.

**Keywords:** Drug delivery, Glioblastoma multiforme, Nanocapsules, *Trans*-resveratrol
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