

Co-delivery of Paclitaxel and Curcumin in Polymeric Micelles to Optimize Lung Cancer Chemotherapy †

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Abstract: Lung cancer is the leading cause of cancer death among men and women, accounting for almost 25% of all cancer deaths. Paclitaxel (PTX) is one of the most effective antineoplastic drugs indicated against lung cancer, while curcumin (CUR), a well-known antioxidant agent, could minimize the main side effects of PTX. In this context, we developed polymeric micelles of Soluplus® (PM) and Soluplus-Glucose (PM-Glu) co-loaded with PTX and CUR by organic solvent diffusion technique. The micellar size was determined by DLS, and the antioxidant activity of the micelles was measured by DPPH method. Moreover, *in vitro* cytotoxicity was tested in H596, a lung cancer cell line. Micelles successfully encapsulated both drugs (2 mg/mL of PTX and CUR) and exhibited a narrow size distribution with a hydrodynamic diameter of ~85 nm for both systems. In addition, drug-loaded micelles remained stable under dilution in simulated lung fluids, and the antioxidant properties of CUR were not affected by encapsulation. *In vitro* cytotoxicity studies showed a better antitumoral activity of the drug-loaded micelles compared to Genexol®. Finally, the biodistribution assay demonstrated a 6-fold lung accumulation of the blank PM-Glu versus their glucose-free counterparts. Overall, our micellar nanoformulations are promising nanotechnological platforms to optimize lung cancer therapy.

Keywords: polymeric micelles; Paclitaxel; curcumin; lung cancer.

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Conflicts of Interest

The authors declare no conflict of interest.