

Peptide-decorated Ferrocifen lipid nanocapsules for the targeting of multidrug resistant ovarian adenocarcinoma

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Ovarian adenocarcinoma reigns as one of the deadliest epithelial carcinomas impacting women, owing to its resistance to current treatments [1]. Thus, a novel approach to this condition is direly needed. Ferrocifen, an innovative organometallic complex, has the potential to be the answer for this hurdle. This molecule has shown very interesting antiproliferative and cytotoxic effects in both *in vitro* and *in vivo* studies [2]. However, this molecule is hindered by its lipophilicity: lipid nanocapsules (LNCs) are a much-needed vehicle to allow the delivery of this agent [3].

The aim of this project is thus to formulate the corresponding ferrocifen-loaded LNCs to target the ovarian adenocarcinoma. Furthermore, to improve the specificity of this formulation, the surface of LNCs has been decorated using different cell penetrating peptides such as TLS or WSG, known from literature to be specific to the SKOV3 ovarian cancer cell line.

Monodisperse suspensions of P722 ferrocifen LNCs were obtained with a diameter of 50 nm and a PDI below 0.1. A post-insertion of DSPE-PEG₂₀₀₀-maleimide into the LNC surface, has been then performed [3] and the TLS [4] / WSG [5], have been successfully covalently grafted via a thiol-maleimide bound.

Cytotoxicity and internalization studies were realized, presenting a promising anti-cancerous effect, with the WSG showing an improved targeting ability compared to the TLS peptide.

Future studies will be performed on these ferrocifen loaded LNCs: further *in vitro* confocal microscopy studies will be undertaken to determine the site of accumulation and action of these decorated ferrocifen loaded LNCs on ovarian adenocarcinoma. Additionally, *in vivo* experiments on Patient Derived Xenograft (PDX) murine models will commence shortly, to determine the biological efficiency of these formulations.

References

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