

Mixed Nanomicelles for Co-delivery of Paclitaxel and Nelfinavir: Preparation and *In vitro* Characterization [†]

Ezequiel Bernabeu ^{1,5,*}, Mariángeles Díaz ², Jenifer Riedel ¹, Silvina Lompardía ², Eduardo Lagomarsino ³, Juan Lázaro Martínez ⁴, Liliana Alarcon ⁵, Marcela Moreton ^{1,5}, Diego Chiappetta ^{1,5}

¹ Universidad de Buenos Aires, Facultad de Farmacia y Bioquímica, Cátedra de Tecnología Farmacéutica I, Buenos Aires, Argentina; bernabeu.uba@gmail.com (E.B.); jenn.driedel@gmail.com (J.R.); marcelamoreton@gmail.com (M.M.); diegochiappetta@yahoo.com.ar (D.C.)

² CONICET-Universidad de Buenos Aires, Instituto de Estudios de la Inmunidad Humoral (IDEHU), Departamento de Microbiología, Inmunología, Biotecnología y Genética, Buenos Aires, Argentina; mariangeles.ds@gmail.com (M.D.); sil.lompardía@gmail.com (S.L.)

³ Universidad de Buenos Aires, Facultad de Farmacia y Bioquímica, Departamento de Farmacología, Buenos Aires, Argentina; edulagoma@gmail.com (E.L.)

⁴ CONICET - Universidad de Buenos Aires, Instituto de Química y Metabolismo Del Fármaco (IQUIMEFA), Departamento de Química Orgánica, Facultad de Farmacia y Bioquímica, Buenos Aires, Argentina; jmlazaromartinez@gmail.com (J.Z.L.)

⁵ Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Argentina; lilipaola@gmail.com (L.A.)

* Correspondence: bernabeu.uba@gmail.com (E.B.);

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Abstract: Drug repurposing represents a growing trend to discover new indications of already existing drugs. Nelfinavir (NFV), an HIV protease inhibitor, has been shown to have potential sensitization effects when co-administered with antineoplastic drugs. In this study, we prepared micelles of Soluplus[®] and D- α -tocopheryl poly(ethylene glycol) for the co-delivery of paclitaxel (PTX) and NFV to enhance the anti-cancer activity of PTX in human leukemic cell lines (Jurkat, K562 and Kv562). The images from transmission electron microscopy showed that PTX-NFV-loaded (2 mg/mL and 5 mg/mL) micelles were spherical. The average particle size measured by dynamic light scattering was close to 60 nm. The ¹H NMR measurements confirmed the incorporation of PTX and NFV into the micelle. A stability study of freeze-dried micelles, which monitored drug content and particle size, demonstrated good storage stability for at least 3 months at room temperature. Also, micelles exhibited dose-dependent hemolytic effects in mouse erythrocytes. Assessment of cell viability using MTS assay indicated that drug-resistant Kv562 cells were more sensitive to PTX-NFV-loaded micelles, exhibiting an approximately 7-fold greater decrease in viability than PTX solution, as evaluated by the IC₅₀ value ($p < 0.05$) after 48 h. Therefore, Soluplus[®]-TPGS micelles could be a promising nanocarrier for the co-delivery of PTX and NFV.

Keywords: micelles; Paclitaxel; Nelfinavir; co-delivery; cancer cells.

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Conflicts of Interest

The authors declare no conflict of interest.