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Development of lipid nanocapsules containing Dexamethasone

Ines Maria Diaz Hernandez Complutense University of Madrid, Spain

Dexamethasone has demonstrated to be effective stimulating apoptosis in the treatment of lymphoblastic leukemias. Due to the resistances and side effects of this glucocorticoid the treatment is restricted and requires high dosages of the drug to be effective. A novel way of treatment is considered, formulating lipid nanocapsules loaded with dexamethasone, that will permit a controlled and selective release that decrease side effects, also facilitating their cell internalization avoiding resistance mechanisms. Lipid nanocapsules are formed of an oil nucleus compounds by Labrafac^{*} in which the active ingredient is dissolved, surrounded by a phospholipid layer and external cover of a hydrophilic surfactant. Nanosystems are developed with Phase Inversion Temperature method (PIT). Since dexamethasone is not soluble in Labrafac^{*}, a solubility study of the drug is carried out in a large numbers of organic solvents and oily vehicles, which result effectives: as organic solvent Dimethyl Sulfoxide (DMSO); and as oily vehicle: Capryol 90^{*}. Two types of nanocapsules are obtained: (A) dissolving dexamethasone in DMSO before the other components incorporation, evaporating organic solvent because of temperature increasing during elaboration; and (B) dissolving dexamethasone in a mixture of Labrafac^{*}: Capryol^{*} (50:50). Both types of nanocapsules became effective for carrying dexamethasone and presented a half size of 50 nanometres with a unimodal distribution, even if with respect to nanocapsules (B) exists a 4 per cent of the population whose distribution is largest.

Biography

Ines Maria Diaz Hernandez has completed her Pharmacy degree in 2014 at University of Salamanca. In 2014-2015, she is doing a Master's degree in Pharmacy and Pharmaceutical Technology at Complutense University of Madrid, with an experimental study entitled: 'Development of Dexamethasone Nanocapsules in the Treatment of Leukemia'. The objective of this study is to prove the efficiency of the nanosystems in cell cultures.

indiher.91@gmail.com

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