Data in Brief 4 (2015) 279–284

Contents lists available at ScienceDirect

Data in Brief

journal homepage: www.elsevier.com/locate/dib

Data Article

Data supporting the physico-chemical characterization, cellular uptake and cytotoxicity of lipid nanocapsules

P. Sánchez-Moreno [a,b], J.L. Ortega-Vinuesa [b], H. Boulaiz [c,d], J.A. Marchal [c,d], J.M. Peula-García [b,e,*]

[a] European Center for Nanomedicine (CEN), Laboratory of Nanostructured Fluorinated Materials (NFMLab), Department of Chemistry, Materials, and Chemical Engineering "Giulio Natta", Politecnico di Milano, 20131 Italy
[b] Biocolloid and Fluid Physics Group, Department of Applied Physics, University of Granada, 18071 Granada, Spain
[c] Biopathology and Regenerative Medicine Institute (IBIMER), Centre for Biomedical Research, University of Granada,
Granada E-18100, Spain
[d] Department of Human Anatomy and Embryology, Biosanitary Institute of Granada (ibs.GRANADA), University Hospitals of Granada-University of Granada, Granada E-18012, Spain
[e] Department of Applied Physics II, University of Málaga, 29071 Málaga, Spain

ARTICLE INFO

Article history:
Received 28 May 2015
Received in revised form
4 June 2015
Accepted 5 June 2015
Available online 17 June 2015

ABSTRACT

The aim of this data article is to provide data for a basic knowledge of the properties of lipid nanocapsules, a new colloidal system with very promising applications in drug delivery. Firstly, we pay attention on how it is possible to determine their surface composition by means of electrokinetics measurements. On the other hand, we provide experimental evidences for a better understanding of the factors that determine the interactions of these nanoparticles with cells as a necessary step to guide the design of the most effective formulations. Additionally, we supply information about encapsulation efficiency of docetaxel, a potent chemotherapy drug, inside nanocapsules supporting the experimental cytotoxicity results of these nanosystems.

© 2015 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).

DOI of original article: http://dx.doi.org/10.1016/j.biomaterials.2015.04.049
* Corresponding author.
E-mail address: jmpeula@uma.es (J.M. Peula-García).

http://dx.doi.org/10.1016/j.dib.2015.06.002
2352-3409/© 2015 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).

1. Specifications table

Subject area	*Materials Science, Physics, Biology*
More specific subject area	*Nanotechnology, Development of drug delivery nanosystems*
Type of data	*Text and graphs*
How data was acquired	*Dynamic light-scattering. Flow cytometry. High performance liquid chromatography (HPLC).*
Data format	*Analyzed*
Experimental factors	*Lipid nanocapsules obtained by solvent displacement technique with a core of olive oil and a shell composed by lecithin, poloxamers or their mixtures.* *The human lung-cancer cell line (A549) and the human leukemic monocytic lymphoma cell line (U937)*
Experimental features	*Electrophoretic mobility measurements. Uptake analysis of Coumarin 6-loaded nanocapsules. Determination of the encapsulation efficiency of Docetaxel.*
Data source location	*Dpt. of Applied Physics, Faculty of Science, University of Granada, Granada, Spain.*
Data accessibility	*Data are available within this article and are related to* [1]

2. Value of the data

- Electrophoretic mobility data of different lipidic nanocapsules with different surface composition allow the determination of the shell composition of these nanosystems.
- Data from experiments of cell uptake using two different cell lines in both serum free and complete medium conditions, will let other researchers to know that the nature of interactions of the same material in the presence or absence of proteins differs.
- The cytotoxicity experiments show how the dosage of docetaxel necessary to induce the same cytotoxic effect in cancer cells that free docetaxel is much lesser in loaded-nanocapsules.

3. Data, experimental design, materials and methods

In the following sections we will present a detailed description about how to synthesize some lipidic nanocapsules with potential applications as antitumor-drug delivery carriers. As demonstrated, it is possible to get valuable information about the nature of their surfaces by means of electrophoretic mobility measurements. Subsequently, once these particles are incubated with different cancer-cell lines in presence or absence of proteins, it is demonstrated a correlation between different cellular uptake patterns observed and the different nature existing in the particle surfaces. Finally, an analysis of the drug (docetaxel) release combined with a study of cytotoxicity is also shown.

3.1. Material preparation

Different lipidic nanocapsule systems with the same olive oil core and shells of different composition and different surface properties were prepared using two surfactants with a markedly different nature, a non-ionic poloxamer and a charged phospholipid. The synthesis procedure was based on an emulsion solvent extraction technique previously reported [1,2]. In this way, the shell of the **EP** nanocapsules was exclusively composed by phospholipids (lecithin); in the case of the **ME** nanocapsules was composed by a mixture of lecithin and poloxamer with a predominance of the first one; for the **MP** nanocapsules both surfactants were present in the shell with a predominance of poloxamer; and finally, the **PL** nanocapsules with the shell exclusively composed by poloxamer. Docetaxel-loaded lipid nanocapsules were formulated in the same way by dissolving docetaxel in the olive oil phase at a concentration of 0.1% (w/w), while Coumarin 6 lipid nanocapsules were formulated dissolving the dye in the olive oil phase at a concentration of 0.025% (w/w).

Download English Version:

https://daneshyari.com/en/article/175115

Download Persian Version:

https://daneshyari.com/article/175115

Daneshyari.com