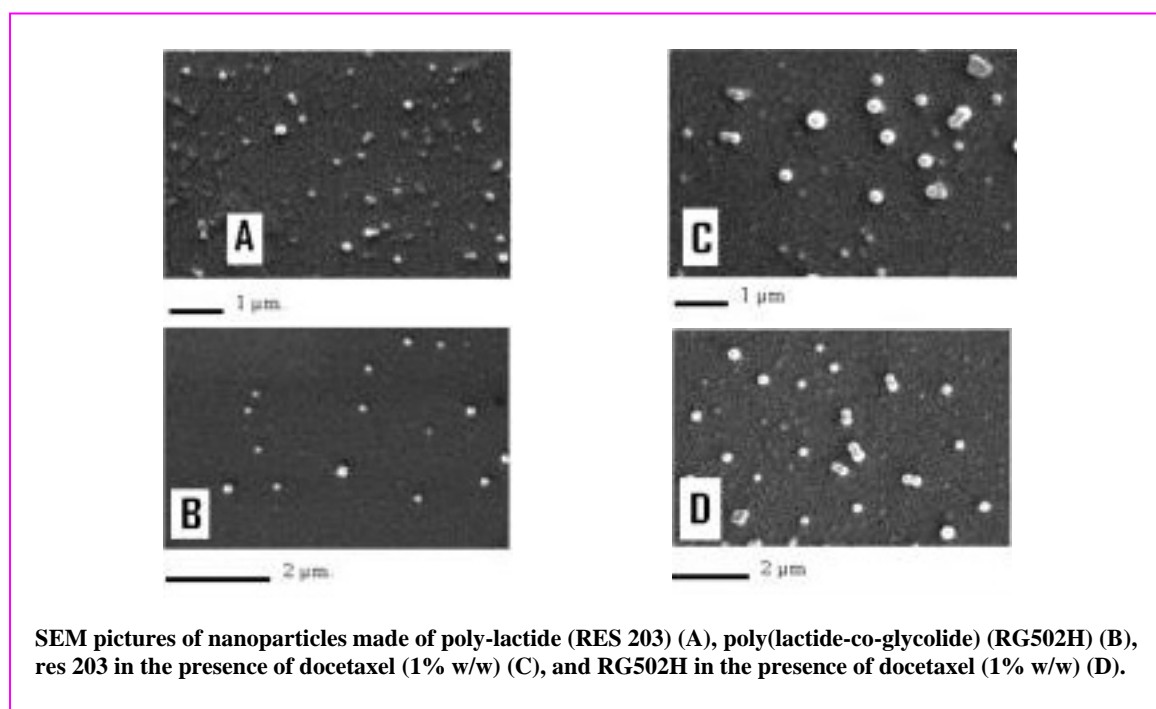


Polymeric nanospheres for anticancer therapy

Prof. Giovanni Puglisi – University of Catania – Consorzio TEFARCO Innova

Several studies have shown that both tissue and cell distribution profiles of anticancer drugs can be controlled by their entrapment in submicron colloidal systems, such as nanoparticles. The aim of this research is to obtain nanospheres entrapping taxanes, to increase the antitumor efficacy and solubility of these lipophilic drugs, while reduce their systemic side-effects.



1. Description of the product

Profile of distribution of anticancer drugs can be controlled if encapsulated in nanoparticle systems. Taxanes were carried in nanospheres based on preformed polymeric matrices -poly-lactic acid, poly-lactic-co-glycolic acid –biocompatible and biodegradable. The surface has been covered with PEG to increase the time of permanence in the bloodstream of nanoparticles. To avoid the aggregation of freeze-dried particles after resuspension, studies with different cryoprotectors have been made. Systems have been studied from a chemical and physical point of view. The prepared systems show a loading capacity between 20 and 30% and a size in the 150-300 nm range. In vitro release tests showed a sustained drug release until 30 days.

2. Innovative aspect of the product

This product is destined to all pharmaceutical companies which operate in the oncology field. To introduce this drug in pharmaceutical market, the capacity to deal on large scale is necessary. The realisation of a therapeutic innovative system, able to improve the therapeutic index of drugs on sale is a strategy followed by a large number of pharmaceutical industries. It is necessary that the materials used to prepare nanoparticles (for pharmaceutical use) have specific biological requisites and have obtained the approval of international organisms (i.e., FDA).

The realisation of DDS ensure advantages in terms of efficiency, reduction of side-effects etc...but can also increase the market share. 13% of pharmaceutical market, in fact, is reserved for DDS drugs, including many nanoparticle systems.

3. Main advantages of the offer

System realized in our laboratories:

- use a simple preparation procedure
- improve solubility of selected drugs
- eliminate effects of hyper-sensitisation due to the carrier actually used in commercial preparations (polysorbate 80, Cremophor EL)
- ensure a prolonged release of actives
- have a more selective action
- reduce side-effects and number of applications (compliance) in chemotherapy so they take patients to a better physical and psychological mood.
- improve the in vitro antitumor activity.

4. Technology key words

Taxanes, biocompatible nanospheres, poly-lactic-co-glycolic acid.

5. Current Stage of Development

In developing phase-tested in laboratory.

6. Intellectual Property Rights

The product of the research is still uncovered by patent.

Technical and scientific publications

T. Musumeci, L. Vicari, Ventura C., Gulisano M., Pignatello R., Puglisi G. "Lyoprotected nanospheres formulations for paclitaxel controlled delivery." Journal of Nanoscience and Nanotechnology, vol 6, pp. 1-8 (2006).

T. Musumeci, C. A. Ventura, I. Giannone, L. Montenegro, R. Pignatello, G. Puglisi. "PLA/PLGA nanoparticles for sustained release of Docetaxel." International Journal of Pharmaceutics, 325 pp.172-179 (2006).

C. Giannavola, C. Bucolo, A. Maltese, D. Paolino, M. A. Vandelli, G. Puglisi, V. H. L. Lee, M. Fresta. Influence of preparation conditions on acyclovir-loaded poly-D,L-lactic acid nanospheres and effect of PEG coating on ocular drug bioavailability. Pharm. Res. 20, N. 4, 584-590. 2003.

M. Fresta, G. Fontana, C. Bucolo, G. Cavallaro, G. Giammona, G. Puglisi. Ocular tolerability in vivo bioavailability of poly(ethylene glycol) PEG-coated polyethyl-2- cyanoacrylate nanosphere- encapsuled Acyclovir. J. Pharm.Sci. 90, 288-297, 2001.

CONTACT

info@biopharmanet.eu

Tel.: +39 0521 905073 Fax: +39 0521 905006