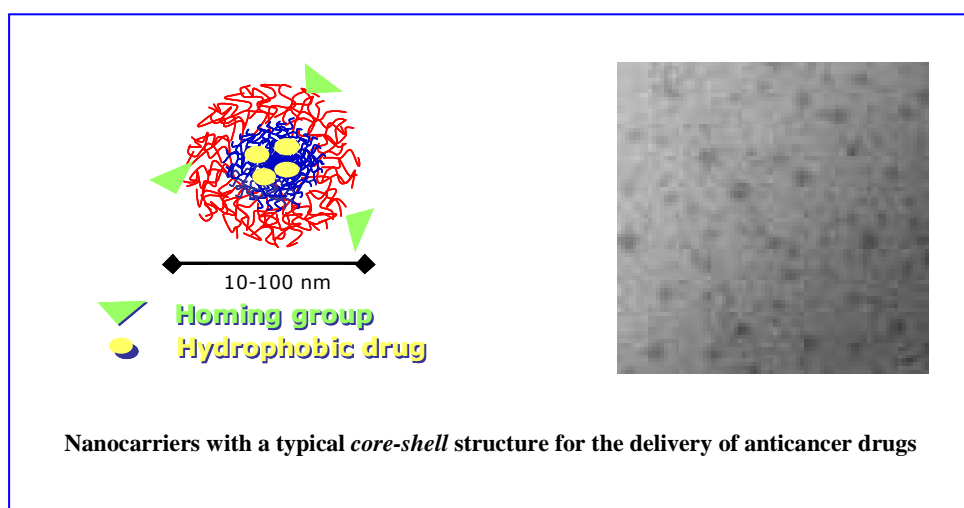


Biodegradable nanocarriers for the delivery of anticancer drugs

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The group of Pharmaceutical Technology at University of Naples has been developing biodegradable nanocarriers (nanoparticles, micelles) for the delivery in solid tumours of poorly soluble anticancer drugs. The main advantage of nanoencapsulated drug is a significant reduction of toxicity as well as an improved therapeutic effect due to a larger drug fraction able to reach target site. A novel technique to prepare nanoparticles with a hydrophilic shell and a hydrophobic core from thermoplastic-low melting amphiphilic co polymers has been developed. The method, named “melting-sonication”, allows the encapsulation of hydrophobic molecules without the use of toxic organic solvents. The group is looking for industrial partners or research institutes interested in applying this technology to develop specific applications.



1. Description of the product

The technology concerns the use of stealth nanocarriers based on biodegradable/biocompatible polymers and amphiphilic cyclodextrins for the delivery of anticancer drugs to solid tumours. The strategy can allow a significant decrease of toxicity and increased efficacy of intravenously administered anticancer drugs. The technology was successfully applied to retinoic acid and docetaxel. A novel solvent-free technique for the preparation of drug-loaded nanoparticles from low-melting thermoplastic polymers has been developed.

2. Innovative aspect of the product

The use of anticancer drugs is mainly limited by their high toxicity. The technology involves the formulation of anticancer drugs in biodegradable/biocompatible nanocarriers able to reach the pharmacological target through the EPR (enhanced permeability and retention) effect after intravenous administration. These systems allows an easy formulation of anticancer agents which are poorly soluble in aqueous media and a full

optimization of their pharmacological/toxicological profile. We have also developed a preparation technique for nanoparticles based on thermoplastic polymers which, differently from other methods, does not involve the use of toxic organic solvents and is of great interest for industrial scale-up.

3. Main advantages of the offer

The use of smart nanocarriers for the delivery of anticancer drugs allows a simple formulation for compounds poorly soluble in water and a targeting in solid tumors, thus improving the overall pharmacological/toxicological profile.

4. Technology key words

Nanoparticles; micelles; anticancer drugs

5. Current Stage of Development

Development phase – laboratory tested

6. Intellectual Property Rights

Partnership/other contractual agreements

Technical and scientific publications

Nanoscopic core-shell drug carriers made of amphiphilic triblock and star-diblock copolymers.
F. Quaglia, L. Ostacolo, G. De Rosa, M.I. La Rotonda, M. Ammendola, G. Nese, G. Maglio, R. Palumbo, C. Vauthier, *Int. J. Pharm.* 324 (2006) 56-66

L. Ostacolo, F. Ungaro, A. Miro, A. Mazzaglia, V. Villari, R. Darcy, F. Quaglia, M.I. La Rotonda
Docetaxel-loaded nanoparticles made of amphiphilic cyclodextrins
Innovation in drug delivery from biomaterials to devices, Napoli 30 settembre-3 ottobre 2007

Micelles Based on Amphiphilic PCL-PEO Triblock and Star-shaped Diblock Copolymers: Potential in Drug Delivery Applications F. Quaglia, L. Ostacolo, G. Nese, M. Canciello, G. De Rosa, F. Ungaro, R. Palumbo, M.I. La Rotonda, G. Maglio, *J. Biomed. Mater. Res A.* (2008) *In press*

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