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CV/ biography

Carmen Alvarez-Lorenzo (PhD Pharmacy, 1998) is Professor of Pharmaceutical Technology at the University of Santiago de Compostela. She was a postdoctoral fellow at Massachusetts Institute of Technology (MIT, USA) (1998-2001) and Ramón y Cajal researcher at the University of Santiago de Compostela (2001-2006). Her research interests include drug and gene nanocarriers, stimuli-responsive and imprinted networks, biomimetic materials, scaffolds, and drug-eluting medical devices. She has coauthored more than 300 papers, 30 book chapters, 17 patents, and +350 contributions to scientific meetings, and co-edited two books. She has supervised 21 PhD students and 8 more are on-going. h-index: 50 (Web of Science Core Collection); 52 (Scopus); 61 (Google Scholar). She is a member of a number of international committees and editorial advisory boards. Activities of her research group can be followed in the web site https://www.idfarmausc.es/en.

POLYMERIC MICELLES FOR TOPICAL TREATMENT OF OCULAR DISEASES

The eyes can suffer a variety of diseases, but their treatment is still a challenge due to the numerous anatomical barriers and eye defense mechanisms. The access of drugs through the blood stream is limited by the blood-ocular barriers. Periocular and intraocular injections may allow in situ management of diverse ocular pathologies, but the need of attenuating risks demands the development of more patient-friendly formulations. Topical formulations, mainly eye drops, are comfortable and safe, but only 1-10% of the dose can penetrate into the eye structures. Such poor ocular bioavailability is caused by low cornea permeability, short residence time, rapid tear fluid turnover, and efflux pumps. To overcome these hurdles, a variety of nanocarriers are being investigated. This talk focuses on the advantageous performances that polymeric micelles may offer for both anterior and posterior segments treatments [1]. A variety of amphiphilic polymers exhibit spontaneous self-assembly into nanomicelles that can encapsulate hydrophobic drugs and withstand the sterilization protocols and the subsequent dilution in the lachrymal fluid without premature disassembly. Moreover, polymeric micelles favor drug partition toward the corneal epithelium while the unimers may inhibit efflux pumps. Prolonged permanence on the ocular surface can be achieved through in situ gelling phenomena. The drug-loaded polymeric micelles can penetrate through different pathways into the ocular structures and may reach the posterior segment of the eye through the conjunctival–scleral route. Relevant examples of nanomicelles for lipoic acid, acyclovir [2], cyclosporine and progesterone [3] ocular delivery are discussed, paying attention to the preclinical tests suitable for predicting in vivo performance.

References: [1] M. A. Grimaudo, et al. Expert Opin. Drug Deliv. 16 (2019) 397-413. [2] A. Varela-Garcia, et al. Int. J. Pharm. 552 (2018) 39-47. [3] A.M. Alambiaga-Caravaca, et al. Pharmaceutics 12 (2020) 702.

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