Nanostructured carriers for effective delivery of drugs to the back of the eye

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Drug delivery to the different compartments of the eye faces many challenges due to the peculiar structure, physiology and biochemistry of this organ presenting natural barriers that hinders the permeation of drugs to the target tissues. Topical treatment of eye diseases is currently achieved primarily by means of solutions, gels or ointments. While these formulations are technologically and economically convenient for the treatment of the anterior segment of the eye, they are not generally efficient for delivering of drugs to the retina. The limitations of topical administration are typically overcome by means of intravitreal injection or intraocular implants. A current example is the use of anti-neovascular agents in wet age-related macular degeneration, for which the delivery system is an intravitreal injection that comes along with a significant potential for infection, complications and the need for frequent reinjections. Challenges of the sort have driven the search for innovative drug delivery approaches paving the way to the exploitation of nanotechnology applications in ophthalmology. Indeed, the use of nanostructured drug delivery systems has proved to be extremely promising in the treatment of the pathologies affecting the eye. Successful preclinical development of nanostructured carriers for ocular drug delivery still requires further efforts to guarantee that technological innovation can be safely taken from bench to bedside.
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