Ocular Drug Delivery: The Pharmacologist Perspective

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Ocular drug delivery is one of the most challenging effort facing the ocular pharmacologists. Despite its apparent easy accessibility, the eye is well protected from foreign materials and drugs by several efficient mechanisms such as blinking, tear turnover, drainage, and barriers. These latter are impressive obstacles causing subtherapeutic drug levels at the tissue target, particularly at retinal level. Delivery of drugs to the posterior eye is challenging, and there is an increasing need for managing rapidly progressing for posterior eye diseases, such as diabetic retinopathy, age-related macular degeneration, and optic neuropathy (Bucolo et al.Ocular drug delivery: a clue from nanotechnology. Front. Pharmacol. 3:188. doi: 10.3389/fphar. 2012.00188). Ophthalmic drug delivery, more than any other route of administration, may benefit to a full extent from the characteristics of nano-sized drug particles. A multi-disciplinary approach (from pharmacology to ophthalmology and from biomaterial science to pharmaceutical science) will bring, very soon, to a clinical use of these innovative nanosystems for the pharmacological management of sight-threatening eye diseases.