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Di Huang, Ying-Shan Chen, Ilva D. Rupenthal

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Overcoming ocular drug delivery barriers through the use of physical forces

Di Huang, Ying-Shan Chen, Ilva D. Rupenthal*

Buchanan Ocular Therapeutics Unit, Department of Ophthalmology, New Zealand National Eye Centre, Faculty of Medical and Health Sciences, The University of Auckland, Private Bag 92019, Auckland 1142, New Zealand

*Corresponding author: Tel.: +64 9 9236386; Fax: +64 9 3677173. E-mail address: i.rupenthal@auckland.ac.nz (I.D. Rupenthal).

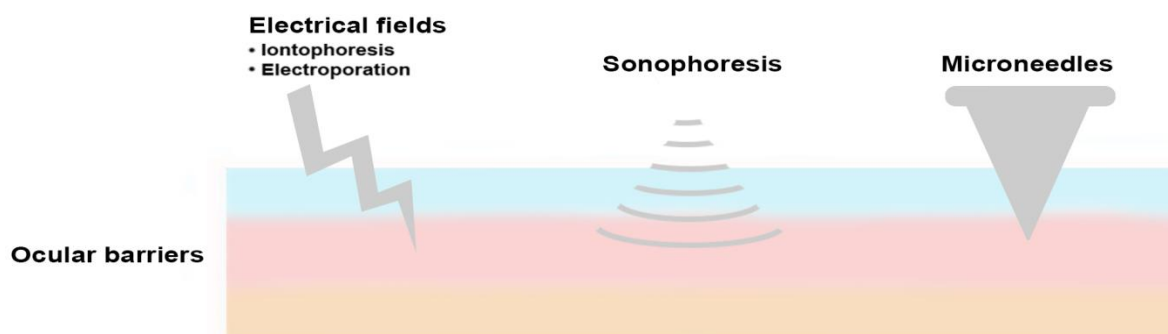
Abstract

Overcoming the physiological barriers in the eye remains a key obstacle in the field of ocular drug delivery. While ocular barriers naturally have a protective function, they also limit drug entry into the eye. Various pharmaceutical strategies, such as novel formulations and physical force-based techniques, have been investigated to weaken these barriers and transport therapeutic agents effectively to both the anterior and the posterior segments of the eye. This review summarizes and discusses the recent research progress in the field of ocular drug delivery with a focus on the application of physical methods, including electrical fields, sonophoresis, and microneedles, which can enhance penetration efficiency by transiently disrupting the ocular barriers in a minimally or non-invasive manner.

Keywords

Ocular drug delivery; Physiological barriers; Electrical fields; Iontophoresis; Electroporation; Sonophoresis; Microneedles

Graphical abstract



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