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Editorial

Ocular Pharmacotherapy: Evolution or Revolution?

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Pharmacotherapeutic management of the eye diseases poses challenge taken into account the natural anatomo-physiological barriers existing in the eye on the one hand and a patient compliance on the other hand, thus disturbing the main principle of drug therapy intended to reach a target in maximal therapeutic concentration. Over the years, and specifically during last year, various approaches have been attempted to solve the problem, thus underscoring the importance of addressing new, more effective drug delivery options, including user friendly format, when formulating treatment strategies.

An eye drop administration route remains a common one in ocular pharmacotherapy based on the following advantages: non-invasive, relatively convenient comparing to others, and avoids the untoward effects from a high systemic load. Despite mentioned evidences, eye drops bioavailability is very low, about 5%, that is why attempts are made to increase it by the different following methods: use of lyophilisate- a triple dose administered to the human eye with a single application; water-free vehicles based on semifluorinated alkane technology ,viscous vehicles and in-situ-forming hydrogels providing prolongated corneal contact time by conversion of instilled liquid form into gel on the eye surface due to some polymers (carbomers, celluloses, poloxamers , xyglucans, etc.) responding to temperature, pH and mucoadhesive polymer (chitosan); Gelfoam- an absorbable gelatin sponge presented in the form of a matrix system; Collagen shields- cross-linked hyaluronic acid–itaconic acid films loaded with an agent; Liposomes- vesicular or colloidal drug-carrier systems; Mini-tablets with a polymer as a carrier for antibacterial (ciprofloxacin, gatifloxacin, gentamycin), antiviral (acyclovir), ocular hypotensive (timolol) agents.

The latest revolutionized approach in the field is a nanopharmacology. Small particles (10 – 1000 nm) named nanoparticles reside at the delivery site deliberating the preloaded drug through diffusion, chemical reaction, polymer degradation or ion exchange offering targeted prolonged-action of therapeutic substance, but evidencing cytotoxic effect due to polyalkyl cyanoacrylate impact on the cell membrane.

Summarizing, currently available findings highlights that still exists a room for improvement, underscoring the feasibility of modified topical preparations of well-known and commonly used in ophthalmology drugs like antibiotics, nonsteroidal anti-inflammatory drugs, steroids, but likewise opening an avenue for incorporation of initially non-ophthalmic agents for special ophthalmic use (omega-3, etc.), therefore enlarging ocular pharmacotherapeutic landscape. Developing an understanding of the pharmacotherapeutic and pharmacokinetic mechanisms of ophthalmic drugs will certainly allow the formulation and implementation of new, more effective, and safe therapeutic procedures, to provide novel treatments to our patients, and hopefully we are closer to the cutting-edge advancement in ocular pharmacotherapy.

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