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#### **Mucoadhesive nanostructured lipid carriers for ophthalmic use**

Eszter L. Kiss, Mária Budai-Szűcs, Erzsébet Csányi

Institute of Pharmaceutical Technology and Regulatory Affairs, Faculty of Pharmacy, University of Szeged, Szeged, Hungary



Today, the development of an effective ophthalmic drug delivery system is a major challenge. The most commonly used ophthalmic preparations are eye drops, which have low bioavailability due to the complex structure and elimination mechanism of the eye [1].

Nanostructured lipid carrier (NLC) is second-generation solid lipid nanoparticles that contain a lipid matrix of mixed solid and liquid lipids. These systems are ideal for the incorporation of drugs with low water solubility, such as corticosteroids [2].

The aim of the study was to incorporate dexamethasone (DXM) into mucoadhesive polymer-containing nano lipid carriers to increase drug bioavailability. A 2<sup>3</sup> factorial experimental design was used in which the three factors were polymer, DXM, and emulsifier concentrations. The particle size, Zeta potential, polydispersity index, and Span value of the samples were analyzed. The biocompatibility of the formulations was assessed by human corneal toxicity tests and immunoassay analysis. Potential increases in bioavailability were analyzed using mucoadhesivity study, *in vitro* drug diffusion, and various penetration tests such as corneal-PAMPA model, human corneal cell penetration, and *ex vivo* porcine corneal penetration by Raman mapping. The results showed that DXM can be incorporated into stable mucoadhesive NLC systems that are non-toxic. Mucoadhesive NLCs can create a depot on the surface of the cornea that can predict better bioavailability.

#### References

- 1 das Neves, J. et al. Eds., New York: Springer (2014)
- 2 Kovacs, A. et al. Eur. J. Pharm. Sci., 99, 246-257 (2017)

*Supervisors: Mária Budai-Szűcs, Erzsébet Csányi*