NASAL DELIVERY OF MELOXICAM NANOPARTICLES

Alexandra Bocsik [1,2] – Levente Kürti [1,2] – Róbert Gáspár [3] – Emese Kápolna [4] – Mónika Vastag [4] – Szilvia Veszelka [2] – Mária A. Deli [2] – Piroska Szabó-Révész [1]

[1] Department of Pharmaceutical Technology, University of Szeged, Eötvös u. 6, 6720 Szeged, Hungary
[2] Laboratory of Molecular Neurobiology, Institute of Biophysics, Biological Research Centre of the Hungarian Academy of Sciences, Hungary
[3] Department of Pharmacodynamics and Biopharmacy, Faculty of Pharmacy, University of Szeged, Hungary
[4] Gedeon Richter Ldt., Hungary

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Novel formulations and sites of drug administration for systemic delivery offer opportunities to develop innovative pharmaceutical compositions. The nasal pathway represents an alternative route for non-invasive systemic administration of drugs, although the nasal epithelium forms a restricting barrier [1].Nanonization of drugs increases their solubility and permeability through mucosal barriers. Previously we have investigated the preparation process of meloxicam (MEL) nanoparticles by co-grinding with polyvinylpyrrolidone [2]. The influence of different parameters on the particle size was studied, the optimiziation of the process was performed, and the physico-chemical properties of MEL nanoparticles were characterised. We also established and characterised an *in vitro* cell culture model of the nasal epithelial barrier to test the toxicity and permeability of innovative nasal formulation [3]. The aim of the present study was to investigate a pharmaceutical composition containing MEL nanoparticles for nasal delivery by *in vitro* and *in vivo* methods. Nanonization increased the solubility of MEL, and the extent of dissolution; complete dissolution of MEL was observed within 15 min. Real-time monitoring of cell viability by cell microelectronic sensing technique indicated no sign of disruption of the integrity of human RPMI2650 nasal epithelial cell layers. The lack of change in cell index suggests that MEL nanoparticles are not toxic and cross the cell layers via the transcellular pathway. The flux of MEL through the epithelial cell layers was significantly slower than in the case of the Franz cell diffusion model, reflecting the complexity of the nasal epithelial barrier. Pharmaceutical compositions containing MEL in nanonized form were tested on Sprague-Dawley rats. The *in vivo* data showed a favourable pharmacokinetical profile of MEL nanoparticles after intranasal administration.

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References

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