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#### Nose-to-brain applicability of Meloxicam-loaded Soluplus polymeric micelles

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Non-steroidal anti-inflammatory agents, such as meloxicam (MEL), play a key role in the treatment of the Alzheimer's Disease-associated neuroinflammation which leads to the loss of physiological functions.

Our aim was to develop MEL-loaded Soluplus<sup>®</sup> polymeric micelles and to test the application of them for the auspicious nose-to-brain drug delivery pathway in order to be a potential therapeutical nano system in the therapy of neuroinflammation.

To decrease the need of in vivo testing, various in vitro methods were used to investigate dissolution and permeability throughout this pathway. In vitro drug release at nasal conditions were tested in simulated nasal electrolyte solution. Cellular uptake and viability were investigated on human RPMI 2650 nasal epithelial cells. Using rapid equilibrium dialysis and parallel artificial membrane permeability assay, passive diffusion was investigated as the determining transport through penetration of the blood-brain-barrier. IVIVC was calculated based on these results.

Based on the in vitro results, we found that the nanoparticles tend to follow this pathway more favourably compared to the initial MEL. The formulation is viable to nasal epithelial cells with high trans-epithelial transport capacity. Rapid release kinetics paired with high flux and permeability values were determined at axonal conditions. A significantly higher simulated cerebral concentration of MEL was detected in the case of the nanoparticles.

In conclusion, it can be claimed that by encapsulating MEL into a polymeric micelle, prosperous pharmacokinetics can be achieved which can be used in the treatment of neuroinflammation.

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