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Drug Discovery Meet 2020-Olanzapine mesoporous nanostructured lipid carrier: Characterization and Physiologically based Pharmacokinetic Modeling

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Abstract :

A promising approach has been emerging to enhance dissolution of hydrophobicdrugsby encapsulation in mesoporous silica materials. Olanzapine is a practically insolubleantipsychotic drug which is subjected to excessive first pass effect and shows inadequate oral bioavailability. Therefore, mesoporous silica was used to improve bioavailability of olanzapine incorporated in nano-structured lipid carriers (NLCs). These systems were characterized for their particle size, polydispersity index (PDI), Zeta potential, entrapment efficiency (EE) and differential scanning calorimetry (DSC) as well asits release profile.The optimized NLC system (F4) displayed nano-spherical particles (120.5 nm), possessed high entrapment efficiency (88.46 %) and the highest percentage of drug released after six hours (75.13%). The biological performance of the optimized system was assessed in comparison with the drug suspension in healthy albino rabbits. The optimized system showed significantly ($P < 0.05$) prolonged MRT (8.47 h), higher Cmax (22.12±0.4ng/ml) and Tmax (2.0 h) values compared to drug suspension.Physiologically based pharmacokinetic (PBPK) model was simulated and verified, then the predicted pharmacokinetic results were compared to the results of the in vivo study. All the predicted results were within 0.5-2-fold of the observed and the reported data. To seta conclusion,in vitroresults as well as in vivopharmacokinetic studyand PBPK data showed an enhancement in bioavailability ofthe optimized NLCs systemover the plain drug suspension. These results provedthe potential of incorporated NLC mesoporous silica for a significant improvement in oral bioavailability of olanzapine.

Biography:

Amira M. Ghoneim has completed her PhD at the age of 34 years (2015) from Department of Pharmaceutics and Industrial Pharmacy in Faculty of Pharmacy, Cairo University. Currently, she is a Lecturer of Pharmaceutical Technology and Pharmaceutics at Faculty of Pharmaceutical Sciences and Pharmaceutical Industries, Future University in Egypt (FUE). Her research interests focus on nanotechnology, pharmacokinetics, simulation and pharmaceutical formulations.

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