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Self-nanoemulsifying self-nanosuspension (SNESNS) for enhancing oral bioavailability of Diacerein: Simultaneous portal blood absorption and lymphatic delivery

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The application of self-nanoemulsified drug delivery system (SNEDDS) to improve bioavailability of diacerein (D) has been hampered by its large dose and limited solubility. This work aimed to prepare diacerein loaded self nanoemulsifying self nanosuspension (D-SNESNS) containing high drug load. D-SNESNS was prepared by homogenizing D into MaisineTM-based SNEDDS that gave the highest drug solubility. D-SNESNS was evaluated for particle size, zeta potential and *in vitro* dissolution. Significant increase of D solubility was observed from D-SNESNS (309mg/mL) than traditional SNEDDS (162mg/mL) due to the spontaneous simultaneous formation of nano-emulsion and nanosuspension (top-down approach). When exposed to water with mild agitation, the drug microparticles in D-SNESNS are temporarily surrounded by unsaturated aqueous layer (containing optimum concentrations of surfactant and co-solvent) that facilitates the erosion of the suspended drug particles into nanosized ones. Nanoemulsion-based nanosuspension (NENS) was confirmed using transmission electron microscopy and particle size analysis. D-SNESNS equivalent to 50 mg D exhibited complete and very rapid dissolution after 15 min in phosphate buffer pH 6.8 due to the existence of D as solubilized molecules inside nanoemulsion globules and nanosized suspended drug particles forming D-NENS. The relative bioavailabilities of diacerein from D-SNESNS in rats with normal and blocked chylomicron flow were about 210% and 164%, respectively in comparison to aqueous D suspension. The significant increase in the dissolution, portal absorption and lymphatic delivery of D propose that SNESNS could be promising to improve oral bioavailability of poorly water soluble drugs that have limited drug load in SNEDDS.

Biography

Emad B Basalious has completed his PhD and Post-doctoral studies from Faculty of Pharmacy, Cairo University. He is an Associate Professor in department of pharmaceutics and Industrial pharmacy, Cairo University. He has published more than 20 papers in reputed journals. He is working as R&D technical consultant for several Egyptian pharmaceutical companies.

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