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Nanosuspensions: An Enhanced Bioavailability of Pulmonary Drug Delivery

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In the recent past drug discovery towards identification of poorly soluble drug molecules as lead candidates has come up as the frontier area of research interest. Formation of such molecules can be challenging and demands the use of novel technologies. A number of drug delivery technologies such as solid dispersions, prodrug approach, SMEDDS, cyclodextrins, nanoparticles are the recent trends in research.

As per FDA a nanoparticulate drug is not considered as generic or approved product therefore it is patentable and considered as new drug, because nanoparticulate drug is not bio-equivalent to a microcrystalline or solubilized form of the same drug, administered at the same dosage. Nano particles play a key role in increasing the saturation solubility, and consequently an increase in the dissolution rate of the compound due to small size with greater specific surface area.

Pulmonary delivery enables local delivery of therapeutics targeting respiratory diseases such as asthma, COPD and cystic fibrosis. The larger pulmonary surface areas in epithelial layer, rich blood supply allows fast absorption and fast onset of drug which makes pulmonary delivery attractive for systemic delivery system.

Nanosuspensions similar to nanoparticles are liquid dispersions of solid drug stabilized by polymer and or surfactant show enhanced adhesiveness to tissues. The tendency of the particles to stick to the mucosal surfaces at the absorption site over an extended period of time achieves an enhanced absorption rate. The dissolution time of nanosuspensions compared to microparticulate suspensions is increased, a prolonged residence time at the site of absorption would be still beneficial for the uptake of anti-asthmatic drugs, as microparticles will be transported out of the lung by cilia movement, where as nanoparticle can adhere to a longer time on the mucosal surface leading to the increased e absorption of drug. Nanosuspension generally posses a very low fraction of microparticles, which reduces undesired deposition of particles in oral cavity and pharynx and decreases local and systemic side effects of the drug. Formulating of nanosuspensions are mainly of two types top down and bottom up technology. The bottom up technology involves dissolving drug in a solvent which is then added to non solvent to precipitate the crystals. The top down technologies include milling and high pressure homogenization.

Biography

Dr.K.Vijaya Sri obtained her Ph.D from College of Pharmaceutical Sciences, Andhra University., India. She is presently working as an Associate Professor at Malla Reddy College of Pharmacy. She has published many research papers in reputed journals and her major area of research interests are poorly soluble drugs, nanosuspensions, pellets and bioanalytical techniques of drugs.