NANOTECHNOLOGY SOLUTIONS FOR DELIVERY OF POORLY SOLUBLE DRUGS

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Abstract

Nanotechnology is revolutionizing the healthcare sciences by improving the different compartments of drug delivery. Drug reformulations, nano-carriers developments, drug solubility enhancements and in vivo drug tracings are some examples of nanotechnological progresses in life sciences. One of the main fields of interest is cancer therapy with nanomedicine. Although most of cancer treatment drugs have satisfactory biological activity, their water solubility is very poor. Due to their poor water solubility, they should be generally administered as a mixture with co-solvents or solubilizers. These chemical additives are adversely harmful for the biological tissues of patients. They may cause serious side-effects such as irritation, nephrotoxicity and neurotoxicity. Therefore, much research is performed to reformulate poorly soluble drugs using alternative approaches. The aim of developing an alternative drug formulation is to eliminate the drawbacks of the current formulation and to achieve reduced toxicity, easier administration, greater patient convenience and maximization of drug activity. In this paper, we investigate into the solutions proposed by Nanotechnology to deliver poorly soluble drugs in vivo with reasonable biological activities. These routes include the addition of water miscible solvent in which the drug has a good solubility in, solution of drug in oil and then separating the solution in water to form a stable O/W emulsion, solubilizing the hydrophobic drug in a hydrophilic environment comprising of a micelle, encapsulating the drug in liposomes and finally using cyclodextrins to make inclusion complexes with drugs.

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