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Nanostructured Lipid Carriers: A Novel Generation of Solid Lipid Nanoparticles

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Nanostructured Lipid Carriers (NLC) are the new generation of lipid nanoparticles, attracting major attention as novel colloidal drug carriers. NLC were developed to overcome the limitations associated with the SLN. SLN consist of solid lipids, while NLC consist of a mixture of specially blended solid lipid (long chain) with liquid lipid (short chain), preferably in a ratio of 70:30 up to a ratio of 99.9:0.1. Commonly observed disadvantages of SLN include limited drug-loading capacity, drug expulsion during storage, and relatively high water content in the dispersions (70–99.9%). As compared to SLN, NLC have a higher drug-loading capacity for a number of active compounds, and avoid or minimize potential expulsion of active compounds during storage. For a number of drugs, the solubility of liquid lipid is higher than that of solid lipid, which enhances drug-loading. These carriers are composed of physiological and biodegradable lipid, exhibiting low systemic toxicity and low cytotoxicity. SLN and NLC revealed several advantages compared to the other colloidal carrier systems. They provide a controlled drug release and an increase in chemical stability of the incorporated drugs. Moreover, they are safe carriers which can be produced easily on large scale. NLC have also a lower water content of the particle suspension and a less tendency of unpredictable gelation.