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Advances in Lipid-Based Drug Delivery Systems: Formulation Strategies, Industrial Applications, and Regulatory Perspectives

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Abstract

Lipid-based drug delivery systems (LBDDS) have emerged as a promising approach for enhancing drug solubility, bioavailability, and targeted delivery. These systems provide site-specific and controlled drug release for both small and large molecules, overcoming challenges associated with poorly water-soluble drugs. Due to their biocompatibility and adaptability, LBDDS have found applications in oral, topical, pulmonary, and parenteral drug formulations. Advances in formulation strategies, including nanoemulsions, liposomes, solid lipid nanoparticles, and self-emulsifying drug delivery systems, have improved therapeutic efficacy. This review explores the industrial applications, key formulation strategies, and regulatory considerations for the successful commercialization of LBDDS.

Keywords

Lipid-based drug delivery systems, bioavailability, nanoemulsions, liposomes, solid lipid nanoparticles, self-emulsifying drug delivery systems, controlled drug release, pharmaceutical formulations, regulatory aspects.

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