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LIPOSOME-BASED DRUG AND VACCINE DELIVERY SYSTEM IN VETERINARY APPLICATION: RECENT ADVANCEMENT AND FUTURE TRENDS – A REVIEW

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Abstract

Liposomal technology has become a significant advancement in the field of veterinary therapeutics, offering increased performance and safety in the delivery of treatments such as antibiotics, anti-inflammatories, and anti-cancer medications. With their superior stability, improved encapsulation of drugs, and more efficient transport mechanisms, nanoparticles are becoming a key tool for future uses in veterinary applications. This review article explores the latest developments and potential future applications of liposomes for delivering drugs and vaccines in veterinary medicine. Furthermore, we delve into the potential of liposomes for ground-breaking applications. These include delivering drugs precisely to specific tissues and organs, alongside the incorporation of immunomodulatory agents to boost vaccine effectiveness in veterinary medicine. It will emphasize the critical role of liposomes in the administration of vaccines and pharmaceuticals, as well as their potential as nanoscale carriers in veterinary applications. It will highlight the expanding significance of liposomes in veterinary medicine and delve into their potential as a foundational technology for advancing animal health management strategies.

Key words: liposomes, nanoparticles, drug delivery system, vaccine delivery system, veterinary applications

In the dynamic field of modern healthcare, the utilization of technology has emerged as a fundamental aspect of both human and veterinary medical practices. The veterinary pharmaceutical industry supplies a broad range of pharmacological agents for diverse types of farms, companions, and laboratory animals (Sadozai and Saeidi, 2013). The past several decades have witnessed a surge in the veterinary pharmaceutical industry. A desire to improve the well-being of companion and wild animals, coupled with the need for safer, more productive, and high-quality food sources are several factors that are contributing to the increase in demand in the industry (da Silva et al., 2020).

Veterinary medicine plays a crucial role in safeguarding the health of billions of livestock and poultry worldwide, with estimates suggesting over 3 billion livestock and 50 billion poultry rely on it (Anon, 2019). This industry's economic significance is substantial, with the global animal medicine market exceeding US$33.8 billion in 2018. Reflecting this trend, in the United States alone, antibiotic use in animals reached nearly 12 million kilograms (kg) in the same year. Further highlighting its growth trajectory, the market has experienced a significant increase from $33.8 billion in 2018 to $44.2 billion by 2020 (Scott et al., 2020). Veterinary medicines play a crucial role in animal healthcare, but they can also carry risks. Therefore, a thorough and responsible evaluation is essential before their market introduction. Additionally, a safe, controlled distribution system minimizes potential side effects and ensures animal well-being (Lúcia et al., 2020).