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# Antibiotic Drug Delivery System for the Intracellular Targeting of Bacterial Pathogen

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**Abstract:** *Treatment of intracellular infections remains a serious pharmaceutical issue even with the introduction of a significant number of novel medicines. These specialized frequently have sub therapeutic antibiotic concentrations, necessitating the frequent administration of large antibiotic dosages. Not only is this expensive, but it could also have more systemic or localized adverse effects. Treatment for intracellular bacterial diseases is challenging due to the resistance of commonly used antimicrobial drugs such as macrolides, aminoglycosides, β-lactamases, and fluoroquinolones to enter, accumulate, or stay inside mammalian cells. The growing issue of antibiotic resistance makes treating illnesses brought on by these drugs increasingly difficult. Targeted drug delivery into the cell compartment that is the most vulnerable to effects of the appropriate drug is a difficult issue, and a proper resolution can greatly improve the therapeutic agents' delivery's effectiveness and minimize its negative effects. A drug delivery system that meets the requirements for usage in pharmaceutical and biomedical formulations should have multiple features, including antibacterial activity, biodegradability, and biocompatibility. Through this approach, outdated antibiotics rendered ineffective due to toxicity or resistance can be revived, last-line therapy antibiotics can be saved by raising the therapeutic index, the antimicrobial spectrum of antibiotic scaffolds that failed due to membrane permeability issues can be expanded, and the time between the emergence of new antibiotics and the increasingly drug-resistant pathogens can be shortened. The Purpose of this article is, to outline the key research directions for the development of drug delivery mechanisms for the intracellular release of antibiotics, as well as the limits of each class of antibiotics in targeting intracellular bacteria. This more efficient use of antibiotics may mitigate their downsides and provide the foundation for decreasing the present time required by traditional therapies. This will be concentrate on the role of DDS as a potential tool against intracellular microorganisms.*

**Keywords:** Intracellular targeting bacterial pathogen, Drug Delivery System, Antibiotic classes, Mechanism of cellular Targeting Antibiotic, Antibiotic Transporters for Intracellular Activity

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