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Drug Delivery System and its Types

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Description

Controlled drug delivery systems can help keep medication levels within a certain range, reduce the number of administrations needed, get the most out of the treatment, and improve patient compliance. While these benefits can be significant, there are some drawbacks to consider, such as the materials' potential toxicity or non-biocompatibility, undesirable degradation by-products, any surgery required to implant or remove the system, the risk of patient discomfort from the delivery device, and the higher cost of controlled release systems compared to traditional pharmaceutical formulations. The ideal drug delivery system should be inert, biocompatible, mechanically strong, patient-friendly, capable of high drug loading, safe from inadvertent release, easy to administer and remove, and simple to build and sterilize.

Many of the first controlled-release systems were designed with the intention of achieving a delivery profile that would result in a high blood level of the drug for an extended length of time. The drug level in the blood with traditional drug delivery systems rises after each injection of the drug and then drops until the next dose. The crucial element to remember with traditional medication administration is that the agent's blood level should stay between a maximum value, which could be hazardous, and a minimum value, beyond which the medicine is no longer effective.

The modified-release (MR) dosage form is defined by the United States Pharmacopoeia (USP) as "one in which the drug release characteristics of time course and/or location are chosen to achieve therapeutic or convenience objectives not offered by conventional dosage forms such as solutions, ointments, or rapidly dissolving dosage forms." Extended-release (ER) dosage forms are one type of MR dosage form. They allow for at least a 2-fold reduction in dose frequency or a significant gain in patient compliance or therapeutic performance when compared to traditional dosage forms (a solution or a prompt drug-releasing dosage form) "Extended release" has been referred to as "controlled release (CR)", "prolonged release", "sustained or slow release (SR)" and "long-acting (LA)". Controlled drug delivery occurs when a drug is delivered at a predetermined rate for a set amount of time, either locally or systemically.

Sustained Drug Release. Sustained release allows delivery of a specific drug at a programmed rate that leads to drug delivery for a prolonged period of time. Prolongedrelease products release the active ingredients slowly and work for a longer time. A prolongedrelease drug delivers a dose of a medication over an extended period of time. The prolonged release or sustained release systems, which only prolong therapeutic blood or tissue levels of the drug for an extended period of time, cannot be considered as controlled release systems by this definition. They differ from rate-controlled drug delivery systems that can accurately target in vivo release rates and durations based on simple in vitro tests. The difference between control release and sustained release, controlled drug delivery delivers the drug to a predetermined rate in a fixed period of Control release is a complete release of zero, which is an unrelated drug release with density. The duster radiation form is defined as the type of part D. The H. (Start dose) of the drug is immediately released to achieve the desired therapeutic response, and the remaining (maintenance dose) is slowly released by the long and the therapeutic agent is released, but can not be kept constant. Sustainable release means slow release of drugs over a fixed period of time. It may not be controlled. On the other hand, drug targeting can be regarded as a form of controlled.

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