

Challenges Over the Advantages of Oral Dosage Forms and their Enhancement Strategies

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Short Communication

Received: 26-Feb-2024, Manuscript No. DD-24-131143; **Editor assigned:** 28-Feb-2024, Pre QC No. DD-24-131143(PQ); **Reviewed:** 13-Mar-2024, QC No. DD-24-131143; **Revised:** 20-Mar-2024, Manuscript No. DD-24-131143(R); **Published:** 27-Mar-2024,
DOI:10.4172/resrevdrugdeliv.8.1.010

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Citation: Maleki F. Challenges Over the Advantages of Oral Dosage Forms and their Enhancement Strategies. Res Rev Drug Deliv. 2024;8:010.

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ABOUT THE STUDY

Oral drug delivery is the most common and preferred route for administering pharmaceuticals due to its ease of use, cost-effectiveness, and patient compliance. However, there are challenges in delivering drugs orally, such as degradation in the harsh acidic environment of the stomach, poor solubility or permeability of the drug, and variability in absorption rates. To overcome these challenges, several strategies have been developed to enhance the oral delivery of drugs.

One strategy that is commonly used is the use of pharmaceutical excipients to improve the stability, solubility, and permeability of the drug. Excipients such as surfactants, solubilizers, and stabilizers can enhance the dissolution and absorption of poorly soluble drugs. For example, solid dispersion technology can be used to improve the solubility of hydrophobic drugs by dispersing them in a water-soluble matrix. Additionally, the use of permeation enhancers can improve the intestinal permeability of drugs, leading to increased absorption rates.

Another strategy to improve oral drug delivery is the use of drug delivery systems such as liposomes, nanoparticles, and micro particles. These systems can protect the drug from degradation in the gastrointestinal tract, provide controlled release of the drug, and enhance drug absorption. Liposomes, for example, are phospholipid vesicles that can encapsulate drugs and protect them from enzymatic degradation [1,2].

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Nanoparticles, on the other hand, can improve the bioavailability of poorly soluble drugs by enhancing their solubility and permeability. In recent years, the use of nanotechnology in oral drug delivery has gained popularity due to its ability to overcome the limitations of conventional drug delivery systems. Nanoparticles can be designed to target specific sites in the gastrointestinal tract, release drugs in a controlled manner, and improve drug stability. For example, polymeric nanoparticles can be designed to release drugs in a pH-dependent manner, allowing for targeted delivery to specific regions of the gastrointestinal tract.

In addition to the use of pharmaceutical excipients and drug delivery systems, other strategies such as prodrug design and enzyme inhibitors can also improve oral drug delivery. Prodrugs are inactive forms of drugs that are metabolized in the body to release the active drug. By modifying the chemical structure of the drug, prodrugs can enhance drug solubility, stability, and absorption. Enzyme inhibitors, on the other hand, can block the activity of enzymes in the gastrointestinal tract that degrade drugs, leading to increased drug bioavailability. Oral drug delivery remains one of the most common and convenient routes for administering medications [3,4]. It offers advantages such as patient compliance, ease of administration, and non-invasiveness. However, challenges such as low bioavailability, degradation in the gastrointestinal tract, and variability in absorption hinder the optimal delivery of drugs via this route. This article explores various strategies employed in oral drug delivery to overcome these challenges and enhance therapeutic efficacy. Overall, oral drug delivery continues to be a key area of research in the pharmaceutical industry, with a growing emphasis on developing innovative strategies to overcome the challenges associated with delivering drugs orally. By utilizing pharmaceutical excipients, drug delivery systems, nanotechnology, prodrug design, and enzyme inhibitors, researchers are able to enhance the effectiveness of oral drug delivery and improve patient outcomes. As technology continues to advance, it is likely that even more innovative strategies will be developed to further optimize oral drug delivery and enhance the efficacy of pharmaceutical treatments.

Oral drug delivery continues to evolve with innovative strategies aimed at overcoming challenges and improving therapeutic outcomes. From enhancing bioavailability and overcoming gastrointestinal barriers to achieving sustained release and targeted delivery, a diverse array of approaches is employed to optimize drug delivery via the oral route. By leveraging these strategies, researchers and pharmaceutical scientists can develop more effective oral drug formulations, ultimately benefiting patients with safer, more efficient treatments [5,6].

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