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Chapter 1: Gastroretentive Nanocarrier in Drug Delivery System

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Abstract

The usage of gastro-retentive drug delivery systems (GRDDS) has recently shown great growth in the field of oral medication administration. In recent years, substantial scientific and technological advancements have been made in the rate of sustained oral drug delivery systems. This development has successfully addressed physiological barriers such as short gastric residence time (GRT) and unexpected gastric emptying time (GET). Drugs that degrade in the gastrointestinal tract or are not absorbed in enough amounts to yield the intended therapeutic effects are frequent problems. Nanocarriers have been a popular option in recent years, offering a good substitute for oral drug delivery. Given the hostile environment of the gastrointestinal (GI) tract, the process of forming medications into nanoparticles may improve drug stability there. This method also provides the chance to enhance drug solubility and bioavailability by targeting particular GI tract locations. Furthermore, sustained release of drugs in the GI tract can be achieved through this method. It is advised to use effective nanocarriers, such as lipid and polymeric nanoparticles, microspheres, microcapsules, dendrimers, quantum dots, and nanoemulsions, to increase the treatment's effectiveness. The amazing developments in the gastro-retentive nanocarrier used for medication administration are highlighted in this chapter. This chapter highlights the principles, mechanisms, types, and applications of gastroretentive nano carriers, along with recent advancements, challenges, and future perspectives.

Keywords: Gastroretentive drug delivery, nanotechnology, bioavailability, floating drug delivery, mucoadhesion, controlled release.

1.1 Introduction

The most desirable and most viable drug delivery route is by mouth as the method is non-invasive and easy to use, patient-compliant, and cost-effective. It takes up an almost 60-70 percent of all marketed formulations since it does not involve discomfort caused

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