CHAPTER 4

THE ROLE AND IMPORTANCE OF SOLID DISPERSIONS IN IMPROVING THE BIOAVAILABILITY PROFILE OF DRUGS

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INTRODUCTION

Bioavailability is a concept that refers to the passage of an active substance from the pharmaceutical dosage form into the systemic circulation when administered to the organism via internal or external administration routes. In practice, it refers to the amount of an administered drug dose that reaches the bloodstream in the form of the active ingredient and then produces a therapeutic effect in the body (1). Various factors such as the physical and chemical properties of the drug, the way the pharmaceutical dosage form is administered, and the interaction of the active substance with other substances in the formulation affect the bioavailability profile of drugs. It is very important for its effectiveness that the active substance expected to have a therapeutic effect is present in the required amount in circulation. Therefore, the bioavailability profile of the drug is one of the most important considerations when designing a dosage form. In order for the drug to enter the bloodstream and take effect, its absorption, distribution and metabolism in the body can change the amount of the active substance. The solubility of a drug is one of the most important physicochemical parameters that govern its pharmacological and biopharmaceutical profiles of absorption, distribution, metabolism and excretion (2). When designing a dosage form, the therapeutic dose of the drug and losses from pharmacokinetic events must be considered (3). Solid dis-

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DOI: 10.37609/akya.3840.c1155

CONCLUSION

APIs with low water solubility characteristics face significant obstacles in formulation development processes. The technique of preparing solid dispersions of drugs is an effective technological approach developed to increase the therapeutic efficacy of active substances with limited solubility and therefore bioavailability. Solid dispersions essentially disperse the API in a carrier matrix in amorphous form, increasing its solubility and optimizing the dissolution rate, thus improving gastrointestinal absorption of the drug. New generation solid dispersion preparation techniques such as Kinetisol®, developed in this field in recent years, are solvent-free and provide high energy in a short time, and offer significant advantages in the production of amorphous solid dispersions of compounds that are difficult to process by heat treatment. Thanks to these technologies, successful formulations can be developed in terms of both processability and product stability by optimizing polymer selection and excipient use. In conclusion, solid dispersions are among the scientifically proven and increasingly adopted strategies in pharmaceutical product development processes for increasing the bioavailability of poorly soluble drugs. It is thought that the integration of innovative technologies in this field will enable the development of more effective dosage forms that increase patient compliance in the future.

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