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# Drug release kinetics in polymeric delivery systems

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This article aims to provide an overview of structure-function relationships of selected non-degradable and degradable polymers as drug delivery matrices. The release kinetics of selected drug compounds from various material systems will be discussed in case studies. Recent progresses in the mathematical models based on different transport mechanisms will be highlighted. Both non-degradable and degradable polymers have found wide applications in the controlled delivery field. Studies on drug release kinetics provide important information into the function of material systems. To elucidate the detailed transport mechanism and the structure-function relationship of a material system, it is critical to bridge the gap between the macroscopic data and the transport behavior at the molecular level. The advancement has led to the rapid development of novel materials with increasing complexity and functions. Specifically, Fick's law of diffusion provides the fundament for the description of solute transport from polymeric matrices. Fickian diffusion refers to the solute transport process in which the polymer relaxation time (tr) is much greater than the characteristic solvent diffusion time (td). When tr ≈ td, the macroscopic drug release becomes anomalous or non-Fickian. Recent developments in release kinetics and mathematical modeling of selected non-degradable and biodegradable polymer systems will be highlighted.

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