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Editors

Long Acting Injections and Implants

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Chapter 4
Anatomy and Physiology of the Injection Site: Implications for Extended Release Parenteral Systems

Arlene McDowell and Natalie J. Medlicott

Abstract Understanding how the biological environment contributes to drug release following administration is increasingly becoming a focus for drug delivery research. Achieving therapeutic levels of a bioactive relies on appropriate drug release following parenteral administration that must be complimentary to subsequent drug absorption, distribution, metabolism and elimination. The biological characteristics of the injection site can have an influence on the drug absorption process. In this chapter the intravenous, intramuscular and subcutaneous routes for parenteral administration of extended release products will be discussed.

4.1 Introduction

There are many extended and controlled release injectable systems used to deliver drugs in human and veterinary medicine [1–5]. These systems are prepared from a variety of biocompatible materials and aim to release drug for an extended period following injection or implantation. Drug release is governed by the design of the dosage form, although the biological environment often influences drug release [6–9]. Understanding how the biological environment contributes to drug release following administration is increasingly becoming a focus for drug delivery research.

Extended release parenteral delivery systems range from relatively simple aqueous suspensions that prolong drug release due to slow dissolution at the injection site to more sophisticated in situ gelling implants and polymeric biodegradable microparticulate systems [4, 10, 11]. For example, long acting intramuscular aqueous suspensions of penicillin have been available since the 1950s [12] and oily

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