DRUG DELIVERY STRATEGIES FOR COMBATING MULTIPLE DRUG RESISTANCE

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10.1 INTRODUCTION

It has been 40 years since the United States Congress passed the National Cancer Act, which directed a great deal of effort into research combating cancer. Since that time, only modest gains have been made in reducing cancer mortality rates in the United States and elsewhere, and the most significant gains have come as a result of prevention campaigns and declining smoking rates [1,2]. Table 10.1 shows that death rates for many cancers have actually increased since 1975 due to rising incidence rates. A major challenge facing researchers has been multiple drug resistance (MDR) in solid tumors [3–6]. Multiple drug resistance is defined as the simultaneous resistance to a wide range of drugs that are unrelated in structure or mechanism of action, and is encountered in up to 80% of nonresectable and 40% of all cancer cases [7,8]. The presence of MDR markers in a patient is strongly associated with poor clinical outcomes [9]. The mechanisms of MDR are extremely varied and can include both chemical and physical barriers to drug action. An MDR tumor generally displays some combination of several MDR phenotypes. The expression of these phenotypes may also vary from cell to cell within a tumor [10].

Pharmaceutical Sciences Encyclopedia: Drug Discovery, Development, and Manufacturing,
Edited by Shayne C. Gad