CHAPTER 15

Novel Controlled Release Pulmonary Drug Delivery Systems: Current updates and Challenges

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1. INTRODUCTION

The lung is a highly susceptible internal organ to different infections and injuries as it continuously gets exposed to chemicals, particles, and infectious organisms present in the air [1, 2]. Worldwide, two billion people are prone to toxic gases emitted by ineffective burning of fuel in fireplaces or poorly ventilated indoors [3, 4]. Approximately, 1 billion people inhale the polluted air and tobacco smoke. These factors are leading to respiratory impairment responsible for causing disability and mortality globally in all social classes [5]. Generally, deprived living conditions are the main causes for increasing vulnerability among the group of people suffering from respiratory disorders. Four of the diseases such as asthma, chronic obstructive pulmonary disease (COPD), tuberculosis (TB), and lung cancer are the common causes of mortality and severe illness worldwide [6–9]. These wide arrays of the disease are termed as "chronic respiratory diseases (CRDs)." All around the world, millions of people of varied ages are affected by these CRDs. A large proportion of people (i.e., approximately 50%) are from developing countries and its prevalence is increasing exponentially, especially in children and elder people [10]. The burden of prevailing CRDs is affecting the life of the affected individuals. The World Health Organization (WHO) has stated that in 2005 approximately 4.6 million people died earlier because of these CRD, and this number is eventually going to grow in the nearby future [11]. However, the preventive measure can aid in managing the burden of CRD in both developing and developed countries, but cost-effectiveness of the interventions restricts it usage ([12]).

Many risk factors such as allergens, indoor pollution, occupational agents, tobacco smoking, and in few cases diseases like sickle-cell or schistosomiasis have been identified and their prevention can play a significant role in regulating mortality and morbidity rate worldwide [12]. Furthermore, insufficient attention is given to preventable CRD and their associated risk factors by community, families, government officials, healthcare, patients, and media. Hence, people suffering from CRD remain undiagnosed and untreated. Although there are many pharmacotherapies available for treating these CRD and manage the suffering patient under

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