APPLICATIONS OF LIGAND-ENGINEERED NANOMEDICINES

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2.1 INTRODUCTION

Over the past two decades, a variety of therapeutic modalities have been investigated for the treatment of cancer. Among the most promising new modalities in the field of medical applications is nanomedicine, which has proven to be an outstanding approach for improving therapeutic index [1,2]. Nanomedicines can achieve remarkable improvements in anticancer efficacy not only by increasing bioavailability and half-life, but also by promoting tumor-accumulation of therapeutic entities through the enhanced permeability and retention (EPR) effect [3]. Moreover, through modifications of the surface of nanoparticles, nanomedicines have showed the ability to improve target-specificity and further enhance the efficacy [4].

2.1.1 Nanoparticulate Drug Delivery

Nanoparticles are a proven modality for altering the *in vivo* fates of various therapeutic entities, such as small molecules, nucleic acids, and peptides [5]. Nanoparticulate drugs can achieve prolonged retention *in vivo*, increased accumulation in tumor tissues, and enhanced pharmacodynamics [1]. Depending on the materials used to construct them, nanoparticles are mainly classified as lipid- or

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