PHOTOSENSITIVE LIPOSOMES AS POTENTIAL TARGETED THERAPEUTIC AGENTS

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4.1 INTRODUCTION

Many biological processes, including those involved in endosomal uptake, tumor growth and inflammation, occur in locally low pH or hypoxic environments [1,2]. In the case of rapidly growing tumors or inflammatory sites, the tissues also are often characterized by porous or poorly formed vasculature, providing limited nanoparticle access to these target tissues via the enhanced permeability and retention effect [3,4]. Taken together, these features have led to the development of a vast array of materials designs and delivery schemes to enhance the efficacy of therapeutic agents in acidic tumors and inflamed tissue. Herein we report recent efforts to utilize photochemical processes to initiate drug release from liposomal carrier systems in a controlled and potentially localized manner.

Liposomes are clinically proven, commercially successful nanoscale carrier systems for delivering high concentrations of small molecule agents such as doxorubicin [5], amphotericin B [6], verteporfin [7], cytarabin [8], and morphine [9]. Widespread clinical application of liposomes to other classes of drugs, however, has been hindered by both their limited tissue penetration [10,11] and their premature release of contents before they reach the target site. Acid-sensitive liposomes bearing targeting ligands can promote site-specific internalization via receptor-mediated

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