

Frontiers in Anti-Cancer Drug Discovery

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CHAPTER 1

Targeting Approaches for the Diagnosis and Treatment of Cancer

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Abstract: Cancer is a multi-factorial disease that necessitates a multi-modality therapeutic approach to accomplish a favorable outcome. Recently, theranostic based systems have been introduced for the diagnosis coupled cancer therapy. The development of targeted novel drug/gene delivery approaches for safe and efficacious treatment of cancer is an emerging arena that includes liposomes, nanoparticles, nanoemulsion, gene therapy, immunosuppressant therapy, herbal bioactive loaded nanocarriers and stimuli sensitive systems (pH, temperature, ultrasound, redox potential, hypoxia and magnetic). Advancements in molecular biology have rendered a wide range of targeting moieties (ligands) and a meticulous understanding of the cancer biology is under extensive exploration for the selection of appropriate targets for cancer treatment. The outcomes of various clinical studies of nanocarriers depict an improvement in the anticancer efficacy and reduction in side effects. This chapter is an assemblage of advances in the novel targeting approaches that enable the cancer prevention, prediction, diagnosis and treatment.

Keywords: Cancer, Diagnosis, Liposomes, Nanocarriers, Nanoparticles.

1. INTRODUCTION

Tumor growth is a dynamic and complex process. Several factors such as complex angiogenesis, suppression of apoptosis, uncontrolled proliferation, escape from growth suppressor, increased invasion and metastasis, altered metabolism and evaded immune destruction may be involved in tumor growth and dissemination [1, 2]. The tumor microenvironment (TME) consists of different

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