Drug delivery systems: application of liposomal anti-tumor agents to neuroectodermal cancer treatment

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ABSTRACT

Disseminated neuroectoderma-derived tumors, mainly neuroblastoma in childhood and melanoma in the adulthood, are refractory to most current therapeutic regimens and hence the prognosis remains very poor. Preclinical research studies have indicated several agents that show promising therapeutic potential for these neoplasms. However, there appears to be a limitation to their *in vivo* applicability, mainly due to unfavorable pharmacokinetic properties that lead to insufficient drug delivery to the tumor or metastatic sites or to high systemic or organ-specific toxicity. In this scenario, the focus is on targeted cancer therapy. Encapsulating anticancer drugs in liposomes enables targeted drug delivery to tumor tissue and prevents damage to the normal surrounding tissue. Indeed, sterically stabilized liposomes have been shown to enhance the selective localization of entrapped drugs to solid tumors, with improvements in therapeutic indices. The identification of tumor-associated antigens and/or genes and the relative ease of manipulating the physicochemical features of liposome hold promise for the development of novel therapeutic strategies that selectively target tumor cells. Combined targeting is still investigated, especially the availability to simultaneously target and kill both the cancer cells and the tumor vasculature. Animal models make it possible to link molecular genetics and biochemistry information to the physiological basis of disease and are important predictive tools that offer a frontline testing system for studying the involvement of specific genes and the efficacy of novel therapeutics approaches. Relevant experimental models of human neuroblastoma and melanoma, which better reflect the tumor behavior in patients, are required to evaluate the effectiveness of the various targeted liposomal formulations and their possible systemic and organ-specific toxicity. The most multifunctional targeted liposomes are herein described, with primary attention on testing their efficacy in clinically relevant animal models for the treatment of neuroblastoma and melanoma.

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