Monocationic chlorin – new promising photosensitizer for antitumor and antimicrobial photodynamic therapy

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Cancer is one of the leading cause of death worldwide. Despite substantial progress in an understanding of tumor biology, the appearance of new generations of targeted drugs and treatment techniques, success in this hard battle, with some notable exceptions, is still moderate. Photodynamic therapy (PDT) is successful, but still underestimated, therapeutic modality of treating many superficial cancers. In this paper, we focus on the extensive comparative investigation of a new monocationic photosensitizer (PS) for antitumor and antimicrobial PDT that is based on a natural chlorophyll platform. This novel photosensitizing agent (McChl) is obtained from methylpheophorbide *a via* a two-step procedure [1,2] with the final purity of 95 %. It is well soluble in water in a physiological temperature range and forms stable complexes with passive carriers [3]. McChl generates singlet oxygen with a good quantum yield in a lipid-like phase [2] and binds mainly to low- and high-density lipoproteins in a vascular system. The comparison of photodynamic activity of this agent with the activity of the well-established photosensitizer chlorin e_6 clearly indicates that the monocationic chlorin provides more efficient photoinactivation of both tumor and microbial cells. The pilot PDT treatment of M1 sarcoma-bearing rats with McChl highlights its good potential for further preclinical investigations.

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