Lanthanide Complexes as Tumor Cells Radar for New Generation Photodynamic Therapy Agents

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Abstract

The major drawback of conventional photodynamic therapy (PDT) is the adverse *in-vitro/in-vivo* reactions, which are caused by variation in physiological conditions and notched distribution of singlet oxygen ($^1O_2$), the latter of which is well known to be the major cytotoxic agent responsible for photobiological activity. Porphyrin is one of the most promising PDT agents with high $^1O_2$ yield, however, its function is non-specific, and it may harm the normal cells during the treatment. Anionic phospholipids are largely absent from the external leaflet of the plasma membrane of mammalian cells under normal conditions. Exposure of phosphatidylserine on the cell surface occurs during apoptosis, necrosis, cell injury, cell activation, and malignant transformation. In this seminar, we would like to present a new generation of PDT agents based on porphyrin-lanthanide complexes with specific function groups which can specifically localize on anionic membrane in cancer cells and their PDT process can be monitored *via* emission from porphyrin and lanthanide(III) ions.

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