Water Soluble Palladium Biladiene Derivatives for Photodynamic Therapy of Cancer

Published date: June 21, 2019

Technology description

Technology Summary:
Researchers at the University of Delaware have synthesized a novel molecule named PdDMBil1]-PEG750, which is a water soluble dimethylbiladiene derivative that is appended with a poly (ethylene) glycol functionality. Characterization of this complex shows that this PEGylated biladiene architecture absorbs visible light approaching the near-IR and generates singlet oxygen with a quantum yield of 0.57, which is well within the range to warrant interrogation as a potential photodynamic therapy (PDT) agent for treatment of cancer cells.
Problem Addressed:
Several photosensitizers, most of which belong to the porphyrinoid family of macrocyclic tetrapyrroles, have been approved for use in PDT. However, widespread clinical use of PDT has been hindered, at least in part, due to the fact that existing PDT agents lack the pharmacological attributes required for an optimal phototherapeutic agent. In particular, most existing PDT agents are highly toxic in the absence of light and do not minimize off-target side effects. The compound developed in present research has an exceptionally low inherent toxicity and is well tolerated by biological samples. It is also a highly potent PDT agent upon irradiation and has a photo-toxicity index that is unparalleled by previously developed systems. Also, this compound can be used to treat triple-negative breast cancer (TNBC) cells, thus suggesting a new treatment option for TNBC which is a critical need.

Application area

Photodynamic therapy (PDT) represents a minimally invasive and highly localized treatment strategy to ablate tumors with few side effects. Photosensitizers embedded within tumors are activated by light and undergo intersystem crossing, followed by energy transfer to molecular oxygen, resulting in the production of toxic singlet oxygen.

Advantages

Highly water soluble compound, significantly less toxicity issues and side effects
Impressive singlet oxygen yields compared to current PDT agents used
The compound can be used to treat triple-negative breast cancer (TNBC) cells

Pd[DMBil] derivatives are biocompatible, well tolerated in the dark and show unprecedentedly high photo-toxicity index by inducing photo-apoptosis

Institution

University of Delaware

Inventors

Joel Rosenthal
Andrea Potocny

联系我们

叶先生

电 话：021-65679356
手 机：13414935137
邮 箱：yeyingsheng@zf-ym.com