Novel Theranostics for Protein Misfolding Diseases

Published date: Aug. 30, 2018

Technology description

Novel theranostics for neurodegenerative diseases such as Alzheimer's and Parkinson's diseases. Researchers have discovered that the photosensitization activity of certain oligo-phenynlene ethynlenes (OPEs) can be turned on when their fluorescence is turned on by binding to specific biological entities, such as amyloid protein aggregates. This can subsequently cause localized oxidation of the amyloid aggregates, and trigger their clearance in the brain. As the protein aggregates are recognized as toxic species implicated in the pathogenesis of these disorders, clearance of these aggregates could result in slowing down or reversing the progression of these diseases.

Background

Generation of reactive oxygen species as a product of photoexcited electronic states in organic molecules can be a useful tool in a variety of applications. The possibilities of spatially localized generation of reactive oxygen species (ROS) in response to irradiation are only just beginning to be explored, despite the long history of phototherapy in modern medicine, and are already in the clinic in the form of photodynamic therapy (PDT) for cancers of the skin, esophagus, and organ linings, actinic keratosis, and acne. Photodynamic destruction of pathogenic bacteria, viruses, and fungi is also under investigation for anti-biowarfare applications, passive sanitization of hospital surfaces under room light, and active sanitization of medical devices such as catheters. A major drawback of systemically dosed PDT photosensitizers, which are primarily porphyrins or their prodrugs, is their accumulation in the skin and eyes leading to long-lasting (weeks to months) post therapeutic photosensitivity. Generation of ROS outside the target area can have multiple harmful effects by overwhelming endogenous ROS-dependent signaling cascades. A solution to these issues would be a localized photosensitizer whose ROS-generating properties can be controllably activated, for example, in response to the binding to a target.

Technology Description

Researchers at the University of New Mexico have developed novel theranostics for neurodegenerative diseases such as Alzheimer's and Parkinson's diseases. More specifically, researchers have discovered that the photosensitization activity of certain oligo-phenynlene ethynlenes (OPEs) can be turned on when their fluorescence is turned on by binding to specific biological entities, such as amyloid protein

aggregates. This can subsequently cause localized oxidation of the amyloid aggregates, and trigger their clearance in the brain. As the protein aggregates are recognized as toxic species implicated in the pathogenesis of these disorders, clearance of these aggregates could result in slowing down or reversing the progression of these diseases.

Publications

Detergent-induced self-assembly and controllable photosensitizer activity of diester phenylene ethynylenes

About STC.UNM

As the technology-transfer and economic-development organization for the University of New Mexico, STC.UNM protects and commercializes technologies developed at the University of New Mexico (UNM) by filing patents and copyrights and transferring the technologies to the marketplace. We connect the business community (companies, entrepreneurs and investors) to these UNM technologies for licensing opportunities and the creation of startup companies. Visit www.stc.unm.edu.

Application area

Clears toxic protein aggregates in the brain
Potential to slow down or reverse the progression of neurodegenerative diseases
Able toturn on the OPEs photosensitization activity
Possible applications as a theranostic agent for protein misfolding diseases such as Alzheimer's and Parkinson's diseases

Institution

The University of New Mexico

Inventors

David Whitten

Eva Yung Hua Chi

联系我们

叶先生

电 话：021-65679356

手 机：13414935137

邮 箱：yeyingsheng@zf-ym.com