Synthetic Carotenoid Derivatives

(VA Reference No. 06-024)

Family of chemical compounds that may be useful as drugs to prevent light-mediated damage in various photosensitivity disorders

Technology
Synthetic carotenoid derivatives for the treatment of photomediated tissue damage

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Key Features
- Identification of synthetic carotenoid derivatives with photoprotective effects
- Potential to provide better photoprotection than natural carotenoids
- Potential to lead to therapy for the dry form of age-related macular degeneration

Stage of Development
Reduced to practice with successful demonstration in vitro studies

Keywords
Therapeutic
- Age-related macular degeneration (AMD)
- Vision
- Photosensitivity

Patent Status
None

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Technology

The Department of Veterans Affairs has identified a family of chemical compounds that may be useful as drugs to prevent light-mediated damage for people with various photosensitivity disorders. The most commercially viable medical application for this technology will likely be as a drug to prevent the progression of the dry form of macular degeneration. In addition to macular degeneration, other disorders in which the invention might be useful include cataract formation, porphyrias, ultraviolet-light induced skin damage, ultraviolet-light induced immunosuppression and drug-induced photosensitivity.

Description

The subject technology describes the photoprotective effects of a group of synthetic carotenoid derivatives as demonstrated utilizing a human pigmented retinal epithelial cell line (ARPE-19). The synthetic carotenoid derivates are either positively charged or weak bases, which allows for localization within mitochondria and/or lysosomes, which are known to be critical sites involved in mediating photosensitized cell damage. The subject technology more specifically relates to methods for treating photomediated tissue damage using synthetic carotenoid derivatives with the most viable medical application being the use of synthetic carotenoids for treating the dry form of macular degeneration.

Competitive Advantage

Unlike current methods of treatment for disorders due to photochemical cell damage, the present invention:

- Could potentially lead to the first therapeutic compound for treatment of the dry form of age-related macular degeneration.
- Has the ability to quench reactive singlet oxygen, thus ameliorating cellular damage.
- Has the potential to provide better photoprotection than natural carotenoids due to charge characteristics and cellular localization.
- Enables the concentration of synthetic carotenoids in mitochondria or lysosomes for greater efficacy.

Status

The Department of Veterans Affairs is looking for a partner for further development and commercialization of this technology through a license, and the VA inventors are available to collaborate with interested companies through a Cooperative Research and Development Agreement (CRADA).