From Photobiolumination to Optogenerapy, Recent Advances in NIR Light Photo medicine applications

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Abstract

The biophysical properties associated with the Near Infrared light (NIR) have fostered the development of many therapeutic applications with high clinical relevance. On the one hand the unique NIR penetration properties enable the clinical monitoring of tissue hemodynamic state; on the other hand, NIR light allows a unique spatiotemporal control over a drug delivery scenario. Furthermore, the optogenetic bioengineering toolbox has now widened the spectrum of possible applications to NIR fluorescing proteins for cell monitoring but also to NIR synthetic optogenetic pathway programming. This review gives an overview of the recent proof of concepts that may broaden the field of NIR light photomedicine application. NIR deepbrain photobiomodulation may hold the promise to offer new options for the treatment of neurodegenerative disorders. Light-activated nanometer-sized drugs and light control vesicles delivering photothermal therapy effectors could circumvent deleterious side effects associated with systemic drugs. Optogenerapy profits from the NIR light optogenetic interface to have a controlled delivery of therapeutic proteins by a bioelectronic implant and opens the road of the tomorrow photomedicine.

Biography

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