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Antimicrobial blue light inactivation of pathogenic microbes: State of the art

As an innovative non-antibiotic approach, antimicrobial blue light in the spectrum of 400-470 nm has demonstrated its intrinsic antimicrobial properties resulting from the presence of endogenous photosensitizing chromophores in pathogenic microbes and subsequently, its promise as a counteracter of antibiotic resistance. Since we published our last review of antimicrobial blue light in 2012, there have been a substantial number of new studies reported in this area. Here we provide an updated overview of the findings from the new studies over the past five years, including the efficacy of antimicrobial blue light inactivation of different microbes, its mechanism of action, synergism of antimicrobial blue light with other antimicrobials, its effect on host cells and tissues, the potential development of resistance to antimicrobial blue light by microbes and a novel interstitial delivery approach of antimicrobial blue light. The potential new applications of antimicrobial blue light will also be discussed.

Biography

Tianhong Dai is working as an Assistant Professor of Harvard Medical School. His research interest is centered around light-based antimicrobial therapy. In particular, his laboratory has been interested for some time in using antimicrobial blue light to treat multidrug-resistant localized infections. He is the author or co-author of over 80 peer-reviewed publications and has been the PI of NIH R01, NIH R21, DoD, CIMIT as well as grants from other funding sources. He is the Founding Chair of the conference "Photonic Diagnosis and Treatment of Infections and Inflammatory Diseases (Conference BO113)" at the SPIE Photonics West, BIOS.

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