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PII: S0891-5849(18)31254-1  
DOI: <https://doi.org/10.1016/j.freeradbiomed.2018.07.012>  
Reference: FRB13851

To appear in: *Free Radical Biology and Medicine*

Received date: 13 April 2018  
Revised date: 12 June 2018  
Accepted date: 19 July 2018

Cite this article as: Veronika Marek, Stéphane Mélik-Parsadaniantz, Thierry Villette, Fanny Montoya, Christophe Baudouin, Françoise Brignole-Baudouin and Alexandre Denoyer, Blue light phototoxicity toward human corneal and conjunctival epithelial cells in basal and hyperosmolar conditions, *Free Radical Biology and Medicine*, <https://doi.org/10.1016/j.freeradbiomed.2018.07.012>

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Blue light phototoxicity toward human corneal and conjunctival epithelial cells in basal and hyperosmolar conditions.

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## Abstract

Aims:

The ocular surface is the very first barrier between the visual system and external environment. It protects the eye from the exposure to various light sources that significantly emit in blue spectrum. However, the impact of blue light on the ocular surface has been poorly explored so far. In this study, we investigated *in vitro* the phototoxicity of blue light illumination in human epithelial cells of the ocular surface. We worked either in basal conditions or under hyperosmolar stress, in order to mimic dry eye disease (DED) that is the most common disease involving the ocular surface.

Results:

Corneal and conjunctival epithelial cells suffered the most from violet-blue light but also from longer-wave blue light. Exposure to blue wavebands significantly decreased cellular viability, impacted on cellular morphology and provoked reactive oxygen species (ROS) overproduction. Conjunctival epithelial cell line had a greater photosensitivity than the corneal epithelial one. Hyperosmolar stress potentiated the blue light phototoxicity, increasing

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