

Retinal damage induced by commercial light emitting diodes (LEDs).

[Jaadane I](#)¹, [Boulenguez P](#)², [Chahory S](#)³, [Carré S](#)², [Savoldelli M](#)¹, [Jonet L](#)¹, [Behar-Cohen F](#)⁴, [Martinsons C](#)², [Torriglia A](#)⁵.

Author information

Abstract

Spectra of "white LEDs" are characterized by an intense emission in the blue region of the visible spectrum, absent in daylight spectra. This blue component and the high intensity of emission are the main sources of concern about the health risks of LEDs with respect to their toxicity to the eye and the retina.

The aim of our study was to elucidate the role of blue light from LEDs in retinal damage. Commercially available white LEDs and four different blue LEDs (507, 473, 467, and 449nm) were used for exposure experiments on Wistar rats. Immunohistochemical stain, transmission electron microscopy, and Western blot were used to exam the retinas. We evaluated LED-induced retinal cell damage by studying oxidative stress, stress response pathways, and the identification of cell death pathways.

LED light caused a state of suffering of the retina with oxidative damage and retinal injury. We observed a loss of photoreceptors and the activation of caspase-independent apoptosis, necroptosis, and necrosis. A wavelength dependence of the effects was observed. Phototoxicity of LEDs on the retina is characterized by a strong damage of photoreceptors and by the induction of necrosis.