

Effect of retinal phototoxicity induced by blue light exposure on the response properties of neurons of the lateral geniculate nucleus of the rat

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Abstract

Purpose Exposure to bright blue light causes photochemical damage of rodent's retina via the apoptotic pathway involved in retinitis pigmentosa and age-related macular degeneration. This photochemical retinal damage occurs with a several different types of morphology and the severity of retinal damage induced by light has great variation among retinal regions. Rather than a mere decrease of the visual response blue light phototoxicity involves important changes on image processing at the retina. Higher visual areas, such as lateral geniculate nucleus (LGN) must adapt their physiology to the new situation. In the present work we will study the changes, and their temporal course, of the response of LGN neurons provoked by acute exposure to bright blue light.

Methods We will stimulate the retina of Wistar rats at 7 different wavelengths and we will record extracellular multiunit activity of these neurons on three different groups: without exposure to bright light (control group), rats exposed to bright (5000 lux) blue light for 72 hours (exposed group) and rats exposed and let a week under control conditions (recovery group).

Results Exposed group showed different profiles of the response parameters measured at the different stimulating wavelengths. These profiles were similar between control and recovery groups.

Conclusion Data shows that retinal damage induced by blue light has a great impact on LGN physiology and that plasticity changes must occur at this area to adapt to the new situation.

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