

17th International Conference on

Clinical and Experimental Ophthalmology

October 01-03, 2018 | Moscow, Russia

The theoretical background for invention of preventive light protection glasses at an early stage of AMD

Anna S Andryukhina¹, Alla A Ryabtseva¹, Pavel P Zak² and Pavel E Golikov³¹Moscow Regional Research Clinical Institute of M F Vladimirsky, Russia²Emanuel Institute of Biomedical Physics of RAS, Russia³Stock company Lornet-M, Moscow, Russia

There was a medical-biological study about advantage of preventive light-filter glasses with the initial age-related macular degeneration (AMD). The main idea is based on selective light diminution in the spectral band of rod sensitivity with a relatively high transmission in the bands of conical day vision. An important factor in the progression of AMD in the initial period is increased generation of free radicals in RPE cells. Molecules that produce free radicals are bis-retinoids: derivatives of free retinal released during the decolorization of rhodopsin. The most massive supplies of free retinal in the retinal pigment epithelium (RPE) occur as a part of the phagosome of the external segments of the retina rods. The possible cone component appears to be insignificant because of the low content of conical visual pigments in the retina in comparison with rhodopsin of the rods. The most significant discoloration of rhodopsin rods and release of free retinal occurs due to daylight. At the same time, in the daylight visual information is provided by cone vision, while the rods are not involved in the visual process. This situation opens the technical possibility of creating preventive light-filtering AMD-glasses for the elderly. Spectral calculations of this type of optical filters have shown the theoretical possibility of 100-1000 fold weakening of the fading of the rhodopsin-filled rods, while maintaining a full-fledged day vision in the conditions of daylight illumination. Experimental samples of such light filter glasses were prepared and tested. In biological studies on the suspension of the external segments of the retina rods of experimental animals was shown the possibility of multiple selective attenuation of the fading of rhodopsin of the rods while using this glasses. Optometric studies revealed that in conditions of high daylight illumination (>10,000 Lk) these glasses do not reduce visual acuity with the preservation of normal trichromatic color perception with a general high visual comfort.

Biography

Anna S Andryukhina has completed her graduation from Russian National Research University of N I Pirogov in 2016. She is an Ophthalmologist, working as a Doctor in Moscow Regional Research Clinical Institute of M F Vladimirsky, Russia.

Notes: